State of California
Department of Transportation

Integrated Financial Management System (IFMS) Feasibility Study Report

22 September 2005

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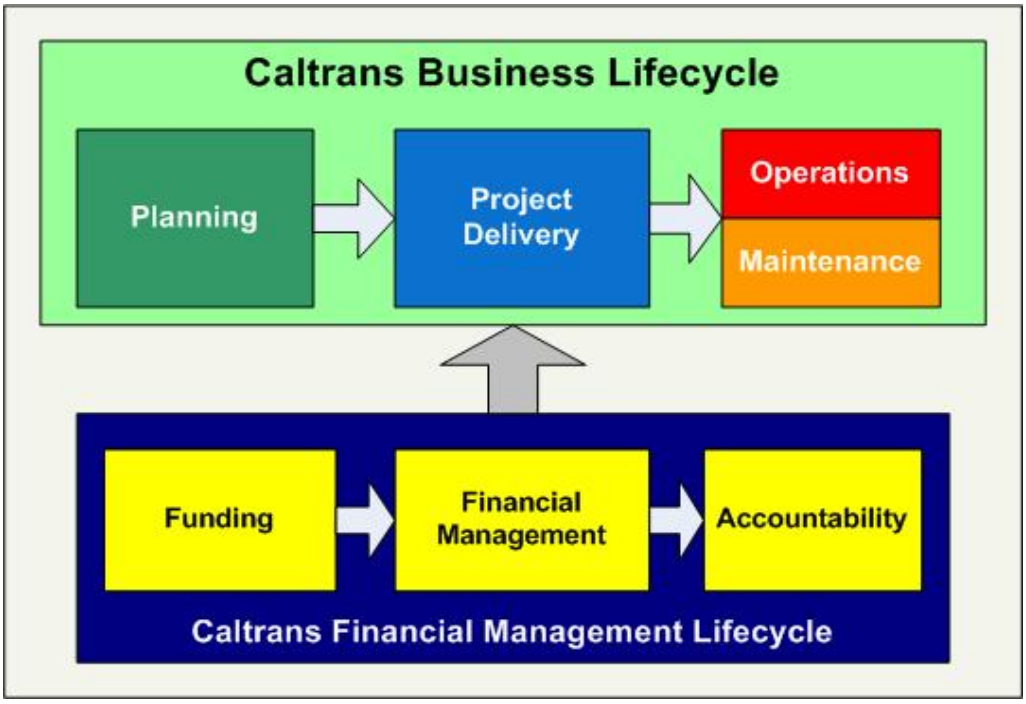
Executive Summary

Overview

Changes in business needs over the past 20 years have placed the Caltrans organization at a crossroads in terms of its financial management processes and supporting systems. Aging technology, an increasing number and complexity of funding sources, and changes in legislation have collectively raised the demands on Caltrans and accentuated problems with the current method of executing financial management functions. More importantly, the lack of management data available to Caltrans often results in decision-making that is based on untimely, incomplete and anecdotal information.

The Caltrans Business Lifecycle in Figure 1 depicts the functions and sequencing of the major components of the Department's mandated duties: Planning, Project Delivery, Operations, and Maintenance. In order to achieve these core elements of its mission, operational units within Caltrans require access to financial data and management information. The financial management function provides critical fiscal information to operational units that enable better planning, prioritization, and evaluation of potential investments. Without comprehensive and accurate data, Caltrans' management cannot make informed decisions.

Figure 1. Caltrans Business Lifecycle



The Financial Management Lifecycle, which supports the Caltrans mission and Business Lifecycle, illustrates its three major sequential steps: Funding, Financial Management, and Accountability. Process and technology weaknesses within and across these major activities negatively impact Caltrans' ability to support the mission and objectives of the Department. To address the business problems associated with financial management functions and processes, Caltrans has established the following strategic objectives for the proposed Integrated Financial Management System (IFMS) initiative:

- Enable Caltrans to make the best investment decisions by providing all facets of financial management information.
- Enable Caltrans to manage the cost of doing business by providing timely and consistent cost management information.
- Establish efficient financial management processes that provide improved customer service by modernizing the financial management systems.

In addition, a number of supporting, more granular, objectives for the scope of this feasibility study report include:

- Support the Department's financial reporting requirements and other highly data-dependent decisions that require timely, accessible, structured and coherent data.
- Achieve financial management and tracking capabilities not currently available to Caltrans, such as the ability to make quicker, more informed management decisions.
- Provide a seamless, streamlined interface for existing legacy systems and other Caltrans' infrastructure components.
- Enable the Department to realize major efficiency and data accuracy gains by consolidating redundant and distributed legacy systems into a new, enterprise-wide solution.

Business Problems and Opportunities

The scope and scale of the business problems and impacts related to financial management functions is challenging to quantify. However, given that Caltrans is responsible for an annual $8 billion budget, $4.6 billion in capital projects and approximately 545 contracts for transportation improvement projects, the impacts of financial management problems are significant for current initiatives and future investments. In addition, the Caltrans program has a direct impact on State commerce, tourism, and recreational travel of Californians. Due to the scope and scale of Caltrans' responsibilities, the Department is often placed in the difficult position of responding without complete information to inquiries from the Legislature, Department of Finance, and the general public regarding the use of, and accountability for, taxpayer dollars.

The evolution of Caltrans' business needs over the last 20 years and the associated business problems and opportunities have resulted in a compelling case for action. Several conditions have resulted in problems that require Caltrans to make significant changes to its financial management infrastructure in order to adapt to current and future changes in business needs:

- **Distributed Organizational Accountability and Operations** – Geographically based service delivery and operational accountability has resulted in distributed decision making as well as multiple, distributed computer systems. Distributed organizational accountability and operations have, over time, resulted in numerous legacy financial and other desktop and workgroup applications ("shadow systems") in the Caltrans environment.
- **Changes to Funding and Management of Funds** – Caltrans' fund management and expenditure tracking requirements have become significantly more time-consuming and laborious over the last 20 years as the number of fund sources have grown from 5 to 48. The Transportation Equity Act for the 21st Century and Senate Bill 45, State Transportation Improvement Program reform, changed the preexisting funding model and created a tremendous business need to provide more financial data to more stakeholders on a timelier basis.

- **Increased Support Burden for Financial Management Systems** - The need for a centralized view of fund management, budget preparation and statewide expenditures has resulted in overlapping and redundant manual processes and automation. Over 160 financial systems currently in use at Caltrans and numerous point-to-point interfaces between them must be maintained to provide necessary financial data, leading to inefficient financial management processes and inflated support costs.

These conditions have created a number of critical problems that require immediate attention and rectification. The primary issue is lack of quality and integrated financial information available to manage Caltrans' finances effectively. The six primary business problems related to Caltrans financial management systems are listed in the figure below.

Figure 2. Primary Business Problems

The six primary business problems addressed by this proposal:	
1.	Limited Capability to Ensure Accountability for Federal and State Funds.
2.	Inability to Track Financial Performance Outcomes/Measures.
3.	Limited Visibility into Costs and Impacts.
4.	Inefficient Financial System Business Processes.
5.	High Financial Management IT Infrastructure Costs.
6.	Inability to Access Timely Financial Information

The problems above are complemented by a number of key opportunities that can be realized through improvement of financial management processes, applications, and infrastructure. The three primary opportunities are listed in the figure below.

Figure 3. Primary Business Opportunities

The three primary business opportunities addressed by this proposal :	
1.	Manage Caltrans Like a Business for the Benefit of Californians.
2.	Optimize the Use of Funds Through Better Business Intelligence and Analysis Capabilities.
3.	Establish the IT Infrastructure and Technical Foundation for Future Business Improvement.

IFMS Strategic Plan and Project Alpha

To address the current situation, Caltrans conducted a comprehensive study, the Financial Management Integration Study, which reviewed financial operations to identify areas of inefficiency and improvements that could be made through a combination of new processes and new systems. The decision to conduct the Integration Study resulted from feedback from the Department of Finance (DOF) on four feasibility study reports (FSR) that Caltrans submitted in 2000 and 2001.

DOF noted the similarities between certain financial functions for these four proposed projects, and declined to approve the FSRs without the completion of an Integration Study that examined the common business requirements of the projects. A major recommendation of the Integration Study was the Integrated Financial Management System (IFMS) Strategic Plan, which was intended to act as a roadmap for implementing IFMS. The IFMS Strategic Plan includes the

implementation of the larger financial management conceptual architecture through a series of projects, paralleled and sequenced according to project priorities and dependencies. The financial functions and data provided by IFMS would provide a framework and platform for common financial processes and requirements across Caltrans.

The scope of this feasibility study, referred to by Caltrans as "Project Alpha," focuses on core financial management, integration, and reporting functionality. Project Alpha is the foundation and critical first step required to realize the goals of the IFMS Strategic Plan. Project Alpha includes the development of core functionality – General Ledger (G/L), Accounts Receivable (A/R), Account Payable (A/P) –which will be accessed and utilized by each of the subsequent projects. Other key components of Project Alpha including budgeting, funds management and financial reporting will also be highly leveraged by subsequent projects. Project Alpha will also provide essential fiscal information to support Caltrans project managers in effectively delivering transportation projects.

Alternatives Analysis and Proposed Solution

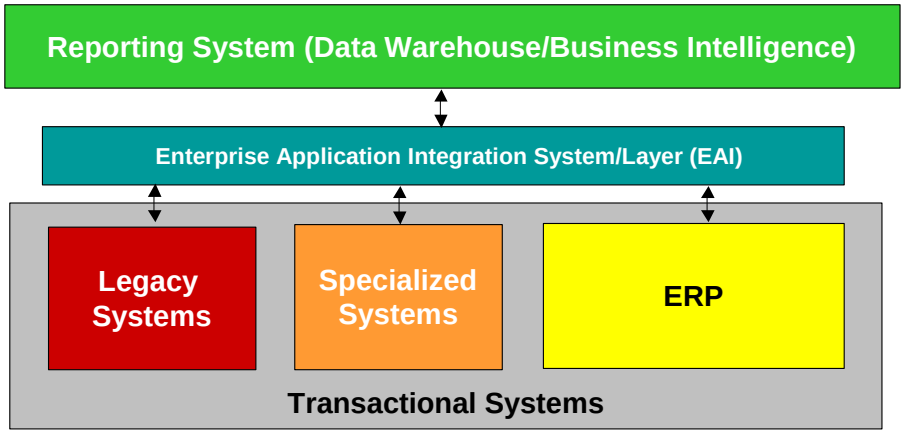
In order to determine the best solution to meet Caltrans' business objectives, the following alternatives were considered for Project Alpha:

Table 1. Project Alpha Solution Alternatives

Alternative	Description
1	Modification and Enhancement of TRAMS
2	Custom Developed Solution(s)
3	Commercial-Off-The-Shelf (COTS) Solution(s) ■ 3a — COTS Suite for ERP, EAI and Data Warehouse ■ 3b — COTS Suite for ERP, Best-of-Breed for EAI and Data Warehouse

After each alternative was analyzed, Option 3 – Commercial-Off-The Shelf (COTS) Solution was selected as the best alternative from a quantitative and qualitative perspective. The figure below illustrates the relationship between the ERP, EAI, and Data Warehouse components, as well as legacy and specialized systems that are outside the scope of this proposal.

Figure 4. Conceptual Model of Proposed Solution



Given the objectives of Caltrans, existing Commercial-Off-The-Shelf (COTS) ERP technologies, and functional requirements for the new system, the optimal solution comprises the following:

- Procuring the base infrastructure that will support ERP, EAI, and data warehouse functionality to include hardware, operating systems, COTS ERP software, other required technical components, and associated systems integration services
- Configuring and modifying the General Ledger, Accounts Receivable, Accounts Payable, and Reporting functionality of the COTS ERP software to meet the Caltrans' financial management needs
- Installing the EAI infrastructure to establish interfaces among specialized legacy systems and future new systems
- Establishing a data warehouse and required data feeds for pertinent financial and related information
- Implementing COTS reporting tool(s) that will provide managerial and operational reporting functionality.

Project Alpha is scheduled to begin with project planning in December 2005 and will be completed in June 2009. The proposed solution is segmented into three primary phases:

Phase 1 – Procurement and Project Planning (14 Months): Encompasses all activities related to development of initial requirements and procurement documents for an ERP, EAI, and data warehouse solution and system integration services. In addition, this phase also includes the procurement of other required services, such as an Independent Project Oversight Contractor (IPOC) and a project management support mentor.

Phase 2 – System Development (24 Months): Includes detailed planning and analysis with the selected Integration Partner. This phase includes functional and technical requirements analysis and validation, technical architecture design, system configuration, interface design and consolidation, data conversion and archiving activities, report development, and system testing.

Phase 3 – System Deployment and Training (4 Months): Includes process and solution training of Caltrans Program staff, deployment of the solution to pilot sites, and review of pilot results followed by full deployment and final acceptance. Change

management activities, which will occur throughout all three phases, will transition from vendor staff to Caltrans staff upon final acceptance.

Finally, in support of Project Alpha, a comprehensive project and risk management plan to support the project were developed and will be maintained throughout the duration of the project.

Costs and Benefits

The total one-time IT project costs, which include all contract costs and internal costs associated with development and implementation of a full data warehouse solution and reporting environment, are **$23,651,566**. The total IT Continuing Costs, which include all contract costs and internal costs associated with the ongoing maintenance and support of the solution, are **$3,031,086** in the first year after acceptance.

The proposed solution meets the primary goal of Project Alpha and the IFMS Strategic Plan, which is to provide access to comprehensive information that enables Caltrans to manage the organization like a business. In addition, implementing the proposed solution will also enable Caltrans to decommission 70 legacy financial management systems.

Processing improvements will allow the Division of Accounting (D of A) to reduce its budget by 33 Personnel Years (PYs) one year after system acceptance, in FY 10/11. The reduction is composed of 16 PYs currently supporting subsystems that will be replaced by Project Alpha and 17 PYs responsible for reconciliations, error files or re-keying activities that will be eliminated through implementation of the proposed solution. Finally, decommissioning the aforementioned systems will allow for a redirection of 16 PYs and the elimination of 3 PYs of IT support staff upon final acceptance of the project at the end of FY 08/09.

1.0 Executive Project Approval Transmittal

Information Technology Project Request

Feasibility Study Report

Executive Approval Transmittal

Department Name		
Department of Transportation		
Project Title (maximum of 75 characters)		
Integrated Financial Management System		
Project Acronym	**Department Priority**	**Agency Priority**
IFMS	**1**	**1**

APPROVAL SIGNATURES

I am submitting the attached Feasibility Study Report (FSR) in support of our request for the Department of Finance's approval to undertake this project.

I certify that the FSR was prepared in accordance with State Administrative Manual Sections 4920-4930.1 and that the proposed project is consistent with our information technology strategy as expressed in our current Agency Information Management Strategy (AIMS).

I have reviewed and agree with the information in the attached Feasibility Study Report.

Chief Information Officer		**Date Signed**
Printed name:	Ann Barsotti	
Budget Officer		**Date Signed**
Printed name:	Norma Ortega	
Chief Information Security Officer		**Date Signed**
Printed name:	Patricia Kuhar	
Department Director		**Date Signed**
Printed name:	Will Kempton	
Agency Secretary		**Date Signed**
Printed name:	Sunne Wright McPeak	

2.0 IT Project Summary Package

2.1 Executive Summary

1	**Submittal Date**	22 September, 2005

		FSR	SPR	PSP Only	Other:
2	**Type of Document**	X			
	Project Number				

			Estimated Project Dates	
3	**Project Title**	Integrated Financial Management System	**Start**	**End**
	Project Acronym	IFMS	3/1/06	6/15/09

4	**Submitting Department**	Department of Transportation
5	**Reporting Agency**	Business, Transportation and Housing

6	**Project Objectives**

The primary objective of Project Alpha and the IFMS Strategic Plan is to have access to comprehensive information to better manage the Caltrans organization like a business. Caltrans intends to create and implement an integrated financial management solution that will:

1. Enable Caltrans to make the best investment decisions by providing all facets of cost of ownership information.
2. Enable Caltrans to manage the cost of doing business by providing timely and consistent cost management information.
3. Establish efficient financial management processes by modernizing the financial management systems.
4. Support the Department's financial reporting requirements, decision-making needs, and other highly data-dependent objectives that require structured and coherent data.
5. Achieve financial management and tracking capabilities not currently available to Caltrans
6. Provide a seamless, streamlined interface for existing legacy systems and other Caltrans infrastructure components.
7. Enable the Department to realize major efficiency and data accuracy gains by consolidating redundant legacy systems into a new, enterprise-wide solution.

7	Major Milestones	Planned Delivery Date
1	Receive FSR Approval	December, 2005
2	Release Integration Partner RFP	July, 2006
3	Begin System Development	February, 2007
4	Complete Process Optimization	May, 2007
5	Complete System Configuration	August, 2008
6	Begins Testing	November, 2008
7	Deploy Pilot	February, 2009
8	Final Acceptance	June, 2009

8	Key Deliverables	Planned Delivery Date
1	Approved FSR	December, 2005
2	Integration Partner RFP	July, 2006
3	Completed Requirements Analysis and Validation	October, 2007
4	Technical Architecture Design	January, 2008
5	Production Environment Deployment	April, 2008
6	Completed System Configuration	August, 2008
7	Converted Legacy Data	August, 2008
8	Developed Reports	November, 2008
9	Final Acceptance	June, 2009

9	Proposed Solution
	The proposed solution for Caltrans' Project Alpha centers on the replacement of 70 current financial applications with a Commercial Off-The-Shelf (COTS) Enterprise Resource Planning (ERP) suite to include General Ledger, Accounts Receivable, Accounts Payable and Reporting functionality. In addition, core to the proposed solution is the implementation of a proven COTS Enterprise Application Integration (EAI) infrastructure required to integrate the ERP system and other Caltrans applications, as well as a data warehouse that will contain financial information available for reporting and queries. Implementation of this infrastructure is the foundation on which other IFMS Strategic Plan projects can build, as described in the Caltrans Financial Management Integration Study Report.

2.2 Project Contacts

Project #	
Doc. Type	FSR

Executive Contacts								
	First Name	Last Name	Area Code	Phone #	Ext.	Area Code	Fax #	E-mail
Agency Secretary	Sunne	Wright McPeak	916	323-5401				
Dept. Director	Will	Kempton	916	654-5267		916	654-6608	will_kempton@dot.ca.gov
Budget Officer	Norma	Ortega	916	654-4556		916	653-2004	norma_ortega@dot.ca.gov
CIO	Ann	Barsotti	916	654-3910		916	654-2949	ann.barsotti@dot.ca.gov
Project Sponsor	Cindy	McKim	916	654-3986		916	654-6608	cindy_mckim@dot.ca.gov
Direct Contacts								
Doc. Prepared by	Gartner	Consulting	916	215-4423		866	630-9110	paul.denvir@gartner.com
Primary Contact	Clark	Paulsen	916	227-9000		916	227-9176	clark_paulsen@dot.ca.gov
Project Manager	Kathy	Booher	916	227-9011		916	227-9737	kathy_booher@dot.ca.gov
IT Project Manager	Doug	Kempster	916	440-0504		916	440-0610	doug_kempster@dot.ca.gov

2.3 Project Relevance to State and/or Department/Agency Plans

	What is the date of your current Operational Recovery Plan (ORP)?	**Date**	10/2003
	What is the date of your current AIMS?	**Date**	8-1-05
	For the proposed project, provide the page reference in your current AIMS?	**Doc.**	AIMS
		Page #	36

Project #	
Doc. Type	FSR

		Yes	**No**
	Is the project reportable to control agencies?	X	
	If YES, CHECK all that apply:		
X	The project involves a budget action.		
	A new system development or acquisition that is specifically required by legislative mandate or is subject to special legislative review as specified in budget control language or other legislation.		
	The project involves the acquisition of microcomputer commodities and the agency does not have an approved Workgroup Computing Policy.		
X	The estimated total development and acquisition cost exceeds the departmental cost threshold.		
	The project meets a condition previously imposed by Finance.		

2.4 Budget Information

Project #	
Doc. Type	FSR

Budget Augmentation Required?							
	No						
	Yes	X	**If YES, indicate fiscal year(s) and associated amount:**				
			FY 05/06	**FY 06/07**	**FY 07/08**	**FY 08/09**	**FY 09/10**	**FY 10/11**
				3,069,051	8,320,700	9,057,261		

PROJECT COSTS								
	Fiscal Year	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	TOTAL
	One Time Cost	547,399	3,430,517	9,327,050	10,346,600			$23,651,566
	Continuing Costs		717,184	738,700	760,861	3,031,086	3,054,597	$8,302,427
	Total Project Budget	**547,399**	**4,147,701**	**10,065,750**	**11,107,461**	**3,031,086**	**3,054,597**	**$31,953,993**

SOURCES OF FUNDING								
5.	General Fund							
6.	Redirection	547,399	1,078,650	1,745,050	2,050,200	3,031,086	3,054,597	$11,506,982
7.	Reimbursements							
8.	Federal Funds							
9.	Special Funds							
10.	Grant Funds							
11.	Other Funds		3,069,051	8,320,700	9,057,261			
12.	**Project Budget**	**547,399**	**4,147,701**	**10,065,750**	**11,107,461**	**3,031,086**	**3,054,597**	**$31,953,993**

PROJECT FINANCIAL BENEFITS								
13.	Cost Avoidances					2,206,183	5,154,548	$7,360,731
14.	Revenue Increase							

2.5 Vendor Project Budget

Vendor Cost for FSR Development (if applicable)	$232,412
Vendor Name	Gartner Consulting

Project #	
Doc. Type	FSR

VENDOR PROJECT BUDGET

Fiscal Year	**2005/06**	**2006/07**	**2007/08**	**2008/09**	**2009/10**	**TOTAL**
Integration Partner Budget		1,196,800	4,752,000	4,646,400	0	10,595,200
Procurement Assistance /DGS/IV&V/IPOC	269,199	755,067	650,000	650,000	0	2,324,266
Total Vendor Budget	**269,199**	**$1,951,867**	**$5,402,000**	**$5,296,400**	**$0**	**$12,919,466**

2.6 Risk Assessment Information

	Yes	No
Has a Risk Management Plan been developed for this project?	X	

General Comment(s)

Given the scope, activities, and resources required to plan for, procure, design and implement Project Alpha, Caltrans has developed a Risk Management Plan that adheres to its Project Management Office (PMO) standards while factoring in the risks specific to this effort. The resulting methodology for the Risk Management Plan is consistent with the State of California's Project Management Methodology, the Department of Finance's Information Technology Project Oversight Framework, and the Caltrans IT Project Management Methodology and Standards.

- **Project management** risk is medium-high due to staffing and schedule risks that should be monitored to ensure the project remains on schedule and on budget, and be supported effectively by Caltrans resources. When taking into consideration the choice to break the IFMS implementation into multiple smaller projects, project management risk is increased to high for the overall implementation of the IFMS.
- **Financial risk** is medium due to the complexity of the project from a program and a technical perspective and the resulting difficulty to estimate an accurate budget.
- **Technology risk** is medium due to difficulties expected in integration with existing systems and performing data conversion.
- **Change management/operational risk** is medium due to the significant number of systems being replaced and the subsequent business processes changes that will take place. Key stakeholders will be incorporated into all phases of project implementation in order to facilitate change management processes.

Preventive measures will be taken in each of the risk areas to mitigate the chances of risk occurrence. These measures are identified in the risk management worksheet contained in Section 7 of this FSR. As new risks are identified throughout the project life cycle, appropriate preventive measures will be developed. Key risk-mitigation strategies include implementing COTS software solutions, using pilots and other phasing of functionality and contracting for project management and IPOC/IV&V support.

3.0 Business Case

The purpose of the Business Case is to provide a clear understanding of the business environment of the California Department of Transportation ("Caltrans"). This section of the FSR describes the program and its major functions, identifies internal and external customers, and articulates the business problems and opportunities as well as the desired objectives of the proposed solution. This section also identifies the requirements that the proposed solution must fulfill in order to meet the business needs.

This business case is comprised of the following sub-sections:

Table 2. Business Case Sub-Sections

3.1 Business Program Background
3.1.1 Program Description
3.1.2 Business Process Description
3.1.3 Impact of the Proposal
3.1.4 Customers and Users
3.1.5 Program Experiencing the Problem
3.1.6 Conditions Creating the Problem
3.2 Business Problem or Opportunity
3.2.1 Business Problems
3.2.2 Business Opportunities
3.3 Measurable Business Objectives
3.3.1 General Objectives
3.3.2 Program Process Analysis
3.3.3 Specific Program Objectives
3.4 Business Functional Requirements
3.4.1 Business Functional Requirements
3.4.2 Infrastructure Requirements
3.4.3 Traceability Matrix

3.1 Business Program Background

High Level Overview

For more than 100 years, Caltrans and its predecessors have been responsible for planning, designing, building, operating and maintaining California's state highway system. With more than 22,000 employees and an annual budget of approximately $8 billion, Caltrans builds and maintains the critical infrastructure on which the State is able to:

- **Enable State commerce —** transportation infrastructure and services contribute significantly to the $1.4 trillion gross state product, which represents 13 percent of the Gross Domestic Product (GDP) of the United States.
- **Facilitate tourism —** the tourism industry generates $78.2 billion each year in spending, employs nearly 900,000 Californians, and contributes $5 billion annually in state and local taxes[1].

Road travel and vehicle miles driven on California State highways demonstrate the critical importance of this infrastructure to the California economy. For example, in 2003 over 323,655 million Annual Vehicle Miles of Travel (AVMT) were driven on California State highways for business and recreational purposes.

By direction of Assembly Bill 69 in 1972, Caltrans is tasked with overseeing and maintaining California's state transportation system, which includes more than 50,000 lane miles of state highways stretching from Mexico to Oregon and from the Pacific Ocean to Nevada and Arizona. The scope and scale of Caltrans' operations include $4.6 billion worth of capital projects and transportation improvements under construction and highway maintenance for 15,146 centerline miles of highway, over 230,000 acres of right-of-way, 12,312 state highway bridges and inspects 12,076 local bridges. Current highway maintenance projects are estimated to total $760 million.

Caltrans' mission is to "improve mobility across California" through the continued development of a talented and diverse team and to strengthen ties with its partners. To achieve this mission, Caltrans has developed six organization goals that are presented in Figure 5 below.

Figure 5. Caltrans Organizational Goals

- **SAFETY —** Provide the safest transportation system in the nation for users and workers
- **RELIABILITY —** Provide dependable travel times
- **PERFORMANCE —** Optimize transportation system throughput
- **FLEXIBILITY —** Provide mobility choices through strategic partnerships
- **STEWARDSHIP —** Preserve and enhance California's resources and investments
- **DELIVERY —** Improve delivery of projects and services

The Department's mission has not changed substantially over the past 100 years; the focus has always been to provide the infrastructure for the movement of people and goods within the State. However, as needs have changed, the strategies that Caltrans employs to meet its

[1] Source: California Travel and Tourism Commission

mission have likewise changed. Dramatic California population growth and a diminishing revenue source for transportation improvements have created additional constraints and obstacles to mission accomplishment.

Financial Management Support to the Caltrans Organization

Changes in business needs over the past 20 years have placed the Caltrans organization at a crossroads in terms of its financial management processes and supporting systems. Aging technology, a growing number and complexity of funding streams, and changes in legislation have collectively increased the demands on Caltrans and accentuated problems with the current method of executing financial management functions. More importantly, the lack of management data available to Caltrans often relegates the Department to a decision-making process based on untimely, incomplete and anecdotal information.

The lack of visibility into current expenditures, performance, and application of funds is a critical problem. Caltrans recognizes this problem as reflected in an excerpt from the most recent Agency Information Management Strategy (AIMS) document: "current financial information does not adequately meet the Department's needs relative to supporting core business activities.[1]"

The scope and scale of the business problems and impacts related to functions that Caltrans cannot currently perform is challenging to quantify. As previously noted, Caltrans is responsible for an annual $8 billion operating budget, $4.6 billion in capital projects and approximately 545 contracts for transportation improvements projects. In addition, the Caltrans Program has a direct impact on State commerce, tourism, and recreational travel of Californians. As a result, Caltrans is often placed in the difficult position of responding without complete information to inquiries from the Legislature, DOF, and the general public regarding the use of, and accountability for, taxpayer dollars.

Financial Management Integration Study

In an effort to address and ameliorate the problems associated with critical shortcomings in Caltrans' financial management processes and information systems, Caltrans conducted a comprehensive study, the Financial Management Integration Study, that reviewed financial operations to identify areas of inefficiency and improvements that could be made through a combination of new processes and new systems. The decision to conduct the Integration Study resulted from feedback from the Department of Finance (DOF) on feasibility study reports (FSR) that Caltrans submitted in 2000 and 2001. The four projects, and corresponding FSRs, submitted by Caltrans included:

- Financial Management System (FMS)
- Construction Management System (CMS)
- California Transportation Infrastructure Funding System (CTIFS)
- Caltrans Land Management System (CLMS)

DOF noted the similarities between certain financial functions for these four proposed projects, and declined to approve the FSRs without the completion of an Integration Study that examined

[1] Source: Caltrans Agency Information Management Strategy (AIMS) Manual (August 2005)

the common business requirements of the projects. Goals of this study were to identify situations where multiple requirements could be met by a single system, or where two or more of the systems would need to be interfaced to avoid redundant processing. DOF placed all four projects on hold pending the completion of the study.

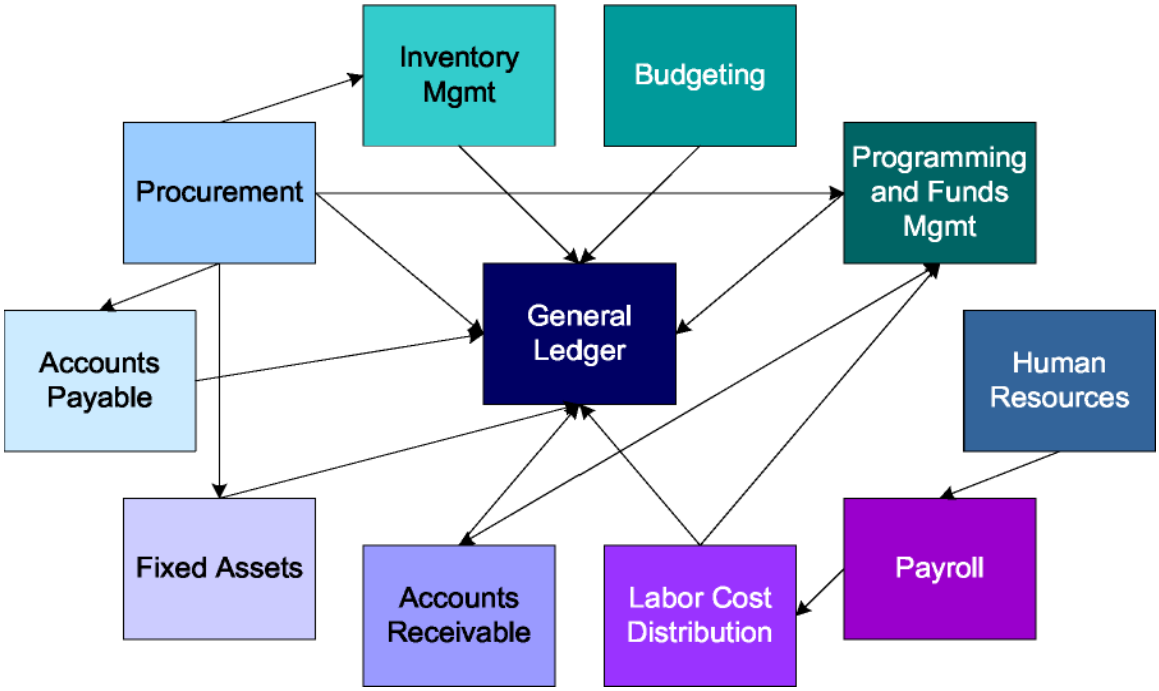
A major recommendation of the Integration Study was the Integrated Financial Management System (IFMS) Strategic Plan, which was intended to act as a road map for implementing IFMS. The Strategic Plan includes the implementation of the larger financial management conceptual architecture through a series of projects, paralleled and sequenced according to project priorities and dependencies. For example, as each project is implemented, existing systems with duplicate financial functions would be retired. The financial functions and data provided by IFMS would provide a framework and platform for common financial processes and requirements across Caltrans.

IFMS Strategic Plan and Project Alpha

The scope of this feasibility study, referred to by Caltrans as “Project Alpha,” focuses on core financial management, integration and reporting functionality. Project Alpha is the foundation and critical first step required to realize the goals of the IFMS Strategic Plan. Project Alpha includes the development of core functionality — General Ledger (G/L), Accounts Receivable (A/R), Account Payable (A/P) — which will be accessed and utilized by each of the subsequent projects. Other key components of Project Alpha including budgeting, funds management, and financial reporting will also be highly leveraged by subsequent projects.

As illustrated in the figure below, the relationships between the functional areas that comprise the larger IFMS Strategic Plan are complex. The dependencies and relationships of future IFMS functionality to the functional scope of Project Alpha, in particular general ledger, provide the primary rationale for executing Project Alpha as the first phase of IFMS implementation.

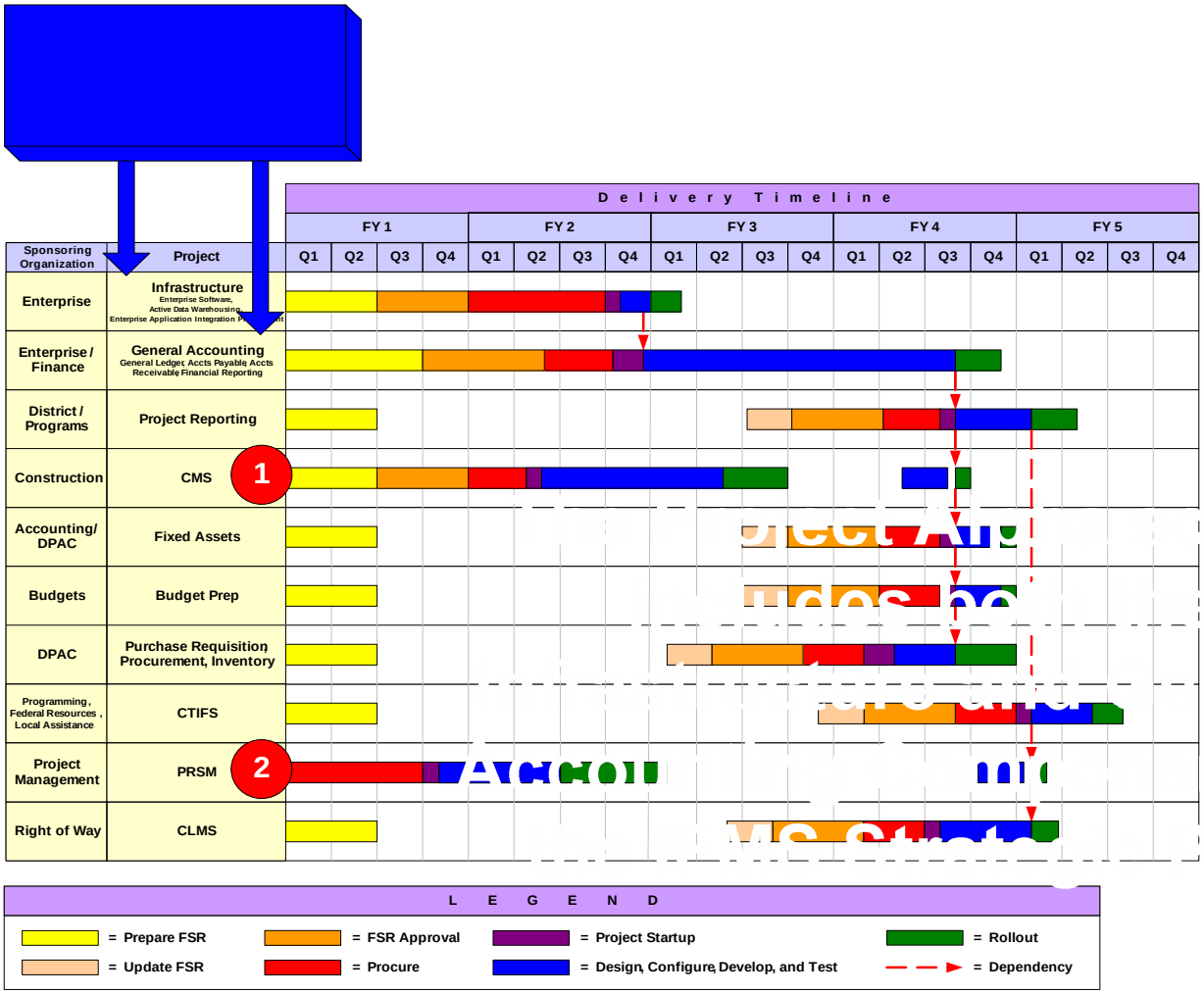
Figure 6. IFMS Strategic Plan Functional Relationships



Source: Caltrans Integration Study

Based on the results of the Integration Study, Caltrans developed an implementation road map comprised of a series of individual, dependent and overlapping projects that, once achieved, will provide the full functionality envisioned within the future IFMS. The figure below provides an overview of the timing and relationship between projects at a conceptual level. Project Alpha is comprised of the first two subordinate projects listed below, Infrastructure and General Accounting.

Figure 7. IFMS Implementation Road Map Project Timing and Relationships



Source: Caltrans Integration Study

While the timing, order and combination of projects subsequent to Project Alpha is still being determined by Caltrans, the immediate execution of Project Alpha is critical to realizing the IFMS Strategic Plan. It should be noted that the CMS and PRSM projects highlighted in the above figure with a “1” and “2”, respectively, are not core IFMS financial management systems and will be integrated with IFMS using integration technologies. As discussed previously, the proposed solution for Project Alpha must facilitate the future IFMS projects and must not preclude future plans from a technological, operational, or procurement perspective. The complete scope of IFMS Strategic Plan includes the following subordinate projects:

- **Infrastructure Project (Project Alpha) —** Encompasses all activities related to acquiring and establishing the financial management, integration and reporting software, along with any required hardware.
- **General Accounting Project (Project Alpha) —** Provides General Ledger (G/L), Accounts Receivable (A/R) and Accounts Payable (A/P) functionality to Department users and lays the foundation for future projects.

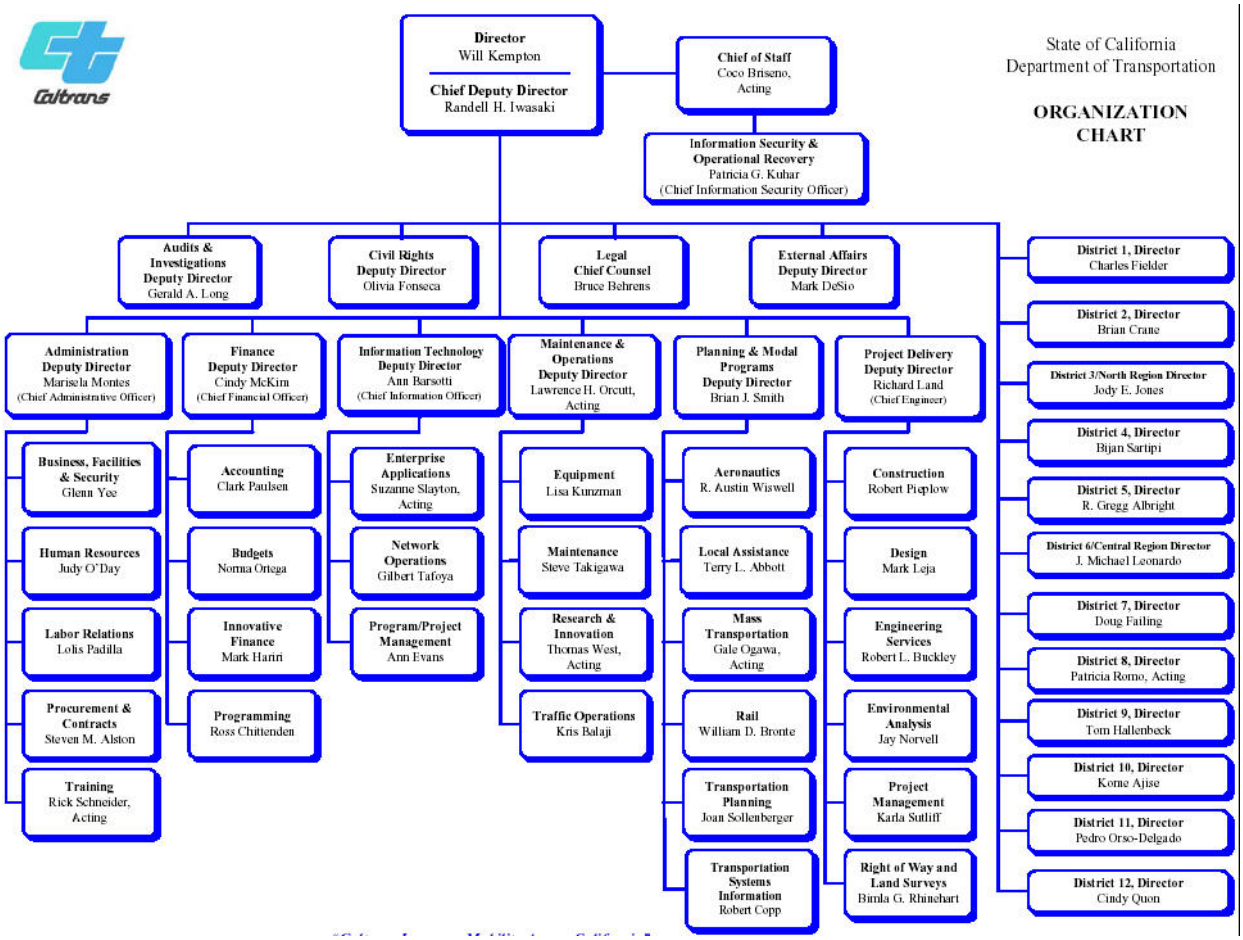
- **Project Reporting Project —** Provides the ability to establish and monitor a budget against a particular project, as well as track and report the associated project activities over the life of the project.
- **Fixed Assets Project —** Provides the ability to monitor and report on all capitalized and non-capitalized property and equipment throughout the Department.
- **Budget Preparation Project —** Provides trend analysis/budget modeling functionality, the ability to analyze the current or prior year budget and/or actual information, and the ability to manipulate the data and create and store various "what if" scenarios for operational and project related budgets.
- **Purchase Requisition, Procurement, and Inventory Project —** Provides streamlined procurement and inventory processes and improved productivity by utilizing online requisitions, purchase orders/contracts and change orders, electronic catalogs, automated workflow approvals and electronic commerce e-mail.
- **California Transportation Infrastructure Funding System (CTIFS) Project —** Provides the Programming, Local Assistance, and Budgets Divisions with the ability to "program" projects into the State Transportation Improvement Program (STIP), the State Highway Operation and Protection (SHOP) Program and categorical programs; obtain and manage federal funds; and oversee projects constructed by local agencies.
- **Construction Land Management System (CLMS) Project —** Integrates functionality provided by earlier projects — procurement, payables, receivables, budgeting, inventory, fixed assets — with the real estate functionality.

Realization of this portfolio of projects under the IFMS Strategic Plan will improve the efficiency, productivity and accountability within the Caltrans organization as it strives to meet new and changing demands, requirements and constraints. The balance of this feasibility study analyzes the current state of Caltrans in relation to financial management processes and supporting applications as well as the business requirements and proposed solution to meet the needs of Caltrans for Project Alpha.

3.1.1 Program Description

Headquartered in Sacramento, Caltrans operates approximately 600 business facilities throughout the State of California. The locations for these facilities range from large metropolitan cities, such as Oakland and Los Angeles, to more remote sites, such as the maintenance stations in the Sierra Nevada Mountains and the deserts of southern California. Director Will Kempton heads the Caltrans organization, which is comprised of three (3) mission-direct programs and three (3) primary support programs that are collectively composed of 28 subdivisions. An additional 12 district offices are distributed throughout the State, which perform the same key business activities as the headquarters divisions, but are confined to specific geographic locations. The figure below illustrates the organizational structure of Caltrans.

Figure 8. Caltrans Organizational Chart



To provide an organizational perspective that conveys the delineation between centralized functions and distributed functions, Caltrans can be divided into two major components: programs and districts.

3.1.1.1 Programs

Headquartered in Sacramento, the programs comprise staff in approximately eight large facilities. They have functional responsibility for key business activities such as capital improvements, design, construction, local programs, traffic operations, transportation facilities maintenance, planning and administration to meet the State's transportation needs.

The Programs provide policy, guidance and allocate budget authority to their counterparts in the Districts. A Deputy Director leads each separate program area, each of which is described in the table below.

Table 3. Caltrans Program Descriptions

Program	Composition and Description	Deputy Director

Program	Composition and Description	Deputy Director
Planning and Modal Programs	Ensures that the needs of non-motorized travelers are incorporated into the program element of transportation planning and the modal elements of the statewide strategy for mobility. **Subdivisions:** Aeronautics, Local Assistance, Mass Transportation, Rail, Transportation Planning, and Transportation Systems Information	Brian J. Smith
Project Delivery	Responsible for the delivery of the Caltrans' portfolio of transportation improvement projects, from design to construction and all the complementary activities within. **Subdivisions:** Construction, Design, Engineering Services, Environmental Analysis, Project Management, Right of Way and Land Surveys.	Richard Land
Maintenance and Operations	Responsible for the preservation, upkeep and restoration of roadway structures. Also responsible for the operation of highway facilities and services, as well as a number of other activities, including review and approval of planned road closures and operation of traffic signals and lighting. **Subdivisions:** Equipment, Maintenance, Research and Innovation, Traffic Operations	Lawrence H. Orcutt (acting)
Finance	Responsible for core accounting functions, such as general ledger, accounts receivable, accounts payable, as well as financial reporting, budgeting, transportation programming and other related functions. **Subdivisions:** Financial Management; Accounting, Budgeting, Innovative Financing, Programming	Cindy McKim
Administration	Responsible for functions including personnel, labor relations, contracts, procurement, administrative policy, training, business services, facilities and space management. **Subdivisions:** Business, Facilities and Security, Human Resources, Labor Relations, Procurement and Contracts	Marisela Montes
Information Technology	Deliver IT services and support the Department's IT infrastructure through centrally located unit at headquarters (HQ-IT), and district IT groups for each of the 12 district offices statewide **Subdivisions:** Enterprise Applications, Network Operations, Program/Project Management	Ann Barsotti

3.1.1.2 Districts

The State of California is divided into twelve geographic districts, each having responsibility for the delivery of services to large, typically multi-county geographical areas. District facilities house from 200 to over 4,000 employees, some across multiple buildings. In addition, because of the large geographic areas covered, there are many field locations widely spread throughout the district to support maintenance, traffic operations, construction, surveys, design staff, and their activities.

The Districts provide the same key business activities as the headquarters divisions; however, their responsibilities are confined to specific geographic locations. District offices are situated in Eureka, Redding, Marysville, Oakland, San Luis Obispo, Fresno, Los Angeles, Bishop, Stockton, San Bernardino, Orange County and San Diego. An overview of the 12 districts is provided in Table 4 below.

Table 4. Caltrans District Descriptions

District	Territory
1	District 1 includes the counties of Del Norte, Humboldt, Lake and Mendocino. Many remote offices for both construction and maintenance activities are located throughout District 1.
2	District 2 encompasses more than 27,000 square miles and all or part of nine counties: Lassen, Modoc, Plumas, Shasta, Siskiyou, Tehama, Trinity and portions of Butte and Sierra Counties.
3	District 3 is responsible for Butte, Colusa, El Dorado, Glenn, Nevada, Placer, Sacramento. Sierra, Sutter, Yolo and Yuba.
4	District 4 serves Alameda, Contra Costa, Sonoma, Marin, San Francisco, San Mateo, Santa Clara, Solano and Napa counties.
5	District 5 is comprised of Santa Barbara, San Luis Obispo, Monterey, San Benito and Santa Cruz Counties, which includes 33 cities and 7,788,809 acres.
6	District 6 serves Fresno, Kern, Kings, Madera and Tulare Counties.
7	District 7 is responsible for Los Angeles and Ventura Counties.
8	District 8 is the largest of the districts and covers Riverside and San Bernardino Counties, which include 49 incorporated cities.
9	District 9 encompasses both Inyo and Mono counties and is located on the eastern side of the Sierra Nevada Mountain Range.
10	District 10 serves Alpine, Amador, Calaveras, Mariposa, Merced, San Joaquin, Stanislaus and Tuolumne Counties.
11	District 11 includes San Diego County and Imperial County and oversees approximately 1000 miles of freeways and highways, both urban and rural.
12	District 12 is responsible for Orange County and vicinity, which encompasses a metropolitan area of 33 cities and 2.8 million people, crisscrossed by 17 state highway routes.

Figure 9 provides a graphical illustration of the geographic coverage of districts throughout the State.

Figure 9. Map of Caltrans Districts

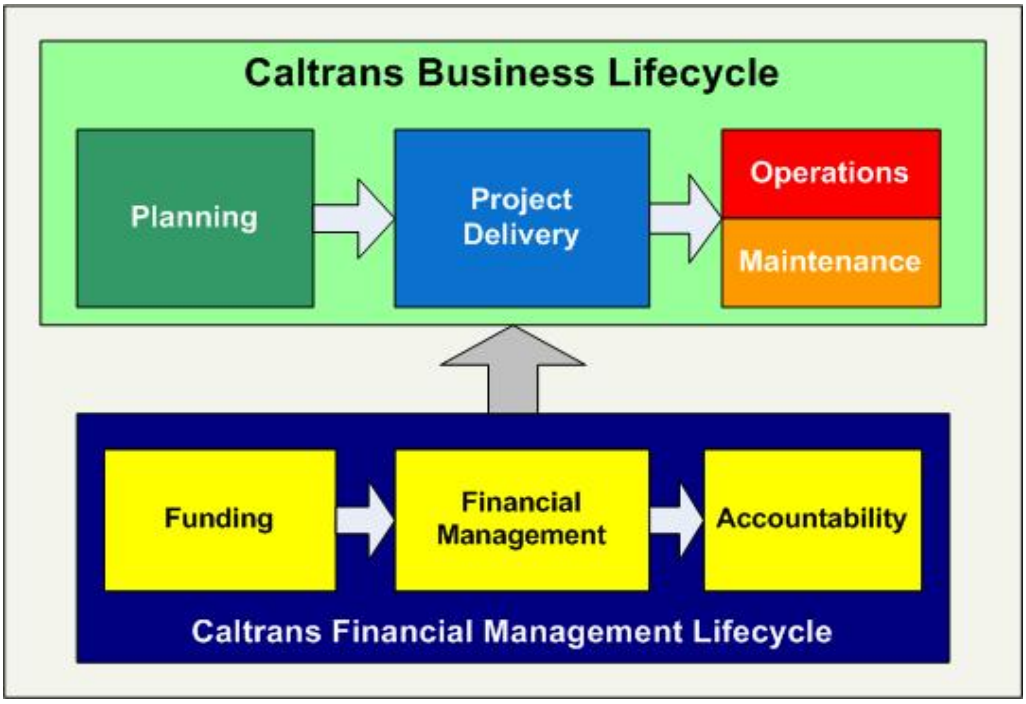
The collective responsibilities and activities of the districts and divisions are broad and diverse. To provide a targeted discussion of the relevant programmatic business processes and issues, Caltrans has developed a business life cycle perspective illustrated in Figure 10. The Caltrans Business Life cycle provides an easy to understand framework to drill down into the specific financial management processes, problems, opportunities and requirements.

3.1.1.3 Caltrans Business Life Cycle Perspective

In an effort to illustrate the impact of the proposed solution, a business life cycle perspective was created to provide a visual representation of the high-level business life cycle of Caltrans. Specific processes germane to this feasibility study within the life cycle are decomposed in Section 3.1.2. Moreover, the descriptions of problems and opportunities in Section 3.2 will use the business life cycle model to cast the issues in business terms that can be linked to business problems and opportunities. Using this approach, the reader can easily understand the impact of problems and opportunities on the delivery of Caltrans' services to the traveling public.

The Caltrans Business Life cycle depicts the functions and sequencing of the major components of the Department's mandated duties: Planning, Project Delivery, Operations and Maintenance. To achieve these core elements of its mission, the operational units require support from other functions, including financial management. The financial management function feeds critical fiscal information to the operational units so they can better plan, prioritize and evaluate potential investments. Without comprehensive and accurate data, management cannot make informed decisions.

Figure 10. Caltrans Business Life Cycle



The Financial Management Life Cycle illustrates its three major sequential steps: funding, financial management and accountability. Process and technology weaknesses within and across these major activities negatively impacts the function's ability to support the mission and objectives of the Department. The subsequent section will decompose the business processes within the Caltrans Financial Management Life Cycle relevant to the scope of this feasibility study.

The subsequent section will decompose the business processes within the business life cycle relevant to financial management and the scope of this feasibility study.

3.1.2 Business Process Description

Caltrans' financial management requirements are organized into seven main financial functions, four of which are germane to the scope of this FSR, namely:

1. Budgetary Control and Funds Management
2. Accounts Payable
3. Accounts Receivable
4. General Ledger

Extensive business process reviews have been conducted during the preparation of the Caltrans Financial Management Integration Study and the previous feasibility study reports noted earlier. As such, the following discussion provides a general overview of the financial management business processes and select descriptions of representative business processes.

A detailed discussion of the method and systems used to accomplish financial functions is provided in Section 4.1.

Please see Appendix C for an account of relevant business processes for Project Alpha. Of particular note within all of the descriptions is the complexity of process and application usage for functions that appear to be fairly straightforward in terms of activities and requirements. It is this complexity, much of it an unnecessary burden, that Caltrans hopes to alleviate through Project Alpha and the entire IFMS Strategic Plan.

3.1.3 Impact of the Proposal

The scope and impact of this feasibility study span the entire Caltrans organization; however, the primary impact will be to the Divisions of Accounting and Budgeting and other employees whose duties fall under financial management and accounting functions. As described in Section 3.1.2, the information requirements to support the primary processes touch virtually all Caltrans employees and are relevant to a number of external stakeholders, including the State Controllers Office (SCO), external contractors and the taxpaying citizens of California.

As indicated in the AIMS, "transformation of data into 'information' is not fully realized…the Department has a wealth of data; however, much of it is difficult to access, inconsistent, redundant, and lacks key integration points.[1]" The improvement in business information to support all facets of Caltrans operations will have a significant positive effect on the organization and its business partners.

Impacts related to cost, time and resources for execution of Project Alpha and the IFMS Strategic Plan are substantial. In terms of cost, the investment in one-time and ongoing funds to procure, design and implement the system will require millions of dollars over several fiscal years. From a timing perspective, realization of benefits generated by Project Alpha will not be achieved until several years after the submission and approval of this feasibility study. Finally, the internal resource requirements for the project require participation from many units within Caltrans over a multi-year period. Managing the risk of sub-optimal participation, as well as other risks related to cost and schedule, are described in Section 7, Risk Management Plan.

3.1.4 Customers and Users

Customers and users of the Caltrans financial management processes within the scope of this feasibility study are both internal and external to the organization. Customer and user groups are described below.

3.1.4.1 Customers

Customers of the financial management processes include internal financial management personnel, external contractors, federal and state agencies, and local and regional transportation partners.

[1] Source: Caltrans Agency Information Management Strategy (AIMS) Manual (August 2005)

Caltrans Executive Management

Given the information issues and the lack of insight into financial status or performance due to system limitations, Caltrans' executive management is arguably the primary customer of financial management data. The inability to provide other customers and stakeholders with meaningful information on spending and return on investment exacerbates accountability issues raised by these customers. Reporting deficiencies and information gaps leave executive management accountable for the financial performance of operations and projects yet severely limited in their ability to aggregate any meaningful information for analysis and reporting.

Caltrans Operational Management

In addition to executive management referenced above, operational management responsible for the application of resources to execute day-to-day functions is another major customer of financial management data. Project delivery, accounting, or budgeting management, to name a few, are all users of financial data and will be positively impacted by Project Alpha.

Federal Highway Administration (FHWA)

A major agency of the U.S. Department of Transportation (DOT), the FHWA is charged with the broad responsibility of ensuring that America's roads and highways continue to be the safest and most technologically up-to-date. Although State, local and tribal governments own most of the Nation's highways, the FHWA provides financial and technical support for constructing, improving and preserving America's highway system. Its annual budget of more than $30 billion is funded by fuel and motor vehicle excise taxes and is primarily divided between two programs:

- Federal-aid funding to State and local governments.
- Federal Lands Highways funding for national parks, national forests, Indian lands and other land under Federal stewardship[1].

Legislature/Department of Finance (DOF)

The California Legislature and DOF often query Caltrans in regard to current or planned projects, use of funds and financial reporting, to name a few. Caltrans often must cobble together incomplete and suspect data from various disparate systems in order to respond to regular and ad hoc inquiries from these bodies. Internal confidence in the figures developed by Caltrans in response to such requests can be described as low, for process and system limitations engender severe data accuracy issues.

Vendor Community

Vendors that conduct business with Caltrans for construction projects, goods and materials and professional services are just a few examples of customers that are impacted by poor financial management. Perhaps more so than the other customers, the vendor community has a heavy transaction-based relationship with Caltrans that is directly linked to the core accounting

[1] Source: United States Department of Transportation — Federal Highway Administration http://www.fhwa.dot.gov

functions that comprise Project Alpha. Payment delays and errors can impact project delivery, budget cycles and the return on investment of funds.

Local and Regional Transportation Partners

Funding, planning, tracking and execution of transportation infrastructure projects require considerable data sharing and communication with local and regional transportation partners. Changes to fund management responsibilities created by the Transportation Equity Act for the 21st Century, passed in 1998, and Senate Bill 45, State Transportation Improvement Program reform, have created increased workloads within Caltrans as the organization is inundated with additional requests for financial data. These legislative developments and other conditions that led to the problems experienced by Caltrans are discussed in more detail in Section 3.1.6.2.

State Controllers Office (SCO)

For most types of payments made by Caltrans, a claim schedule packet is created and submitted to the SCO in order to issue warrants for the Department's invoices. SCO will produce the warrants and deliver them through the mail or trigger the Electronic Funds Transfer (EFT) payment process between Union Bank, Mellon Bank and other partners. Considering this relationship, SCO is also considered a primary user of Caltrans financial management information. As described in Section 4, Baseline Analysis, although the SCO has a standard file format for submissions, various Caltrans' applications write payment files to SCO using unique file formats due to legacy financial systems still within the Caltrans' environment.

California Transportation Commission

The California Transportation Commission (CTC) consists of nine members, all appointed by the Governor to staggered four-year terms, and two non-voting ex-officio members, one from the State Senate and one from the State Assembly.

The Commission is responsible for the programming and allocating of funds for the construction of highway, passenger rail and transit improvements throughout California. The Commission also advises and assists the Secretary of Business, Transportation and Housing Agency and the Legislature in formulating and evaluating state policies and plans for California's transportation programs.

3.1.4.2 Users

All Caltrans employees are potential users of the system, given the breadth and depth of financial information in the current systems and planned for IFMS. However, a number of user groups are impacted more than the average Caltrans user and are identified and described below.

Division of Accounting (D of A)

The D of A is the financial organization within Caltrans that provides various accounting services to customers, both internal and external. Among its offerings to customers are:

- **Contract Payments and Information** web site to track major construction projects.

- **Electronic Funds Transfer (EFT)** for utility customers, major construction projects, local agencies, traffic congestion relief program and lease program vendors.
- **Local Agency Funded Project Accounting** web site to access financial data regarding projects within specific geographical areas, EFT due dates and other information.
- **Local Assistance Payment System** web site provides payment history and invoice information on Local Assistance funded projects.

D of A staff members are heavy users of TRAMS and many of the ancillary systems described in Section 4, Baseline Analysis. The majority of the Project Alpha efficiency savings highlighted in Section 5 Proposed Solution and substantiated in Section 8, Economic Analysis Worksheets, relate to these employees.

Division of Budgets

The Division of Budgets staff members are also heavy users of financial management systems within Caltrans. In addition to the creation, validation and tracking of the Caltrans budget, the Division issues budget guidelines to districts/divisions and the program managers/advisors. The Division is also responsible for managing federal funds appropriated for state and local transportation projects. As budgeting is a core financial management process that links to all the functional areas related to Project Alpha, this group of users will also be significantly impacted by the proposed solution.

Division of Procurement and Contracts

The Division of Procurement and Contracts provides services in the areas of procurement, publications, warehousing, service contracts, architectural and engineering contracts, minor public works contracts (under $120,000) and all emergency force account contracts for phase one emergencies that immediately restore services. The services provided interact considerably with the current, core financial management and accounting functions and the slated functional scope for Project Alpha.

Divisional/District Resource Management

Budgeting, accounting and other financial management functions related to programs, divisions and districts are performed by resource management staff throughout the State. Duties are subsets of those of the Division of Accounting and Budgets, although responsibilities are at the operational day-to-day level and are bound by organizational or geographic boundaries. Many of the shadow systems discussed in Section 4, Baseline Analysis, were created by resource management staff in response to real or perceived limitations of TRAMS and other financial management systems.

Project Delivery Staff

Staff responsible for the budgeting, execution, tracking and completion of construction projects, referred to internally as Project Delivery staff, are collectively another user group of the current financial management systems.

IFMS, with its improved coding and project identification structure and ability to handle increased funding complexity, will allow Project Delivery personnel the opportunity to track the costs of transportation projects more accurately, and with improved timeliness.

3.1.5 Program Experiencing the Problem

The problems detailed in Section 3.2 are experienced by all participants in financial management processes and impact the entire Caltrans organization. However, Executive Management is the primary group experiencing the problem, for insight into cost information and financial performance is an elusive goal. From an organizational perspective, day-to-day issues are particularly experienced by the Divisions of Accounting and Budgets and Program staff. Resource Management staff in the field employ a number of systems to perform accounting, budgeting and related functions so Project Alpha will also impact these employees considerably.

3.1.6 Conditions Creating the Problem

As California's transportation needs have broadened over the last century, so has Caltrans' focus. The investment in California's transportation infrastructure has significant economic impacts on the State including the creation of jobs and the stimulation of linked industries. In addition to a changing mix of transportation modes — such as highways, rail, mass transit and aeronautics — Caltrans' professionals today must consider such complex issues as land use, environmental standards and the formation of partnerships between private industry and local, State and federal agencies, including comprehensive and complex financial management requirements and activities.

Furthermore, modifications to financial management requirements and responsibilities stemming from changes in the economic climate contribute considerably to a need for action. As stated in the Agency Information Management Strategy (AIMS) document, "the State's immediate and potentially long-term fiscal situation resulting from the declining economy and the declining gas tax base due to more efficient automobiles has intensified the need for efficiency, accountability and budget management.[1]" Consequently, Caltrans must ensure that the supporting infrastructure and financial management solutions are comprehensive, optimally configured and cost-effective.

Several other conditions, which are outlined below, have resulted in problems detailed in Section 3.2 and require Caltrans to make significant changes to its financial management infrastructure in order to adapt to current and future changes in business needs.

3.1.6.1 Distributed Organizational Accountability and Operations

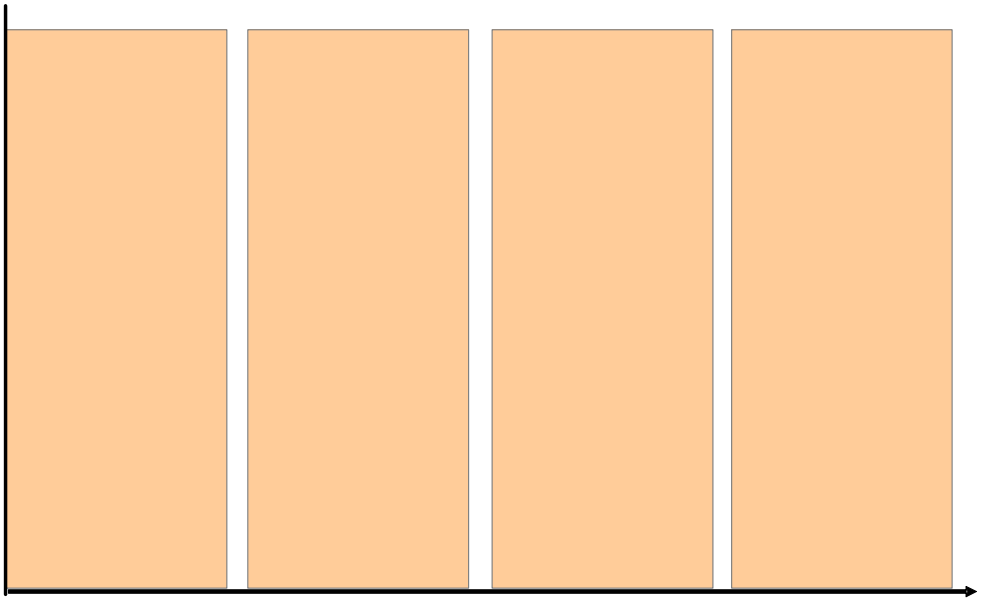
Geographic service delivery and accountability to both local and enterprise entities has resulted in distributed decision-making as well as a need for the development of multiple distributed automation systems. Caltrans' deployment of technologies over time is not atypical and it largely parallels the information technology industry evolution of automation capabilities (i.e., mainframe, client-server, n-tier, etc.). As such, the existing systems supporting financial management functions within Caltrans exhibit the following characteristics:

[1] Source: Caltrans Agency Information Management Strategy (AIMS) Manual (August 2005)

- Distributed organizational accountability and operations have, over time, resulted in numerous legacy financial and other systems in the Caltrans environment.
- Changing needs of Caltrans' business units that could not be met through legacy systems has led to additional layers of automation redundancy.
- Inability to implement a comprehensive financial management solution has resulted in the need to continue maintenance of secondary financial systems.
- Unmet needs have resulted in the proliferation of desktop and workgroup applications ("shadow systems").

Conditions such as those listed above are not unique to organizations, particularly public sector agencies. Many of the current problems hindering Caltrans relate to the evolution of technology capabilities over time. As the figure below illustrates, it has only been in the last decade that business integration and multi-tier business process fusion have become enabled through automation.

Figure 11. Evolution of Back-end Systems



Transportation Accounting and Management System (TRAMS), for instance, is the largest application in support of financial management functions and is the Department's primary accounting system. TRAMS is a collection of mainframe applications implemented in 1983 that simply cannot be modified to meet the business needs that have developed over the past 22 years. As a result, the functional gaps, both real and perceived and other limitations in TRAMS have led to the development and acquisition of complementary and overlapping systems that negatively impact productivity, data integrity and support costs.

3.1.6.2 Changes to Funding and Management of Funds

Caltrans fund management and expenditure tracking requirements have become significantly more time-consuming and laborious over the last 20 years as the number of fund sources have grown from 5 to 48.

For non-state highway projects, over 800 local agencies track expenditures in their own internal systems. The format of this information varies by the nature of the local agencies' internal systems and their own unique processes. Typically, local agencies submit expenditure information to the Department to be reimbursed with State or federal dollars for the expenditures. As the fiduciary agent for all State and federal dollars (i.e., the Department administers these funds directly for the State, as well as, local agencies), the Department is responsible for tracking expenditures.

In addition to the sheer growth in the number of funding sources, other mandated changes have also significantly impacted Caltrans' financial management operations. The Transportation Equity Act for the 21st Century, passed in 1998, and Senate Bill 45, State Transportation Improvement Program reform, changed the preexisting funding model.

TEA 21 replaced the Intermodal Surface Transportation Efficiency Act (ISTEA) passed in 1991 and is the largest public works program ever passed. Under TEA 21, each state receives at least 90.5 percent of its contributions to the Highway Trust Fund and overall funding for transportation was significantly increased.[1] Senate Bill 45, in contrast, transferred significant State-funded project programming responsibilities to local agencies, with "timely use of funds" constraints attached. Later, AB 1012 added, "use it or lose it" constraints on local agencies to ensure timely obligation of federal funds. Both of these actions created a tremendous business need to provide more financial data to more stakeholders on a timelier basis. All stakeholders must have access to financial information to monitor the financial status and perform cash flow analysis on a project-by-project basis, and be able to aggregate the information by funding program.[2]

These two developments directly impacted Caltrans' responsibilities and workload and accentuated the technical limitations of existing systems. The new funding model has led to increased reporting requirements, more sophisticated fund management processes and increased coordination between State, federal and local agencies. The provision of increased decision-making ability and accountability at the local level generated increased external data and reporting requests of Caltrans, which remained responsible for tracking fund availability and usage. In essence, data aggregation, integrity and access problems that were previously experienced only by internal Caltrans employees were amplified by new demands from local agencies.

Furthermore, there may be additional changes on the horizon. The recently passed SAFETEA-LU, the Safe, Accountable, Flexible, Efficient Transportation Equity Act — A Legacy for Users, may add additional funding requirements in the future and other developments are bound to occur as well. Current system and process limitations will only be exacerbated by additional requirements.

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[1] Source: Metropolitan Transportation Commission (http://www.mtc.ca.gov)

[2] Source: Caltrans Agency Information Management Strategy (AIMS) Manual (August 2005)

3.1.6.3 Increased Support Burden for Financial Management Systems

Finally, the need for a centralized view of fund management, budget preparation and statewide expenditures has resulted in overlapping and redundant manual processes and automation. Key attributes of the current environment include:

- High cost of automation as a result of both horizontal and vertical redundancy (over 160 financial systems currently in use at Caltrans).
- Development of point-to-point interfaces that must be operated and maintained to provide necessary financial data.
- Higher program costs due to overlapping and redundant business processes. For example:
  - Substantial time and effort is expended to reconcile data between systems.
  - Manual re-keying of data into multiple systems is commonplace.

Largely due to inflexible technologies and changing requirements over more than twenty years, TRAMS is now riddled with major functional gaps that have resulted in shadow systems, redundant data and processes and unnecessary costs to the Department.

For instance, when TRAMS was developed, the vast majority of construction projects had only two fund sources — State and federal. Today, individual projects are funded from as many nine sources. TRAMS simply does not have the ability to track and account adequately for the use of each of these multiple funds on a single construction project.

Other functional gaps are due to increased demands from external parties. As an example, when TRAMS was implemented, expectations of auditors were much lower than they are today. TRAMS was, at the time, viewed as far more advanced than most systems utilized by other state Departments of Transportation. However, as auditors began to expect additional detail and increased data accuracy, Caltrans' inability to cobble this information together from multiple sources became apparent. Moreover, auditors also increased expectations for the correction of identified errors. In light of increased demands, TRAMS cannot provide the level of detail required nor can it be easily modified to meet this and other needs.

The heavy data management and tracking requirements of the Department render the current environment unable to support current needs. The sheer number of accounts, transactions, projects and other entities that must be tracked require a robust and integrated set of solutions to support Caltrans staff. For example, at any point in time, Caltrans staff is actively engaged in the management and development of approximately 2,500 to 3,000 projects. Concurrently, over 5,000 local agency administered projects are taking place. Clearly, the data challenges to meet these business needs are tremendous.

Moreover, the numerous systems and distributed nature of organizational data compounds functional reporting gaps exhibited by current financial management systems. As a result, reporting needs are often times only met with significant effort manually compiling and aggregating data from multiple systems, clearly a significant process inefficiency.

These conditions have substantially contributed to five primary problems related to financial management processes and their impact on the Caltrans organization. Moreover, three

opportunities exist as a result of the conditions described above. The next section describes the chief problems and opportunities that the proposed solution must alleviate and capitalize on, respectively.

3.2 Business Problem or Opportunity

The conditions described in Section 3.1.6 have created a number of critical problems that require immediate attention and rectification by Caltrans. While many problems are the result of current financial management process and systems issues, a major driver for Project Alpha and the entire IFMS Strategic Plan relates to functions and activities that the Department is unable to perform, as opposed to problems with current methods.

Although the impacts of these opportunities are difficult to quantify, the benefits to be provided by IFMS will generate marked improvements in Caltrans' ability to operate as a cohesive enterprise and quickly adapt to market, legislative and economic changes. The primary opportunities related to Project Alpha were identified by the project team and are described after a discussion of the primary business problems.

3.2.1 Business Problems

The six primary business problems related to Caltrans financial management systems and Project Alpha are listed in the figure below.

Figure 12. Primary Business Problems

The six primary business problems addressed by this proposal:	
1.	Inability to Track Financial Performance Outcomes/Measures
2.	Limited Visibility into Costs and Impacts
3.	Limited Capability to Ensure Accountability for Federal and State Funds
4.	Inefficient Financial System Business Processes
5.	High Financial Management IT Infrastructure Costs
6.	Inability to Access Timely Financial Information

The primary issue faced by Caltrans is lack of quality and integrated financial information available to manage the Caltrans' finances effectively. From the lack of knowledge about the efficiency of construction projects to insufficient information to make decisions regarding which projects Caltrans should invest in, the business problems currently severely hinder the Department's ability to perform its mission.

Each problem is addressed individually below with substantiating information to convey the scope, magnitude and criticality of the problem.

3.2.1.1 Inability to Track Financial Performance Outcomes/Measures

In addition to State and federal funds management requirements that cannot currently be met without laborious effort, limited capability to track financial performance outcomes and measures due to multiple, disparate sources of data has reached a critical point. Caltrans management is debilitated in regard to its ability to use historical information to measure performance outcomes and make educated decisions about the application of future human and financial resources. Performance of programs, districts and other initiatives is subsequently

tracked through manual efforts to aggregate data and generate qualitative, subjective reports. As a result of the lack of integration of data sources, Caltrans is unable to track:

- Expenditure trends and effects of management programs.
- Outcomes of process improvement initiatives.
- Non-labor project costs with any confidence in the figures.

For example, the existence of multiple data sources forces Caltrans to reconcile project financial information on a monthly basis. As a result, individuals that want to create reports must wait for data to be collected and reconciled each month before proceeding. These reports are often of diminished value as it is often too late to correct areas of concern from a financial, operational, or managerial perspective. This example exemplifies the severe business impacts that have developed as a result of financial management system deficiencies. Caltrans management does not have the information available to make enterprise decisions that impact the entire organization and its customers.

3.2.1.2 Limited Visibility into Costs and Impacts

From a project perspective, the lack of real time visibility into costs impacts budgets and availability of funding sources due to multiple disjointed systems used to track programming and project costs. Funding risks cannot be identified early in the project life cycle, leaving decision-makers reactive and not proactive in addressing risks to project success.

Financial performance of projects is extremely difficult to track as management is not able to address issues in real time as the earliest warning signs unfold. For instance, a recent and well-publicized example of the impacts of poor project tracking is the current construction project for a new suspension span of the Bay Bridge. Originally budgeted at $1.3 billion in 1996, the most recent estimate places the estimated cost of the project at $6.3 billion.[1] While the new estimate cannot solely be attributed to lack of visibility into project costs and impacts, Caltrans is aware that its project tracking limitations contributed to the uncertainty of costs for this project. This 385 percent increase in project costs does not place Caltrans in a favorable light as taxpayer dollars are applied to the project and the risk of increasing tolls for citizens in the Bay Area becomes more probable.

3.2.1.3 Limited Capability to Ensure Accountability for Federal and State Funds

Funding tracking and reporting requirements for Caltrans to execute its required functions for management and reporting on federal and State funds are insufficient due to a limited centralized view of data resulting from multiple sources of funds, budget and expenditure data. Use of federally appropriated and allocated funds must be tracked using a variety of systems (FADS, FMIS, CBARS, LPAMS, etc.), localized databases and paper-based processes. In fact, a Legislative Analyst Office Report concluded that due to these deficiencies, neither the Legislature nor the public is currently able to:

- Hold Caltrans accountable for managing taxpayer funds.
- Track changes or trends in Caltrans' project expenditures over time.

[1] Source: San Francisco Chronicle (18 July 2005) (http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2005/07/28/BAG06DUKO21.DTL)

- Use the budget to verify Caltrans' annual project delivery claims.
- Compare the budget to the California Transportation Commission's biennial project delivery plan.
- Determine the amount of federal and state funds paid out for transportation projects in any year.[1]"

These monumental process and system deficiencies related to funds management and reporting requirements place Caltrans in a very difficult position. Failure to communicate these facts to the Legislature and the public introduces doubt and attracts additional attention and scrutiny. Since the numbers cannot be accurately reported, it is nearly impossible to quantify the impact of these problems. However, given a budget of $8 billion and $4.6 billion worth of capital projects and transportation improvements under construction, the accountability gaps are unacceptable and require technology and process improvements immediately.

3.2.1.4 Inefficient Financial System Business Processes

Caltrans' financial management staff resources are poorly utilized due to lack of centralized financial management capability and overlapping, redundant systems and processes. Divisions and districts have developed their own "shadow systems" to perform accounting functions unavailable in TRAMS and complementary systems. The Caltrans Financial Management Integration Study estimated that Caltrans has over 120 systems that exhibit overlapping data and functionality.[2] These division/district systems must be reconciled manually with central accounting systems and, as a result, the same data elements have to be entered into multiple systems manually.

For example, systems that support programming and project delivery are not integrated and do not easily share data. More specifically, data pertaining to California Transportation Commission, such as project programming, are contained in multiple systems (e.g., CTIPS, COMS/EAS, PMCS, etc.), most of which require manual keying of data. Despite the efforts of financial management staff at headquarters and distributed throughout the districts, the current processes and sub processes developed in response to system limitations creates an unnecessary personnel burden.

To give an indication of the magnitude of the financial management process inefficiency at Caltrans, the Caltrans Integration Study estimated that consolidation of accounting infrastructure around general ledger, accounts payable and accounts receivable would generate 17.3 PY and $1,468,227 annually[3] in process savings.

3.2.1.5 High Financial Management IT Infrastructure Costs

Given the 160 financial management systems in use throughout the organization today, the cost of supporting existing financial management IT infrastructure is extremely high. Multiple,

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[1] Source: Legislative Analyst's Office, February 2005 (http://www.lao.ca.gov/analysis_2005/transportation/tran_03_2660_anl05.htm)

[2] Source: Caltrans Integration Study, (June 2004)

[3] Source: ibid, assumes an average loaded salary (i.e., salary and benefits) of $85,000

redundant processes, software and hardware, and support functions are a direct result of the conditions described in Section 3.1.6. There is substantial duplication among system functionality and data within the Department and many systems operate using outdated technology and esoteric programming languages. Dozens of point-to-point interfaces between systems introduces data accuracy and integrity risks as they create new interface support requirements for an already overburdened staff. To compound the issue, it is extremely difficult to attract and retain qualified IT staff with the requisite skills to maintain many of the older applications. A poignant example of the current state relates to interfaces with the SCO. Multiple interfaces must be maintained with the SCO by Caltrans in order to issue checks. These interfaces range from various automated systems to manual processes that exchange data on removable media. With proper planning, resources and execution, this interface burden could be streamlined considerably to the benefit of both Caltrans and SCO.

3.2.1.6 Inability to Access Timely Financial Information

The financial needs of operational management are not currently satisfied because managers cannot access information when it is needed. With the current environment of multiple and disconnected financial systems, Caltrans management must make decisions without the benefit of credible current financial data since they must frequently rely on out-of-date information. For example, Department districts and divisions are hampered in managing their budgets during the year due to the time delay in processing allocation and expenditure information. Currently, financial information is not accessible to Department districts and divisions until 15 to 20 days after the end of each month.

3.2.2 Business Opportunities

The problems described in Section 3.2.1 are complemented by a number of key opportunities that can be realized through improvement of financial management processes, applications and infrastructure. The three primary opportunities related to Project Alpha are listed in Figure 13.

Figure 13. Primary Business Opportunities

The three primary business opportunities addressed by this proposal :	
1.	Manage Caltrans Like a Business for the Benefit of Californians
2.	Optimize the Use of Funds Through Better Business Intelligence and Analysis Capabilities
3.	Establish the IT Infrastructure and Technical Foundation for Future Business Improvement

Each opportunity is described below. Each opportunity impacts the entire Life Cycle and all aspects of the organization.

3.2.2.1 Manage Caltrans Like a Business for the Benefit of Californians

Perhaps the most important problem or opportunity within this feasibility report, Project Alpha will set the foundation that will enable Caltrans to operate and manage itself like a private sector business. The fiduciary responsibilities of Caltrans are not effectively executed today despite the best efforts of its 22,000 employees. Given better tools, systems and infrastructure, Caltrans' management will have the information available to make fact-based decisions that will benefit all Californians. Quantification of this opportunity cannot be realistically estimated; however, the $8 billion budget and billions in construction projects could be much better managed and

Departmental investments can be substantiated by accurate information from its financial management systems. For example, a complete understanding of labor and material costs, as well as the trends of these costs and forecasts, could be used by Caltrans to intelligently prioritize projects and/or make project decisions that result in more efficient use of funds.

3.2.2.2 Optimize the Use of Funds Through Better Business Intelligence and Analysis Capabilities

Through the application of a robust reporting environment and improved reporting and business intelligence tools, future investments in projects and programs can be based on deep analysis and modeling to predict and accurately estimate outcomes and manage investments wisely. Caltrans can make significant inroads in consolidating and linking its disparate data repositories in a manner that will give the Department actionable information for management decisions. Data from systems outside the scope of IFMS can be combined with IFMS data to uncover trends and patterns that cannot be achieved via standard reporting functionality. This data will include five-year fund estimates, estimated revenue and expenses, construction-related data, as well as other, relevant historical data. Systems such as those listed below could be combined to the benefit of Caltrans:

- Budget Planning Model System (BPMS)
- Construction Management System (CMS)
- Office Engineer Item Database
- Disadvantaged Business Database

This opportunity to monumentally increase the Department's business intelligence will complement the increased knowledge base that Caltrans' management will have by realizing the opportunity in 3.2.2.1.

3.2.2.3 Establish the IT Infrastructure and Technical Foundation for Future Business Improvement

As described in Section 3.1, Project Alpha, in addition to the providing significant benefits as an individual project, is the cornerstone of the IFMS Strategic Plan. Project Alpha is required to enable current and future business needs by establishing infrastructure and core accounting functionality that all future projects will depend on. Without a major improvement to its core accounting functionality and the supporting infrastructure, realization of the IFMS Strategic Plan cannot be achieved and future technology opportunities may be precluded by lack of investment in the short-term. For example, the Fixed Assets and Inventory implementations that are planned to be initiated in the near future, have dependencies on Project Alpha that require the project to begin only after successful completion of Project Alpha. This dependency is true of all the projects that comprise the IFMS Strategic Plan.

3.3 Measurable Business Objectives

3.3.1 General Objectives

The primary objective of Project Alpha and the IFMS Strategic Plan is to have access to comprehensive information to better manage the Caltrans organization like a business. Caltrans

intends to create and implement an integrated, financial management solution and infrastructure that will enable three major strategic objectives of the Department:

- Enable Caltrans to make the best investment decisions by providing all facets of financial management information.
- Enable Caltrans to manage the cost of doing business by providing timely and consistent cost management information.
- Establish efficient financial management processes by modernizing the financial management systems.

Section 3.3 identifies a number of more granular objectives that fall under these three objective categories. Achievement of these objectives will allow the organization to better understand how finances flow in and out of the organization and the benefits that to be achieved from accurately allocating funds to programs and projects. In addition, there are a number of secondary objectives that Caltrans hopes to achieve; they are as follows:

- Support the Department's financial reporting requirements, decision-making needs and other highly data-dependent objectives that require timely, accessible, structured and coherent data.
- Achieve financial management and tracking capabilities not currently available to Caltrans, such as the ability to make quicker, more information-based management decisions.
- Provide a seamless, streamlined interface for existing legacy systems and other DOT infrastructure components.
- Enable the Department to realize major efficiency and data accuracy gains by consolidating redundant legacy systems into a new, enterprise-wide solution.

3.3.2 Program Process Analysis

As described in the sections above and studied at length in the Caltrans Financial Management Integration Study, the direct process benefits that will result from Project Alpha are significant to both internal and external parties. The core processes described in Appendix C will be greatly improved and redundant systems and processes can be eliminated to the benefit of Caltrans and its customers. For a detailed discussion of the core processes and the limitations of the current method of executing these processes, refer to Section 4, Baseline Analysis.

3.3.3 Specific Program Objectives

Table 5. Project Alpha Measurable Business Objectives

Project Alpha Measurable Business Objectives
Enable Caltrans to Make the Best Investment Decisions by Providing all Facets of Financial Management Information ■ Provide executive staff, project managers and resource managers quick access to accurate and complete financial information for accountability and decision-making purposes.

Project Alpha Measurable Business Objectives
Enable Caltrans to Manage the Cost of Doing Business by Providing Timely and Consistent Cost Management Information ■ Utilize improved financial information as a formal input into project prioritization activities within one year following system acceptance. ■ Capture, monitor and report transportation system costs at the level of detail necessary for funding requirements within one year after system acceptance. ■ Reduce interest penalties on late payments by 60 percent one year after system acceptance.
Establish Efficient Financial Management Processes by Modernizing the Financial Management Systems ■ Decommission 70 legacy financial management systems, resulting in a savings of 16 PYs of Accounting support staff and 19 PYs of IT support staff. ■ Reduce average time period for development of monthly management reports by 66 percent.

3.4 Business Functional Requirements

3.4.1 Business Functional Requirements

An abbreviated list of the key business functional requirements for the new system is provided in the table below. For a complete list of business functional requirements, refer to Appendix A.

3.4.2 Infrastructure Requirements

The primary infrastructure requirement for Project Alpha is the hosting platform at DTS. Network and localized Caltrans hardware is sufficient to operate business applications. Any additional infrastructure components will be proposed by the Integration Partner and accepted by Caltrans. Identified technical requirements are provided in Appendix B.

3.4.3 Traceability Matrix

The following traceability matrix provides a visual representation of the relationship between business problems or opportunities, business objectives and system functional requirements. This matrix does not include all functional requirements, but representative requirements. See Appendices A and B for a complete list of business and technical requirements, respectively.

Table 6. Project Alpha Traceability Matrix

Business Need (Problem or Opportunity)	Business Objective	Representative Functional Requirement(s)
Problems		
Inability to track financial performance outcomes/measures.	■ Reduce interest penalties on late payments 60 percent one year after system acceptance.	■ Ability to integrate fiscal and non-fiscal data to track performance outcomes.
Limited visibility into costs and impacts.	■ Capture, monitor and report transportation system costs at the level of detail necessary within one year after system acceptance.	■ Ability to perform cost accounting easily and accurately. ■ Ability to manipulate financial data to measure impacts.

Business Need (Problem or Opportunity)	Business Objective	Representative Functional Requirement(s)
Limited capability to ensure accountability for federal and state funds.	■ Enable Caltrans to make the best investment decisions by providing all facets of cost of ownership information.	■ Ability to track funds across multiple dimensions, such as budget year, state and federal fiscal years and funding requirements.
Inefficient financial management business processes.	■ Establish efficient financial management processes by modernizing the financial management systems. ■ Reduce average time period for development of monthly management reports by 66 percent.	■ Ability to automate processes for general ledger, accounts receivable and accounts payable functions. ■ Ability to define workflow steps for financial management functions.
High financial management it infrastructure costs.	■ Decommission 70 legacy financial management systems, resulting in a savings of 16 PYs of Accounting support staff and 19 PYs of IT support staff.	■ Ability to support users geographically distributed across the state. ■ Ability to easily aggregate data to generate standard and ad hoc reports.
Inability to Access Timely Financial Information	■ Reduce average time period for development of monthly management reports by 66 percent.	■ Ability to easily aggregate data to generate standard and ad hoc reports.
Opportunities		
Manage Caltrans like a business for the benefit of Californians.	■ Within one year following system acceptance, utilize improved financial information as a formal input into project prioritization activities.	■ Ability to easily aggregate data to generate standard and ad hoc reports.
Establish the IT infrastructure and technical foundation for future business improvement.	■ Establish efficient financial management processes by modernizing the financial management systems.	■ Ability to easily integrate future business applications with core accounting and financial management system. ■ Ability to integrate ERP data with legacy and future applications.
Optimize the use of funds through better business intelligence and analysis capabilities.	■ Utilize improved financial information as a formal input into project prioritization activities within one year following system acceptance.	■ Ability to perform trend analysis for labor and operating expenditures against historical costs. ■ Ability to generate reports generated from multiple data sources.

4.0 Baseline Analysis

The purpose of this section is to provide a clear understanding of the technical environment and infrastructure that currently supports Caltrans financial management business functions. In addition to a description of the present technical landscape at Caltrans, it details the manner in which Caltrans end-users use applications and technology to execute the business processes previously described in Section 3, Business Case. The content builds on the Business Case in Section 3, further highlighting and substantiating the need to implement the Proposed Solution described in Section 5.

Table 7. Baseline Analysis Sub-Sections

4.1 Current Method
4.1.1 Objectives of the Current System
4.1.2 Ability to Meet Workload
4.1.3 Internal User Satisfaction
4.1.4 External User Satisfaction
4.1.5 Technical Satisfaction
4.1.6 Data Input and Output
4.1.7 Data Characteristics
4.1.8 Security, Privacy and Confidentiality
4.1.9 Equipment Requirements
4.1.10 Software Characteristics
4.1.11 Internal and External Interfaces
4.1.12 Personnel Requirements
4.1.13 System Documentation
4.1.14 Failures of the Current System
4.2 Technical Environment
4.2.1 Expected Operational Life
4.2.2 External System(s) Interface(s)
4.2.3 State-Level Information Processing Policies
4.2.4 Financial Constraints
4.2.5 Legal and Public Policy Constraints
4.2.6 Department Policies and Procedures Related to Information Management
4.2.7 Anticipated Changes in Equipment, Software or the Operating Environment
4.2.8 Availability of IT Personnel

4.1 Current Method
4.3 Existing Infrastructure
4.3.1 Desktop Workstations
4.3.2 LAN Servers
4.3.3 Network Protocols
4.3.4 Application Development Software
4.3.5 Personal Productivity Software
4.3.6 Operating System Software
4.3.7 Database Management Software
4.3.8 Application Development Methodology
4.3.9 Project Management Methodology

4.1 Current Method

In support of the primary financial management business processes illustrated in Section 3.1.2, Caltrans' financial management requirements are organized into seven main financial functions, four of which are germane to the scope of the FSR, namely:

1. Budgetary Control and Funds Management
2. Accounts Payable
3. Accounts Receivable
4. General Ledger

The current automation method for financial management includes 160 systems that vary from centralized mainframe systems to distributed client-server applications to individual desktop databases and spreadsheets. This environment has resulted in systems that exhibit duplicate functionality and data, redundant data entry into unconnected systems, as well as multiple point-to-point interfaces necessary to provide accessible data to meet user needs.

The largest application in support of financial management functions is the Department's primary accounting system, Transportation Accounting and Management System (TRAMS). TRAMS is a collection of mainframe applications implemented in 1983. It was designed to meet the Department's accounting needs in the following areas: appropriation control, allocation accounting, encumbrance accounting, receipt accounting, accounts payable, general ledger accounting, cost accounting, cost allocation and labor distribution.

TRAMS is the system of record for financial information and produces the financial statements that represent the financial position of the Department's funds. A number of the 160 applications used today were procured or developed in response to real or perceived functional limitations of TRAMS (for example, TRAMS is a batch system, processing transactions overnight — this causes interruption in the normal workflow as some staff-initiated processing steps must take place after TRAMS processing). The proliferation of duplicate functionality and "shadow systems" in response to changing business requirements and limitations of legacy systems is common in many organizations, particularly public sector organizations.

While the focus of the current method will be on four primary business functions that comprise the scope of this FSR, known internally as "Project Alpha," it is important to note that the Integrated Financial Management System (IFMS) functionality that will be implemented is the cornerstone of a larger initiative to modernize Caltrans' information systems. The functional scope of the IFMS within the scope of this FSR will form the basis from which future automation projects will be deployed.

As described in Section 3, the Caltrans financial management life cycle provides a way to conceptualize how business process and automation improvements will impact Caltrans' ability to efficiently and effectively deliver services to the citizens of California. Project Alpha will have a significant impact on financial management processes and will provide the foundation for subsequent projects that will further improve Caltrans' operations throughout each stage of the financial management life cycle.

An individual description of the current methods — including manual and technology-assisted procedures and tasks — used to execute each of the four primary functions is provided below. These functions span Caltrans' financial management life cycle from fund management through service delivery and provide insight into the complexity and interconnected business requirements that are manifest in the multiple, distributed automation systems currently within the Caltrans environment.

Following each current method description is a detailed diagram of systems currently in use for each financial function. These diagrams provide a more granular view of the systems and the flow of information within each financial function to provide the reader with a full understanding of the current state. It is important to note that the systems in the diagrams provide greater detail than the description of the current method for each function. This approach provides an overview of each financial function and the systems involved, without overwhelming the reader in a layer of technical detail unnecessary for the purposes of an FSR. However, the major and salient problems with the current methods are detailed for each function.

Budgetary Control and Funds Management

Budgetary control and funds management functions are supported by over 16 financial management systems across the Caltrans organization. Caltrans manages budget allocations executed by the State Budget Act within the Budget Monitoring System (BMS). BMS also contains expenditure information that allows divisions to monitor what they spend against their available resources. However, transaction level expenditure details reside in other TRAMS files and subsystems. As a result, BMS does not capture allocations and expenditures at the level of detail required by Caltrans. Consequently, Districts and Divisions have developed secondary expenditure tracking systems, also known as "checkbook" systems, to monitor expenditures on a near real-time basis. Divisional staff expends time and resources every month reconciling data from these distributed computer systems with BMS and TRAMS, using manual or semi-automated processes.

As local agencies complete roadway infrastructure projects and request reimbursement from the Department, the Local Programs Accounting and Management System (LPAMS) processes the payment to the local agency. As the project incurs costs, the Current Billing and Reporting System (CBARS) creates the federal aid bill for reimbursement from the Federal Highway Administration (FHWA). Using multiple systems to process payments to local agencies and request reimbursement from the FHWA, makes it difficult to track project expenditures and introduces additional staff effort to reconcile each system.

Develop and Maintain Allocations

Once the Caltrans department-wide budget is approved in the passing of the State Budget, the Department allocates appropriations to the Divisions and Districts. Allocations are maintained in the BMS, and, together with expenditure data maintained within TRAMS, are downloaded to the Budget Allocation Tracking System (BAS), which is the Department's primary source for support of allocation balances. However, neither BMS nor BAS decompose allocations to the level of detail that Divisions and Districts require. For example, purchases under $2000 are not encumbered in TRAMS. As a result, BMS cannot report on them. Consequently, the Divisions maintain expenditure tracking systems and Districts maintain their own "checkbook" systems to monitor their allocation balances. These systems have to be reconciled manually or through semi-automated processes developed by the various divisions. This results in increased staff

workload to conduct data reconciliation, redundantly input data, and introduces data integrity problems.

In addition to Division and District allocations, funds are allocated to projects through the State/Federal programming processes. The Caltrans District performing the work, or the local agency responsible for the project, requests an allocation of funds for support and capital investments over the multi-year duration of the project. Each approved capital project is assigned an expenditure authorization (EA), which identifies the amount of allocation per fund that can be used. Various systems are used to monitor project allocations, including LPAMS, Capital Outlay Monitoring System/Expenditure Authorization System (COMS/EAS) and the Capital Allocations database. Maintaining the same data across multiple systems introduces issues with tracking projects, data reconciliation and increased staff workload dedicated to compiling meaningful enterprise wide data to determine current status of project funding and available allocations.

Moreover, the Department must track the State and local split of budgeted federal appropriations and allocations. Division of Budgets' staff enters the appropriations and allocations data into an Excel spreadsheet to determine the State and local split amounts. Both the federal funding notification and the worksheet containing the state and local split are distributed to Accounting staff (using CBARS) and Local Programs Accounting staff (using LPAMS,) who manually input the information into their systems. Significant research and reconciliation is required to ensure that California fully utilizes its obligation authority each year.

Data from various systems are used to track the obligated amount of Federal funds for specific State and local projects. Accounting provides the Federal Resources Office (FRO) with a monthly CBS601R report showing individual project information, including the amount of Federal funds obligated to the project and type of Federal fund(s) being used. FRO creates a draft of the Monthly Fund Usage Report and distributes a hardcopy of the report to Accounting (using CBARS) and Local Programs Accounting (using LPAMS). These groups reconcile the data with their internal data systems and coordinate with the FRO to investigate any discrepancies in appropriation and allocation totals. Tracking Federal funds in multiple systems leads to excess staff workload when entering and reconciling data in multiple systems. Furthermore, Caltrans has limited ability to report and track how obligations are being spent from year to year.

Monitor Expenditures

Divisions and Districts utilize 16 different primary systems to monitor actual expenditures against their appropriations, allocations, obligation authority, planned expenditures and/or encumbrances. Seven of these sixteen systems provide functionality that is within the scope of Project Alpha. The systems are as follows:

- COMS/EAS
- CAPS
- LPAMS
- CBARS
- BMS
- BAS
- TRAMS

In addition to these seven primary systems there are dozens of division and district systems that are maintained to monitor expenditures at a more detailed level. These “checkbook” systems have been developed to track expenditure information that is not maintained in BMS or other systems. This includes tracking expenditures for items under $2000. These purchases are not encumbered in BMS and only appear after an invoice has been paid resulting in a distorted view of funds available to the division or district.

The same appropriation, allocation, obligation authority, planned expenditure, or encumbrance data is often times maintained across multiple systems to provide varying levels of detail needed for those systems to function. As a result, Caltrans has to maintain numerous processes for updating and maintaining this information in each system, a cumbersome and time-consuming task.

Manage Funds

Transportation Funds allocated by the California Transportation Commission (CTC) and funds obligated by the FHWA are managed by numerous systems throughout the Caltrans organization. The systems germane to Project Alpha include LPAMS and CBARS. Multiple systems create issues with data reconciliation and maintenance of numerous point-to-point interfaces. Reconciliation is often done manually by Caltrans’ staff, requiring a significant amount of time and effort. Furthermore, obtaining information about funds is complicated by varying levels of detail and duplicate data existing in multiple systems.

Table 8 provides traceability between the business functions, current method used to perform the functions and limitations associated with the current methods.

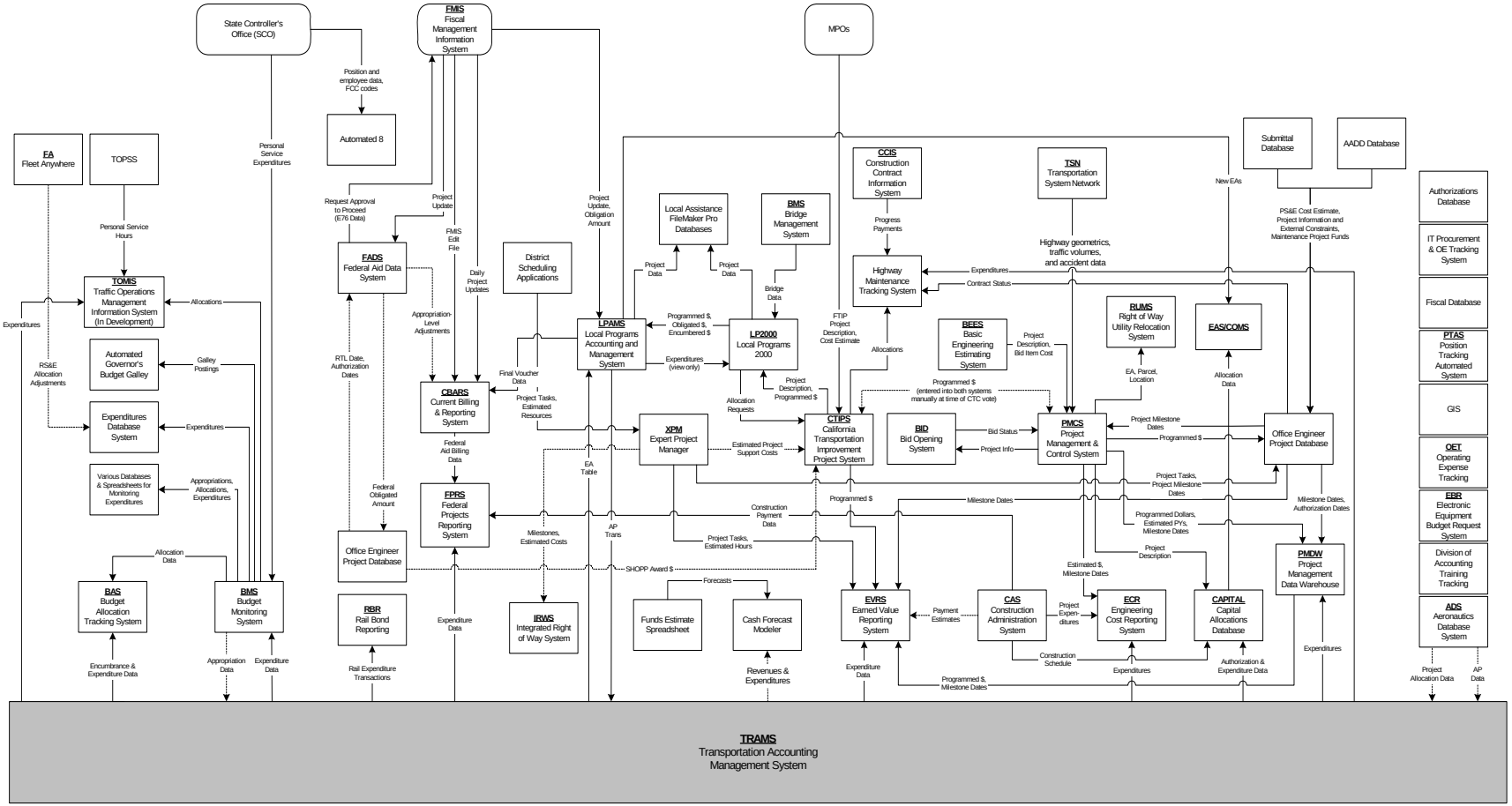
Table 8. Current Method for Budgeting, Programming and Funds Management

Business Function	Current Method	Limitations of the Current Method
Develop and Maintain Allocations	■ BMS downloads allocation data into the BAS. ■ Districts/Divisions use BAS to reconcile their own “checkbook” systems. ■ LPAMS and COMS/EAS are used to manage project allocations. ■ Federal funds are managed using spreadsheets to determine allocations manually entered into CBARS and LPAMS.	■ Departments run their own “checkbook” systems due to a lack of detail in BMS and BAS, requiring effort to reconcile with BMS and BAS on a monthly basis. ■ Disparate reconciliation routines based on individual systems. ■ Manual processes and proliferation of data transmission engender data quality issues.
Monitor Expenditures	■ Seven separate systems are used to monitor appropriation, allocation, obligation, planned expenditure and encumbrance data. ■ The same data has to be entered into multiple systems for tracking expenditures.	■ Numerous, redundant processes have to be maintained for keeping data updated in multiple systems. ■ Many systems are inaccessible, causing staff to rely on incomplete information regarding specific expenditures.

Business Function	Current Method	Limitations of the Current Method
Manage Funds	■ LPAMS and CBARS are used for managing funds allocated by the CTC and the FHWA.	■ LPAMS and CBARS have duplicate functionality and contain duplicate data. ■ Significant effort is required to reconcile data and manage department funds across multiple systems.

Figure 14 provides a detailed illustration of the computer applications utilized to execute the business functions of budgeting, programming and funds management

Figure 14. Systems used in Budgeting, Programming and Funds Management



Procurement

Caltrans has implemented numerous-stand alone systems over the past 22 years to support procurement activities. In most cases, the same data that is manually prepared on a requisition form is keyed into a system as a purchase order or contract, manually received, and keyed yet again into an accounting system to process the payment transaction. The majority of procurement system functionality will be included in a follow-on project to Project Alpha. Only the Contract Status Tracking System (CSTS) and the Contract Delegation Purchase Order System (CDPOS) are relevant to the scope of Project Alpha. CSTS is used for monitoring the status of procurement contracts while CDPOS is used to generate purchase orders after receiving a valid request. Impacts to the overall procurement process will be realized in projects subsequent to Project Alpha. The replacement of CSTS and CDPOS with Project Alpha systems, however, will have several immediate benefits to the procurement process. Project Alpha will automate the receiving process and create a receiving record in the IFMS. This record will provide the glue between procurement and accounts payable that is essential to keeping expenditure data correct and the budget position current in the IFMS. The systems used for the requisition process, however, will not be part of project alpha, but will be the focus of a future project.

Accounts Payable

The accounts payable processes encompass all of the activities required to maintain vendor information, record the encumbrance for the liability, liquidate the encumbrance, validate the vendor's invoice, and process and issue payment.

For most goods and services obtained through the procurement process, the Division or District submits the invoice and supporting documentation to the D of A for processing. Staff members match the invoice, receiving record and contract/purchase order against the encumbrance. A claim schedule number is retrieved and the transactions are posted into TRAMS. The claim schedule documentation is subsequently forwarded to the State Controller's Office (SCO) to produce the warrant. Finally, the warrant is mailed to the vendor by the SCO, unless special handling instructions are required.

The accounts payable processes and activities are decomposed in further detail into the following sub-functions:

- Establish and Maintain Vendor Files/Lists
- Encumbrance Control
- Process Payment
- Claim Schedule Processing
- Record Payment
- Reconcile A/P Accounts

Establish and Maintain Vendor Files/Lists

Vendor data is collected during the procurement process and maintained in multiple systems that monitor the award of contracts and purchase orders. The same data is re-keyed into

accounts payable systems to process payments to vendors. The master list of vendors used by the department is maintained in TRAMS and is duplicated in Caltrans' numerous procurement and accounts payable systems.

Encumbrance Control

Encumbrances are recorded manually in TRAMS to reserve a portion of the applicable appropriation so that required funds will be available to meet planned expenditures. In addition to manually entering encumbrance transactions, the COMS/EAS and the LPAMS systems also post encumbrance transactions to TRAMS. The Capital Outlay Monitoring System (COMS) component of COMS/EAS is responsible for the certification of Capital Outlay Expenditure Authorizations (EAs). This process involves validating that the authorized dollars on the EA are less than or equal to the allocated dollars. If this is the case, the process culminates in the posting of the EA Authorized Amount to the TRAMS EA File and the generation of an encumbrance, which is posted to the TRAMS Encumbrance File. LPAMS posts encumbrance transactions that pertain to local projects. It is important to reiterate here that amounts less than $2,000 are not encumbered. The cumulative effect of these missing encumbrances causes overspending — something that is detected after it is too late to avoid.

Process Payments

Payment requests are processed either directly through TRAMS or through one of the various subsystems outside of TRAMS that have been developed to accommodate the new process requirements that could not be accommodated because of difficulties in modifying existing systems. Subsystems that process payments include:

- Purchase Card Accounting and Requisition System (PCARS) for the approval and processing of CAL-Card purchases.
- American Express Billing System for processing travel purchases from Navigant.
- Statewide Utility Billing System (SUBS) and the Paper Utility Billing System (PUBS) for the processing of telephone and utility bill charges.
- Caltrans Accounts Payable System (CAPS) for processing CDPOs and Equipment Shop purchases.
- Construction Administration System (CAS) for triggering payments to vendors on Capital Outlay projects.

Payments issued from multiple systems require additional staff workload to perform the current business process and to reconcile data among the various systems and TRAMS. For example, staff are unable to retrieve and report on data stored in subsystems from a single reporting source, which results in staff requesting multiple data sets from multiple sources, requiring manual consolidation of the resulting information.

Issue and Collect Advances

Numerous systems are currently in use for processing advances and overpayments. Duplication of effort for these functions involves the manual entry of invoice and collection data into multiple systems, and the subsequent need for reconciliation of this data. For travel advances, TRAMS and TAMS record the outstanding travel advance or travel overpayment receivable. The

receivable is initially keyed into TRAMS when the Office Revolving Fund Check is produced and then this data is manually keyed into TAMS. Office of Accounts Payables' staff use the data in TAMS to request payroll deductions from the SCO.

Vendor advances, such as legal or postage advances are processed using TRAMS and the Vendor Advances spreadsheet. The receivable is initially keyed into TRAMS when the Office Revolving Fund Check is produced. This data is then manually keyed into the Vendor Advance spreadsheet.

Maintaining multiple systems for processing of advances and overpayments creates significant duplication of effort and manual data entry. Furthermore, department staff must spend significant time manually reconciling data among the various subsystems.

Process Claim Schedule

For most types of payments, a claim schedule packet is created and submitted to the SCO in order to issue warrants for the Department's invoices. The systems listed below submit claim schedule information to the SCO. Although the SCO has a standard file format for submissions (some systems submit electronically, but most submissions occur as a hard copy submission), each of the applications below writes a payment file to the SCO using a unique format. This is because the applications were developed during different eras with differing SCO interface requirements.

- For utility bills, one of two different payment processes are executed depending on whether the bill is submitted in hardcopy, by CD-ROM, or electronically. For paper bills and bills submitted on CD-ROM, PUBS posts the payable transaction to TRAMS, which in turn, generates the claim schedule that is submitted manually to the SCO. For claims submitted electronically by vendors through the MCI Internet Mailbox, PUBS posts a payable transaction to TRAMS, produces an EFT Face Sheet that is mailed to the SCO, and generates an electronic SCO Claims File containing the payment details. The receipt of the Face Sheet by the SCO triggers the Electronic Funds Transfer (EFT) payment process between Union Bank, Mellon Bank, and finally, the utility vendor.
- For contract delegation purchase orders, the CAPS automates the document processing and transaction recording.
- TRAMS creates an EFT payment transaction for select vendors that submit invoices for EFT (only certain payment types have been approved by SCO for EFT payment). An EFT payment file is created from which the SCO processes electronic payments.
- CAS initiates a voucher to the State Controller to pay contractors for contract work completed.
- For transactions that are manually keyed into TRAMS, the system creates a face sheet that is combined with the payment package and delivered to the SCO.

Record Payment

Once the claim schedule has been processed by the SCO and warrants are issued, SCO sends two magnetic tapes to DTS — one file with direct warrant payment data and one file with reimbursement data for payments originally made from the Revolving Fund. The purpose of the payment tapes is to notify Caltrans of payments that have been made on its behalf. Together

these two files include payment information related to all of the payments requested, irrespective of which system initiated the payment. Without the tapes, TRAMS and its payables subsystems have records that payments were requested through the claims schedule process, but have no record of whether or not payment was actually made. These two files are processed by the Daily Direct Claims Paid (DCP) and No Warrant (NOW) systems; both systems' sole purpose is to transfer Claim Schedule information from the two tapes into TRAMS, as DCP and NOW posts these liquidations to TRAMS. CAPS receives confirmation directly from the SCO about the payments the Department requested; therefore, CAPS does not need to receive any data from the tapes processed by DCP and NOW. CAPS posts accounts payable liquidations to TRAMS. No systems other than TRAMS and CAPS receive updates concerning the status of the payable. The other payables subsystems only have records of the issuance of a claim schedule to the SCO.

Several subsystems track and control the payments to Caltrans' vendors. The Service Contracts Automated Tracking System (SCATS) tracks and publishes contract information, vendor payment history and contract balances of major service contracts. The Progress Estimate Tracking System (PETS) tracks and publishes payments made to construction contractors. In addition, PETS is used as a mechanism to hold payments for vendors who are subject to liens, stop notices, labor compliance violations, or other legal actions.

Reconcile A/P Accounts

TRAMS is recognized by Caltrans as the system of record for accounts payable transactions. TRAMS, however, does not provide adequate functionality for divisions and districts, resulting in the creation of numerous systems that provide reconciliation functionality.

- Revolving Fund System (RFS) is used to reconcile the Revolving Fund checks and advances against reimbursements made by the State Controller's Office.
- Duplicate Payment Reporting System (DPRS) is designed to detect the possibility of duplicated payments that may have been paid to a vendor and to provide information that assists staff in recovering any actual duplicate payments that may have been made. DPRS selects transactions from TRAMS for reconciliation.
- American Express Billing System allows disputed items to be flagged in the system and a list is generated. This list is printed to facilitate reconciliation.
- PCARS and the CAL-Card Tracker allow users to reconcile purchases with the monthly state of account file received from the bank.

Table 9 provides traceability between the Accounts Payable business functions, current automation method and limitations associated with those systems.

Table 9. Current Method for Accounts Payable

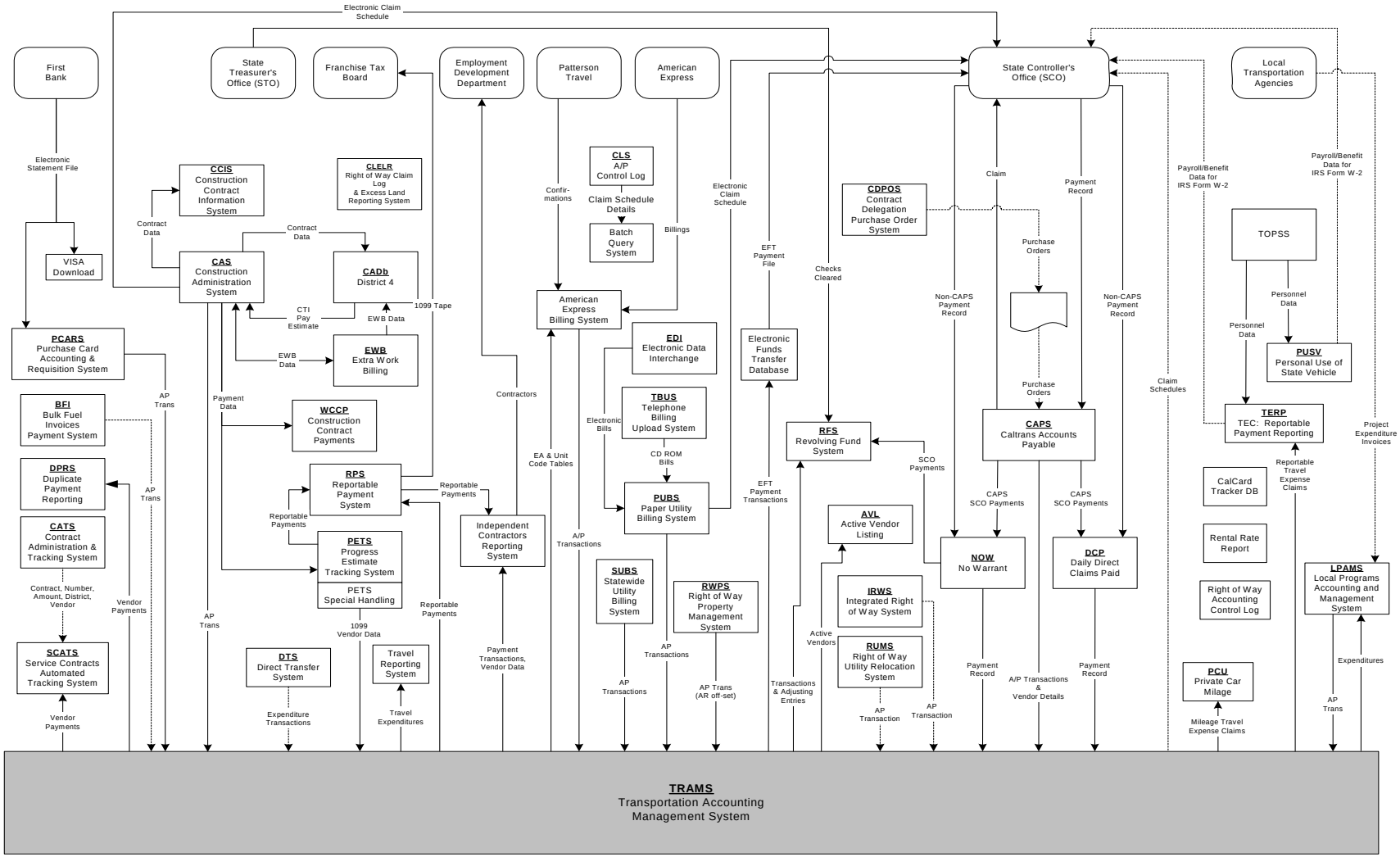
Business Function	Current Method	Limitations of the Current Method

Business Function	Current Method	Limitations of the Current Method
Establish Maintain Vendor Files/Lists	■ Vendor data is keyed into multiple systems for processing accounts payable. ■ TRAMS serves as the system with the master vendor list. ■ Data is reconciled between TRAMS and the various subsystems.	■ Numerous systems are used to support the accounts payable process; each requires that vendor information is manually keyed in to execute one transaction. ■ Manually keying data into multiple systems not only is labor intensive but is error prone.
Encumbrance Control	■ Encumbrances are manually recorded and controlled in TRAMS. ■ COMS/EAS posts capital outlay encumbrances to TRAMS. ■ LPAMS posts local program related encumbrance data to TRAMS.	Funds for expenditures of less than $2000 are not encumbered in TRAMS, and only show up as being spent when an invoice is paid, resulting in a distortion of funds available. ■ Departments have had to develop their own “checkbook” systems to effectively track expenditures.
Issue and Collect Advances	■ Issue travel advances by keying requests into TRAMS and TAMS (Travel Advance Monitoring System). ■ Monitor and clear vendor advances and overpayments in the Vendor Advance Spreadsheet.	■ Travel advances have to be manually keyed into multiple systems. ■ Reconciliation is required to keep the data between TRAMS and the Vendor Advance Spreadsheet accurate.
Process Payments	■ Payments are processed through TRAMS and multiple subsystems developed to accommodate differing process requirements including: ❑ PCARS for CAL-Card purchases. ❑ American Express Billing System. ❑ SUBS for utility billing. ❑ PUBS for paper utility billing. ❑ CAPS for processing CDPOs and Equipment shop purchases.	■ Multiple payment systems require significant effort to reconcile errors with subsystems posting data to the general ledger. ■ Many subsystems have their own edits, which differ from TRAMS. This results in multiple error files which need to be corrected.
Process Claims Schedule	■ Claim schedule packets are created and submitted to the SCO using a variety of systems, each with its own interface developed over the years.	■ Each system used to create a claim schedule uses its own unique file format that does not match the format required by the SCO. ■ Multiple interfaces and schedule formats must be maintained.

Business Function	Current Method	Limitations of the Current Method
Record Payment	■ Two magnetic tapes are sent from the SCO once payment schedule has been processed and warrants have been issued. ■ DCP and NOW are used to post payment tapes from the SCO into TRAMS.	■ Confirmation that payments have been made are not posted to Caltrans until after a largely manual process of uploading tapes into TRAMS has occurred. ■ Multiple systems must be maintained to post payment data to TRAMS.
Reconcile A/P Accounts	■ The Revolving Fund System is used to reconcile revolving fund checks and advances against reimbursements made by the SCO. ■ The Duplicate Payment Reporting system is used to identify the possibility of duplicate payments made to vendors and provide information to assist staff in recovering any actual duplicate payments.	■ Processing edits to the general ledger is currently prone to errors. ■ Current payment methods are error prone, introducing the possibility of duplicate payments and the need for the Duplicate Payment Reporting System.

Figure 15 provides a detailed illustration of the computer applications utilized to execute the Accounts Payable business functions.

Figure 15. Systems Utilized for Accounts Payable Processes



Accounts Receivable

The majority of accounts receivable transactions are processed by the Accounts Receivable System (ARS — written in Queo V), with the exception being specialized receivables processed by other systems. ARS records most receivable transactions (i.e., billings, collections) and also records all cash deposits to the Department's zero balance accounts.

Specialized accounts receivable systems include:

- Current Billing and Reporting System (CBARS) — processes federal reimbursement billings.
- Signals and Lighting Billing System (SLB) — creates bills to local government entities for utility sharing agreements.
- Right of Way Property System (RWPS) — tracks rental payments for properties that are held for future highway projects. RWPS functionality will be addressed in a subsequent project to follow Project Alpha.
- Payroll Accounts Receivable and Reporting System (PARR) — records receivables due from employees for salary and travel overpayments.

From the perspective of Accounts Receivable, TRAMS operates solely as the General Ledger system. TRAMS does not record the details of Accounts Receivable invoices or payments. Details are maintained in the subsidiary systems ARS, SLB and CBARS. (ARS must still be accessed using a District logon account, causing users to log on and off multiple times to process invoices.) TRAMS merely records the transaction postings to the appropriate General Ledger account. The lack of a central single source for accounts receivable information limits Caltrans' ability to monitor and report on accounts receivable data. Furthermore, the limited reporting capabilities that do exist take a significant amount of manual effort to aggregate and reconcile.

Finally, a number of specialized reporting systems provide accounts receivable-related reports. For instance, the Reimbursement Subsystem and Reimbursement PC Reporting System provide reports of reimbursable expenditures over the life of a project.

Establish and Maintain Customers/Tenants

Maintenance of customer data in the accounts receivable subsystems is entirely manual. As D of A's Office of Accounts Receivable receives documentation on a new customer, or receives updated or modified information regarding an existing customer, the customer's identifying information is entered or updated in a customer or tenant profile in the subsystem. The lack of an integrated financial management system results in this data being maintained manually in multiple systems.

Generate Invoice Transactions

Several differing methods exist for generating invoices for the various types of receivables. The different types of receivables and the systems used to generate their invoices are described below:

- **Revenue Billing —** Revenue bills are entered into the ARS and Districts' staff enter the permit sale data into a District Microsoft Access database for Permits. A daily debtor permit report is generated from the Access database and submitted to the Accounts Receivable Revenue Unit. Accounts Receivable staff members then key data from the paper report into ARS to generate the invoices.
- **Installment Billing —** Installment billings are set up in ARS after Accounts Receivable staff receives paper documentation of purchase agreements for excess land sales and application forms for the land use programs. The Accounts Receivable staff set up the invoice in ARS based on the data in the application form. The installment cycle can be set up either monthly, quarterly, or annually and installment billings can be interest bearing or non-interest bearing. Once, the installment invoice is generated and sent to the customer, the ARS posts the installment billing transaction to TRAMS.
- **Reimbursement Invoices —** Reimbursement-related transactions are stored in the Reimbursement Subsystem. Staff accountants calculate the amount to be reimbursed and enter the billing transaction information into ARS. The ARS then creates the invoice and posts the billing transaction to TRAMS.
- **Abatement Invoices —** For abatements related to the repair costs incurred by individuals who have damaged Caltrans property, ARS receives maintenance and repair costs from the Integrated Maintenance Management System (IMMS). The damage billing is then handled similar to other ARS receivables and is posted from ARS to TRAMS.
- **Signal and Lighting Billing —** The Signals and Lighting Billing System (SLB) is used to capture direct and indirect costs of operating electrical installations at intersections and to bill participating local agencies for their share of these costs. SLB reads a TRAMS file of expenditures originally input to TRAMS via maintenance dailies and the Utility Billing System (UBS). The system then calculates the local agencies' shares of these expenditures and creates invoices accordingly. Billing transactions are posted to TRAMS and the invoices are generated monthly and forwarded to the signals and lighting accountant who reviews them for reasonableness and accuracy and mails them to the local agencies.
- **Federal Highway Administration (FHWA) Reimbursement —** CBARS creates the Federal Aid Bill for billing the FHWA. CBARS captures and accumulates expenditure transactions that were identified by its fund split processing as being federally reimbursable. CBARS creates a bill file when a user-maintained threshold amount (currently set to $5 million) is reached and sends the bill file to the FHWA via file transfer protocol (FTP). The billing data is also posted to TRAMS in the form of Accounts Receivable transactions.
- **Payroll Accounts Receivable —** Receivables due from employees for salary advances or overpayments are recorded in the Salary Advance Monitoring System (SAL) based on salary advance check transactions from TRAMS. Receivables due from travel advances

are manually keyed into TAMS based on travel advance check transactions from TRAMS.

Process and Apply Receivables/Revenue

Processing and applying receivables and revenue is sieved through the use of various systems, depending on the type of receivable or revenue.

- **Receipts for ARS Billings —** Receipts are processed by the Cashiering Deposits and Services Section using ARS. ARS then posts the receivable liquidation transaction to TRAMS. Upon entering the receipt into ARS, the cash balance of the Agency Trust Account 81 is automatically updated.
- **Receipts for Signals and Lighting Billings —** Receipts are sent to the Cashiering Deposits and Services Section. Cashiers identify SLB billings by the presence of an SLB remittance advice included with the payment. SLB does not have any mechanism for recording the liquidation of the receivable. Instead, the Cashier enters the payment receipt data into TRAMS to liquidate the receivable in TRAMS. A summary of the day's SLB receipts is entered into ARS to update the cash balance of the Agency Trust Account 81.
- **Receipts for FHWA Billings —** The FHWA's Rapid Approval and State Payment System (RASPS) edits the bill file sent from CBARS. The FHWA provides payment via electronic funds transfer to the California State Highway Account, usually on the same day that the billing file is electronically sent to FHWA. After the payment is received in the State Highway Account, the Office of Financial Accounting and Analysis initiates a cash receipts transaction in CBARS, which liquidates the receivable in both CBARS and TRAMS.
- **Receipts for Payroll Accounts Receivable —** Payroll receivables that are deducted from the employee's paycheck are automatically loaded into PARR when the SCO's payroll tape is loaded. The liquidated receivable information in PARR is then used to manually key the receivable liquidation transaction into TRAMS. SAL pulls the liquidation transaction from TRAMS. The receivable liquidation must then be manually keyed into TAMS. If the employee pays cash, the cash is deposited by the Cashiering Deposits and Services Section and manually keyed into PARR, TRAMS and TAMS. SAL is updated by loading the TRAMS transaction. The SCO is notified by e-mail not to deduct the receivable from the employee's paycheck. A summary of the day's cash payroll receipts is entered into ARS to update the cash balance of the Agency Trust Account 81.

Collect Cash

The Collect Cash function covers the receipt of cash when no receivable has previously been set up. Cash collections are deposited directly into the State Treasurer's Office bank accounts. Cash collections can be made for a variety of transactions; however, regardless of the source of the cash, the daily cash summary is entered into ARS. ARS records all cash deposits to the Department's zero balance accounts, i.e., Agency Trust Accounts 81 and 84.

Receivables produced from ARS, SLB and PARR are all collected using the centralized cashiering function in Caltrans. All cash receipts are forwarded to the cashier's office in the D of A at the Farmers Market site. Cashiers identify which system the receipt should be entered into: ARS, PARR, or TRAMS. The cashiers have access to all of these systems and key the payment

data into the appropriate system. Daily Deposit Summaries with the total dollar amount of each receivable type received are then manually keyed into ARS. In addition, staff cannot post a payment to more than one invoice — staff must either deposit the check and issue two checks that can be entered into ARS, or record manual adjustments. Manually having to process cash receipts and payments is not only resource intensive, but can be prone to data reconciliation and data entry errors.

Track Accounts Receivable Status

Monitoring accounts receivable status is generally performed in the system in which the accounts receivable transaction was originally entered. However, there are a few exceptions worthy of note. The list below describes which systems are involved with the different accounts receivable types.

- **Monitoring ARS Billings —** Monitoring of accounts receivable entered into ARS is also performed in ARS. ARS produces some standard reports, including an accounts receivable aging report. Reimbursement receivables entered into ARS are monitored in the Reimbursement Subsystem, which collects the transactions from TRAMS.
- **Monitoring Signals and Lighting Billings —** Signal and lighting reimbursements must be monitored using TRAMS data. SLB does not contain the functionality necessary to liquidate receivables, so liquidations are posted directly to TRAMS. An aging report is produced on a monthly basis by running a RAMIS report.
- **Monitoring FHWA Billings —** FHWA reimbursements are monitored in CBARS. The FHWA usually reimburses Caltrans the same day that the bill is submitted, so monitoring for payment is simply a formality.
- **Monitoring Payroll Accounts Receivable —** Payroll accounts receivable are monitored in PARR, SAL and TAMS. Users tend to use SAL and TAMS for their specialized information (salary and travel overpayments, respectively) rather than PARR; but PARR can be used as well.

Reconcile Accounts Receivable Accounts

The Accounts Receivable Reconciliation System (ARR) facilitates the daily reconciliations between ARS and TRAMS. Monthly reconciliations are completed between ARS reports and TRAMS general ledger account balances to comply with State Administrative Manual and Generally Accepted Accounting Principles (GAAP) requirements. Monthly reconciliations are also made between TRAMS, ARS and the Reimbursement Subsystem.

The Final Voucher Process is similar to a reconciliation process. A final voucher represents the final accounting of costs that is submitted to the FHWA once a federal project is completed. Completing the final voucher paperwork is facilitated by the Federal Projects Reporting System (FPRS). FPRS is a collection of mainframe reports that collects data from TRAMS, CBARS and the Contract Administration System (CAS). As the final voucher paperwork is completed, the documentation tasks are updated in the Completed Federal Project Inventory System (CFPIS).

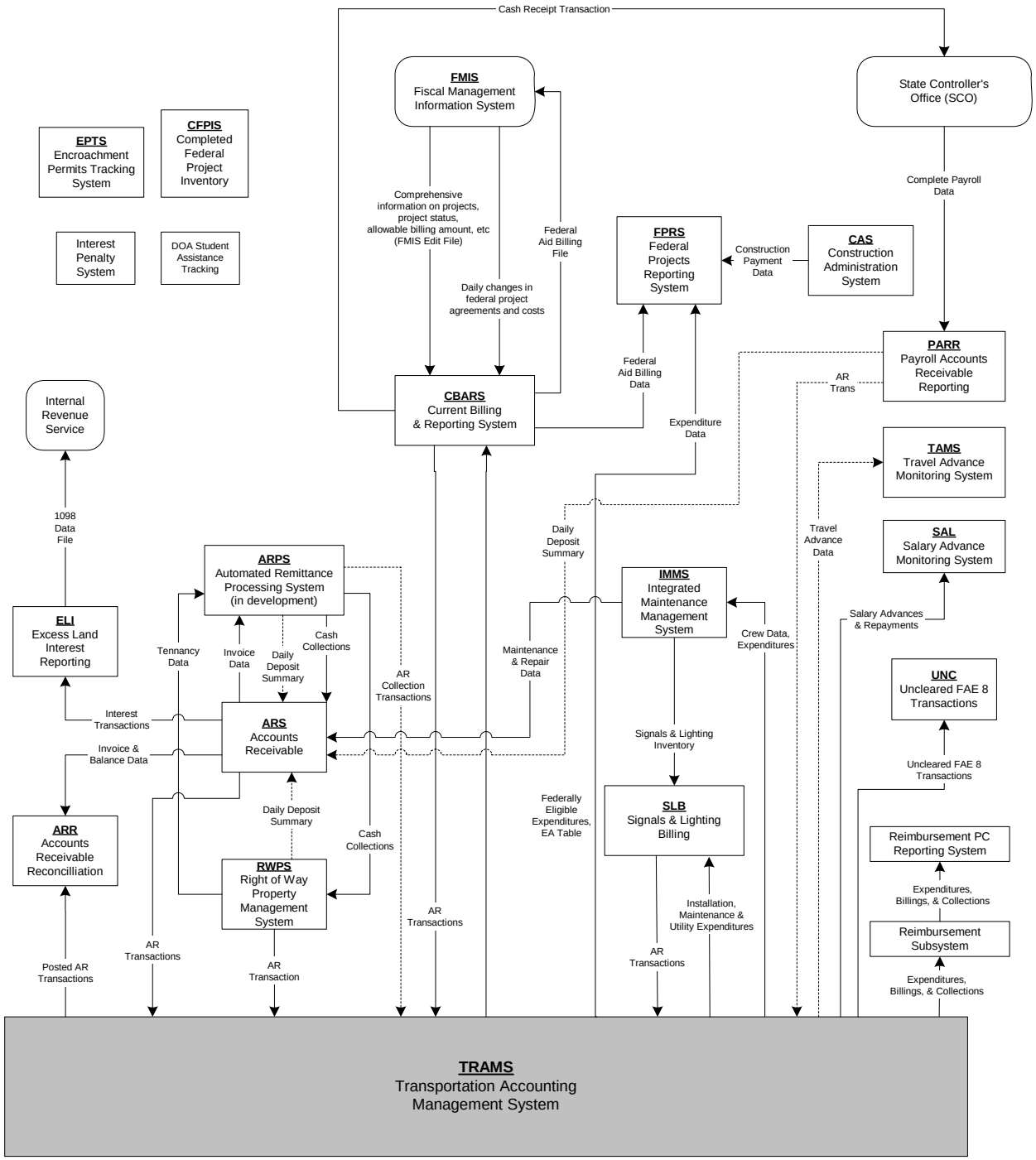
Table 10 provides traceability between the Accounts Receivable business functions, current automation method and limitations associated with those systems.

Table 10. Current Method for Accounts Receivable

Business Function	Current Method	Limitations of the Current Method
Establish and Maintain Customers/Tenants	■ Accounts Receivable System (ARS), Signals and Lighting Billing (SLB) and Right of Way Property System (RWPS), all maintain their own lists of customers and tenants. ■ Staff maintain the customer/tenant lists in each system independently of one another.	■ Multiple lists of customers and systems have to be maintained for establishing and maintaining customer tenants creating issues with manual data reconciliation and additional workload.
Generate Invoice Transactions	■ Invoices to contributors on local projects are entered manually into ARS and posted to TRAMS. Billing transactions are then loaded into the Reimbursement Subsystem and the Reimbursement PC Reporting System ■ Each month, billing accountants evaluate each project EA listed in the subsystem and determine whether or not to create an invoice.	■ Generating invoices requires manually entering data into several different systems. ■ Evaluating EAs monthly and determining if an invoice should be generated requires accounting staff to manually search multiple systems to make a decision.
Process and Apply Receivables/Revenue And Collect Cash	■ Receive customer payments, match the remittance advice to the invoice, and liquidate the outstanding receivable in one or more systems. ■ Data is entered into RWPS at the detail level for payments to Caltrans, and then the same data is re-keyed into ARS at the summary level for the bank deposit.	■ The same data has to be entered and maintained in two separate systems. ■ Cash deposits are made using a separate system than the one used to receive payments.
Reconcile Accounts Receivable Accounts	■ The Accounts Receivable Reconciliation System (ARR) facilitates the daily reconciliation between ARS and TRAMS. ■ Monthly reconciliation also occurs between TRAMS, ARS and the Reimbursement Subsystem	■ Multiple accounts payable systems require daily manual reconciliation by department staff.

Figure 16 provides a detailed illustration of the computer applications utilized to execute the Accounts Receivable business functions.

Figure 16. Systems Utilized for Accounts Receivable Processes



General Ledger

As noted earlier, TRAMS is the system of record for financial information. Financial statements that represent the financial position of the Department's funds are created manually, by keying TRAMS and RAMIS report data into Excel and Word files. TRAMS consists of an assortment of interrelated COBOL programs that run on the mainframe at the Department of Technology Services (DTS). The system coding structure and rules are recorded in tables and financial data is posted to financial files. When financial transactions are entered into TRAMS (either directly or through subsystems), the transactions are deposited into the TRAMS collector, a storage location on the mainframe where all input records are stored until processed.

During processing, the TRAMS subsystems and TRAMS programs are run in the order specified in the TRAMS calendar, to ensure that table updates and transactions are posted in the correct order. TRAMS takes each financial transaction located in the collector and processes it according to the rules specified in its coding tables. The processed financial transaction results in debit and credit postings to the proper general ledger accounts, as well as postings to subsidiary financial files, such as the Expenditure Authorization financial file.

TRAMS includes a number of programs that are important enough to its functional base that they are often referred to as their own separate programs, although they are subcomponents of TRAMS. These systems include:

- Net Zero system
- Encumbrance Refresh and Recalculation System
- Overhead Assessment Reimbursement
- Labor Distribution System
- Payroll Variance Distribution System

The Net Zero System backs out costs that have been previously expended in TRAMS to avoid double counting materials expenditures. The Encumbrance Refresh and Recalculation System updates encumbrance balances every month. The various cost distribution systems — that is, Overhead Assessment Reimbursement, Capital Outlay Support Overhead Assessment Rates — build TRAMS project expenditure transactions based on various indirect costs.

In addition to the core TRAMS processes that maintain setup tables for data validation and financial files for the posting of transactions, several additional systems perform core financial functions. COMS/EAS provides a routing and approval mechanism for EAs prior to activation for financial use. Once approved in COMS/EAS, the new EA is automatically set up in TRAMS. Prior to posting to financial files, each expenditure transaction is processed by the TRAMS/CBARS fund split program. During the fund split process, a single transaction is split into multiple transactions, with a separate accounting transaction for each funding line on the EA Table. As a result of this process, accounting transactions are generated to record the splitting of encumbrances and expenditures between funding sources (such as federal, state and reimbursements), program codes, appropriations, funds, etc. However, COMS/EAS can only split expenditures among different fund sources based on percentages that sum to 100 percent. To split fund sources in alternate situations (e.g., for a particular period of time, a set dollar amount, or certain type of expenditure), staff must manually move expenditures based on the specific situation.

The general ledger functionality in this section is decomposed into the following three sub-functions:

1. **Establish and Maintain the Chart of Accounts and Coding Structure**
   - This function represents the population and maintenance of core tables that support the creation and validation of financial transactions. In TRAMS terms, these are maintenance activities on tables such as the Appropriation Symbol Table, the Descriptor Table and the EA Table.
2. **Allocate and Process Costs**
   - This function utilizes systems responsible for the allocation and distribution of overhead costs and the assignment of labor costs to specific projects.
3. **Reconcile General Ledger Accounts**
   - This function refers to the process by which financial subsystems are balanced to the entries in the general ledger. Examples include any system that feeds summary transactions to TRAMS and maintains the underlying detail.

Establish and Maintain Chart of Accounts and Coding Structure

The vast majority of table maintenance on TRAMS' tables is performed by manually keying data changes into the TRAMS descriptor tables. Most table elements do not change regularly, which enables easier comparison of financial data over time. Changes to some table elements require approval from the Department of Finance, which controls the California Uniform Codes Manual (UCM), which defines the minimum accounting structure for State of California Departments.

Updates to the TRAMS Expenditure Authorization (EA) table are mainly performed in COMS/EAS, since it has unique approval functionality. EAs are electronically routed for approval by COMS/EAS and finally submitted to the TRAMS Collector on approval. After processing in TRAMS, TRAMS sends a "match file" to COMS/EAS to verify that the EAs were created. LPAMS also initiates the creation of new EAs, which are sent to COMS/EAS for electronic approval processing.

Allocate and Process Costs

The types of cost allocations include the distribution of overhead and indirect costs and the assignment of labor and material costs to specific projects. Overhead and indirect costs are allocated by different systems, with each system specializing in a specific type of costs. The Overhead Assessment Reimbursement and Billing System (OAR) calculates the overhead allocation for reimbursable labor costs. The Capital Outlay Support Overhead Assessment Rates (COSOAR) applies Capital Outlay Support costs as overhead to projects, as required by Senate Bill 45. COSOAR is planned to be replaced by a mainframe system called SB45. OAR, COSOAR, and the proposed SB45 distribute costs using a fixed allocation rate.

The Current Billing and Reporting System maintain the percentage recovery rate that allows the Department to bill and collect the Statewide Allocation Program portion of the Indirect Cost Rate Proposal from FHWA.

The Labor Distribution System (LDS) creates TRAMS material and labor expenditure transactions based on maintenance work orders and employee timesheets provided by IMMS

and TOPSS. LDS creates the labor and material cost transactions for TRAMS. LDS also receives equipment usage data from IMMS, which it passes on to the Vehicle Usage Reporting System (URS). Actual payroll cash payments are received from the SCO on a tape, which is loaded into the Payroll Accounts Receivable and Reporting (PARR) System. The SCO also sends a hard copy report of total payroll. Any variation between the labor expenditures posted through LDS and the actual payroll paid to employees is distributed by the Payroll Variance Distribution System.

Lastly, The Usage Reporting System (URS) calculates possession and usage charges for each Division and unit who possessed or used a piece of equipment, which are submitted to TRAMS. Owners of equipment are charged a possession fee to cover vehicle-related costs. This possession fee is charged through TRAMS to an overhead EA on a weekly basis. When equipment is used, a usage fee is charged through TRAMS in the form of a debit applied to the user's EA and a credit to the owner of the equipment. URS calculates fees based on a table of rental rates developed from the information from the Rental Rate System (RRS); at the beginning of each fiscal year, the rental rates are loaded into URS from a file from RRS.

The multitude of systems utilized for allocation and processing of costs requires significant effort to track and process costs. Furthermore, the cost of operating multiple systems and reconciling data between TRAMS and the various subsystems is significant and in some cases has led to the development of an additional subsystem (e.g., the Payroll Variance Distribution System).

Reconcile G/L Accounts

TRAMS is the financial system of record and therefore, it contains the balances of all of the general ledger accounts. Some subsystems maintain subsidiary or detailed data that is not recorded in TRAMS, but support the transactions that are posted to TRAMS. These subsidiary systems must be reconciled to the balances in the TRAMS general ledger in order to ensure that they maintain correct data. There are five main types of subsystems that must be reconciled with TRAMS. The subsystems are:

1. **Core Subsystems —** Reconciliation between core sub-systems and TRAMS are described in the Accounts Payable and Accounts Receivable sections of this report.
2. **Non-Core Subsystems —** A number of non-core subsystems perform functions that are directly linked to TRAMS processing. Examples of these systems include: NOW, TAMS, SAL and PCARS. Reports are generated from the non-core subsystems and compared to respective TRAMS data reflected on various TRAMS reports. Adjustments are made in either the TRAMS systems and/or the non-core subsystem as appropriate.
3. **Non-Expendable Equipment —** Equipment data that is manually maintained in the Non-Expendable Equipment System is reconciled each month with the TRAMS SO1 Report for the Equipment General Ledger Account (2341). Any adjustments necessary to reconcile the two systems are made.
4. **Rail Bond Reporting System —** Both the Rail Bond Reporting System (RBR) and TRAMS track expenditures and encumbrance balances on rail projects impacting Fund 703. RBR extracts expenditure and encumbrance data monthly from TRAMS. This data is combined with contract and resolution data which is keyed into the system. Monthly reconciliation occurs between the RBR Bond Status Report, the TRAMS Operating File RAMIS report, and the SCO CTC Reconciliation report with adjustments made as necessary.

5. **State Controller's Office —** General ledger accounts are manually reconciled with the balances maintained by the State Controller's Office.

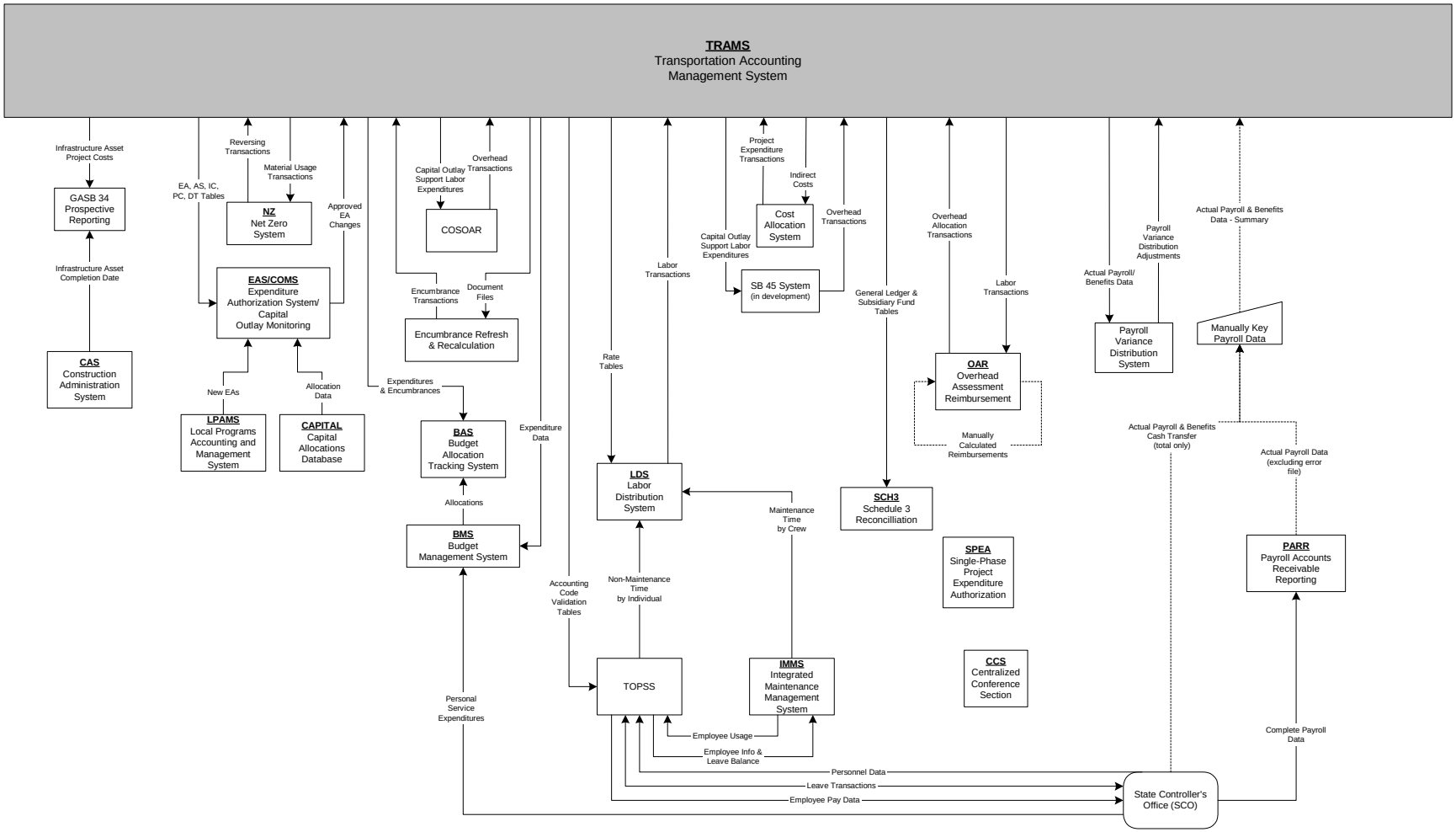
Table 11 provides traceability between the General Ledger business functions, current automation method and limitations associated with those systems.

Table 11. Current Method for General Ledger

Business Function	Current Method	Limitations of the Current Method
Establish and Maintain Chart of Accounts and Coding Structure	■ Population and maintenance of GL tables are done with several separate systems. EA updates are done with COMS/EAS, LPAMS and TRAMS. ■ When modifications are made the coding reference manual and associated Web site must be updated. SCO currently relies on a four digit fund code, while TRAMS has a three digit fund code that cannot be modified.	■ Multiple systems are used to maintain and update the core financial tables creating additional work for department staff. ■ Edits to TRAMS requires the associated sub-systems to be updated with the same information (if fund codes match), introducing a duplication of effort. Manual edits must be made when fund codes do not match.
Allocate and Process Costs	■ OAR, COSOAR and the proposed SB45 system are used to allocate overhead costs. ■ Each system uses its own cost base to develop distribution rates and has its own policies. ■ Each system has its own procedures dictating how distributions are made. Some are applied monthly and others are applied quarterly.	■ Multiple systems require significant effort by department staff to work together on the rate setting process. ■ Rate setting is further complicated by the need to adjust rates for each system's specific procedures and cost base.
Reconcile G/L Accounts	■ TRAMS and the multiple departmental subsystems are manually reconciled using manually generated reports. ■ Subsystems include: ❑ Core subsystems such as COMS/EAS, LPAMS, ARS, and SCO. ❑ Non-core subsystems such as NOW, TAMS and SAL ❑ Non-Expendable Equipment system ❑ Rail Bond Reporting System.	■ Multiple subsystems use and track financial information that must be updated and reconciled with TRAMS through manual efforts. ■ Financial data in TRAMS and one of the multiple subsystems is often times inaccurate due to one system's information being more current and not yet reconciled with other systems

Figure 17 provides a detailed illustration of the computer applications utilized to execute the General Ledger business functions.

Figure 17. Systems Utilized for General Ledger Processes



Summary of Current Method

Over the years, the evolving organizational needs of Caltrans' distributed IT funding and decentralized decision-making has led to the creation of over one hundred systems needed to accomplish the current method of financial management. As described in the sections above, the redundant functionality, cumbersome processes and procedures, sheer number of applications utilized and data integrity risks have generated an irrefutable need for action to improve the financial management processes and technologies in the Caltrans organization.

Project Alpha is the first step in addressing the problems introduced in Section 3, Business Case, of this FSR and will result in implementing the optimal solution to address functionality spanning 70 of these systems. As stated earlier, Project Alpha addresses a significant potion of the core financial management processes and will address many limitations of the current method. Many of the other problems engendered by the current method will be addressed in subsequent projects that require the successful implementation of functionality covered by Project Alpha.

Table 12 summarizes the current method for primary functions germane to Project Alpha and the business problems introduced in Section 3 that apply to each business function of the current method.

Table 12. Summary of Current Method for Project Alpha Business Functions

Business Function	Current Method	Limitations of the Current Method
Budgeting, Programming and Funds Management	■ The budgeting, programming and funds management process uses over 10 systems to track and perform various processes.	■ Limited centralized view of budgeted and programmed funds limits Caltrans' ability to provide statewide accountability for federal and state funds.
Accounts Payable	■ Accounts payable functions are handled by multiple systems to manage encumbrances, establish/maintain vendor lists, issue and collect advances, process payments, process claims schedule, record payment and reconcile A/P accounts.	■ High cost of maintaining the IT infrastructure for multiple systems and point-to-point interfaces. ■ Highly inefficient accounts payable business processes. ■ Limited visibility into costs and impacts.
Accounts Receivable	■ Accounts receivable functions are performed with multiple systems to establish and maintain customers, generate invoice transactions, process and apply receivables and revenue, collect cash and reconcile accounts receivable accounts.	■ High cost of maintaining the IT infrastructure for multiple systems and point-to-point interfaces. ■ Accounts receivable processes are highly inefficient due to multiple systems with overlapping functionality. ■ Limited visibility into costs and impacts. ■ Limited capability to ensure accountability of federal and state funds.

Business Function	Current Method	Limitations of the Current Method
General Ledger	■ General Ledger functions are accomplished using TRAMS and multiple subsystems. These functions include establishing and maintaining the chart of accounts and coding structure, allocating and processing costs and reconciling G/L accounts.	■ Limited capability to ensure accountability of federal and state funds. ■ Inability to track performance outcomes and measures. ■ High general ledger IT infrastructure costs. ■ Inflexible funding based on percentages.

In an effort to summarize the detailed information provided in the narrative and supporting diagrams for illustration of the current method, Table 13 below lists the primary current Caltrans systems that provide functionality in support of Budgeting, Programming and Funds Management, Accounts Payable, Accounts Receivable, and General Ledger processes and procedures.

Table 13. Systems Exhibiting Functionality Germane to and Replaced by Project Alpha

Principal Owner or Organization	System Name and Acronym
Accounting	Accounts Payable Control Log System (CLS)
Accounting	Accounts Receivable Reconciliation (ARR)
Accounting	Accounts Receivable System (ARS)
Accounting	Active Vendor Listing (AVL)
Accounting	American Express Billing System
Accounting	Automated Remittance Processing System (ARPS)
Accounting	Batch Query System (OAP Control Log)
Accounting	Budget Allocation Tracking System (BAS)
Budgets	Budget Monitoring System (BMS)
Accounting	Bulk Fuel Invoices Payment System (BFI)
Accounting	CalCard Tracker Database
Accounting	Caltrans Accounts Payable System (CAPS)
Budgets	Capital Allocations Database
Accounting	Capital Outlay Support Overhead Assessment Rates (COSOAR)
Accounting	Category 25 Reporting System
Accounting	Centralized Conference Section (CCS)
Accounting	Completed Federal Project Inventory System (CFPIS)
DPAC	Contract Delegation Purchase Order System (CDPOS)
DPAC	Contracts Status Tracking System (CSTS)
Accounting	Cost Allocation System
Accounting	Current Billing and Reporting System (CBARS)
Accounting	Direct Transfer System (DTS)
Accounting	D of A Student Assistance Tracking
Accounting	D of A Training Tracking

Principal Owner or Organization	System Name and Acronym
DPAC	Drug-Free Certifications Database
Accounting	Duplicate Payment Reporting System (DPRS)
Accounting	Electronic Data Interchange (EDI)
Accounting	Electronic Fund Transfer Database
Accounting	Encumbrance Refresh and Recalculation
Accounting	Expenditure Authorization System/Capital Outlay Monitoring System (COMS/EAS)
Accounting	Federal Projects Reporting System (FPRS)
Accounting	Independent Contractor's Reporting System
Accounting	Interest Penalty System
IT	IT Procurement and OE Tracking System
Accounting	Labor Distribution System (LDS)
Accounting	Local Programs Accounting and Management System (LPAMS)
Accounting	Net Zero System (NZ)
Accounting	No Warrant System (NOW)
Maintenance	Operating Expense Tracking (OET)
Accounting	Overhead Assessment Reimbursement and Billing System (OAR)
Accounting	Paper Utility Bills System (PUBS)
Accounting	Payroll Account Receivable and Reporting System (PARR)
Accounting	Payroll Variance Distribution System
Accounting	Personal Use of State Vehicles (PUSV)
Accounting	PETS Special Handling (PSH)
Accounting	Private Car Mileage System (PCU)
Accounting	Progress Estimate Tracking System (PETS)
Accounting	Purchase Card Accounting and Requisition System (PCARS)
Accounting	Rail Bonds/TCI Reporting System (RBR)
Accounting	Reimbursement PC Reporting System
Accounting	Reimbursement Subsystem
Accounting	Reportable Payment System (RPS)
Accounting	Revolving Fund System (RFS)
Accounting	Right of Way Accounting Control Log
Accounting	Right of Way Claim Log and Excess Lands Tracking System (CLELR)
Accounting	Salary Advance Monitoring System (SAL)
Accounting	SB 45 Mainframe
Accounting	Schedule 3 Reconciliation (SCH3)
Accounting	SCO Daily Direct Claims Paid System (DCP)
Accounting	Service Contracts Automated Tracking System (SCATS)
Accounting	Signals and Lighting Billing (SLB)

Principal Owner or Organization	System Name and Acronym
Accounting	Single Project Expenditure Authorization (SPEA)
Accounting	Statewide Utility Billing System (SUBS)
Accounting	TEC Reportable Payment Reporting System (TERP)
Accounting	Telephone Billing Upload System (TBUS)
Traffic Operations	Traffic Operations Management Information System (TOMIS)
Accounting	Transportation Accounting System (TRAMS)
Accounting	Travel Advance Monitoring System (TAMS)
Accounting	Travel Reporting System
Accounting	Uncleared FAE 8 Transactions (UNC)
Accounting	VISA Download (VISA)

4.1.1 Objectives of the Current System

TRAMS was implemented and modified over the past 20 years to provide functionality that includes four major functional areas:

- Budgeting, Programming and Funds Management
- Accounts Payable
- Accounts Receivable
- General Ledger

The proliferation of redundant and shadow systems occurred largely due to perceived or real functional limitations in TRAMS and some of the ancillary systems described in the previous section. The objectives were partially met through modification of TRAMS and the development of complementary systems but new business requirements and system limitations have forced Caltrans to further investigate other means to meets its financial management objectives.

4.1.2 Ability to Meet Workload

The financial management environment consists of 160 distributed computer systems developed over time to meet the various Caltrans business needs. Project Alpha will replace 70 of these financial management systems. Due to the large number of distributed computer systems, the Department must maintain the same data in multiple systems, often resulting in manually re-keying information into several systems. In addition, staff members using the systems must access data from multiple sources to get a fractured picture of a project or process as different information on aspects of the project or process will be stored in multiple systems while some may not be accessible at all. Furthermore, the inability for the Department's primary systems to meet fundamental business needs has resulted in divisions or end users having to develop their own shadow or stovepipe systems that then require additional effort to maintain and operate. And finally, maintaining and operating such a large distributed computing environment requires a significant amount of staff time and resources to ensure the systems are functioning properly, and to facilitate the exchange of data between systems.

A more detailed description of issues with the current method and their impact on the ability to meet the current workload was provided at the beginning of this section.

4.1.3 Internal User Satisfaction

The growth of funds to manage, and new business requirements, have highlighted the deficiencies in the current environment and decreased user satisfaction. The current environment's large number of distributed applications and data results in staff being tasked with tracking down information in multiple systems and reconciling data between systems. The need to access multiple systems for different aspects of the same information set can be a frustrating task. Often times the same data may need to be entered into two or more systems by the same staff member in order to track the information through various business processes.

4.1.4 External User Satisfaction

Caltrans' current financial management systems are unable to provide adequate reporting for external user's needs. In some cases, limited reporting is not available, and in others, generating reports for external users is an extremely long and arduous process. An example of external reporting failures is contained in a recent Legislative Analysts Office report. The LAO called the attention to the fact that Caltrans is "unable to track changes or trends" in Caltrans' project expenditures over time.[1] Furthermore there have been instances of public record's requests going unfilled due to an inability to generate reports on the requested data. While many of the financial management process are largely internal and transparent to external stakeholders, the above examples and interaction with partner agencies like SCO are negatively impacted by the current method of operations.

4.1.5 Technical Satisfaction

Maintaining dozens of interrelated systems that share data and functionality is a daunting task for centralized and regional technical staff. Issues arise with data integrity and maintenance of code that require constant attention. Technical staff is expected to be knowledgeable of multiple systems that have been developed using a range of programming languages and supporting technologies. Several of the systems are written in old or outdated languages, such as COMS/EAS and ARS, which are written in Queo V, an outdated programming language that is no longer in use or supported. Another example is TRAMS itself; TRAMS' multiple interrelated COBOL programs create issues when changes need to be made to any one module often times resulting in problems with another module due to dependent code. As a result, changes to the code to meet evolving business needs are not effected rapidly, if at all. Finally, CAPS requires Windows 95 to run the version of Filenet Caltrans is using, and is also the only application at Caltrans that runs on an Informix database.

4.1.6 Data Input and Output

Caltrans' use of 160 systems for their financial management needs has resulted in significant effort in maintaining and operating data input and output processes. The Department must maintain numerous point-to-point interfaces between systems to keep data up to date. These interfaces include manual keying and re-keying of data into several systems, exchanging magnetic tapes or other removable media with departments outside of Caltrans, and custom-coded automatic processes to transfer data in specific formats between systems.

[1] California Legislative Analyst Office report on the 2005-2006 Transportation Budget

A poignant example of this is the claims schedule processing function under accounts payable business processes. For most types of payments, a claim schedule packet is created and submitted to the SCO in order to issue warrants for the Department's invoices. Some Caltrans' systems submit claim schedule information to the SCO. Although the SCO has a standard file format for submissions, multiple applications write a payment file to the SCO with a unique format. This is because the applications were developed during different time periods with differing SCO interface requirements. In many other instances, Caltrans' staff are required to manually key data into multiple systems to enable them to track the same information in different business processes.

4.1.7 Data Characteristics

TRAMS provides the central repository for the Department's general ledger requirements. TRAMS however, does not adequately provide the necessary functionality for the majority of the department's business processes, nor does it provide adequate timeliness of data for management reporting needs. As a result, the multiple systems that have been developed to interface with TRAMS and provide the necessary functionality for department users to conduct business all store data in different formats. The data stored in these systems varies from robust RDBMS databases, to FileMaker Pro databases run by small groups of departmental users, to TRAMS mainframe data. Furthermore, the significant duplication of data among these systems is an issue in and of itself. Maintaining the unique identity of particular elements of data across multiple systems has become a significant issue that can be greatly alleviated through the application of modern technologies and functionality.

4.1.8 Security, Privacy and Confidentiality

Ensuring the confidentiality, integrity and availability of data in a large distributed set of loosely connected systems is a costly and challenging endeavor. The numerous systems operated by Caltrans all require there own set of measures to ensure the data is being stored in a secure manner and access to the systems is properly restricted. Maintaining the integrity of data among many loosely connected systems that store redundant information is costly and time consuming for the Department.

4.1.9 Equipment Requirements

TRAMS is housed at DTS on an IBM mainframe. Other department systems vary in the type of hardware and software in use, ranging from desktop workstations running various version of the Windows operating system (e.g., the many FileMaker Pro databases in use across the divisions), to Sun Solaris servers running Oracle.

4.1.10 Software Characteristics

Caltrans' use of numerous systems for their financial management needs has resulted in a wide range of software applications and languages in use, ranging from mainframe-based COBOL and RAMIS applications in TRAMS, to esoteric languages such as Queo V used for COMS/EAS and ARS. The applications themselves run on a wide range of operating systems including Microsoft Windows desktops running FileMaker Pro, Sun Solaris systems running Oracle RDMS and IBM Mainframe systems. Applications were largely developed in a silo manner without a common application development approach, resulting in a wide range of data naming conventions, programming approaches and validation routines.

4.1.11 Internal and External Interfaces

As discussed in previous sections, Caltrans operates 160 interconnected systems to meet their financial management needs. These systems all interface with each other in numerous ways including manual keying and re-keying, physical exchanges of removable media, and custom automated processes to update and reconcile data between systems. The result is several hundred internal interfaces needed to maintain data between the multiple systems. The systems to be replaced in Project Alpha have over 100 point-to-point interfaces that must be maintained. In addition to multiple interfaces between Caltrans internal systems, the Department maintains several interfaces with external information systems. As discussed earlier, the department has several interfaces developed to process claim schedules with the SCO. Although the SCO has a standard file format for submissions (some systems submit electronically, but most submissions occur as a hard copy submission), each application writes a payment file to the SCO using a unique format. This is because the applications were developed during different eras with differing SCO interface requirements. In addition, the Department interfaces in several ways with the Federal Highway Administration (FHWA). The Current Billing and Reporting System (CBARS), for example, sends an electronic bill to the FHWA for reimbursement of federally funded transportation projects via the File Transfer Protocol (FTP).

4.1.12 Personnel Requirements

Caltrans' current method for executing financial management functions requires significant staff resources to reconcile data between systems, and to manually update data in systems with duplicate data and functionality.

Maintaining and operating the numerous financial systems in use by Caltrans requires a significant number of IT staff with a diverse set of skills. Furthermore, many of the systems use outdated or specialized software that makes it difficult to attract and retain qualified staff. Table 14 contains the PY breakdown of Caltrans technical staff in support of financial management systems.

Table 14. HQIT and Division Staff Costs

	HQIT PYs	HQIT Costs	Division PYs	Division IT Costs
Accounts Payable Control Log System	0.00	$0	0.05	$4,906
Accounts Receivable System.	0.95	$93,052	0.60	$58,866
Active Vendor Listing reports vendors doing business with the Department	0.00	$0	0.05	$4,906
American Express Billing System assists in the validation and cost coding of the monthly American Express bill	0.00	$0	0.10	$8,932
Automated Remittance Processing System (in development)	0.05	$3,724	0.25	$24,528
Batch Query System (OAP Control Log)	0.00	$0	0.05	$4,906
Budget Monitoring Systems	0.75	$66,987	0.00	$0
Bulk Fuel Invoices Payment System	0.00	$0	0.05	$4,906
Caltrans Accounts Payable System	2.81	$275,238	0.40	$35,727

	HQIT PYs	HQIT Costs	Division PYs	Division IT Costs
Capital Outlay Monitoring System/Expenditure Authorization System	0.95	$93,052	0.60	$53,590
Category 25 Reporting System for equipment usage	0.00	$0	0.10	$9,811
Completed Federal Project Inventory System tracks the status of the final voucher and project close-out activities	0.00	$0	0.15	$14,717
Contract Delegation Purchase Order System	0.55	$59,240	0.40	$32,867
Contracts Status Tracking System	0.00	$0	0.10	$9,099
Current Billing and Reporting	2.75	$296,199	1.45	$129,509
Direct Transfer System	0.00	$0	0.05	$5,385
D of A Student Assistance Tracking	0.00	$0	0.08	$5,658
D of A Training Tracking	0.00	$0	0.25	$17,682
Drug-Free Certifications Database	0.00	$0	0.05	$2,831
Duplicate Payment Reporting System	0.00	$0	0.05	$3,713
Electronic Funds Transfer Database	0.00	$0	0.25	$24,528
Encumbrance Refresh and Recalculation	0.00	$0	0.20	$17,863
Federal Projects Reporting System	0.00	$0	0.05	$4,906
IT Procurement and OE Tracking System	1.00	$107,709	0.00	$0
Labor Distribution System	0.95	$84,851	0.75	$73,583
Local Programs Accounting and Management System	1.80	$193,876	0.50	$44,658
Net Zero System	0.00	$0	0.10	$8,932
No Warrant System	0.20	$17,863	0.05	$4,466
Operating Expense Tracking	0.00	$0	0.25	$22,329
Overhead Assessment Reimbursement and Billing System	0.10	$10,771	0.15	$13,397
Paper Utility Bills System	0.10	$8,932	0.35	$31,261
Payroll Account Receivable and Reporting System	0.45	$48,469	0.25	$22,329
Payroll Variance Distribution System	0.00	$0	0.05	$4,466
Personal Use of State Vehicles r	0.00	$0	0.05	$4,906
PETS Special Handling	0.00	$0	0.10	$9,811
Private Car Usage (also known as Private Car Mileage Reporting System)	0.10	$10,771	0.00	$0
Progress Estimate Tracking System	0.00	$0	0.15	$14,717
Purchase Card Accounting and Requisition System	0.45	$48,469	0.50	$44,658
Reimbursement PC Reporting System	0.00	$0	0.20	$17,110.78
Reimbursement Subsystem	0.05	$4,466	0.10	$8,932

	HQIT PYs	HQIT Costs	Division PYs	Division IT Costs
Reportable Payment System	0.60	$58,770	0.75	$66,987
Revolving Fund System	0.25	$26,927	0.05	$3,713
Right of Way Accounting Control Log	0.00	$0	0.05	$4,906
Right of Way Claim Log and Excess Land Transactions Reporting System	0.00	$0	0.05	$4,906
Salary Advance Monitoring System	0.00	$0	0.05	$4,906
SB 45 Mainframe Overhead Calculation (in development, will replace COSOAR)	0.10	$8,500	0.15	$13,397
Schedule 3 Reconciliation (in development)	0.00	$0	0.01	$981
SCO Daily Direct Claims Paid System	0.10	$8,500	0.05	$4,466
Service Contracts Automated Tracking System	0.00	$0	0.15	$13,524
Signals and Lighting Billing	0.05	$5,385	0.05	$4,906
Single Project Expenditure Authorization	0.05	$4,250	0.10	$9,811
Statewide Utility Billing System	0.35	$31,261	0.05	$4,466
TEC: Reportable Payment Reporting System	0.00	$0	0.10	$19,622
Telephone Billing Upload System	0.00	$0	0.70	$51,987
Transportation Accounting System	4.10	$441,606	4.60	$357,266
Transportation Management System Database	0.00	$0	0.05	$5,131
Transportation Operation and Project Support System	8.00	$944,891	6.50	$566,293
Travel Advance Monitoring System	0.00	$0	0.05	$4,906
Travel Reporting System	0.00	$0	0.15	$13,397
Uncleared FAE 8 Transactions	0.00	$0	0.10	$7,427
VISA Download	0.00	$0	0.05	$4,466

4.1.13 System Documentation

Documentation for systems described in the current method is not sufficient for many systems and resides in several different formats in multiple locations. In many cases adequate documentation does not exist for systems currently in use. For example, TRAMS has multiple COBOL programs that over the years have been modified to accommodate changing business needs. During the last two decades, these changes have made updates to the code extremely difficult due to undocumented interdependencies on other modules within TRAMS. Furthermore, developers that would normally modify routines to combat these issues have all retired.

4.1.14 Failures of the Current System

The amalgamation of multiple systems across Caltrans to meet the financial management functions of the organization has created numerous issues with the Department's ability to accomplish its mission and effectively execute its core business functions. The current systems are difficult (sometimes nearly impossible!) to modify to meet changing business needs, do not provide a level of detail necessary for internal and external stakeholders, contain significant

duplication among data and functionality in the systems, and require significant staff resources to maintain, operate and reconcile. Furthermore, the fact that financial data is spread across numerous aging financial management systems creates a serious problem: to effectively assemble meaningful financial data into a report (for example) requires an individual to possess a comprehensive knowledge of both how to manipulate each system to obtain data as well as the location of existing data. As outlined in Section 3, the current method of operation for financial management does not allow Caltrans to operate efficiently and optimally for the benefit of the citizens of California and is in dire need of attention.

4.2 Technical Environment

This section provides a detailed description of the technical environment supporting Caltrans financial management systems, including its expected operational life, system interfaces, State and Caltrans policies, and financial, legal and public policy constraints. A description of the technical resources and staffing required to support the system is also provided.

4.2.1 Expected Operational Life

TRAMS, ARS, COMS/EAS, CAPS, and many of the external non-integrated applications that interface with TRAMS are functionally and technically obsolete. TRAMS is based on older technology (over 20 years) and lacks the tools and integration capabilities of modern enterprise resource planning (ERP) software solutions. In addition, ARS and COMS/EAS are written in Queo V, an obsolete programming language that is no longer supported. Continued use of these systems is likely to result in progressively increasing process inefficiencies, ongoing replication of system functionality, isolation of information (information silos), suboptimal use of resources, and a collective detrimental effect on Caltrans financial management operations.

4.2.2 External System(s) Interface(s)

The proposed solution will require interacting with Caltrans operational systems and other external agencies and entities such as the SCO and the FHWA. Interaction with local jurisdictions will also be required to meet legislative requirements set forth in AB1012 and SB45.

4.2.3 State-Level Information Processing Policies

According to the State Administration Manual for Information Management Planning, each agency identifies opportunities to improve program operations through strategic uses of information technology. Each agency also “establishes and maintains an information technology infrastructure that supports the accomplishment of agency business strategies, is responsive to agency information requirements, and provides a coherent architecture for agency information systems.”

As explained in Section 3.2, Caltrans’ disparate accounting system applications and infrastructure do not allow them to meet business requirements. Caltrans does not provide a “coherent architecture” with the current set of technologies it uses to execute financial management processes.

4.2.4 Financial Constraints

Implementation of the proposed solution will be a complex, multi-phased endeavor likely to require a separately-funded budget. The economic impact to local governments should be minimal, if not beneficial, as financial data needed to plan, program and manage projects will be vastly improved with more timely, accurate and relevant information available for billing and receiving funds for projects. Refer to Section 8, Economic Analysis Worksheets for detailed information on current costs and the costs to implement the proposed solution to address the problems presented herein.

4.2.5 Legal and Public Policy Constraints

The proposed solution must meet current functional requirements for financial systems and processes, such as the accounting standards and practices of the Governmental Accounting Standard Board (GASB). In addition, the DOF and the SCO have financial accounting and reporting mandates, record-keeping requirements and security policies that must be met by Caltrans and all associated financial systems.

4.2.6 Department Policies and Procedures Related to Information Management

The Department has implemented an enterprise-wide IT standards management process for the timely development, adoption, migration, implementation, communication, enforcement and retirement of departmental IT standards. Technical committees, based on technical domains, are responsible for the development and maintenance of IT standards. An Enterprise Standards Board, made up of representatives of the various business units of the Department, oversees the work of these committees.

4.2.7 Anticipated Changes in Equipment, Software, or the Operating Environment

Caltrans is planning to upgrade its existing desktop environment to support Windows 2000, Windows XP, and Linux at a minimum prior to implementation of a new system. The current LAN server standard, Windows NT, is also slated to be upgraded to Windows 2000.

4.2.8 Availability of IT Personnel

The Department has approximately 604 staff in IT-classified positions. These staff members have been historically distributed among three organizational groups, which shared collective responsibility for delivering IT services and supporting the Department's IT infrastructure:

- HQ IT oversees approximately 60 percent of the Department's IT-classified positions.
- District IT groups in each of the 12 district offices statewide accounts for approximately 40 percent of the Department's IT-classified positions. (These staff are currently being consolidated into HQ IT).

The employee experience and skills assessment for the IT-classified positions is based on the State Personnel Board's specifications for IT classifications. As new assignments occur, an employee skills assessment and a gap analysis is conducted to determine the level of training, if any, that will be required to meet the skills requirement.

4.3 Existing Infrastructure

This section provides a broader view of the entire Caltrans infrastructure to convey key elements of the environment in which the proposed solution must reside. The Caltrans Information Technology (IT) environment supports 22,000 employees, which are located in approximately 600 business facilities throughout the State of California. The locations for these facilities range from large metropolitan cities such as Oakland and Los Angeles to more remote sites such as the maintenance stations in the Sierra Nevada Mountains and the deserts of southern California.

In addition to these business facilities, the Department has a need to maintain connectivity to over 40,000 field elements located on or adjacent to California's transportation facilities. The field elements include process control devices that provide the count and classification of vehicles, ramp metering, electronic message boards, video cameras and automated toll collection on California's freeways and bridges. As a result, the Department's IT environment also, indirectly supports everyone using California's transportation facilities.

This section begins with a description of the standard workstation configuration and follows with additional infrastructure details to provide the technical landscape of the Caltrans organization.

4.3.1 Desktop Workstations

A standardized platform of desktop and portable systems is necessary for Caltrans to continue its day-to-day business operations. Caltrans' desktop workstation environment includes approximately 20,000 PCs, including Windows 2000 and XP desktops, Windows 2000 notebooks, Macintosh desktops and Unix workstations. Figure 18 represents Caltrans' standard software for workstations.

Table 15. Caltrans' Workstation Software Standards

Type of Software	Standard
Desktop and Portable Workstation Operating Systems	Microsoft Windows 2000 Microsoft Windows XP Linux (Proposed, in pilot)
Network Software Connectivity for Workstations	Novell Client
Desktop Office Automation Suite	Microsoft Office Professional (includes Word, Excel, PowerPoint and Access) or the Office Standard (without Access)
3270 Mainframe Emulation	Ericom Powerterm Interconnect
E-Mail	Lotus Notes
Internet Browser	Internet Explorer
Antivirus Software	Network Associates (McAfee) VirusScan
Hard Drive Defragmenter	Executive Software DISKEEPER
Desktop Video Player	Real Player Windows Media Player Apple QuickTime Reader

Type of Software	Standard
Project Management Software	Microsoft Project (for Non-Engineering purposes) Primavera
Graphics/Multimedia	Adobe PhotoShop
Digital Video Graphics	Adobe Premiere
Graphics for print and Web	Adobe Illustrator
Web Authoring	Macromedia Dreamweaver
Electronic Forms	Form Flow Filler
PDF Viewer	Adobe Reader
PDF Writer	Adobe Acrobat
Drawing	Deneba Canvas
Diagramming Tool	Microsoft Visio
Engineering Drawing	Microstation
Engineering Roadway Design Software	CAiCE IGrds
Plotting Software	Iplot
Network Access Tool for NTFS	Hummingbird
GIS (Geographical Information System for EC/GW only)	Arcinfo and ArcView
Utility to Compress/Decompress files	WinZip

Table 16 represents Caltrans' desktop and workstation standards. In the table, each component has two recommendations: minimum standard, which represents the minimum level that Caltrans recommends, and power user, which represents what Caltrans recommends for use in more demanding applications.

Table 16. Caltrans' Desktop Workstation Standards and Recommendations

Component	Minimum Standard	High End/Power User
Disk Configuration	20 GB 7200 RPM 512k	18 GB Ultra 160 SCSI 10Krpm
CPU	Intel Pentium 4, 1.7 GHz	Intel Pentium 4, 2.0 GHz
Network Interface Card	Integrated Intel 10/100 Ethernet Adapter	Pro 100 10/100 Network Connection
Video	32 MB Matrox G550	Matrox G550 dual-head AGP 4X Graphics
Minimum RAM	256 MB DDR	256MB ECC PC133 SDRAM (single DIMM)
Preferred Manufacturer	Dell, Gateway, HP	Compaq, Gateway, SDIG

Component	Minimum Standard	High End/Power User
Additional Hardware	■ 3.5” 1.44 MB diskette drive ■ 24x/10x/40x Recordable Rewriteable CD-RW Drive ■ Integrated Sound Blaster compatible audio ■ Mini-tower or Desktop Case ■ 104+ keyboard and Microsoft two-button scroll mouse ■ Three PCI and one AGP expansion slots ■ Six USB ports, two Serial Ports, one Parallel Port	■ CD-RW Drive ■ Silver/Carbon Casing ■ Intel 845 Chipset w/400MHz FSB ■ AC97 Audio with internal premium speaker ■ Smartstart CD ■ Internal Solenoid cover lock
Monitor	Any Samsung or Sony analog/digital LCD or plasma monitor up to 26 inches may be procured. CRT monitor (recommend NEC or Samsung)	
Network Printers	HP is the standard printer manufacturer for Caltrans. Any HP network-ready printer is acceptable. Extra RAM should be made available by the manufacturer. All printers must be NDS compatible. HP printers are NDS compatible.	
Personal Printers	HP is the standard printer manufacturer for Caltrans. Any HP network-ready printer is acceptable. Extra RAM should be made available by the manufacturer.	

Table 17 contains Caltrans’ laptop standards and recommendations. The minimum specification column contains Caltrans’ minimum performance quantity for the item indicated; while the conforming vendor laptop column shows which laptop brands are known to meet those performance criteria.

Table 17. Caltrans’ Laptop Standards and Recommendations

Minimum Specification	Conforming Vendor Laptops
Processor: Intel Pentium III-M Memory: 256 MB Operating System: Microsoft Windows 2000 Professional Hard Drive: 10 GB CD-ROM Drive: 10x Floppy Disk Drive: 3.5” 1.44 MB diskette drive Modem: 56k Network Interface Card: 10/100 Ethernet Adapter Display: 14.1” TFT 1024x768	Dell Latitude — Any model that meets specs. Toshiba Tecra — Any model that meets specs IBM Thinkpad T23 Series — Any model that meets specs HP OmniBook — Any model that meets specs

4.3.2 LAN Servers

Caltrans’ LAN is Ethernet-based, employing a TCP/IP data transfer protocol. LAN servers vary in terms of model and manufacturer, and include Dell, HP, Compaq, IBM and Sun servers. Caltrans’ application, database and Web server hardware and software standards and recommendations are listed below, in Table 18.

Table 18. Caltrans' Application, Database and Web Server Hardware and Software Standards and Recommendations

Application Server Type	Hardware	Software
Enterprise Servers for Local Area Networks and File & Print Services	Minimum 512 MB RAM Preferred Manufacturers: IBM Netfinity, HP NetServer, Dell and Compaq Proliant	Novell File and Print Services and Novell Directory Services (NDS) provided from Novell
Enterprise Application Servers	Preferred Manufacturers: HP, Sun (The server manufacturer's RAM is required.)	HP-UX Sun Solaris 8
Enterprise Web Servers	Preferred Manufacturers: Sun	Sun Solaris 8
Enterprise Internet/Intranet Application Database Servers	Preferred Manufacturers: Sun	Sun Solaris 8
Streaming Video Servers	Preferred Manufacturers: Sun	Sun Solaris 8 Real Networks Real Server
Enterprise Servers for Lotus Notes	Preferred Manufacturers: Sun	Sun Solaris 8

WAN/LAN hardware standards and recommendations are listed in Table 19. The component column lists each component type, while the standard column lists Caltrans' standard/recommended hardware vendor.

Table 19. Caltrans' WAN/LAN Hardware Standards and Recommendations

Component	Standard
Routers	Cisco
Hubs	HP
Switches ((LAN/WAN)	Cisco
Bridges	Cisco
Backup Hardware for 100G or less	Quantum ATL M2500 tape library for Novell HP Surestore Autochangers
Backup Hardware for large facilities	Sun tape library for Unix StorageTek library for Unix
Print Server Hardware	HP Jet Direct Cards
Dial In Hardware (WAN)	Cisco

Standard WAN/LAN software is contained in Table 20. Various software types are shown in the type of software column, and the corresponding standard is contained in the standard column.

Table 20. Caltrans' Standard WAN/LAN Software

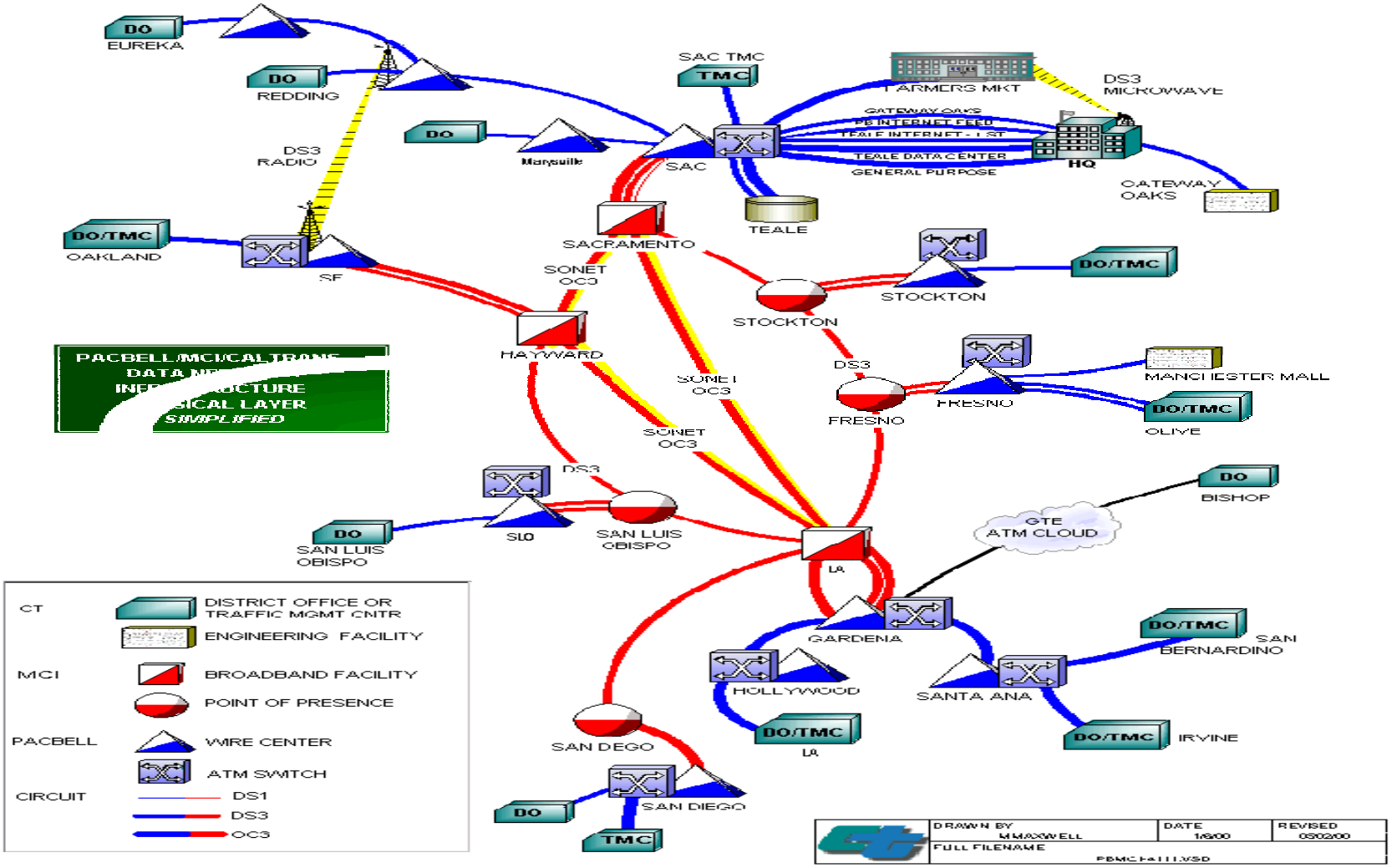
Type of Software	Standard
Network Directory Services	Novell eDirectory Lightweight Directory Access Protocol (LDAP)
File and Print Server Software	Novell NetWare
Print Server Management Software	HP Jet Admin

Type of Software	Standard
3270 Printing through Novell	Novell Host Print
Antivirus Software	Network Associates (McAfee) Netshield
Dial In Software for Servers	Novell Border Manager Authentication Services
Dial In Software for Desktops, Laptops and Engineering CADD/GIS Workstations (EC/GW)	Windows 2000 Dial Up Networking Windows XP Dial Up Networking
3270 Gateways and Controllers	NetWare for SAA
Software Distribution	Novell ZENworks
Backup Software	Veritas Net Backup Veritas Backup Exec for NetWare server Computer Associates ARCserveIT

4.3.3 Network Protocols

Caltrans' WAN, depicted in Figure 18, consists of a redundant ATM backbone using Pacific Bell pass through line management to the Department's ATM concentration points, which support over 500 frame relay boundary points used as redundancy circuits (exceptions include Caltrans Headquarters, which employs DTS' CSGNet, and District 8, which uses Genuity/Level 3 Communications services). The network provides access to a variety of business and engineering applications and databases, networked electronic mail, general file and print services, as well as data transfer using TCP/IP. In addition to this, many sites support both Ethernet and ATM switches, with Ethernet switches providing the main interface between the WAN and LAN. The network also allows static IP addressing, DNS and DHCP services through servers for communication protocols. Alternate means of access include remote and dialup access entry points using standard analog and ISDN technologies (access using ADSL, DSL and cable modem digital technologies is currently being implemented). The Department also supports wireless connectivity via radio and satellite communications.

Figure 18. Caltrans Wide Area Network (WAN) Physical Layer (Simplified)



4.3.4 Application Development Software

Caltrans uses a number of different methodologies and software products for application development. Current application development software standards include Oracle Developer, JDeveloper and Designer, MS Visual Basic and Visual C++, Sun Java Development Kit, Intertest and Expediter. Application development software standards adopted by Caltrans are listed in Table 21.

Table 21. Caltrans' Application Development Standards

Type of Software	Standard
Scripting/Programming Languages	Java, JavaScript, PL/SQL, C++, Visual Basic, PERL, PHP
Development and Reporting	Oracle JDeveloper9i, Developer 6i, Designer 6i, Discoverer, MS Visual Basic, MS Visual C++, Sun Java SDK, Crystal Report Writer
Testing	Mercury Interactive WinRunner Mercury Interactive TestDirector Mercury Interactive LoadRunner
Enterprise Database	Oracle
Workgroup/Personal Database	Personal Oracle, Lotus Notes
Change and Configuration Management	Computer Associates (CA) AllFusion Harvest Change Manager
IT Project Management	CA AllFusion Process Management Suite, MS Project

4.3.5 Personal Productivity Software

Caltrans is standardized on the Microsoft Office suite of office automation products, including the standard modules Word, Excel, Access and PowerPoint. Caltrans uses Internet Explorer 6.0 and/or Netscape as the standard browser for the Internet.

4.3.6 Operating System Software

Caltrans currently uses a number of operating systems, depending on the machine type and purpose of the server. Operating systems currently in use include:

- Solaris 9
- HP Unix 11
- NetWare 6
- Windows NT 4.0
- IBM AIX
- Windows XP
- Windows 2000

4.3.7 Database Management System

Current database management system standards are comprised of the following:

- Desktop Database: Used primarily to develop local or desktop databases for small to medium data management purposes. Software packages include MS Access, Personal Oracle, MS FoxPro and Filemaker Pro.
- Enterprise Database: Used primarily for larger business unit or enterprise data management needs. Database products used include Oracle, Informix, VSAM, DB2 and MySQL.

4.3.8 Application Development Methodology

The current application development methodology standard is project specific, subject to meeting Caltrans standards such as those promulgated by IEEE. (Caltrans IT staff is currently developing a Systems Engineering standard Work Breakdown Structure for application development, with the intent to work toward Maturity Level 1.)

4.3.9 Project Management Methodology

The current project management methodology standard is Caltrans' IT project management methodology, a project-specific methodology that complies with the State's Project Management Methodology, as defined in SIMM Section 200. The project management methodology includes creating a project charter/statement of work, detailed comprehensive business and technical requirements, a detailed project schedule and progress and quality monitoring strategies. Further information on Caltrans' Project Management Office (PMO) and its methodologies can be found in Section 6, Project Management Plan.

5.0 Proposed Solution

This section identifies the alternative that best satisfies the objectives and functional requirements as outlined in Section 3 of this FSR. Each of the alternatives and the proposed solution are described in the sub-sections outlined in Table 22 below.

Table 22. Proposed Solution Sub-Sections

5.1 Solution Description
5.1.1 Project Scope
5.1.2 Industry Perspective of the Major Components of the Proposed Solution Components
5.1.3 Detailed Perspective of the Proposed Solution Components
5.1.4 Project Phasing and Schedule
5.1.5 Hardware
5.1.6 Software
5.1.7 Technical Platform
5.1.8 Development Approach
5.1.9 Integration Issues
5.1.10 Procurement Approach
5.1.11 Technical Interfaces
5.1.12 Testing Plan
5.1.13 Resource Requirements
5.1.14 Training Plan
5.1.15 Ongoing Maintenance
5.1.16 Information Security
5.1.17 Confidentiality
5.1.18 Impact on End-Users
5.1.19 Impact on Existing System
5.1.20 Consistency with Overall Strategies
5.1.21 Impact on Current Infrastructure
5.1.22 Impact on Data Centers
5.1.23 Data Center Consolidation
5.1.24 Backup and Operational Recovery
5.1.25 Public Access
5.1.26 Costs and Benefits
5.1.27 Sources of Funding
5.2 Rationale for Selection
5.3 Other Alternatives Considered
5.3.1 Alternatives Descriptions
5.3.2 Evaluation of Alternatives

5.1 Solution Description

The proposed solution for Caltrans' Project Alpha centers on the replacement of 70 current financial applications with a commercial off-the-shelf (COTS), Enterprise Resource Planning (ERP) suite to include General Ledger, Accounts Receivable, Accounts Payable and Reporting functionality. In addition, the proposed solution includes the implementation of a proven COTS infrastructure required to integrate the ERP system and other Caltrans applications, as well as a data warehouse (a reporting-only database that supports Business Intelligence tools) that will contain financial information available for reporting and queries. Implementation of this infrastructure is central to the follow on projects to Project Alpha, as described in the Caltrans Financial Management Integration Study.

In order to determine the best solution to meet Caltrans' business objectives, all viable alternatives were considered including those listed in Figure 19.

Figure 19. Project Alpha Solution Alternatives

Alternatives Considered for Project Alpha:	
1.	Modification and Enhancement of TRAMS
2.	Custom Developed Solution(s)
3.	Commercial-Off-The-Shelf (COTS) Solution(s):
	a. COTS Suite for ERP, EAI and Data Warehouse
	b. COTS Suite for ERP, Best-of-Breed for EAI and Data Warehouse

After each alternative was analyzed, Option 3a — Commercial-Off-The Shelf (COTS) Solution was selected as the best alternative. While the detailed analysis indicates that Option 3a would be less risky and costly, Caltrans will consider either of these variants of Option 3 during the procurement phase. For the purposes of this FSR, Caltrans has provided costs and implementation planning that is consistent with Option 3a, since this option is consistent with Caltrans' research of other Department of Transportation and State of California implementation. The evaluation methodology and analysis for each alternative is provided in Section 5.3, Other Alternatives Considered.

Based on best practices and market research, the final solution selected by Caltrans will include Enterprise Resource Planning (ERP), Enterprise Application Integration (EAI) and Data Reporting functionality that will be installed and configured with minimal modifications to provide a complete solution supplied by a single Integration Partner. However, regardless of the final architectural solution, the market offers mature, functionally robust COTS products that can meet the requirements of Caltrans. The COTS solution will be modified to meet only those unique Caltrans' requirements that are not native to the core COTS application.

The EAI functionality of the proposed solution will provide a single, robust integration mechanism for interfacing with existing and future applications, and functions to dramatically improve Caltrans' overall business intelligence capabilities now and into the future. This solution provides the best value to Caltrans and the State by cost-effectively meeting the business and technical requirements specified in this FSR.

Given the objectives of Caltrans, existing COTS ERP technologies, and functional requirements for the new system, the optimal solution for Caltrans comprises the following:

- Procuring the base infrastructure that will support ERP, EAI and data warehouse functionality to include hardware, operating systems, COTS ERP software, database software and ETL utilities and associated systems integration services.
- Configuring and modifying the General Ledger, Accounts Receivable, Accounts Payable and Reporting functionality of the COTS ERP software to meet Caltrans' financial management needs.
- Installing the EAI infrastructure to establish interfaces among specialized legacy systems and future new systems.
- Establishing a data warehouse and required data feeds for pertinent financial and related information.
- Implementing COTS reporting tool(s) that will provide managerial and operational reporting functionality.

The proposed solution provides Caltrans with all the benefits of a COTS system, which include best practices inherent in the product's customer base, favorable support and maintenance agreements and a lower total cost of ownership. Furthermore, it leverages existing investments in key supporting technologies in order to leverage functionality and improve the overall knowledge base of the organization. Considering the increased support needs that the State has been required to provide due to the aging and redundant technologies of the 70 incumbent systems, a new COTS system will enable more focused proactive support for current technologies.

In terms of functionality, Project Alpha will automate the major core financial business processes (i.e., General Leger, Accounts Payable and Account Receivable) through the new ERP system. This solution enables Caltrans to centralize core financial information in the organization and provide a data repository that will benefit Caltrans' ability to provide information for internal and external stakeholders needs. Based on market research, an estimated 80 to 85 percent of Caltrans' requirements can be provided through configuration of a COTS solution. Modification of the solution to meet specific needs can be achieved through integrated development environments (IDEs), custom-defined fields, and other application configuration and modification tools native to current COTS ERP solutions on the market. Interfaces to specialized Caltrans' systems providing functionality outside the ERP solution, will be managed through the EAI infrastructure. Reporting needs will be fulfilled through a combination of standard and custom reports in the transaction and data warehouse environments.

This proposed solution is in alignment with many aspects of Caltrans' Agency information Manual (AIMS) document, including "establishing a foundation for future technology solutions, encouraging and giving priority to Department-wide solutions, developing and enforcing optimal technology standards and policies, enhancing access to applications and information, and continuously improving the quality of technology service delivery.[1] " Furthermore, the solution specifically addresses several of the IT Strategic Plan objectives. For example, the solution will provide secure data in a controlled environment. Enterprise needs will be addressed through the ERP system as well as the approach for EAI and the data warehouse in an integrated solution

[1] Source: Caltrans Agency Information Management Strategy (AIMS) Manual (August 2005)

suite. Finally, end-user access to critical financial information will enhance effectiveness and communication. The Caltrans Agency Information Manual (AIMS) 2005, dated August 2005, calls for future re-engineering in the areas of transforming data into information and addressing the alignment of business processes, data and technology solutions.

5.1.1 Project Scope

Project Alpha's scope includes the procurement and installation of an infrastructure for the ERP, EAI and data warehouse; and the implementation of core financial functionality including General Ledger (GL), Accounts Receivable (AR) and Accounts Payable (AP). The infrastructure and functionality implemented in Project Alpha will lay the foundation for future financial management systems integration projects.

Project Alpha is planned to commence in December 2005, and be completed in June 2009. The State intends to engage a consulting firm to the complete technical requirements for the RFPs, and the resulting contracts will run from March, 2007, through February, 2009.

The proposed solution for Project Alpha COTS Suite for ERP, EAI and Data Warehouse solution is segmented into three primary phases:

- **Phase 1 — Procurement and Project Planning (14 Months)**
  - The scope of Phase 1 includes procurement activities and initial requirements definition. Caltrans will acquire the services of a procurement support vendor to provide assistance in the development of the requirements and procurement documents, and provide ongoing selection assistance. Phase 1 will encompass all activities related to development of initial requirements and procurement documents for an ERP, EAI, data warehouse solution and systems integration services. Initial requirements for required hardware, database and system support tools will also be defined. Finally, this phase includes a competitive procurement process to select a vendor solution as well as an independent project oversight contractor (IPOC), independent verification and validation (IV&V) vendor and project management support mentor.
- **Phase 2 — System Development (24 Months)**
  - The scope of Phase 2 includes detailed planning and analysis with the selected Integration Partner. This phase includes functional and technical requirements analysis and validation, technical architecture design, system configuration, interface design and consolidation, data conversion and archiving activities, report development, and system testing.
- **Phase 3 – System Deployment and Training (4 Months)**
  - The scope of Phase 3 includes process and solution training of Caltrans Program staff, deployment of the solution to pilot sites, and review of pilot results followed by full deployment and final acceptance.

Caltrans will seek to minimize costs, minimize disruption to current operations, maximize training and familiarity with the new system environment and mitigate technological risk. A high level project timeline that includes implementation activities can be found in Section 6, Project Management Plan.

The following sub-section offers an industry perspective of the ERP, EAI and data warehouse components of the proposed solution.

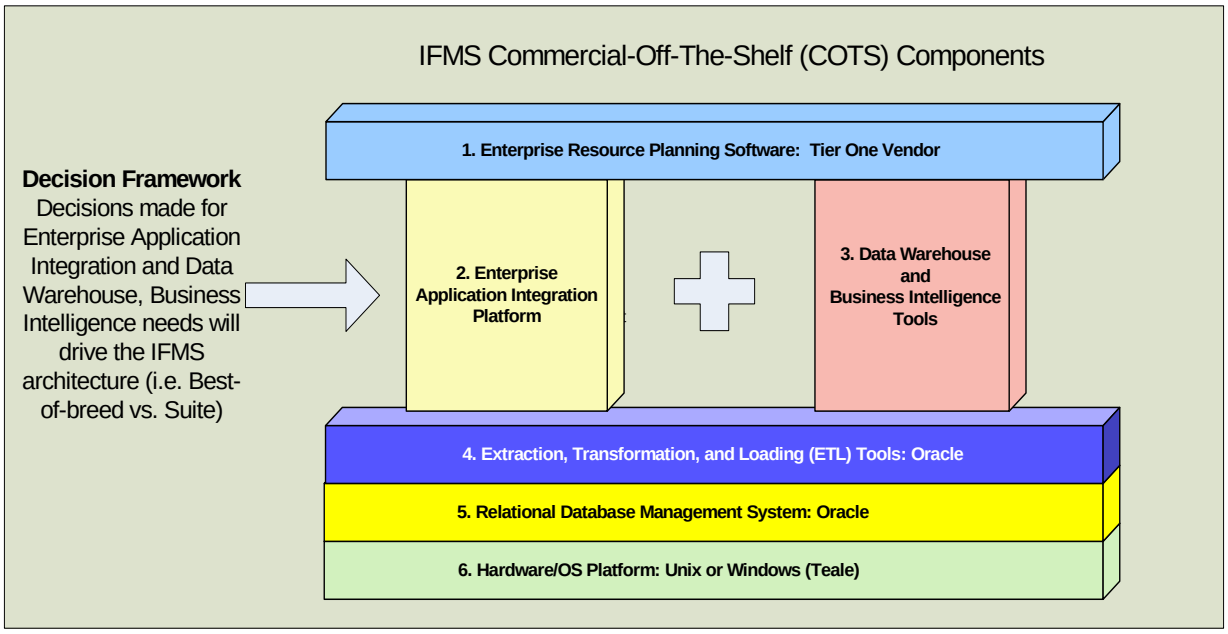
5.1.2 Industry Perspective of the Major Components of the Proposed Solution

As illustrated in Figure 20 below, there are six major components of the proposed solution, namely:

1. Enterprise Resource Planning Software
2. Enterprise Application Integration Platform
3. Data Warehouse and Business Intelligence Tools
4. Extraction, Transformation and Loading Tools
5. Relational Database Management System Tools
6. Hardware/OS platform

Solution components 4, 5 and 6 include well established platforms on which Caltrans has standardized and are described in the hardware and software topics later in this section. In order to further explain items 1 through 3, the following industry-based perspective, taken from recent Gartner research, provides context for how these solution components will be deployed within the Caltrans environment.

Figure 20. Major Components of the Proposed Solution



5.1.2.1 Enterprise Resource Management (ERP) Description

ERP Software Packages

ERP software includes functionality (modules) that automate and support the processes of administrative functions (financial and human resource) within the organization. ERP software

functionality is typically divided into the categories of financial management systems and human resource management systems. [1]

The traditional definition of financial management applications includes General Ledger (GL), Accounts Payable (AP) and Accounts Receivable (AR). These are the functional areas contained within the core applications branch of financials functionality. Inasmuch as the definition of financials systems has been expanded to incorporate additional fiscal responsibilities of an organization, these three traditional applications (GL, AP, AR) still remain at the core of any financials package being evaluated.

General Ledger represents the functionality that provides the capturing of fiscal data from various transactional sub-systems for the purpose of analyzing and reporting on financial results. Accounts Payable represents the functionality that provides the capturing of vendor and supplier data from various sources of input. Accounts Receivable represents the functionality that provides the capturing of revenue data from various sources of input. Core Financials ERP implementations also include functionality for security, reporting, query and setup. In addition to the Core Financials, additional financial applications such as Purchasing, Inventory, Project Accounting and Budgeting may increase an ERP system's value for an organization and will be implemented in subsequent projects to Project Alpha. (It is important to note that the pricing strategy of most ERP vendors is not based on distinct application modules. In other words, depending on the vendor selected, Caltrans may acquire the licensing rights to software functions such as Fixed Asset, Purchasing, Project Accounting, etc. Though these functions are to be deployed in later phases of the IFMS, the State will carefully consider the procurement strategy in order to align as closely as possible to market dynamics.) Although beyond the scope of Project Alpha, ERP Human Resources systems include the traditional functional areas of benefits, personnel, payroll, as well as more strategic functionality such as recruiting, applicant tracking, and training and development.

Implementation of an ERP system includes automation of business processes, integration across business functions, and fast and flexible end-user access to information.[2]

ERP External Service Providers

ERP projects that are of scale and complexity as that of Caltrans, require skill sets that are often beyond the capabilities of any one organization. External service providers (ESPs), also referred to as systems integrators (SIs), can bridge those skill gaps with business process knowledge, functional expertise, industry practices and technical competencies. ESPs often fulfill the role of Integration Partner for ERP implementations, systems integration services and software solutions.

It is important to note that successful ERP projects result from multiple factors that include design and project planning, domain and technology capabilities, implementation and industry best practices, knowledge transfer and change management. The competencies of a service provider in one product set and across functional areas are important to match with the

[1] Source: Gartner Research: Market Trends: ERP Consulting and Integration, North America, 2004, 25 March 2005, by Alex Soejarto.

[2] Source: Gartner Decision Support Engine for Vendor Selection — Integrated Financials and Human Resources.

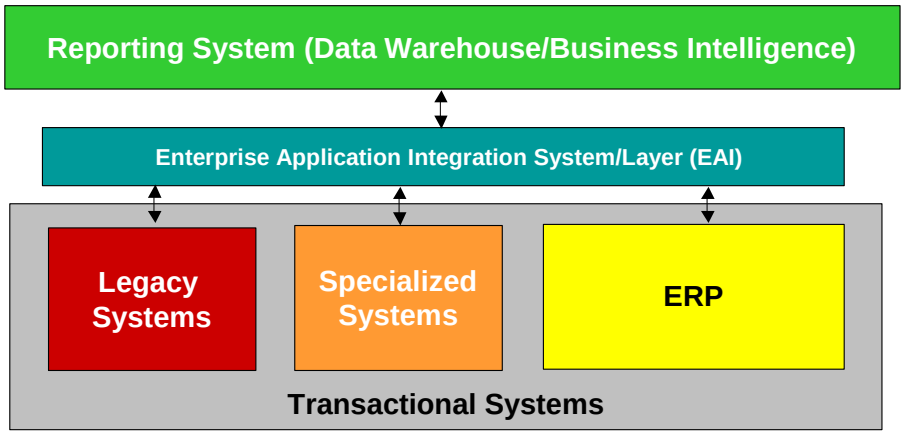
requirements of any ERP engagement. With regard to Caltrans' choice of provider, the size of the provider, the provider's geographic reach, whether the provider focuses on one product or several, industry depth, delivery models, intellectual property and a host of other factors will determine the subset of ESPs that Caltrans considers. In addition, for many organizations, the scope of an ERP project often includes the bundled implementation of an enterprise application integration strategy and/or data warehouse for business intelligence. (Given the nature of California procurement policies and procedures, Caltrans intends to conduct a single procurement for both the ERP software and ESP services in order to mitigate the procurement risks.) Consequently, many ESPs possess different characteristics that may range widely across these factors.

5.1.2.2 EAI Description

"Integration" is defined as the act or approach of making two of more independently designed things (for example, systems, databases or processes) work together to achieve a common business goal. There are many styles of integration. The types of "things" in question determine the category or style of integration that applies. Caltrans recognizes that integration requires dealing with the data. In order to link disparate applications and databases, or to ensure that these applications and databases reflect a consistent view of the organization, data must be accessed, transformed and moved. These activities form the core of integration and Caltrans' selection of an EAI platform will consider the different "styles" of integration that are required to meet business needs. Whether it is individual transactions being propagated from a source system to one or many target applications in near real time, or bulk data moving in a batch mode from one application database to another, the EAI solution component will address getting the data to the right place, at the right time, in the right format is critical.

As described in the Caltrans Financial Management Integration Study Conceptual Architecture document, Project Alpha will utilize an Enterprise Application Integration (EAI) infrastructure to interface the ERP system with specialized legacy systems and the data warehouse. The EAI infrastructure proposed for Project Alpha is illustrated below in Figure 21.

Figure 21. EAI infrastructure purposed in Project Alpha

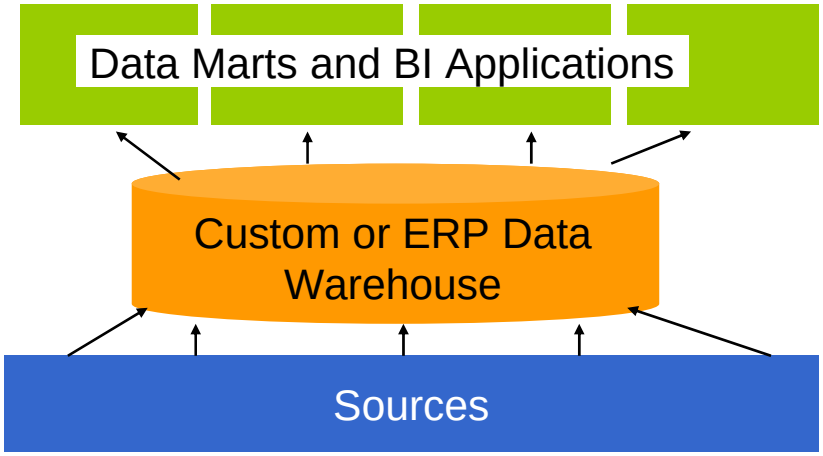


5.1.2.3 Data Warehouse Description

Organizations are being presented with a wide range of opportunities and decisions regarding the data warehouse and BI capabilities offered by vendors of enterprise applications (such as ERP) and specialty solution providers of BI tools. Caltrans' vision for the data warehouse to be deployed in Project Alpha is that all financial data will eventually be consolidated into this environment through data conversion of systems to be retired as a result of IFMS deployment and through integration with systems that remain within the Caltrans environment. Caltrans also seeks to minimize the number and variety of BI and reporting tools that will be used to manipulate data within the data warehouse.

Caltrans intends to take a pragmatic approach to planning and deploying the "data warehouse" solution component of Project Alpha. As described earlier, Caltrans intends to use the data warehouse solution to primarily provide operational reporting, with additional functionality to conduct more sophisticated analyses of financial data. Caltrans and the selected Integration Partner will consider the data sources, the style of data analysis, and the fit of packaged content and capabilities of current software products to determine the optimal role of the data warehouse.[1] A simple illustration of the data warehouse solution is provided in Figure 22 below. In this representation, the core ERP system and other source systems support the data capture and operational execution of business processes, while the BI component supports information analysis. Whether these BI components are provided as part of a single ERP suite or specialty BI tools will result from the market response to Caltrans' needs and requirements.

Figure 22. ERP Data Warehouse Strategy



The table that follows provides a definition of typical data warehouse elements and their relevance to Caltrans.

[1] Source: Gartner Research: Gartner Business Intelligence Summit, ERP Data Warehouses: Not "Whether" But "How" to Deploy Them, 7 March 2005, Chicago, Illinois, by Frank Buytendijk.

Table 23. Description of Potential Data Warehouse Elements

Elements	Description of Element
ETL Tools/Process	ETL (Extract, Transform, Load) tools and processes are used to extract data from the transactional/operational system, transform the data to be consistent with the enterprise data model and perform any data cleansing, and load the data into the data warehouse in an effective and efficient manner. While Caltrans has standardized on Oracle ETL products that should provide the capabilities necessary for data conversion and ongoing data integration, Caltrans is receptive to alternative approaches proposed by vendors.
Data Warehouse	A data warehouse is a copy of transaction data specifically structured for querying and reporting. Data warehouses are typically organized in a normalized (an approach to database design which eliminates data redundancy by linking related entities through a relational database with the end goal of decreasing maintenance requirements and increasing flexibility in accessing data), non-application specific manner. Subject areas related to logical business processes can be created (through light denormalization, an approach to database design which focuses on performance over maintenance. Data is stored in ways that improve query performance, but sometimes results in redundant data and increased maintenance requirements) in order to facilitate querying. Caltrans anticipates that outside of ERP generated data, the need for normalization of additional data within the data warehouse will be minimal.
Data Marts	A data mart is a type of data warehouse designed primarily to address a specific reporting need using a specific data structure or organization (an aggregation or summarization of the data) to enhance query performance. Data marts can be "dependent" (sourced from a data warehouse) or "independent" (sourced directly from production/source systems and other data marts). Depending on the solution design of the Integration Partner, Caltrans will define 3-4 subject areas to optimize reporting (i.e., "Project Financial Data", "Expenditures", etc.).
BI Tool Sets –Enterprise BI Suites	Enterprise BI Suites are used to create, manipulate and view reports. Enterprise BI Suites are commonly referred to as reporting tools and include products provided by a number of vendors (e.g., Hyperion, BusinessObjects, Cognos, SAS, etc.). Major ERP vendors provide BI capabilities as an integral component of the ERP solution. Depending on the solution design of the Integration Partner, Caltrans may utilize integrate ERP reporting tools or third party tools specifically selected to meet Caltrans' needs.

5.1.3 Detailed Perspective of the Proposed Solution Components

There are several critical points addressed in the industry-based discussion above that are relevant to the choices available to Caltrans (e.g., COTS ERP suites, EAI and Data Warehouse best-of-breed vs. bundled solutions, systems integration sourcing, procurement and implementation approaches, complexity of the solution, data consistency and integration approaches, and the capability of a solution to meet the needs of Caltrans' requirements). To further describe the approach selected for Project Alpha, each solution component is addressed in more detail below.

Component 1: Enterprise Resource Planning

Description

Caltrans will implement a mature COTS ERP solution from among available software packages (i.e., SAP, Oracle, Lawson, etc.) Use of the new system and processes will enable Caltrans to operate like a business, providing the flexibility and agility to respond to future changes in business and legislation. Caltrans will benefit from ERP vendor experience with other state agencies and similar transportation agencies in other states. This solution will include ongoing maintenance support to mitigate technological risk and provide the opportunity for externally developed added functionality in the future. In addition, opportunities for redirection of current technical staff to support the new system will minimize the need for additional staff. Core ERP train-the trainer and documentation resources will be provided by the vendor.

The new solution will replace the current inefficient method for financial management at Caltrans by eliminating 70 antiquated mainframe and distributed disparate systems. Project Alpha will resolve a significant portion of duplicate functionality and data, including the automation a number of manual processes within Caltrans. After the completion of follow on projects to Project Alpha, over 120 systems will be replaced and integrated into the Integrated Financial Management System (IFMS). The new system will provide a single source of reliable data that affords the right level of information to the right people at the right time. Furthermore, the proposed solution for Project Alpha will enable Caltrans to improve accountability to external stakeholders, including the Legislature and the citizens of California. Caltrans will have the ability to be accountable for managing taxpayer funds and track changes or trends in Caltrans' project expenditures over time.

Scope

The scope of the ERP solution component for Project Alpha will include approximately 60 ERP software licenses that support operational related roles with regard to the software and 1,000 ERP software licenses that support employee self service and other limited operational uses. The ERP solution component will also include the integration services necessary to deploy core financial system functionality.

Table 24. Project Alpha ERP Scope vs. Total IFMS Scope

Project Alpha	IFMS
■ General Ledger ■ Accounts Receivable ■ Accounts Payable ■ Financial Reporting	■ Project Alpha functionality ■ Project Reporting ■ Fixed Assets Accounting ■ Budget Preparation Project ■ Procurement and Inventory Project ■ CTIFS Project — Funds and Grant Management ■ CLMS Project — Real Estate and Land Management

Component 2: Enterprise Application Integration Platform

Description

The EAI component of the solution would provide the infrastructure to remove the current multiple point-to-point interfaces necessary to provide accessible data to meet user needs. It will also provide timely automated information sharing across multiple applications that will eliminate manual re-keying of data in unconnected systems. Additionally, significant time will be saved when the need to manually reconcile data across remaining legacy systems is eliminated. Finally, the EAI infrastructure will provide a mechanism for temporary interfaces necessary as systems are replaced by the ERP system and data warehouse.

Scope

The scope of the EAI solution component for Project Alpha will include approximately 17 system interfaces between the ERP and remaining specialized legacy systems. In addition, the EAI will provide the infrastructure to eliminate several point-to-point interfaces existing between systems outside of the ERP, and provide a means for interfacing with remaining legacy systems that will be replaced in subsequent projects to Project Alpha. As additional functionality is added to the IFMS through subsequent projects to Project Alpha, the EAI will be integral to interfacing additional specialized legacy systems with each other, the ERP, and the data warehouse. Table 25 below outlines the systems to be interfaced with the proposed solution in Project Alpha, and a listing of systems that will remain after the full implementation the IFMS.

Table 25. Project Alpha EAI Scope vs. Total IFMS Scope

Project Alpha	IFMS
■ Integrated Right of Way System (IRWS) ■ Right of Way Utility Relocation System (RWURS) ■ Right of Way Property Management System (RWPS) ■ Right of Way Management Information System (RWMIS) ■ Fleet Anywhere (FA) ■ Integrated Maintenance Management System (IMMS) ■ Project Management Systems (PRSM) ■ Transportation Operation and Project Support System (TOPSS) ■ Federal Financial Management Information System (FMIS) ■ Construction Management Systems (CAS, CCIS, WCCP, EWB) *	■ Interfaces will include 17 specialized systems to remain after full implementation from follow on Projects to Project Alpha. These systems include: ❑ BBA ❑ BEES ❑ BID/iBID ❑ BPMS ❑ Bridge Management System ❑ CADb ❑ CUC ❑ Equipment Status Database ❑ Final Utilization Database ❑ Fiscal Database ❑ Fleet Anywhere ❑ IMMS ❑ Office Engineer Project Database ❑ TOPSS ❑ TSN ❑ XPM/PRSM ❑ CMS

* These systems could be replaced by the CMS by the time Project Alpha is being implemented. Caltrans is currently in the process or procuring an integrated Construction Management System. These interfaces will be reviewed by the Integration Partner for Project Alpha to make any necessary adjustments.

Component 3: Data Warehouse and Business Intelligence Tools

Description

The data warehouse component of the solution will provide operational reporting as well as better business intelligence and analysis capabilities to allow Caltrans to optimize the use of funds. Although limited reporting capabilities exist with the current systems, it takes a significant amount of manual effort to aggregate and reconcile the information for reporting purposes. The data warehouse will provide a central repository for ERP data and a data storage repository for replaced or retired systems and data that will be actively populated into the data warehouse from systems that remain in the Caltrans environment. (Due to the variety of data types and data requirements, the solution may require separate physical database/storage environments to accommodate Caltrans' requirements at a reasonable cost, i.e., legacy data that simply needs to be archived may be stored on different mediums at a lower cost.) Business intelligence tools provided by the ERP vendor will be available with many standard reports. This will eliminate the need to create multiple disparate reports on separate systems. By using the data warehouse, a single report can contain aggregate information from multiple sources without the user needing to know the details of the underlying infrastructure.

Scope

The scope of the data warehouse solution component for Project Alpha will include the central reporting repository for ERP data, and data from existing Caltrans systems residing outside of the ERP. Caltrans currently has five primary reporting systems that will be replaced by the fully implemented IFMS. Project Alpha will completely replace one of these reporting systems. The remaining four reporting systems plus the remaining Caltrans legacy systems will feed the data warehouse through ETL tools creating a single source for Caltrans to leverage business intelligence tools for report generation and decision support activities. The data warehouse for Project Alpha will include approximately 500 GB of data, and will grow as necessary through subsequent projects, and as Caltrans' needs evolve over time. Table 26 shows the reporting systems to be retired to the data warehouse in Project Alpha, and the systems to be retired in subsequent projects with the full implementation of the IFMS.

Table 26. Project Alpha Data Warehouse Scope vs. Total IFMS Scope

Project Alpha	IFMS
■ Federal Projects Reporting System (FPRS)	■ Right of Way Management System (TPRC) ■ Right of Way Management Information System(RWMIS) ■ Project Management Data Warehouse (PMDW) ■ Earned Value Reporting System (EVRS)

Component 4: Extraction, Transformation and Load Tools

Oracle for ETL tools are currently in use within the Department and are preferred, however Caltrans will consider alternative solutions proposed by vendors.

Component 5: Relational Database Management System

Caltrans will also use Oracle for its Relational Database Management System (RDBMS) as Oracle is the Department's established standard.

Component 6: Hardware/Operating System Platform

Caltrans will lease data center servers with either Unix or Windows OS depending on the proposed solution by the Integration Partner. The Department of Technology Services (DTS) has the capability to support either operating system platform. The hardware and software deployment will occur as part of a well-planned phased project schedule.

5.1.4 Project Phasing and Schedule

The proposed solution will be procured, configured and implemented over a period of approximately 36 months. In order to achieve the desired benefits, the project will include three high-level phases with critical accomplishments that must be achieved. The phases include:

- Phase I — Procurement and Project Planning
- Phase II — System Development
- Phase III — System Deployment and Training

The following sub-sections provide a description and accomplishments for each phase.

Phase I

During Phase I Caltrans will select the services of a procurement support vendor to provide assistance in the development of the RFP requirements and provide ongoing selection assistance. Phase I will encompass all activities related to the initial development of requirements and an RFP for an ERP, EAI, data warehouse solution and systems integration services. The accomplishments for Phase I are provided in Table 27 below.

Table 27. Phase I Accomplishments

1	Solicitation and selection of a procurement contractor to develop the RFP and assist with vendor selection activities.
2	Initial functional and technical requirements will be defined and documented.
3	Development and issuance of a Integration Partner RFP.
4	Development and issuance of RFPs for contractors to perform: ■ Project Management Mentoring ■ Project IV&V ■ Project Oversight (IPOC)

Phase II

Phase II initiates the system development effort, including development and configuration of the ERP solution, EAI infrastructure and required interfaces, data conversion, system testing, etc. The accomplishments for Phase III are provided in Table 28 below.

Table 28. Phase II Accomplishments

1	Requirements Analysis and Validation
2	Technical Architecture Design
3	System Configuration
4	Development and Consolidation of Interfaces
5	Data Conversion and Archiving of Legacy Data
6	Report Development
7	System Testing

Phase III

Phase III will begin with a pilot at selected offices to monitor the new system and address any bugs or flaws prior to full deployment. Training will be provided during deployment. The accomplishments for Phase III are provided in Table 29 below.

Table 29. Phase III Accomplishments

1	Train pilot District Program Staff users
2	Deployment of solution at pilot offices
3	Pilot review and acceptance
5	Deploy solution at remaining District Offices
6	Final acceptance

5.1.5 Hardware

It is estimated that the proposed solution will require the processing capacity of approximately 42 processors leased from DTS to support the operational, development and test environments. The server functions and locations for hosting and support are listed in the table below. For a more detailed account of the hardware costs associated with the proposed solution, see Section 8, Economic Analysis Worksheets.

Table 30. Required Servers Functions

Function	Location
Production Database server(s)	Division of Technology Services (DTS)
Reporting Database server(s)	Division of Technology Services (DTS)
Application server(s)	Division of Technology Services (DTS)
Test server(s)	Division of Technology Services (DTS)
Development server(s)	Division of Technology Services (DTS)
Portal/Web server(s)	Division of Technology Services (DTS)

Note: different functions will likely be consolidated on single servers as determined by the Integration Partner.

5.1.6 Software

The following table contains a summary of the software requirements associated with the proposed solution; including ERP, EAI, Business Intelligence, data warehouse, database and system support software.

Table 31. Summary of Software Requirements

Function	Description
ERP	Enterprise Resource Planning licenses, e.g., SAP, Oracle, Lawson
EAI	Enterprise Application Integration Tools, e.g., SAP, Oracle, BEA, Vitria
Data Warehouse	SAP, Oracle, Lawson
Reporting Software	Business Intelligence tools/Suite, e.g., Oracle Discoverer, Brio, BusinessObjects, Cognos, SAP, Oracle
Database Software	Relational Database Management Systems (RDBMS), e.g., Oracle, which is the Caltrans DBMS standard
ETL Tools	Extraction, Transformation and Load Tools, e.g., Oracle or other proposed solution

Function	Description
Data Modeling Software	Oracle Designer, which is the Department standard
System Support	■ Tools for monitoring performance of systems, databases and queries ■ Problem management tools

For additional details on the software to be purchased, please refer to Section 8 Economic Analysis Worksheets.

5.1.7 Technical Platform

The technical platform is likely to be based on standard servers as to be determined by the solution, e.g., Unix, Linux or Windows solutions that comply with the DTS technical environment.

5.1.8 Development Approach

The solution will be developed by third party vendor/systems integrator while conducting knowledge transfer to State staff. As the State develops formal skills in ERP, EAI and data warehouse management development, responsibilities will shift and will be allocated to State/County experts for ongoing maintenance and operations.

5.1.9 Integration Issues

Data integration will be required as part of the proposed solution. In Project Alpha, integration of the ERP system with the data warehouse and 70 remaining systems will be the responsibility of the Integration Partner utilizing the EAI infrastructure. In addition, the EAI infrastructure will provide the foundation for integrating future systems including subsequent projects to follow on to Project Alpha.

5.1.10 Procurement Approach

Given the need to pursue implementation of the proposed solution in order to realize the benefits of Project Alpha and the IFMS, Caltrans will pursue the most expedient procurement processes allowed within State guidelines for each discrete set of vendor services being acquired.

For the Integration Partner services, Caltrans will conduct a competitive RFP process that facilitates open competition within the marketplace. It is anticipated that the procurement process will take 14 months to execute. Caltrans will contract with additional third party vendors (Procurement Support, IPOC, IV&V, Project Management Mentor) using CMAS and IT MSA contract vehicles.

5.1.11 Technical Interfaces

The proposed EAI component will provide the infrastructure for technical interfaces. Initially, the EAI system will interface and extract data from the ERP system and provide the data to interface with existing systems in the format that is used by TRAMS. In this way, legacy systems will be unaware that TRAMS has been replaced by an ERP system. These interfaces may operate in batch mode or in real time depending on the source and type of data required.

In the long term, additional internal interfaces will be developed using the EAI infrastructure. In addition, the system will be architected to allow other external systems to extract data. However, details around these systems and interfaces cannot be determined at this point and will be driven by future demands and needs. Table 32 summarizes the internal system interfaces for systems to remain after the full implementation of the IFMS that will be included with the Project Alpha proposed solution.

Table 32. Proposed Solution Required Internal Interfaces

Interface	Type
BID/iBID	■ Bidirectional — Capital project construction data. ■ One-way — Contract award amount and winning vendor ■ One-way — Contract account code, project description and location data.
IMMS	■ Bidirectional — Master File of Signal and Lighting Inventory. ■ One-way — Accident Costs/Damage Claim Data. ■ One-way — Damage Assessment Form Data.
TOPSS	■ Bidirectional — Validated time. ■ One-way — Employee position/personnel data/salary. ■ One-way — Personnel data to support annual budget preparation.
CMS*	■ Bidirectional — Payment Request (to AP module). ■ One-way — Labor compliance violation payment (to AR module). ■ One-way — Master vendor data. ■ One-way — Data regarding third party payments to contractors. ■ One-way — Payment hold data.

* Caltrans is currently in the process or procuring an integrated Construction Management System (CMS). These systems interfaces will exist assuming the CMS will be implemented prior to Project Alpha being implemented. These interfaces will be reviewed by the Integration Partner for Project Alpha to make any necessary adjustments.

5.1.12 Testing Plan

The proposed solution includes testing and development environments. There will be several approaches to simplify the amount of testing and the approach, including the following:

- **ERP —** The system will require extensive validation of requirements using test scripts at various stages of the implementation life cycle. Unit, system/integration, load and performance testing, end-user acceptance, operational testing, and any other testing procedures recommended by the integration vendor and the project oversight team will be performed. Cost for unit testing is included in the development cost.
- **EAI —** Interface connectors will be individually tested.
- **Data Warehouse —** Tests will be performed to validate proper configuration of the data warehouse.
- **Reports —** For existing reports that will be re-written, there will be testing to compare report results of old and new reports. New reports will require extensive validation by comparison of report results against actual data. This process is typically quite manual. Cost for unit testing is included in the development cost.
- **Load and Performance Testing —** Load and performance testing will be conducted on the infrastructure and ERP system to ensure compliance with required service-level agreements (SLAs) that will be established in the Integration Partner contract. There will

be some level of performance testing for the data warehouse environment, but typically, individual queries will be monitored through tools, and the databases will be tuned over time.

5.1.13 Resource Requirements

The proposed solution requires redirection of current IT staff, plus skills that will require assistance from contractors. Assumptions and costs for all of the proposed resource requirements are detailed in the Economic Analysis Worksheets in Section 8.

External Resources

The following external resources are anticipated for the procurement, modification, and implementation of the proposed solution. Given the high criticality of Project Alpha, Caltrans will be required by the Department of Finance to acquire both Project Oversight and IV&V support.

Contractor resource requirements include:

- Procurement assistance vendor to define procurement specifications, RFP documents, and vendor selection assistance.
- Project Oversight (IPOC) vendor to provide monthly reporting to DOF.
- IV&V vendor to provide oversight of design, development and deployment of the solution.
- Project management support/mentor vendor to provide support to the Project Manager and advise on project implementation best practices, provide coaching, etc..
- Integration Partner to manage subcontractors and provide systems integration services and to deliver the integrated solution.

A summary of the external skills required for the proposed solution is listed in Table 33. Refer to the Economic Analysis Worksheets for cost information associated with external resources.

Table 33. External Skills Required for Project Alpha

External Skills Required
■ Procurement Assistance ■ Project Management Support/Mentoring ■ Project Oversight (IPOC) ■ Independent Validation and Verification (IV&V) ■ Integration Partner for COTS Implementation and Integration Services

Internal Resources

Internal PY estimates that represent the various Caltrans employees involved in Project Alpha were made across phases based on prior Caltrans projects, information from previous public sector ERP implementations and Gartner research. The estimates, by fiscal year:

- 2.92 PYs in FY 05/06
- 16.69 PYs in FY 06/07

- 32.53 PYs in FY 07/08
- 32.12 PYs in 08/09

The exact PY requirements for a given fiscal year depend directly on the phase of the project and the skills required — refer to Section 8, Economic Analysis Worksheets for details. Redirection of current program staff will save money, avoid organizational disruption and stabilize ongoing support efforts. Internal project management will be performed primarily by a Caltrans' staff member, who will rely on the assistance of an external project management mentor to monitor and execute daily activities.

Ten PYs will be required for the duration of the project to provide full-time assistance for the project beginning in Phase 2, System Development. A subset of the ten PYs will be used to assist with requirements definition; RFP development and review; and evaluation and selection responsibilities. These PYs in fact comprise numerous Caltrans employees that will be utilized at different points of the project to gather requirements, design the system, and participate in testing, training and other activities.

To support the system after implementation, 16 PYs will be redirected from support of the current financial management systems that will be decommissioned upon completion of Project Alpha.

As mentioned earlier, detailed staffing assumptions and costs are provided in Section 8, Economic Analysis Worksheets.

5.1.14 Training Plan

Training for this solution is a key component and is required throughout the duration of the project. Caltrans and DTS technical staff must be trained on usage and maintenance of the new infrastructure, as well as of the new COTS ERP system. Technical training for IT staff addresses skills to support the ERP platform transition and the EAI and data warehouse infrastructure. It also addresses development, maintenance and user administration skills to support the system.

Training of Caltrans and DTS staff will be required in the following areas:

- Server administration and security.
- ERP system administration and security.
- EAI system administration.
- Data warehouse system administration.

Training of Caltrans program staff will be required in the following areas:

- "Train the trainer" courses for end-user ERP solution usage.
- "Train the trainer" courses for end-user reporting/BI tool usage.

Pilot site and end-user training will be provided for Caltrans' program staff. Caltrans' employees in the Divisions and District Offices will attend "train the trainer" courses to familiarize themselves with the new ERP system. These employees will in turn train all end users throughout Caltrans on the new ERP system. Training will be provided immediately prior to the

ERP system migration at each site to improve information retention. In addition, managers and business analysts who must use the system to conduct analysis and develop reports will need training on tools and database structures.

Group courses will be conducted for Divisions and District Offices, and computer-based training will be leveraged where possible. This training will benefit staff whose business processes and core financial tools have changed.

End-user training needs include the following:

- ERP COTS application usage.
- Reporting/BI tool usage.

Table 34 summarizes the end user training needs for the project. Costs for this training have been incorporated into Section 8 Economic Analysis Worksheets.

Table 34. End User Training Needs for Project

Staff	Number	TRAINING NEEDS
Caltrans' IT Staff	16	10-15 days depending on role
Caltrans' Program Train the Trainer Staff	40	10–15 days of training
Caltrans' End Users	800	5-10 days training depending on role(s)

5.1.15 Ongoing Maintenance

Ongoing operations of servers and databases, including database backup and recovery, will be managed by DTS. The Integration Partner will provide maintenance as per the licensing agreement, to include updates and/or upgrades to the base products. In addition, Caltrans will be responsible for maintaining databases, interfaces and reports and providing guidance for requirements, design and architecture of the solution over time.

5.1.16 Information Security

Security is key to the selection of the solution and will comply with the plans for security outlined in the Caltrans Agency Information Management Strategy (AIMS) 2005, dated August 2005. Classes of users will be established, and the user log-on process will manage role-based access levels for both the ERP system and the BI tools. These access levels include inquiry, additions, deletions, modifications, security maintenance (e.g., creation or update of security profiles) and system maintenance (e.g., maintenance of table-driven system parameters).

Key elements of security include:

- Physical Security: The new system will be secured within a locked room at DTS.
- Network Access Security: network security will continue to be maintained at various levels including firewalls, a VPN, and network directory structure to facilitate a secure network environment.
- Application Security: Roles and rule-based application access controls must be configured in the solution. Administration of roles and rules will be managed by the State

using security administrators. These security capabilities are assumed to be part of the ERP system and Business Intelligence (BI) Suite/Report tools to be acquired.

- Confidentiality of Data: Use of Secure Web browser and Internet technology, e.g., SSL.
- Audit and Logging: Access to sensitive data will require separate logging and audit trails. These capabilities are also assumed to be part of the ERP system and Business Intelligence (BI) Suite/Report tools to be acquired.

5.1.17 Confidentiality

Confidentiality of data will be maintained using established procedures for the existing Caltrans systems solution including:

- System will be hosted in secure data locations.
- Backup tapes and other media will be protected.
- Access to data will require systems administrators and supervisors to authorize access.
- Critical data will be encrypted in the systems if so required.
- Data in flight (transmitted over the network) will require encryption, e.g., SSL.

5.1.18 Impact on End Users

Project Alpha will have a significant impact to financial management business processes and supporting systems. The proposed system will be deployed to all Caltrans financial staff, managers and business analysts. The new system will have a different “look and feel” than current systems and will require time for end users to attend training and familiarize themselves with navigation. Although many Caltrans employees are familiar with browser applications through Internet use, shifting from menu-driven and character-based systems to Web-based ERP application can be a difficult adjustment. When users do become familiar with the system, the efficiency gains in performing daily job duties using the redesigned business processes and accessing program data will favorably affect end users.

End users will also be impacted in that they will have access to additional reports for doing their job. It is assumed that reports will be accessed over a Portal/Web solution and that necessary training will be provided. These training requirements are described in Section 5.1.13.

5.1.19 Impact on Existing System

Installation and configuration of the new ERP system will not affect daily operations or the use of the existing 70 financial systems until “cut-over.” Once the new ERP system has gone live, the old systems will be decommissioned leaving the proposed solution as the system of record. To ensure continuity of service, remaining legacy and new systems will be interfaced through the EAI functionality. In this way, users of these systems will be “unaware” of the new ERP system. Existing data can be ported to optical disk and select legacy data can be moved to the data warehouse for access by the BI reporting tools.

5.1.20 Consistency with Overall Strategies

The infrastructure migration and selection of a COTS ERP system meets Caltrans' overall strategies outlined in the Caltrans AIMS 2005. For example, the ERP, EAI and data warehouse solution establishes a foundation for future technology solutions based on Department-wide business processes, data records and data standards. The solution will meet shared business needs and will be integrated. It will also comply with Departmental technology standards and processes.[1]

The solution also follows the recommendations outlined in the Caltrans Financial Management Integration Study Strategic Plan.[2] The Strategic Plan recommends that "the Department implement a single enterprise-wide integrated system to meet the Department's financial systems requirements." In addition, the Strategic Plan recommends implementing an active data warehouse to support the Department's financial reporting requirements and providing interfaces between IFMS and other Department systems using industry standard Enterprise Application Integration (EAI) software.

Furthermore, the proposed solution is aligned with the mission and vision of Caltrans, as outlined in its most recent strategic plan, and supports e-government initiatives outlined by the State. Project Alpha is the first in a series of projects planned to improve information management at Caltrans.

5.1.21 Impact on Current Infrastructure

The State anticipates the use of existing servers and infrastructure to support the ERP system, EAI and data warehouse infrastructure. It is assumed that this infrastructure will continue to be housed at DTS. End-user desktop infrastructure is not expected to change nor are there any anticipated changes in telecommunications or network requirements.

5.1.22 Impact on Data Centers

The State will continue to procure server hardware and monitoring capabilities from DTS using standard contracts. When TRAMS is decommissioned, additional mainframe capacity will be released for other applications.

5.1.23 Data Center Consolidation

As noted earlier, all components of the proposed solution will be housed at DTS.

5.1.24 Backup and Operational Recovery

The new infrastructure will support Caltrans' current disaster recovery routines and will be in compliance with the State's Operational Recovery Plan (ORP) standards. Backup of data within the ERP system and the data warehouse will be performed on a regular basis. In the event of a data center disaster, the State will leverage standard backup and recovery capabilities of DTS.

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[1] Source: IT Strategies taken from the Caltrans Agency Information Management Strategy (AIMS) Manual 2005 (August 2005).

[2] Source: Caltrans Integration Study (CIS) — Financial Systems Strategic Plan, (17 March 2004).

5.1.25 Public Access

There will be no general public access to the systems in the short-term. In the long term, the State may determine that general public or certain community stakeholder groups have access to specified reports and data.

5.1.26 Costs and Benefits

The total one-time IT project costs, which include all contract costs and internal costs associated with development and implementation of a full data warehouse solution and reporting environment, are **$23,651,566**. The total IT Continuing Costs, which include all contract costs and internal costs associated with the ongoing maintenance and support of the solution, are **$3,031,086** in the first year after acceptance.

The proposed solution meets the primary goal of Project Alpha and the IFMS Strategic Plan, which is to provide access to comprehensive information that enables Caltrans to manage the organization like a business. In addition, implementing the proposed solution will also enable Caltrans to decommission 70 legacy financial management systems.

Processing improvements will allow the Division of Accounting (D of A) to reduce its budget by 33 Personnel Years (PYs) one year after system acceptance, in FY 10/11. The reduction is composed of 16 PYs currently supporting subsystems that will be replaced by Project Alpha and 17 PYs responsible for reconciliations, error files or re-keying activities that will be eliminated through implementation of the proposed solution. Finally, decommissioning the aforementioned systems will allow for a redirection of 16 PYs and the elimination of 3 PYs of IT support staff upon final acceptance of the project at the end of FY 08/09.

5.1.27 Sources of Funding

The proposed solution with be funded through a combination of two funding sources:

1. Redirection of current PY, IT hardware, software and data center costs to the new system during implementation and after final acceptance.
2. Additional funding provided through a complementary Budget Change Proposal.

Refer to Section 8, Economic Analysis Worksheets for funding specifics and associated assumptions.

5.2 Rationale for Selection

Alternative 3, Commercial-Off-The Shelf (COTS) Solution, is the most complete solution that meets current needs and is consistent with the long-term vision of the State. The proposed solution satisfies all of the solution objectives and the technical and functional requirements described in this feasibility study report. The selection of this alternative over the others can be summarized as follows:

- Provides the most cost-efficient solution for Caltrans and the State and mitigates technological risk and support concerns.
- Significantly reduces the manual and redundant processes within the organization.

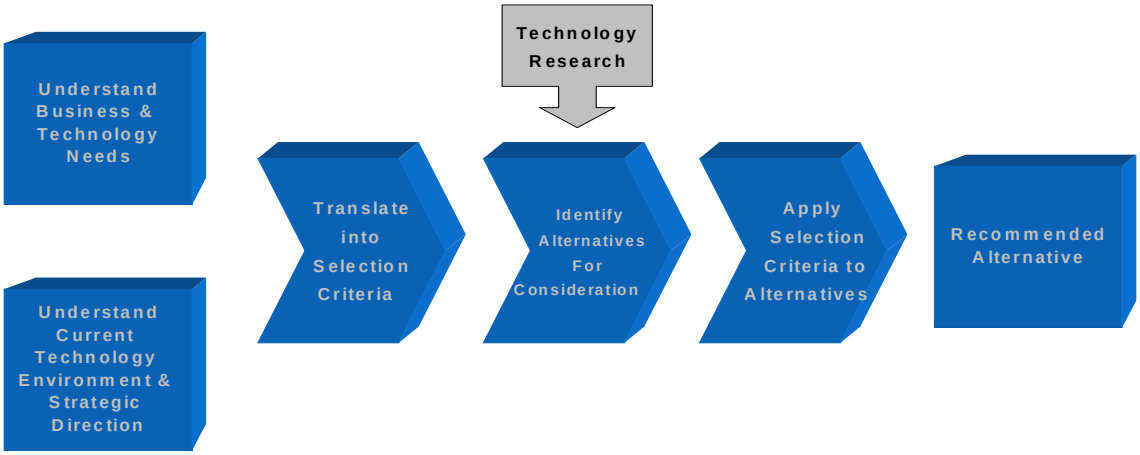
- Improves business processes and efficiency through business process analysis and best practices inherent within the application stemming from other COTS vendor clients.
- Provides the infrastructure that will be leveraged in future projects.
- Allows redirection of current staff to leverage existing skills and avoid organizational disruption.
- Benefits from regular upgrades, user groups, help desk support and other stipulations typically found in COTS maintenance contracts.
- Reduces support needs and reliance on technical staff for reporting, system and data fixes.
- Provides easy-to-use reporting tools for information requests and decision-making activities.

The following section provides additional detail on the other alternatives considered.

5.3 Other Alternatives Considered

All viable options were explored in order to select the best alternative for Caltrans to meet its requirements and objectives for the new ERP, EAI and data warehouse system. The options were researched to ascertain their suitability for Caltrans in light of its current situation, departmental goals and objectives, business and functional requirements, and funding constraints. Figure 23 below depicts the methodology for the selection and assessment of alternatives.

Figure 23. Alternatives Analysis Approach



Source: Gartner, 2005

After completing research and due diligence activities, three basic alternatives were considered for Caltrans. These alternatives are listed in Table 35.

Table 35. Alternatives Considered

Alternative	Description

Alternative	Description
1	Modification and Enhancement of TRAMS
2	Custom Developed Solution(s)
3	Commercial-Off-The-Shelf (COTS) Solution(s) ■ 3a — COTS Suite for ERP, EAI and Data Warehouse ■ 3b — COTS Suite for ERP, Best-of-Breed for EAI and Data Warehouse

Each of these alternatives is described in the following sub-sections, followed by a comparison table to assess each alternative in key areas for Caltrans.

5.3.1 Alternative Descriptions

5.3.1.1 Alternative 1: Modify and Enhance TRAMS

Description

This alternative entails modifying the current TRAMS system to support the required functionality that would replace the myriad systems and eliminate manual processes across the Department. Modification of TRAMS would involve development of new application code on the mainframe to meet the financial management needs of Caltrans. Advantages and disadvantages for Alternative 1 are provided in Table 36.

Table 36. Advantages and Disadvantages of Alternative One

Advantages	Disadvantages

Advantages	Disadvantages
Meets some of the objectives and functional requirements identified in the Business Case Section of this FSR, specifically: ■ Support the Department's financial reporting requirements, decision-making needs, and other highly data-dependent objectives that require structured and coherent data. ■ Achieve financial management and tracking capabilities not currently available to Caltrans, including the ability to: ❑ Truly assign overhead costs ❑ Differentiate between expenses and expenditures ❑ Track non-labor costs and view the return on investment (ROI) on a monthly basis as is currently done for labor costs ■ Provide a seamless, streamlined interface for existing legacy systems and other DOT infrastructure components. ■ Enable the Department to realize major efficiency and data accuracy gains by consolidating redundant legacy systems into a new, enterprise-wide solution. Avoid some new costs, in particular acquisition of new COTS products, and development, data conversion (potentially), hardware, software, training, and additional staffing costs associated with a COTS implementation. Limit disruption of daily operations for conversion, migration and implementation activities.	Modifying obsolete mainframe technology severely limits future system flexibility, puts Caltrans at risk of discontinued support, and will still result in shadow systems for data analysis. The level of effort to modify the TRAMS system to meet functional requirements would be cost prohibitive. In addition, this alternative does not meet the following objectives: ■ Meeting standards and initiatives for Caltans' Agency Information Management Strategy Plan, and State e-government initiatives ■ A stable, reliable, scalable and secure technical infrastructure to support daily operations ■ Increased staff productivity through the elimination of redundant business processes and data entry ■ The ability to easily modify currently utilized software in response to legislative and business changes ■ The ability to generate meaningful reports and run inquiries on an ad hoc basis ■ The ability to provide greater access to users, (Web-based drill down capabilities, data mining, business intelligence capabilities, etc.) Continued operations in a mainframe environment, which will continue to limit flexibility to meet changing business needs Design flaws may be inherited by the modified system depending on the level of re-engineering of the TRAMS system

Recommendation

Although this alternative offers the ability to support more functionality than the current TRAMS system, it still leaves a technical environment in place that is neither modern nor widely supported. In addition, modifying the current TRAMS system to fully meet the requirements of Caltrans is not feasible. Cost concerns, lack of flexibility to meet changing business needs, and a non-standard infrastructure render this alternative unacceptable for Caltrans.

5.3.1.2 Alternative 2: Custom Developed Solution(s)

Description

Develop a customized Financial Management System solution incorporating all the requirements and objectives of Caltrans. Replace the obsolete infrastructures with a more modern, industry-standard infrastructure. Advantages and disadvantages for Alternative 2 are provided in Table 37.

Table 37. Advantages and Disadvantages of Alternative Two

Advantages	Disadvantages
■ All requirements and objectives can be met through customization ■ Ownership of the source code affords flexibility and development options not available with the other options ■ Development vendors have proven development methodologies, allowing Caltrans to benefit from their experiences in development	■ High costs accompany custom development projects, particularly those that involve multiple sites and complex requirements ■ The time frame associated with the full customization cycle is significantly longer than the other options ■ Technological risk is high ■ Support concerns will increase over time as a customized solution will not benefit from regular version upgrades, rather relying on new development skills

Recommendation

Although this option could result in meeting all the requirements and objectives of Caltrans, the costs, risk and time that accompany such an initiative are difficult to justify. If there are no COTS solutions on the market that meet the majority of an organization's requirements, custom development is often the only alternative. However, since COTS solutions do exist, the technological risk, support concerns and cost of customization are simply too high to support this alternative.

5.3.1.3 Alternative 3: Commercial-Off-The-Shelf (COTS) Solution(s)

Description

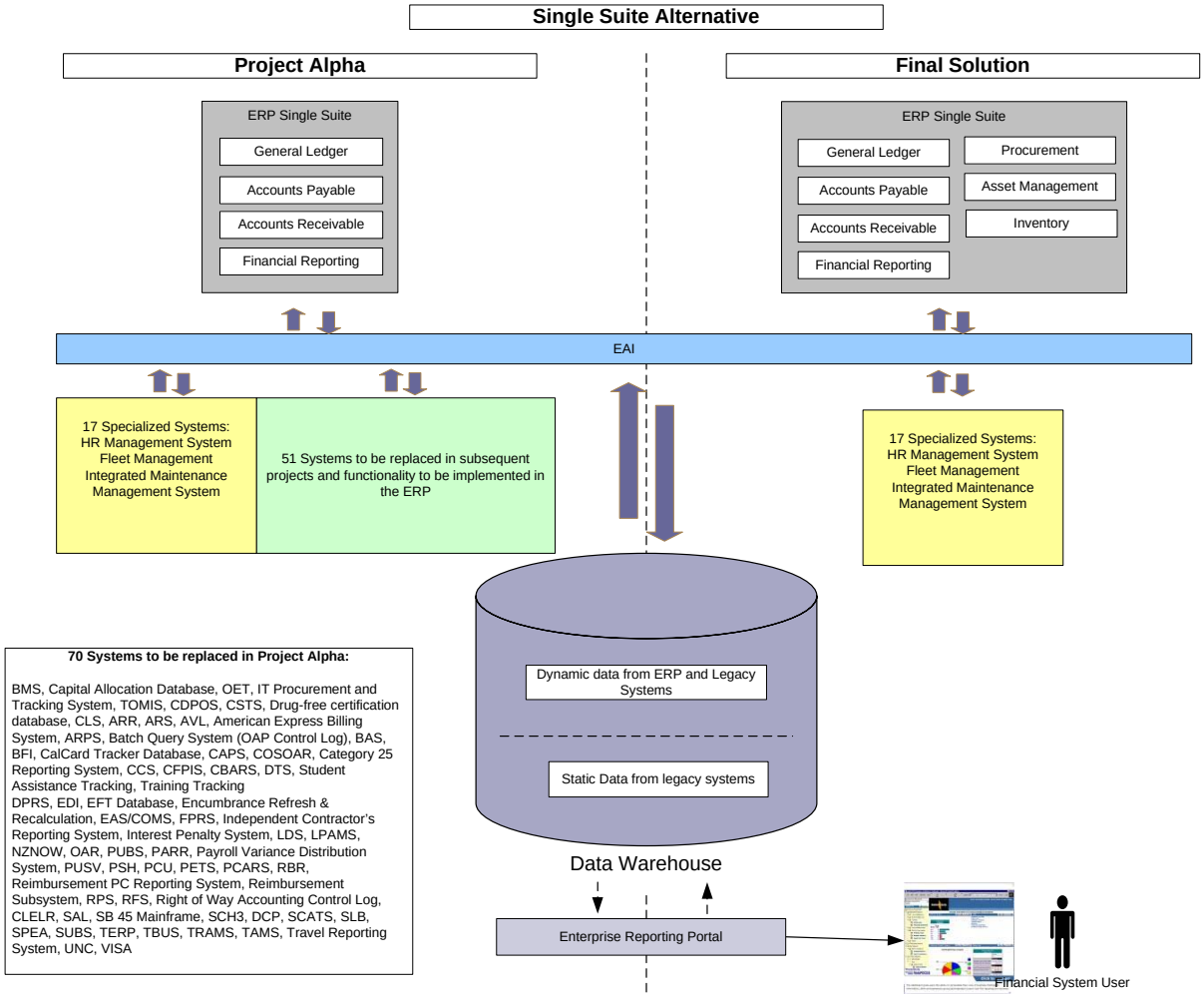
Alternative 3 includes two similar solutions:

- Alternative 3a, COTS Suite for ERP, EAI and Data Warehouse.
- Alternative 3b, COTS Suite for ERP, Best of Breed for EAI and Data Warehouse.

With the exception of the source vendors for the EAI and data warehouse components of the solution, all components are the same for both variants of Alternative 3. While this analysis indicates that a best-of-breed approach would add complexity to the implementation and would increase Caltrans' level of effort for vendor management, both variants of Alternative 3 will be considered by Caltrans in a business based, competitive procurement.

A conceptual model of Alternative 3 is illustrated below in Figure 24.

Figure 24. Alternative 3 Commercial-Off-The-Shelf (COTS) Solution(s)



5.3.2 Evaluation of Alternatives

Specific criteria, shown in Table 38, were established to evaluate the ability of each alternative to meet Caltrans objectives. Alternative 3 provides clear advantages over the other alternatives considered. Alternative 3a provides a better fit for Caltrans due to the lower costs associated with this alternative as well as lower complexity in terms of IT staff training and ongoing maintenance requirements, but as noted previously, both variants of Alternative 3 will be considered by Caltrans in a competitive procurement.

Table 38. Evaluation Criteria Definitions

	Criteria	Definition
1.	**Meets functional and technical requirements**	Does the alternative fulfill Caltrans' business process requirements?
2.	**Business process risk**	How closely does the solution meet the functional requirements? Does the gap between functional requirements and solution capabilities force undesirable changes to business processes?

	Criteria	Definition
3.	**Dollar cost**	What is the comparable magnitude of cost across alternatives?
4.	**Time to build and install**	How long will it take for the alternative to be completely operational?
5.	**Operational continuity impact**	How disruptive to operations will the implementation of the solution be?
6.	**Initial training required to maintain system**	How much internal IT staff training will be required to maintain the system for Caltrans?
7.	**End-user training requirements**	How much training will be required to train end users to effectively use the new system?
8.	**Ongoing staffing requirements**	What magnitude of internal Caltrans staffing is required on an ongoing basis to support, operate and maintain the solution?
9.	**Caltrans control of solution**	Once the solution is selected, how much control does Caltrans have regarding its customization?
10.	**Expected initial life**	How long will the alternative be in place before additional customization or upgrade is required?
11.	**Overall life (including upgrades and customization)**	How long will the alternative be in place before it needs to be replaced altogether?

The evaluation criteria above were applied to assess each of the four alternatives. Table 39 provides a summary of this evaluation.

Table 39. Evaluation of Alternatives

	Criteria	Alternative 1: Modify and Enhance TRAMS	Alternative 2: Custom Developed Solution(s)	Alternative 3a: COTS Suite for ERP, EAI and Data Warehouse	Alternative 3b: COTS Suite for ERP, Best-of-Breed for EAI and Data Warehouse
1.	**Meets Functional and Technical Requirements**	Moderately	Yes	Yes	Yes
2.	**Business Process Risk**	Significant	Significant	Low	Low
3.	**Dollar Cost**	High	High	Moderate	Moderate-High
4.	**Time to Build and Install**	24-48 months	48-72 months	18-24 months	18-24 months
5.	**Operational Continuity Impact**	Moderate	Significant	Significant	Significant
6.	**IT Support Staff Initial Training Required to Maintain System**	Low	Significant	Moderate-Low	Moderate
7.	**End-User Training Requirements**	Moderate	Significant	Significant	Significant
8.	**Ongoing Staffing Requirement**	Flexible	Significant	Flexible	Flexible

	Criteria	Alternative 1: Modify and Enhance TRAMS	Alternative 2: Custom Developed Solution(s)	Alternative 3a: COTS Suite for ERP, EAI and Data Warehouse	Alternative 3b: COTS Suite for ERP, Best-of-Breed for EAI and Data Warehouse
9.	**Caltrans Control of Solution**	Limited	Significant	Flexible	Flexible
10.	**Expected Life (before additional customization or upgrade)**	1-2 years	2-4 years	2-4 years	2-4 years
11.	**Overall Life (including upgrades and customization)**	3-5 years	6-10 years	6-10 years	6-10 years

As stated above, each alternative was evaluated utilizing specific assumptions and background information. Table 40 calls out this background information against the application of each criterion for each alternative.

Table 40. Background Information and Assumptions for Evaluation of Alternatives

	Criteria	Alternative 1: Modify and Enhance TRAMS	Alternative 2: Custom Developed Solution(s)	Alternative 3a: COTS Suite for ERP, EAI and Data Warehouse	Alternative 3b: COTS Suite for ERP, Best-of-Breed for EAI and Data Warehouse

	Criteria	Alternative 1: Modify and Enhance TRAMS	Alternative 2: Custom Developed Solution(s)	Alternative 3a: COTS Suite for ERP, EAI and Data Warehouse	Alternative 3b: COTS Suite for ERP, Best-of-Breed for EAI and Data Warehouse
1.	Meets Functional and Technical Requirements	Moderately	Yes	Yes	Yes
Assumptions/Background — Although Caltrans has unique aspects to its financial management processes, there are several viable COTS alternatives that could be leveraged with minimal customization. Alternative 1 would afford some additional functionality improvements but would be hampered by a dated TRAMS design and its inherent flaws. Although Alternatives 2, 3a and 3b would meet most or all of Caltrans' requirements, Alternative 2 would carry significant costs and risk.					
2.	Business Process Risk	Significant	Significant	Low	Low
Assumptions/Background — Disparity between Caltrans' functional requirements and the solution's ability to meet those requirements imposes risk to Caltrans' business processes. That is, where a solution fails to address functional requirements, Caltrans will have to create "work-arounds" in its business processes. While these "work-arounds" fill gaps not addressed by the solution, they eventually create additional parallel systems, compromising efficiencies gained by a single, integrated solution. While Alternative 2 would allow continued customized business processes, Alternatives 3a and 3b include industry best practice business processes inherent to the systems.					
3.	Dollar Cost	High	High	Moderate	Moderate-High
Assumptions/Background — Specific dollar figures are provided in detail in the Economic Analysis Worksheets. For comparative purposes, we have ranked the alternatives from Low to High.					
4.	Time to Build and Install	36-48 months	48-72 months	18-24 months	18-24 months
Assumptions/Background — Length of time required to build and install is based on industry standards and interviews conducted on behalf of Caltrans. The alternative timeframes will vary based on the implementation methodology (customization, training, rollout, etc.) chosen by Caltrans.					
5.	Operational Continuity	Moderate	Significant	Significant	Significant
Assumptions/Background — Implementation of a new system and an entirely new infrastructure can significantly affect day-to-day operations for an organization. Alternative 1 would affect Caltrans as the current TRAMS system is modified, but the effect would be considerably less than Alternatives 2, 3a, and 3b, which include the implementation of an entirely new system. Detailed implementation planning can mitigate these risks.					
6.	IT Support Staff Training Required to Maintain System	Low	Moderate	Moderate-Low	Significant
Assumptions/Background — The complexity associated with each alternative dictates the level of ongoing internal training required to maintain the system once implemented. Therefore, we have evaluated comparative levels of training required across the alternatives.					
7.	End-User Training Requirements	Moderate	Significant	Significant	Significant
Assumptions/Background — The training requirements for each alternative depend on the familiarity with the solution and the technical environment. Therefore, Alternatives 2, 3a and 3b would require a significant training effort.					
8.	Ongoing Staffing Requirement	Flexible	Significant	Flexible	Flexible

	Criteria	Alternative 1: Modify and Enhance TRAMS	Alternative 2: Custom Developed Solution(s)	Alternative 3a: COTS Suite for ERP, EAI and Data Warehouse	Alternative 3b: COTS Suite for ERP, Best-of-Breed for EAI and Data Warehouse
Assumptions/Background — Caltrans must consider the need to retain some level of technical expertise. However, budgetary and other constraints require that the level of staff required be managed closely. Alternative 1 would leverage current staff to maintain the system and make minor functional changes. Alternative 2 will require retraining to develop skills that support more modern development tools. It will also require several PYs to ensure system knowledge is retained throughout the organization and that knowledge transfer issues associated with custom solutions do not arise over time. Alternative 3a would also leverage current staff while Alternative 3b would require several additional PYs to manage multiple best-of-breed maintenance contracts.					
9.	Caltrans Control of Solution	Limited	Significant	Flexible	Flexible
Assumptions/Background — Caltrans' ability to affect the solution will influence that solution's ability to meet specified functional requirements. Alternative 2 does not lend itself to additional application development. Alternative 2 would ostensibly provide Caltrans with significant control over the development path of the solution. Selecting Alternatives 3a and 3b may preclude Caltrans from any substantive influence on the developmental path of the solution.					
10.	Expected Life (before additional customization or upgrade)	1-2 years	2-4 years	2-4 years	2-4 years
Assumptions/Background — Expected life figures are based on industry standards and interviews conducted on behalf of Caltrans.					
11.	Overall Life (including upgrades and customization)	3-5 years	6-10 years	6-10 years	6-10 years
Assumptions/Background — Overall life figures are based on industry standards.					

6.0 Project Management Plan

This section describes the project management methodology, the project organization, and the project monitoring and quality assurance processes that will be utilized to ensure a smooth implementation of the proposed solution for Project Alpha. Caltrans recognizes that a structured approach to project management is required to ensure the success of the Project Alpha and subsequent projects. Following project approval, Caltrans will develop a detailed project management plan that addresses the project schedule; change and issue management; quality management; human resources management; and risk management. Table 41 provides an outline of the Project Management Plan components to be described in this section.

Table 41. Project Management Plan Sections

6.0 Project Management Plan
6.1 Project Manager Qualifications
6.2 Project Management Methodology
6.3 Project Organization
6.4 Project Priorities
6.5 Project Plan
6.5.1 Project Scope
6.5.2 Project Assumptions
6.5.3 Project Phasing
6.5.4 Roles and Responsibilities
6.5.5 Project Schedule
6.6 Project Monitoring
6.7 Project Quality
6.8 Change Management
6.9 Authorization Required

As mentioned previously, Project Alpha is the combination of two of the projects defined in the Caltrans Financial Management Integration Study Strategic Plan -- the Infrastructure and General Accounting projects. The decomposition into separate projects was developed to facilitate the implementation of the IFMS solution through a managed implementation effort with incremental benefits. Since Caltrans' overall solution involves the coordinated delivery of multiple projects, a focus on change management, discussed at length later in this section, will be vital to the success of each individual project as well as the overall Integrated Financial Management System Strategic Plan.

6.1 Project Manager Qualifications

Caltrans understands that appropriate, professional project management policies, practices and staff must be assigned to successfully execute Project Alpha. In order to address the complexities of implementing the proposed solution, Caltrans will assign an experienced project manager to the project who understands the business needs of the various individuals that interact with Caltrans' financial systems as well as the technical environment that supports the organization. Day-to-day direction for the project will be the responsibility of the project manager from the Accounting Division, who will be responsible for ensuring that the project comes in on time and under budget. The project manager, with the assistance of the project team, will collectively offer the following key qualifications:

- Understanding of the overall financial business requirements and their relation to the project's objectives.
- Knowledgeable in financial business processes, procedures and information technology.
- Skilled in communicating, both written and oral, on goals, objectives and status with management, stakeholders and staff.
- Skilled in resolving phase conflicts with stakeholders, vendors and phase staff.
- Knowledgeable in the Caltrans information technology project procurement and development methodologies.
- Experienced at working with multiple vendors to accomplish information technology and business process change goals.
- Knowledgeable in information technology project management and execution methodologies, using scheduling tools and information technology application development strategies.

6.2 Project Management Methodology

Caltrans will comply with the State's Project Management Methodology as defined in SIMM Section 200, augmented by project management methodologies (PMM) as found in the Department's Information Technology (IT) Project Management Manual. As a result, the project management plan will include the following components and deliverables:

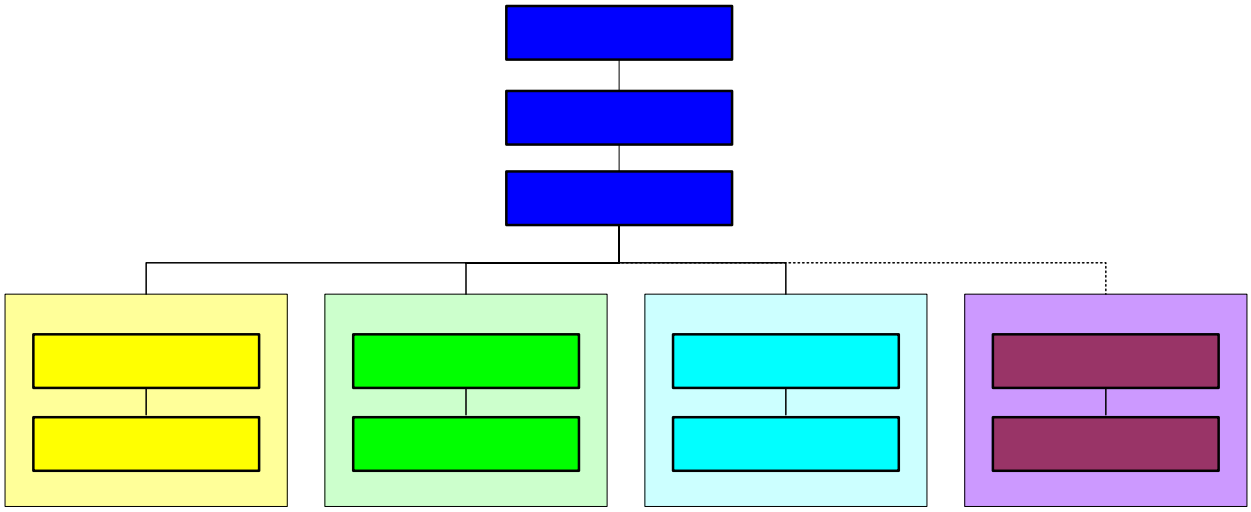
- Project Execution Methodology
- Project Cycles
- Project Management Volume Organization
- Project Management Policies
- Project Approval
- Configuration Management
- Contract Management
- Completion and acceptance of project charter/statement of work
- Development of comprehensive business and technical requirements
- Development of activities/work breakdown structures

- Clearly defined project roles and responsibilities
- Development of detailed project schedule, including milestones and deliverables (project planning and tracking)
- Completion of a quality assurance (QA) plan
- Completion of a risk management plan
- Ongoing project performance review and project plan updates (Oversight)
- Comparison of planned and actual progress-to-date
- Completion of project closeout

6.3 Project Organization

Implementation of the IFMS Strategic Plan, and the individual projects that comprise it, including Project Alpha, will require the participation of many people from throughout the Department in addition to vendor staff and representatives from the Department of Technology Services (DTS). In order to effectively organize the various resources to successfully complete the plan, the Caltrans' team recommends an overall governance structure similar in scope to the organization chart included in the Caltrans Financial Management Integration Study, and presented in Figure 25.

Figure 25. IFMS Strategic Plan Program Governance Structure



Source: Visionary Integration Professionals

The IFMS Strategic Plan program governance structure is not intended to replicate any existing Department organization structure. Each role in the program governance structure acts as an agent of change within the Department. The assignment of Department management and staff to fill the program governance roles should be based on their ability to facilitate change, not based on their current roles and responsibilities within the Department.

Throughout the execution of the projects that comprise the IFMS Strategic Plan, support for each project will include ongoing functions such as communication and training management. The communication management team will create and publish each project's communication

strategy and plan, coordinate communication events both internal and external to the project teams, serve as an active communication advisor to the department managers, and maintain a project web site as appropriate. The training management team will coordinate training, including creating and publishing the project's training strategy and plan (tasks and resources), and coordinate all training events. It will also evaluate, identify, facilitate, propose and manage use of selected training methods, and serve as an active training advisor to department managers.

The roles and responsibilities of key participants in Project Alpha are described in Section 6.5.4. Refer to the Section 3, Business Case and Section 4, Baseline Analysis, for organization charts and discussion of the affected Caltrans business and technical organizations.

6.4 Project Priorities

All projects have three components that must be managed: schedule, scope and resources. For this project, project scope can be adjusted if necessary; that is, project scope may be slightly adjusted to accommodate and ensure the planned timing (e.g. fiscal year boundaries) of the project is realized. However, procurement or development delays could significantly impact subsequent projects. The timely and successful completion of Project Alpha is critical to improving Caltrans' operational abilities. The project scope is accepted — the success and functionality of latter projects are directly dependent on the successful implementation of the cornerstone project, Project Alpha, but the project schedule takes precedence over scope. Finally, resources are improved, meaning that additional resources may be added to the project depending on the circumstance. Table 42 summarizes the assessments for project priorities.

Table 42. Project Priorities

Schedule	Scope	Resources
Constrained	Accepted	Improved

6.5 Project Plan

The following section provides an overview of critical project planning elements, including project scope, project phasing and an initial schedule estimate.

6.5.1 Project Scope

The Project Alpha scope includes procurement and installation of enterprise resource planning (ERP), enterprise application integration (EAI) and data warehouse (DW) infrastructure components. Within the ERP functionality, Project Alpha will implement the core financial functionality of General Ledger, Accounts Receivable, Accounts Payable and financial reporting for Department users, and lays the foundation for future projects.

Project Alpha is planned to commence in March, 2006 with procurement activities, and is scheduled to be completed by June 2009. The State intends to engage a consulting firm to assist with procurement assistance and the development of requirements and the Request for Proposals (RFP), and the resulting contract will run from March, 2006 through February, 2007.

6.5.2 Project Assumptions

The following assumptions have been made in the development of this FSR:

- Funding for the IFMS project is acquired for the time period specified in the FSR.
- The project will adhere to a strict schedule in which all milestones must be met.
- There will be timely review and feedback on all project deliverables by reviewers.
- Problem/issue resolution will be handled on a timely basis.
- Proactive risk management strategies will be employed to minimize risk and ensure timely completion of the project.
- All vendor contracts and procurements will be accomplished within planned timelines.
- Technical staff and end users will receive training to support the new system.
- Business process optimization (BPO) around inherent software processes will be utilized to ensure that minimal customization will be required of software applications.

6.5.3 Project Phasing

The project will be implemented according to the phases outlined in Table 43 which provides an overview of the major activities that will be accomplished within that phase. Additional descriptions of anticipated activities, by phase, follow the presentation of Table 43. Order of tasks is based on best practices, previous ERP implementations and other sources. The exact list and order of activities will depend on the solution and approach proposed by the Integration Partner and accepted by Caltrans.

Table 43. Project Alpha Phases

Phase	Description
1. Procurement and Project planning	■ Development and issuance of RFP for procurement assistance support. ■ Definition of solution requirements to include functional, technical, implementation and support. ■ Development and issuance of RFP for the Integration Partner. ■ Development and issuance of RFPs for project support including an independent project oversight consultant (IPOC) vendor, independent verification and validation (IV&V) vendor, and a project management mentorship vendor.

Phase		Description
2. System Development	**Change Management**	■ Requirements Analysis/Validation ❑ Process Optimization ❑ Organizational Process and Solution Design ❑ Technical and Functional Requirements ■ Technical Architecture Design ❑ System Design ❑ Database and Reporting Design ❑ Train Caltrans IT Staff ■ System Configuration ❑ Production Environment Deployment ❑ Development/Configuration of Software Functionality ■ Develop and Consolidate Interfaces ■ Data Conversion and Archive of Legacy Data ❑ Conversion to Enterprise Resource Planning ❑ Archive Legacy System Data (into DW/Repository) ❑ ETL Development for Legacy Reporting Systems Data ■ Report Development ■ Testing ❑ Unit Testing ❑ Integration Testing ❑ Load Testing
3. System Deployment and Training		■ Process and solution training of Caltrans Program staff (phased) ■ Deployment of solution to one or more pilot locations ■ Review of pilot results and acceptance ■ Deployment of solution throughout the Caltrans organization ■ Final acceptance

In addition to the major phases described above, Caltrans understands that a structured phasing of the system development, deployment and training (Phases 2 and 3) can reduce project risk and ensure that core business functionality is implemented early. Caltrans will require in RFP responses that Bidders propose a phased implementation of functionality to meet these goals.

Additional details about each project phase are provided below.

Phase 1 — Procurement and Project Planning

The procurement process will begin with the solicitation and selection of a procurement assistance contractor to procure the proposed solution and coordinate the procurement effort with DGS. Once this vendor is selected, the procurement assistance contractor can initiate a complete requirements analysis. Caltrans IT and program staff with intimate knowledge of the business will be required on a part-time basis to assist the procurement contractor. Requirements for the new system will be gathered and the RFP document will be developed, reviewed and approved, and issued to the vendor community.

Due to the criticality of realizing the IFMS Strategic Plan and implementing Project Alpha, and the time, skills and effort that will be required to complete the project successfully, Caltrans requires the assistance of project support consultants. In a separate but related effort to the integration partner RFP, Caltrans will develop the RFPs for these project support consultants. These vendors will provide assistance in the areas of IPOC, IV&V and project management mentoring.

Contracting with the additional vendors will bring needed skills to the project, reducing overall project risk and freeing up Caltrans resources to perform their daily duties. Caltrans' resources will also be able to contribute to requirements definition, data conversion efforts, software configuration exercises, and any other project components that benefit from institutional knowledge. Focusing the attention of Caltrans staff on the functionality and system requirements will help ensure that the deployment of this mission-critical system meets all of Caltrans' financial management objectives.

For each RFP issued, proposals will be reviewed and scored in accordance with defined evaluation criteria. Caltrans will select the vendors that best meet the RFP requirements for each effort and provide the "best value" to the State. Depending on the solution chosen, Caltrans may be required to provide additional, updated information to the Department of Finance before approval of the project. Upon receiving approval, preliminary Caltrans project planning activities will focus on resource requirements, technical and functional scoping, and time commitments for the project.

Phase 2 — System Development

The System Development Phase will commence with the integration partner developing various project planning documents and a baseline project schedule. Planning must include all required activities and resources and must build in contingency planning components to respond to identified risks and unanticipated events. Caltrans staff will provide input and review for these efforts. The tasks that follow are included in this phase.

Requirements Analysis/Validation

Using the requirements developed in the procurement process as a starting point, the selected vendor will work with Caltrans staff to analyze and validate the detailed requirements that will drive the overall design and configuration of the new system and new business processes. Staff from each functional area will participate in the requirements sessions to ensure that all functional needs are addressed and included in the system. During this task, Caltrans' various business processes will be optimized and streamlined to leverage the coherent and integrated nature of the upcoming solution. The intent is to take advantage of the inherent workflow and best practices within the selected COTS system in order to improve the current manner in which Caltrans operates. By following this course, the level of customization required for the system can be minimized, thus saving time and money. The integration partner will be responsible for gaining a deep understanding of Caltrans processes and procedures so that system modifications and re-engineering of business processes can be performed in tandem to bear operational efficiencies for the Department. Critical to this effort will be redesign of processes for general ledger, accounts payable and account receivable appropriate to optimize use of the ERP system with Caltrans financial management operations.

Technical Architecture Design

Based on the requirements developed in the previous phase, the complete technical architecture will be designed by the Integration Partner in collaboration with Caltrans and DTS. Phasing of the development will be decided on at this stage with proper consideration given to desired time frames and potential project risks. This design will include the following components:

- *Technical Architecture Design* — The complete technical architecture framework will be designed and documented in a top down manner according to business needs, while minimizing maintenance requirements.
- *Database Design* — Database design will take various business needs into consideration, including reporting requirements and data retention and integration requirements.
- *Reporting Design* — The technical architecture will be devised to accommodate various types of reporting.

In parallel with the technical architecture design process, Caltrans' IT staff will be trained to maintain and operate the new integrated solution.

System Configuration

The installation, configuration and deployment of all hardware and software components will be conducted during this phase. Separate environments will be deployed to support the various development, testing and production activities. Maintenance of environments will be a primary responsibility of the Integration Partner with support by DTS and Caltrans as required.

To the extent possible, the majority of the development and configuration of the ERP software will be performed on site at Caltrans headquarters to ensure that knowledge transfer to Caltrans staff takes place and to help foster communication within the project team.

Develop and Consolidate Interfaces

This activity encompasses development and consolidation of interfaces between the IFMS and legacy systems as defined in Section 5, Proposed Solution. It is at this point that the EAI infrastructure will be utilized to build the five interfaces to existing systems identified in Section 5, Proposed Solution. Interface consolidation, including removing interfaces from retired legacy systems to not-retiring legacy systems and replacing them with interfaces from non-retiring legacy systems to IFMS, will also be completed in this step.

Data Conversion and Archive of Legacy Data

The inherent data structure of the ERP system must be customized to meet Caltrans data element and naming requirements. Data exchange requirements between the ERP system and legacy systems must be thoroughly analyzed to ensure that a metadata model can be developed for all financial management and complementary system functionality. This development effort will aid in the technical interface design and development efforts.

Planning, design, development and execution of data conversion will be a time-intensive activity during this phase. Caltrans will need to determine how much historical data as well as which data elements will be converted to the new system to accommodate organizational, policy and daily business operations. There are three possibilities for the handling of data in the systems being replaced. For data that will be required for transaction processing in the next fiscal year (encumbrances, open purchase orders, etc), the conversion will result in data being created in the ERP. If the data is not required for transaction processing, but will need to be reported "on the same page" with data from the new system (project financial reports, etc.), the data will be converted and stored in the data warehouse. For data that will not need to be blended with data from the new system, the legacy system can be changed to "report only" mode and the data can be left in place without any conversion. Capital outlay data, for instance, requires historical data for the previous ten years to that will need to be extracted, transformed and loaded (ETL) into the data warehouse. Data from the 70 systems that will be retired, however, will mostly be stored on disks in the event it is needed but will not be converted for IFMS operational use. This business decision reduces data conversion requirements considerably.

A plan for how to access data not converted (e.g., paper, remaining legacy systems) will also be defined. Development of a comprehensive database schema, normalization of the data, and conversion and migration to a new RDBMS (Relational Database Management System) will be required. The integration partner will be responsible for data conversion, albeit in accordance with conversion requirements established in the RFP. Database administrators, Caltrans business staff, and representatives from DTS will potentially be involved in this effort as required.

Report Development

Utilizing the standard “canned” ERP reports as much as possible, a report inventory will be developed to identify the types and nature of reports needed to mimic current needs and develop new reports to fill reporting gaps. Custom reporting requirements will be developed according to organizational need and value to Caltrans and its customers.

The reporting environment and data warehouse infrastructure will be configured and established. Upon completion of Project Alpha, the reports utilized by users will primarily be canned ERP reports configured to Caltrans needs, be it using data wholly from the ERP system, a blend of ERP and data warehouse data, or data obtained directly from a legacy system in “report only” mode. Business intelligence (BI) tools will be configured to allow for data and trend analysis. The timing of this collective effort for reporting and business intelligence may vary based on the solution and approach proposed by the Integration Partner.

Testing

Testing of the new IFMS system in both the development and production environments will begin at headquarters and will include unit, system/integration, load and performance testing, quality assurance activities, and any other testing procedures recommended by the integration partner and the project oversight team. Development of comprehensive test scripts, tracking and reporting of test results, and error resolution procedures are examples of the deliverables that the selected Integration Partner will be required to produce.

Phase 3 — System Deployment and Training

Phased Process and Solution Training

A phased training approach of Caltrans Program Staff will be implemented, beginning in selected district offices where the pilot solution will initially be rolled out, as outlined below. Training of the IT staff will occur throughout the project and will require a time commitment by the future system administrators of the new solution. IT staff will be trained on the functionality and technical architecture of the new IFMS system so that they can be adequately prepared to support an integrated COTS application, as outlined in Phase 2. Program Staff training will be performed using training resources from the vendor and Caltrans, who will be responsible for development of the training materials and the overall success of the training effort. Training will not only include using the new system but will also incorporate new processes and procedures that align with use of the IFMS.

Pilot Deployment

System deployment will begin with deployment of a pilot at selected district offices or on an incremental module-by-module basis to monitor the new system and address any bugs or flaws prior to full deployment. Pilot offices that vary in terms of size and location are recommended, allowing Caltrans to ascertain the full range of problems from small offices to large offices. The initial pilot rollout will use test data instead of actual data to permit Caltrans to continue to operate using the existing system. Only on acceptance of the results of the system pilot will Caltrans progress to a full department-wide deployment.

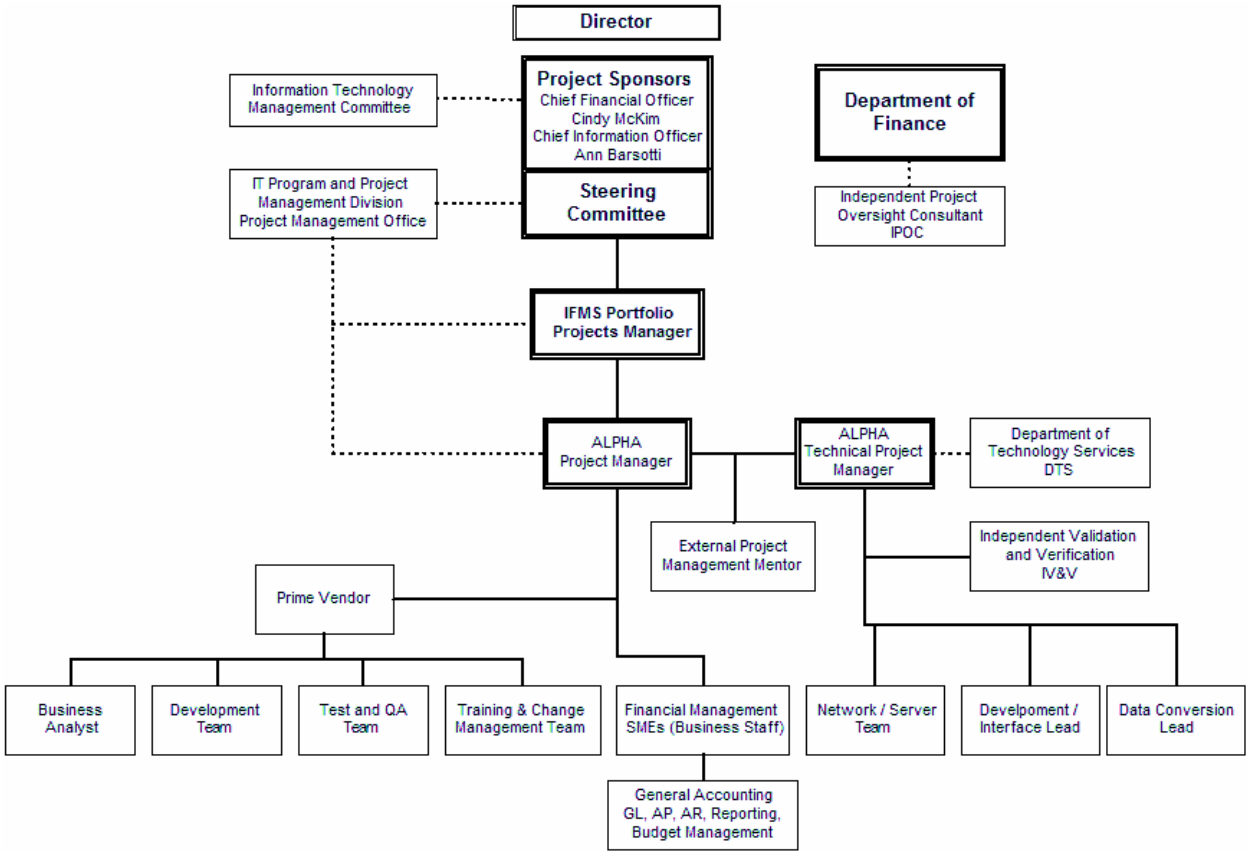
Full Deployment and Acceptance

Once system deficiencies have been addressed and Caltrans executives, management and staff are comfortable with the performance of the new system, it will be deployed to all district offices throughout the State. The project schedule for deployment will be determined by the integration partner in concert with Caltrans executive staff as well as district office representatives. Once the system is fully deployed throughout the organization, the new system will become “live” and will be used by all staff for daily business.

6.5.4 Roles and Responsibilities

Figure 26 represents the project organization chart for governing the IFMS portfolio of projects and Project Alpha, illustrating the relationships between parties internal and external to Caltrans that will be involved in the execution of the project. This section defines the roles and responsibilities of the key participants involved in the implementation of Project Alpha and ongoing governance of subsequent IFMS projects.

Figure 26. Project Alpha Project Organization Chart



IFMS Sponsor

The project sponsor for the IFMS portfolio of projects is Caltrans' Chief Financial Officer, Cindy McKim, in collaboration with Caltrans' Chief Information Officer, Ann Barsotti. Project sponsorship at the executive-level assures project ownership at the highest possible echelon in Caltrans. The project sponsors jointly provide leadership and oversight as needed; as well as review and resolve policy, fiscal, and resource allocation issues that cannot be resolved at lower levels, additionally promoting the Department's long-term vision.

IFMS Steering Committee

The Steering Committee is comprised key stakeholders across the IFMS projects, including Division Chiefs from the following divisions:

- Accounting
- IT EAD Division Chief
- Budgets
- Programming
- Division of Procurement and Contracts (DPAC)
- Project Management

- Local Assistance

The Steering Committee consists of high-level stakeholders who can make decisions and implement policies within Divisions and Districts. The Steering Committee performs the following functions:

- Responsible for oversight of Project Alpha and subsequent IFMS projects, ensuring that deliverables and functionality are achieved as defined in the FSR and subsequent project plans.
- Ensures coordination by establishing and sponsoring collaboration across organizational boundaries.
- Works with the Project Sponsor, Alpha Project Manager, subsequent IFMS Project Managers, and Integration Partner to review and resolve project issues not resolved at lower levels.
- Provides advice and insight into project management issues.
- Responsible for executive-level oversight of control agency reviews and other observation processes to ensure that planned project objectives are achieved in accordance with the approved project plan.
- Approves project deliverables in a timely and complete manner.
- Works to develop consensus and resolve policy, cross-functional scope and directional issues in a timely manner.
- Ensure adequate personnel are available to the project for necessary tasks.
- Provides approval/disapproval of a particular project proceeding as planned based on information provided by the Project Management Team.

Information Technology Management Committee (ITMC)

The purpose of this committee is to ensure that IT investments meet the business needs of Caltrans. Members of this committee, including the key Deputy Directors and District Directors, will provide comprehensive executive representation of the various business organizations throughout the Department, and may advise the CFO on Project Alpha related issues. The ITMC, in conjunction with the IFMS sponsors, recommends the order of subsequent IFMS projects and routinely reviews the status of Alpha Project, when reviewing other IT project status reports.

IV&V and IPOC

The Independent Verification and Validation vendor is responsible for providing the project manager with impartial oversight of the performance of the Integration Partner and, in some cases, the project itself. The IV&V vendor will perform the following task during Project Alpha:

- Provide independent perspective for reviews, meetings and evaluations.
- Monitor project technical activities.
- Evaluate integration partner proposals for technical feasibility.
- Evaluate integration partner work products for correctness and completeness.

- Monitor integration partner's test program.
- Validate adequacy and appropriateness of test procedures.
- Verify requirements traceability.

The Independent Project Oversight Consultant is responsible for providing impartial oversight of the project office to ensure the State is effectively managing their technology investments. The IPOC vendor will perform the following tasks during Project Alpha:

- Provide independent perspective for reviews and meetings.
- Prepare status reports mandated by DOF.
- Monitor project activities.
- Evaluate project's adherence to industry standard project management methodologies.
- Evaluate project risk management efforts.
- Evaluate project progress toward completion of the project.

Information Technology Program and Project Management Division (IT PPMD) and the Project Management Office

The IT PPMD is responsible for supporting information technology resources and projects at an enterprise level. Within the PPMD the Project Management Office (PMO), will assure the professional performance of project management processes, supporting each of the IFMS project managers during each project. The PMO assures that required external agency project reporting occurs. The PPMD chief supervises the enterprise project manager who will be the IFMS Portfolio Project Manager through the life of the IFMS implementing projects.

Integrated Financial Management System Portfolio Projects Manager

The IFMS Portfolio Projects Manager is the enterprise project manager who will be responsible for overall continuous management of the implementation of the IFMS projects. This manager will direct the selection of the ERP product that best meets all IFMS stated needs, and oversees each project's successful implementation through the respective project manager.

External Project Management Mentor

The External Project Management Mentor is a contracted vendor that will provide general project management guidance and advice to Caltrans project managers during Project Alpha. Retention of this position in future projects will be on a project-by-project basis.

Project Alpha Project Manager

The Project Manager for Project Alpha will be responsible for overall continuous management of the project. The project manager will consult with the PMO and Steering Committee in coordinating management activities with the selected Integration Partner, as well as project support teams. Responsibilities of the project manager should specifically include:

- Reviewing project deliverables in a timely and complete manner.

- Assisting in business process re-engineering, with the assistance of the following groups:
  - Financial Management Subject Matter Experts (SMEs).
  - Functional team leader for each major function (i.e., Accounts Receivable, Accounts Payable, General Ledger, Reporting and Budget Management functions).
  - Specialists from the above areas to participate in functional workshops, analysis activities, business process redesign activities, data conversion and user testing.
- Assisting in change management.
- Resolve phase problems and conflicts.
- Manage all State and vendor project tasks throughout the projects.
- Maintain all project management files.
- Manage and track all project risk management activities.
- Act as the program's spokesperson responsible for communicating program strategy, benefits, direction, status, decisions and recommendations to the steering committee, and other stakeholders.
- Ensure quality control and quality assurance are performed in accordance with the quality plan.
- Ensure all problems, issues and changes are recorded, maintained and tracked in the program's tracking database.
- Ensure all correspondence going from or coming into the project are recorded in the program's correspondence database.

Technical Project Manager

The Technical Project Manager for Project Alpha will be responsible for the continuous technical management of the project, while working alongside the Project Manager. The Technical Project Manager will consult with the Project Manager as well as DTS, the Network/Server Team, Development/Interface Team and Data Conversion Lead in performing the following tasks:

- Development of data, process and integration standards.
- Programming support to assist in the completion of data conversion.
- Programming support to assist in the completion of interfacing strategy and implementation.
- Programming support for the completion of expanded reporting.
- System, network and database administration support.

Department of Technology Services (DTS)

DTS will provide the following services:

- Ongoing support and interaction with the Technical Project Manager.
- Network administration.
- Database Administration.

- Security Administration.
- Hardware and operating system support.

Integration Partner

The Integration Partner will be responsible for design, development and implementation of the solution. The Integration Partner will introduce the following individuals and teams to facilitate Project Alpha design and implementation:

- *Business Analyst* — Responsible for requirements analysis, system documentation and business process re-engineering.
- *Development Team* — Responsible for system design, application development and implementation, design and development of data conversion, system interfaces, etc.
- *Test and QA Team* — Responsible for test planning, quality assurance through generation and application of various test scripts, user acceptance testing, and various other testing activities.
- *Training and Change Management Team* — Responsible for generating training materials and plans, development of training curriculum and user training sessions, contribution to change and issue repositories, and interacting with Caltrans Change Manager and Change Control Board.

As discussed in this section, vendor staff will augment the project team to provide specific skills and expertise. The planned roles and responsibilities for Project Alpha are identified within Table 44.

Table 44. Project Roles and Responsibilities

Project Team Area	Vendor/Caltrans/DTS
Project Steering	Caltrans
Independent Project Oversight	Caltrans
Independent Verification and Validation	Caltrans
IFMS Project Manager	Caltrans
IFMS Acquisition Support	Caltrans
IFMS Administrative Support	Caltrans
IFMS Business Manager	Caltrans
Business Analysts	Vendor
Subject Matter Experts	Caltrans
IFMS System Architect	Caltrans
IFMS Development Lead	Vendor
IFMS Application Developers	Vendor
IFMS Testing Lead	Vendor
IFMS Testers	Caltrans
IFMS DBA	Vendor/DTS
IFMS Implementation Coordinator	Vendor
IFMS Training Lead	Vendor

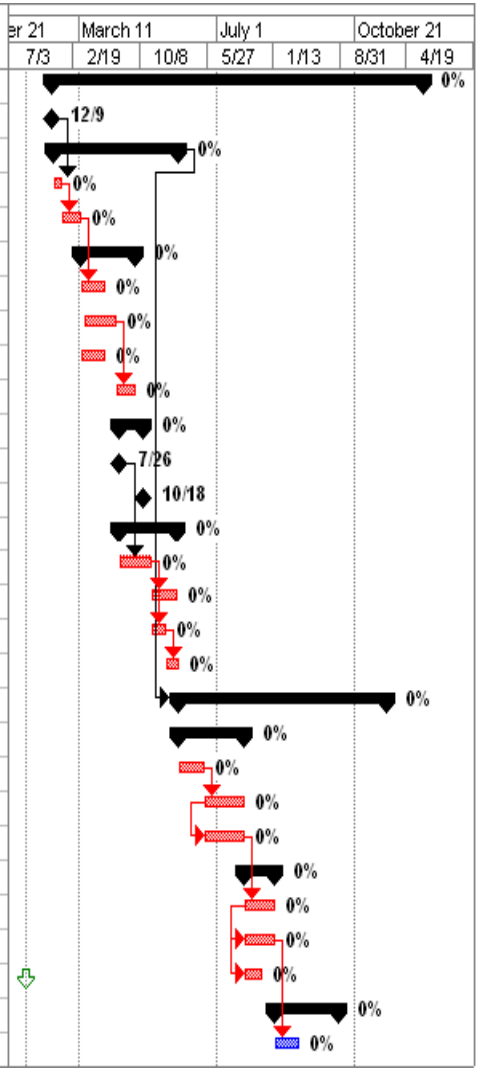
Project Team Area	Vendor/Caltrans/DTS
IFMS Trainers	Vendor/Caltrans
IFMS Data Conversion Lead	Caltrans
IFMS Network/Server Staff	DTS
IFMS Interface Lead	Caltrans

6.5.5 Project Schedule

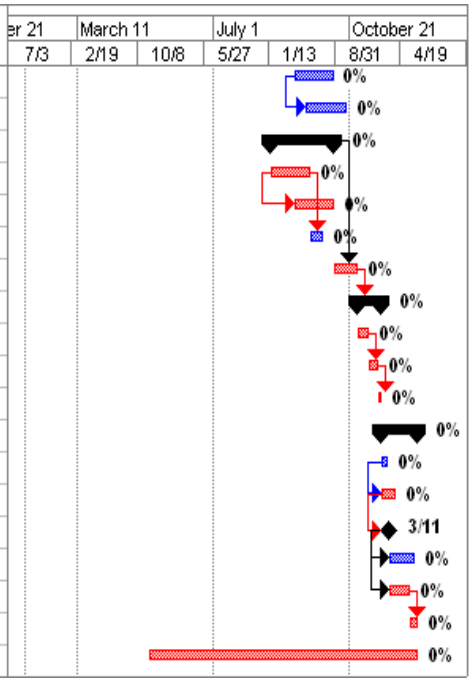
Figure 27 illustrates the proposed project schedule for Project Alpha. At this early stage of the effort, start and end dates should be considered high-level estimates. Caltrans will require that Bidders for the long-term solution provide a detailed project schedule, including its recommended phasing of implementation, as part of their response to the RFP.

Figure 27. Proposed IFMS Project Schedule

ID	Task Name	Duration	Start	Finish
1	**Caltrans Integrated Financial Management System Project Plan**	**918 days**	**Fri 12/9/05**	**Tue 6/16/09**
2	Receive FSR Approval	0 days	Fri 12/9/05	Fri 12/9/05
3	**Phase 1 - Procurement and Project Planning**	**310 days**	**Wed 12/14/05**	**Tue 2/20/07**
4	Establish Caltrans Project Team	20 days	Wed 12/14/05	Tue 1/10/06
5	Develop RFP, Evaluate and Select Procurement Vendor	45 days	Wed 1/11/06	Tue 3/14/06
6	**Develop Requests for Proposal**	**135 days**	**Wed 3/15/06**	**Tue 9/19/06**
7	Define Functional, Technical, Implementation and Support Requirements	60 days	Wed 3/15/06	Tue 6/6/06
8	Develop Prime Vendor RFP	80 days	Wed 3/29/06	Tue 7/18/06
9	Develop IPOC, IV&V, and Project Management Mentor RFPs	60 days	Wed 3/15/06	Tue 6/6/06
10	Caltrans, Agency, and DGS Review and Approval	45 days	Wed 7/19/06	Tue 9/19/06
11	**Issue RFPs**	**60 days**	**Wed 7/26/06**	**Wed 10/18/06**
12	Issue Prime Vendor RFP	0 days	Wed 7/26/06	Wed 7/26/06
13	Issue IPOC, IV&V, and Project Management Mentor RFPs	0 days	Wed 10/18/06	Wed 10/18/06
14	**Evaluate Proposals and Select Vendors**	**145 days**	**Wed 7/26/06**	**Tue 2/13/07**
15	Assess and Select Prime Vendor	80 days	Wed 7/26/06	Tue 11/14/06
16	Assess and Select IPOC, IV&V, and Project Management Mentor Vendors	65 days	Wed 11/15/06	Tue 2/13/07
17	Contract/Agency Approvals	35 days	Wed 11/15/06	Tue 1/2/07
18	Complete Project Planning and Scoping	35 days	Wed 1/3/07	Tue 2/20/07
19	**Phase 2 - System Development**	**515 days**	**Wed 2/21/07**	**Tue 2/10/09**
20	**Requirements Analysis/Validation**	**160 days**	**Wed 2/21/07**	**Tue 10/2/07**
21	Process Optimization	60 days	Wed 2/21/07	Tue 5/15/07
22	Organizational Process and Solution Design	100 days	Wed 5/16/07	Tue 10/2/07
23	Technical and Functional Requirements	100 days	Wed 5/16/07	Tue 10/2/07
24	**Technical Architectural Design**	**75 days**	**Wed 10/3/07**	**Tue 1/15/08**
25	System Design	75 days	Wed 10/3/07	Tue 1/15/08
26	Database and Reporting Design	75 days	Wed 10/3/07	Tue 1/15/08
27	Train Caltrans IT Staff	45 days	Wed 10/3/07	Tue 12/4/07
28	**System Configuration**	**160 days**	**Wed 1/16/08**	**Tue 8/26/08**
29	Production Environment Deployment	60 days	Wed 1/16/08	Tue 4/8/08



ID	Task Name	Duration	Start	Finish
30	Development/Configuration of Software Functionality	100 days	Wed 4/9/08	Tue 8/26/08
31	Develop and Consolidate Interfaces	100 days	Wed 5/21/08	Tue 10/7/08
32	**Data Conversion and Archive of Legacy Data**	**160 days**	**Wed 1/16/08**	**Tue 8/26/08**
33	Conversion to Enterprise Resource Planning (ERP)	100 days	Wed 1/16/08	Tue 6/3/08
34	Archive Legacy System Data (into Data Warehouse/Repository)	100 days	Wed 4/9/08	Tue 8/26/08
35	ETL Development for Legacy Reporting Systems Data	30 days	Wed 6/4/08	Tue 7/15/08
36	Report Development	60 days	Wed 8/27/08	Tue 11/18/08
37	**Testing**	**60 days**	**Wed 11/19/08**	**Tue 2/10/09**
38	Unit Testing	25 days	Wed 11/19/08	Tue 12/23/08
39	Integration Testing	25 days	Wed 12/24/08	Tue 1/27/09
40	Load Testing	10 days	Wed 1/28/09	Tue 2/10/09
41	**Phase 3 - System Deployment and Training**	**90 days**	**Wed 2/11/09**	**Tue 6/16/09**
42	Train Pilot District Office Users	15 days	Wed 2/11/09	Tue 3/3/09
43	Deploy Solution at Pilot Offices	35 days	Wed 2/11/09	Tue 3/31/09
44	Pilot Review and Acceptance	30 days	Wed 3/11/09	Tue 4/21/09
45	Train Caltrans Program Staff	60 days	Wed 3/11/09	Tue 6/2/09
46	Deploy Solution at Remaining District Offices	50 days	Wed 3/11/09	Tue 5/19/09
47	Final Acceptance	20 days	Wed 5/20/09	Tue 6/16/09
48	Change Management	675 days	Wed 11/15/06	Tue 6/16/09



6.6 Project Monitoring

The process to be used for tracking and reporting on the status of project and phase deliverables, phase schedule and phase budget is defined in Caltrans' IT Project Management Policy for Project Tracking. This policy requires that "each information technology project management team will track the status and monitor the progress of defined project activities against the Project Management Plan and will document variance in terms of scope, schedule, and cost, as required, for all information technology projects within Caltrans.[1]"

Project status will be tracked and reported on an ongoing basis. Regularly scheduled status meetings will be held to discuss project progress, issues/issue resolution and next steps. Attendees include the project manager, project team members and any external vendors involved in the project. Project Steering Committee meetings will be held on a regular basis to discuss project progress, change requests and open issues. Caltrans will implement the following project management elements to collect data to assess and manage the current state of the project:

Track and Monitor Project Execution

- Status — Discuss current activities and planned activities.
- Progress — Compare planned schedule to actual progress.
  - Activity planned and actual start/finish date.
  - Project and actual start/finish date.
  - Overall schedule impact.
  - Workarounds or corrective actions currently in place to adjust schedule variance.
- Compare planned budget with actual expenditures.
  - Actual expenditures to date.
  - Estimate to Complete.
  - Estimate at Completion.
  - Burn Rate (in either hours or dollars).
  - Adjusted baseline, planned expenditure.
- Technical performance and quality indicators from each of the developmental stages of the project.

Project Review

- Conduct project organization and deliverable status meetings.
- Perform executive reviews.
- Conduct team meetings.
- Execute independent reviews (Project Oversight).

[1] Source: Caltrans IT Project Management Policy

- Perform technical reviews (based on current project stage).

Risk Monitoring and Mitigation

- Provide consistent and ongoing risk item evaluation and resolution strategies, including identifying and evaluating the risk, then defining a resolution strategy.
- Summarize information on Caltrans standardized risk form.
- Include risk summary in status meetings.
- Create central risk information repository to document risk items and resolution strategies.

Change and Issue Management

- Implement change/issue management processes, including:
  - Change and issue information central repositories.
  - Summarize change and issue information on Caltrans standardized change request form and issue resolution form.
  - Configuration management.

Corrective Actions

- Caltrans will implement a corrective action process (a recovery plan).

Approval Process

- Phase reviews.
- Deliverable reviews.

6.7 Project Quality

The process to be used for assuring phase results will meet business and technical objectives and requirements, as well as applicable State and departmental standards is defined in the IT Project Management Policy for Quality Assurance. This policy states: "Caltrans will maintain processes and organizational entities to ensure that quality assurance is performed for information technology products that will include meeting stated business requirements and technology standards. [1]"

In order to ensure that the project meets identified business and technical objectives and requirements, Caltrans will develop a Quality Assurance/Risk Management Plan based on the State's Project Management Methodology and Caltrans' methodology outlined in the previous section. In addition to Caltrans' methodology, the plan will have the following elements:

Measurable objectives for functional requirements

- Software Development standards to be used during system development.
- Data conversion standards.

[1] Source: Caltrans IT Project Management Policy

- Interfacing standards (where possible).
- Unit, System and Acceptance testing plans.
- Regularly scheduled audits/reviews of key tasks.
- Establishment of the measures for process quality control both during the project and for ongoing operations.

6.8 Change Management

It is important to recognize that the chances of project success are significantly increased through the utilization of a comprehensive Change Management Plan. Change affects the view of the project and will impact the scope, project definition and specification, impacting every individual and division involved within Caltrans. The criticality of change management to Project Alpha and the entire IFMS Strategic Plan is paramount, a fact clearly understood by both Caltrans and DOF.

As defined by Gartner,[1] "IT change management is a process that enables an enterprise to modify any part of its IT and communications environment, and supports the acceptance, approval and implementation of the modifications."

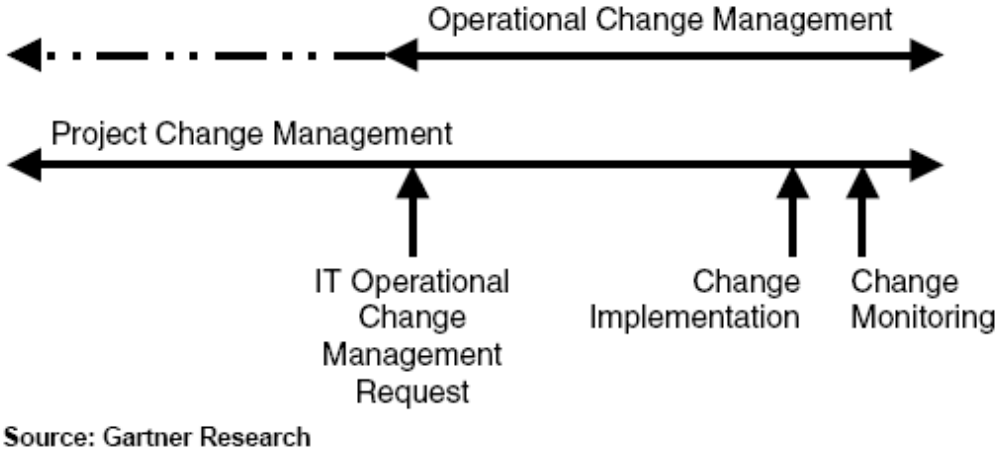
Furthermore, IT change management consists of two primary components: project change management and operational change management.

Project change management includes project planning, design, development, testing, and change implementation. For example, complex changes to the IT infrastructure — such as facilities changes or upgrades to power or IT components — must also have detailed project plans and project managers assigned to their design and implementation. Project plans and repeatable processes ensure a uniform methodology for the change process and increase the chances for change success.

On the back end of IT change management is operational change management, sometimes called change control or change integration. Operational change management coordinates and schedules requested changes, with the goal of reduced downtime and risk. Figure 28 below illustrates these two change management components and their relationships.

[1] Source: Scott, D., Brittain, K, "Defining IT Change Management." 6 March, 2003. Gartner Research Note ID Number: COM-19-1428.

Figure 28. IT Change Management Key Components



Source: Gartner Research

In addition to these two primary components, a sound project change management plan should consider the impact of the project on the individual within Caltrans. Most organizations value their old ways, have entrenched knowledge and skills, established policies and procedures, and traditional power bases of authority. The fact that the implementation of the Caltrans solution will affect and replace legacy systems built and customized by Department personnel over the years will make this change personal. There are three individual "archetypes" to consider when developing a change management strategy, as shown in Table 45.

Table 45. Change Management: Typical Individual Traits

Won't Change	Can't Change	What Change?
Traits		
■ Not bought in ■ Threatened ■ Pride in Ownership ■ Experienced Previous Failures	■ Lacking Skills ■ Lacking Understanding ■ Would Rather Quit	■ Ambivalent ■ Follower
What Can Be Done		
■ Active Engagement ■ Responsible for Change ■ Incentive ■ Decisive Leadership ■ Biggest Critic to Biggest Advocate	■ Communication ■ Engagement ■ Training ■ Career Counseling	■ Communication ■ Engagement ■ Exposure ■ Training/Education ■ Support

First, there are those employees that are resistant to change. These experienced resources are likely to feel threatened by the initiative and have close ties to the legacy state. These people will likely be the biggest critics of the initiative, but, once converted, can become the biggest advocates, or "evangelists" for change. Effective strategies include active engagement, assigning individuals to be responsible for delivering change, providing incentives, and guiding

them with very decisive leadership.

Some employees are simply not prepared for change and need education and training. The remainder of employees will likely not be aware of the impact of change on their day to day activities. These people require clear communication and broad exposure to the initiative but they will typically follow the lead of project evangelists and leaders. In summary, a brilliantly planned technical solution will not succeed if the right amount of organizational buy-in and preparation are not present.[1]

The change management process is critical to successfully transitioning Caltrans employees to ready and willing users of new business systems and must take into account the different perspectives within the Department. Change management enables the executive leadership and other stakeholders within the Department to proactively assess and prepare the organization for the changes in technology and job responsibilities that will impact all levels of staff.

The project manager, with support from the Integration Partner and the PMO is responsible for managing the operational change management process. The manager:

- Receives requests for change.
- Works with a cross-functional IT and business group to assess the business and technical risks of the change.
- Approves the change, which sometimes requires higher-level, Steering Committee approval.
- Schedules changes during times of least business risk.
- Coordinates the timing of changes to reduce overall planned downtime without increasing risk.
- Monitors the postmortem results of changes.
- Provides change performance analysis to senior management.

For the Caltrans IFMS solution, the selected Project Manager will serve as the Change Manager. The project Steering Committee will act as the Change Control Board (CCB) responsible for the approval and/or rejection of change requests. Change requests will be:

- Drafted by the Project Team (both developers and end users).
- Reviewed and edited by the Project Manager.
- Decided by the Project Steering Committee (if they impact scope, schedule or cost).
- Implemented by the Project Team.

6.9 Authorization Required

This project does not require any special federal or legislative authorization. In accordance with the reporting criteria in the Statewide Information Management Manual (SIMM), the project requires Caltrans to prepare a Feasibility Study Report (FSR) in accordance with SIMM FSR

[1] Source: Gartner Research

Guidelines (December 2004) for the long-term component of the proposed solution. Any significant changes of 10 percent (+/-) to the cost, schedule or benefits of the original FSR estimate will be handled and approved in accordance with SIMM guidelines.

7.0 Risk Management Plan

In order to reduce the overall risk of Project Alpha, and mitigate any future risks associated with the portfolio of subsequent projects that comprise the Integrated Financial Management System (IFMS) Strategic Plan introduced in Section 3, Business Case, Caltrans has developed the following Risk Management Plan. The plan is based on State Information Management Manual (SIMM) guidelines, as well as Caltrans Project Management Office (PMO) standards, and includes the components listed in the table below.

Table 46. Risk Management Plan Sub-Sections

7.1 Risk Management Approach
7.1.1 Responsible Parties
7.1.2 Risk Management Process
7.2 Risk Management Worksheet
7.2.1 Risk Assessment
7.2.2 Risk Identification
7.2.3 Risk Analysis and Quantification
7.2.4 Risk Prioritization
7.2.5 Risk Response
7.2.6 Risk Acceptance
7.2.7 Risk Mitigation
7.2.8 Risk Sharing
7.3 Risk Tracking and Control
7.3.1 Risk Tracking
7.3.2 Risk Control

7.1 Risk Management Approach

Given the scope, activities and resources required to plan for, procure, design and implement Project Alpha, Caltrans has developed a Risk Management Plan that adheres to its Project Management Office (PMO) standards while factoring in the risks specific to this effort. Furthermore, risk assessment and mitigation activities consider the entire portfolio of projects that comprises the IFMS Strategic Plan. The resulting methodology for the Risk Management Plan is consistent with the State of California's Project Management Methodology, the Department of Finance's Information Technology Project Oversight Framework, and the Caltrans IT Project Management Methodology and Standards. The following sub-section details the parties who will be responsible for risk management for Project Alpha and the process that they will follow.

7.1.1 Responsible Parties

Caltrans realizes that risk management is a dynamic process that occurs throughout the project life cycle. Therefore, several parties will be responsible for developing and implementing the Risk Management Plan. The Risk Manager, who will be provided by the IPOC vendor, will have primary responsibility for managing the risk management process. The specific roles of parties to the Risk Management Process are described below.

- **Steering Committee —** The Steering Committee will ensure that project goals and objectives are being met, and will resolve escalated issues as they arise. The Committee will be responsible for providing the project team with resources (i.e., time, staff or funding) necessary to help avoid or mitigate risks as needed. For more information on the composition of the Steering Committee, refer to Section 6, Project Management Plan.
- **Project Manager —** The Project Manager will have overall responsibility for the implementation of Project Alpha. As part of this role, the Project Manager will approve the Risk Management Plan and will work with the Steering Committee, Project Management Office, Project Team Members, Independent Project Oversight Consultant (IPOC) vendor (including the Risk Manager), and the Independent Verification and Validation (IV&V) vendor, to develop the process for tracking and managing issues and risk factors. The Project Manager will also be responsible for elevating risks to the Steering Committee, when appropriate, consistent with this plan.
- **Caltrans Project Management Office (PMO) —** The Caltrans Project Management Office will be responsible for working with the IPOC vendor (including the Risk Manager), IV&V vendor, Project Manager, and Project Team Members to identify risks. The PMO will also monitor project risks, develop mitigation measures and contingency plans, and implement those contingency plans as necessary.
- **Risk Manager —** The Risk Manager will be responsible for ensuring that risk management is effectively performed throughout Project Alpha. Responsibilities include developing a baseline Risk Assessment and Risk Management Plan and then submitting it to the PMO Office and Steering Committee. This baseline risk management plan will be developed using the risk management plan elements provided in this FSR as a starting point. The Risk Manager will work with the Caltrans Project Management Office and Project Manager to implement and update this risk management plan throughout the project life cycle. The Risk Manager function will be part of the services provided by the

IPOC vendor.

- **IPOC and IV&V Vendors —** The project will employ an IPOC vendor and an IV&V vendor to provide insight from an IT professional and industry standards perspective. The additional review of project processes and deliverables by these resources is intended to provide a third-party, independent assessment of project risk areas with appropriate findings, recommendations and proposed corrective actions. The IPOC and IV&V Vendors will report to the Steering Committee. In addition, the IPOC vendor will provide the Risk Manager for Project Alpha.
- **Project Team —** Members of the collective project team (i.e., Financial Management Subject Matter Experts (SME), Technical Project Manager, Integration Partner, Network/Server Team, Data Conversion Lead, etc.), as outlined in Section 6, Project Management Plan, will be involved in identifying potential risks and will work with the Project Manager to carry out mitigation actions and/or contingency plans.

7.1.2 Risk Management Process

The Caltrans risk management process includes further development and continuous maintenance of this Risk Management Plan in accordance with the Caltrans Project Management Methodology as prescribed by its PMO. The Integration Partner will submit a baseline Risk Management Plan to Caltrans within 30 days of project initiation. This plan will be used on an ongoing basis to identify risks, quantify the potential impact of each identified risk, present mitigation plans for each identified risk, and enact appropriate risk responses. Mitigation measures and contingency plans will be developed and implemented as high-priority risks are identified and monitored. Project reserves (i.e., time, personnel, funding) will be allocated at the discretion of the Project Manager and/or Steering Committee as appropriate.

Controlling a project of this size and scope during the performance life cycle phases requires an established risk management process that is tailored to the specific needs of the project. This process will begin as part of project planning and kept current until project closeout. The key elements of the Caltrans IT project risk management process are:

- Creating a central repository for risk information and associated documentation of risk items and resolution strategies.
- Summarizing information on a risk form or similar construct.
- Assigning a Risk Manager. For large IT projects such as Project Alpha, this resource will be provided by the IPOC vendor.
- Including a risk summary in the regular status meetings.
- Providing a consistent and ongoing evaluation of risk items and development of risk strategies using the following procedure:
  - ❑ Identify the risk.
  - ❑ Evaluate the risk.
  - ❑ Define a resolution strategy.

7.2 Risk Management Worksheet

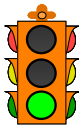
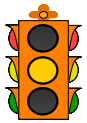
As introduced in pervious sections, and elaborated on in Section 6, Project Management Plan,

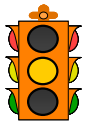
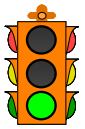
Project Alpha is the first step in a series of projects to decommission, modify, or replace applications used for the current operations of financial management processes at Caltrans. The implementation of the complete IFMS Strategic Plan will be completed through a series of separate projects with separate FSRs and procurements. While this approach has some advantages, including breaking up the implementation into smaller manageable pieces that will each have measurable business objectives, it does introduce the following additional risks:

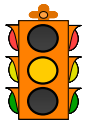
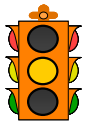
- **Project Management and Contractual Risks —** Caltrans will need to integrate the efforts of multiple vendors, creating the need for sophisticated contracts and contract management competencies. Managing multiple vendors over multiple projects introduces risks of vendor "finger pointing" and difficulty in determining the responsible parties when integration or performance issues arise.
- **Procurement Risks —** Procuring large IT systems carries many inherent risks to timely implementation and the realization of benefits from use of the new system. By spreading the procurement of IFMS functionality over several smaller projects, the risk probabilities are multiplied, creating an increased likelihood of project delays. Furthermore, significant delays in procuring the full IFMS functionality would introduce issues with project management continuity over the life of the full IFMS implementation. Finally, due to California procurement regulations, it is possible that a vendor selected for Project Alpha could be disqualified from future follow on projects, depending on the scope and nature of the procurement.
- **Financial Risks —** Segmenting the procurement of the entire IFMS Strategic Plan into smaller projects runs the risk of increasing total costs through the purchase of smaller pieces of functionality from multiple vendors. A single procurement would have the advantages of lower costs and volume discounts by creating one large purchase from one vendor; however, it is unclear if the cost disadvantages introduced from multiple procurements outweigh the advantages from breaking the IFMS implementation into a series of smaller more manageable individual projects.
- **Technology Risks —** Procuring systems and integration support from multiple vendors through several projects over the life of the IFMS implementation introduces risk associated with differences in vendor approaches and software. Furthermore, advances and changes in technology products, architectures and paradigms can create additional integration and compatibility risks over the multi-year span of the total IFMS effort.

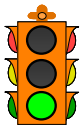
While there are risks associated with breaking up the IFMS implementation into multiple projects, the focus of this FSR is on Project Alpha. The following risk management worksheet will be used as the starting point for identifying and prioritizing risks as the basis of the Risk Management Plan for Project Alpha. Each row represents a unique risk facing Project Alpha. The risks are divided into four main categories: Project Management Risks, Financial Risks, Technical Risks and Change Management/Operational Risks. Each risk has an assigned probability of occurring, a description of the affected project area or element, preventative measures to be taken by Caltrans, and contingency measures to put into action should the risk occur.

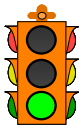
Table 47. Project Alpha Risk Management Worksheet

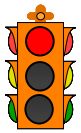
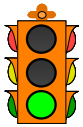
Risk Category/Event	Prob.	Affected Project Area/Element	Preventive Measures	Contingency Measures
Project Management Risks — Management				
Lack of adequate participation by Caltrans leadership and financial management employee representatives.	Low-.20 	Large numbers of users will be impacted by the new system and sufficient representatives should be involved in the design and analysis, implementation and testing phases. It may be difficult to coordinate the involvement of these stakeholders.	■ The project team will be comprised of representatives from each affected Division and District. ■ The Project Steering Committee will provide business and IT leadership to ensure needed participation. ■ A communication plan will be developed and implemented.	■ Re-sequence deployment to those units or locations best equipped for immediate implementation. ■ Adjust schedule as necessary.
Project Management Risks — Staffing				
Current HQIT personnel lack training and experience with COTS ERP, Data Warehouse and EAI vendor software.	Medium -.40 	Caltrans HQIT staff may not be available to support this project due to lack of skills in solution technologies.	■ Assess skill sets against the new technologies to identify gaps. ■ Implement a knowledge transfer plan that ensures HQIT staff members feel comfortable with the new system during all project phases. ■ Include requirements in Integration Partner contract to provide training to personnel on software. ■ Regularly communicate with all HQIT staff affected by the new system.	■ Secure contractor assistance for system implementation/support and training.

Risk Category/Event	Prob.	Affected Project Area/Element	Preventive Measures	Contingency Measures
Continuity of project personnel throughout the life of the project.	Medium -.40 	Caltrans program staff will have competing priorities throughout the project life cycle. Additionally, due to the length of the project, there may be staff promotions, retirement or turnover.	■ Create detailed estimates of resource demands in advance and update at regular intervals ■ Communicate resource demands to senior executives as early as possible. ■ Make Project Alpha a project that people want to be involved with by a) setting reasonable, clearly defined expectations to facilitate project participation, b) delivering real benefits to the user so sacrifices made to provide staff are deemed worthwhile, c) creating a communication plan to market Project Alpha among Caltrans staff, and d) involving staff who would be able to assume critical roles as needed.	■ Adjust the schedule as necessary. ■ Enter into formal agreements with appropriate financial management staff to ensure participation on the project.
Integration Partner program familiarity.	Low -.30 	The Integration Partner that is chosen must understand the intricacies of the program and the organizational structure and culture of Caltrans in order to be effective. This understanding will take time to develop.	■ Ensure the Integration Partner's Project Manager and Project Team participates in the fit/gap analysis activities to facilitate knowledge transfer. ■ Consider inclusion of a criterion in the evaluation and selection plan that awards bidders with bonus points for experience with Caltrans.	■ Provide the Integration Partner team with training and clear program guidelines.

Risk Category/Event	Prob.	Affected Project Area/Element	Preventive Measures	Contingency Measures
Project Management Risks — Schedule				
Unanticipated project schedule overruns.	Medium -.40	Project schedule may be difficult to meet due to unforeseen technical issues, or deployment difficulties. A high level of organization and planning must take place to ensure a smooth transition from 70 financial management systems to one integrated financial management solution.	■ The project will be staffed by an experienced Risk Manager and will incorporate risk management and project management standards. ■ IPOC and IV&V vendors will assist with the scoping of, and adherence to, time and resource estimates. ■ Ensure Project Alpha is staffed with adequate representation of staff with key business process and existing system expertise.	■ Adjust the schedule as necessary. ■ Reduce/delay scope of project to reflect available schedule.
Process changes will impact business operations.	Medium -.50 	Analysis/implementation of process changes could increase the length of the project schedule should the Integration Partner experience issues coordinating changes with Caltrans staff.	■ Identify significant change opportunities prior to finalizing the project schedule. ■ Implement change management activities early on in the project communicating impacts of system implementation.	■ Adjust the schedule as necessary.
Financial Risks — Cost				
Caltrans underestimates project costs.	Medium -.40 	The cost of the project could be underestimated based on the fact that FSR project estimates are based on assumptions, past experience and industry best practices that do not reflect detailed vendor costing that is performed during a competitive RFP process.	■ Develop conservative cost estimates that take into consideration the complexity and risks associated with this project and the potential for cost changes. ■ Enter into fixed-price contracts with Integration Partner.	■ Reduction in scope of project to reflect available budget. ■ Request additional funding.

Risk Category/Event	Prob.	Affected Project Area/Element	Preventive Measures	Contingency Measures
Vendor underestimates project costs.	Low -.30 	The cost of the project could be underestimated based on the fact that Integration Partner estimates are based on assumptions that are made before entering the actual environment. A selected Integration Partner may issue change order requests to recover these underestimated costs.	■ As part of the Integration Partner selection process, Caltrans will ensure the proposed solution is robust enough to handle requirements and future changes easily. ■ Track true project costs on a monthly or phase-by-phase basis to identify real cost vs. budgeted cost discrepancies early.	■ Request additional funding.
Technology Risks — Technical				
Legacy systems dependent on the Project Alpha IFMS do not operate properly.	Medium -.50	The complexity and effort required to integrate systems that rely on data from applications being replaced by Project Alpha could be underestimated. These remaining systems could require an additional amount of effort to be integrated into the IFMS.	■ A formal plan for analysis and integration will be developed with the Integration Partner. ■ The product selected to provide the EAI functionality will need to be robust enough to handle the various types of interfaces required for Caltrans' business processes.	■ Adjust the project schedule to allow for additional customization and configuration of interfaces to the IFMS. ■ Acquire additional technologies and products to fill gaps.
Unanticipated technical challenges resulting in a disruption of existing services.	Medium -.40	Replacing 70 existing financial management systems with one integrated solution and interfacing the remaining systems has the potential for unforeseen technical challenges that could result in disruption of service.	■ Environment validation, cutover rehearsals and pilot deployments will identify challenges and solutions. ■ Phasing of rollout by function and/or location will isolate issues prior to full deployment. ■ Ensure the new system is fully operational prior to "turning off" the old Caltrans systems.	■ Leave legacy Caltrans systems operational until the new system can be thoroughly tested and implementation is complete.

Risk Category/Event	Prob.	Affected Project Area/Element	Preventive Measures	Contingency Measures
Technology Risks — Data Conversion				
Data quality and integrity.	Low -.30 	Data conversion will be a problem due to the quality of data residing in existing systems and the number of systems that will be decommissioned as part of Project Alpha and subsequent projects.	■ Develop a formal plan for data analysis, conversion and integration. ■ Institute a formal data quality assurance and improvement process. ■ Create meaningful metrics for measuring data quality, including criteria for acceptance of the data, prior to system implementation. ■ Actively assess and improve data quality up to system implementation and thereafter.	■ Adjust schedule as necessary. ■ Only convert data that is absolutely needed in the new system. ■ Backup and archive all data prior to any conversion or scrubbing activities.
Change Management/Operational Risks — Internal				
Caltrans program staff resistant to change.	Medium -.40	Some Caltrans staff members may be resistant to the new system as it will affect how they work in the future (e.g., it will require staff to share and update information in a new manner). These individuals may not participate in the project and/or may try to circumvent the new system.	■ Involve potentially resistant staff in the design, implementation and testing of the new system. ■ Survey staff to understand key issues and concerns. ■ Educate staff on the benefits of the new system. ■ Design and implement a communication plan. ■ Develop clear systems and user procedures for the new working environment.	■ Conduct additional end user training.

Risk Category/Event	Prob.	Affected Project Area/Element	Preventive Measures	Contingency Measures
Work may be disrupted as users learn how to use new software.	High -.60 	Business operations could be interrupted during the transition from the old to the new system as users learn to navigate and utilize new applications.	■ Training must be appropriate to business needs and give users confidence in the new system. ■ Utilization of pilot offices will allow project team to understand and potentially deal with impacts to business performance. ■ Provide procedural as well as technical outreach and assistance during early stages of system deployment.	■ Existing systems and paper files will be available during implementation and transition phases.
Change Management/Operational Risks — External				
Legislative changes and their timing.	Low -.30 	There is a risk that legislative changes will be made to the program during the project that will require a change in design, timing, or scope.	■ Monitor proposed legislative changes and analyze their associated cost, benefits and impacts relative to their impact on the system. ■ Utilize a flexible system architecture that enables changes in business processes to be reflected in the system quickly through the adaptation of workflows and user defined fields.	■ Follow change management procedures. ■ Modify business processes as mandated.

7.2.1 Risk Assessment

The risk management worksheet was completed to assess the risks involved in the implementation of Project Alpha. Four broad risk areas were examined including: project management risk, financial risk, technology risk and change management/operational risk. A preliminary assessment of the primary risk areas is outlined in Table 48.

Table 48. Primary Risk Areas for Project Alpha

Risk Area	Risk Level
Project Management Risk	Medium-High
Financial Risk	Medium
Technology Risk	Medium
Change Management/Operational Risk	Medium

- **Project management risk** is medium-high due to staffing and schedule risks that should be monitored to ensure the project remains on schedule and on budget, and be supported effectively by Caltrans resources. When taking into consideration the choice to break the IFMS implementation into multiple smaller projects, project management risk is increased to high for the overall implementation of the IFMS.
- **Financial risk** is medium due to the complexity of the project from a program and a technical perspective and the resulting difficulty to estimate an accurate budget.
- **Technology risk** is medium due to difficulties expected in integration with existing systems and performing data conversion.
- **Change management/operational risk** is medium due to the significant number of systems being replaced and the subsequent business processes changes that will take place. Key stakeholders will be incorporated into all phases of project implementation in order to facilitate change management processes.

7.2.2 Risk Identification

Risks for Project Alpha were identified through the use of project team risk discussions, historical information, industry best practices, management interviews, and evaluation of the Caltrans Integration Study. The method of risk assessment Caltrans has adopted uses vulnerability as a primary concept for its guidelines.[1] Items that may indicate a potential of project vulnerability include “yes” answers to the following:

- Will multiple physical installations extend project implementation?
- How much will the project schedule depend on the availability of end-user staff for analysis and testing?
- Is the end date fixed or flexible?
- Are there several complex deliverables?

[1] Source: Gartner — “How to Assess and Mitigate IT Project Risk” — Matt Light, Jack Heine (9 June 2004)

- Will the project change entire business processes?
- How severely will user procedures change under the proposed system?
- How large is the user population? How diverse is it?
- Are the functional requirements clear or vague?
- Will the system depend on many other business systems?
- Will the new system require new maintenance procedures?
- Will the proposed system adhere to enterprise standards?
- Are more than three distinct systems involved?
- Are critical tasks out of the project team's control?
- Will the project require major hardware or software upgrades?
- Must multiple departments provide resources to the project?
- Will the IS staff be continuously available throughout the project?
- Is any software (such as language, database, communications or tools) for the project new to the development team?
- Is any hardware new to the development team?
- Will construction require complex and intricate logic?

Using the above questions and other methods to identify risk, the following risk areas were identified and included in the Risk Management Worksheet:

- Project Management
  - Management
  - Staffing
  - Schedule
- Financial Risks
  - Cost
- Technology Risks
  - Technical
  - Data Conversion
- Change Management/Operational Risk
  - Internal
  - External

As new risks are identified during the life of the project, they will be fit into the aforementioned categories or new categories as appropriate. The Project Management Team and the other responsible parties involved in the risk management process identified in Section 7.1.1 will meet regularly to review new risk assessments as well as ongoing risk efforts to:

- Evaluate and determine the risk exposure and severity.
- Identify appropriate action to avoid or mitigate the risk.
- When appropriate, elevate the risk assessment and response to the Project Manager and/or Steering Committee.

The Project Management Team will meet with the Risk Manager, IPOC vendor and IV&V vendor to review and modify the Risk Management Plan at the beginning of each project stage. The format for these meetings should follow the Caltrans IT project management standards and

methodologies. These standards and methodologies outline the following guidelines for conducting risk meetings.

Each meeting should be open and interactive to facilitate a wide consideration of risk areas. The group should be provided with “ground rules” in terms of the degree of risks that will be tracked and ways to eliminate or include risk items. Criteria for risk tracking include time frame (when it would possibly occur) and value (what would be the cost if it occurred). The Risk Manager should provide this information to the group. Current problems are not to be considered, as these are issues for the change and issue management process.

At a minimum, each meeting will require a meeting leader, and a scribe to record the decisions made by the participants. Larger meetings may require the services of a dedicated facilitator. These meetings assist in the process of prioritizing the risks by determining the probability of their occurrence and the impact the risk could have on the project. A standard output of each meeting will be an updated list of risks for the Risk Manager and Project Manager. Specific procedures for risk management are defined by the Project Manager and PMO.

7.2.3 Risk Analysis and Quantification

Project risks will be tracked and analyzed on an ongoing basis, and discussed as part of regular project management meetings. Risks will be analyzed based on the type of risk, probability of the risk occurring, the ability to mitigate the risk and the potential effect of the risk. Quantification efforts will focus on probability and impact of identified risks according to the scale utilized for the Risk Management Worksheet or another method proposed by the Integration Partner and accepted by Caltrans.

7.2.4 Risk Prioritization

Based on the risk analysis, each risk has been prioritized and ranked. Those risks with high priority will receive the most attention from the project team. Low priority risks will be monitored on an as-needed basis. Based on the risk analysis and quantification completed to date, the following preliminary high and medium risks have been identified in priority order:

- High Risks
  - Change Management/Operational Risk — Work may be disrupted as users learn how to use new software.
- Medium Risks
  - Project Management Risk — Negative impacts related to current HQIT personnel lack of training and experience with COTS ERP, Data Warehouse and EAI vendor software.
  - Project Management Risk — Lack of continuity of project personnel throughout the life of the project.
  - Project Management Risk — Unanticipated project schedule overruns.
  - Project Management Risk — Process changes negatively impact business operations.
  - Financial Risk -Caltrans underestimates project costs.

- Technology Risk — Legacy systems dependent on the Project Alpha IFMS do not operate properly.
- Technology Risk — Unanticipated technical challenges result in a disruption of existing services.
- Change Management/Operational Risk — Caltrans program staff resistant to change.

7.2.5 Risk Response

As the project proceeds and risk events occur, appropriate risk response actions will be implemented. Preventative and contingency measures have been identified for each risk in the risk management worksheet.

Project risk management will be ensured by the project manager and team using standard project control procedures, including the risk management and escalation procedures defined in the Department of Finance's Information Technology Project Oversight Framework.

As noted earlier, Caltrans will also contract with independent consultants to provide IPOC and IV&V services to ensure that best management practices are employed and that anticipated outcomes are reached through regular audit and oversight activities.

7.2.6 Risk Acceptance

Caltrans realizes that taking on an IT project of this magnitude has inherent risks. The strategies outlined in this section along with the analysis conducted to identify risks and contingency plans provides an approach and starting point for Caltrans to move forward with implementing Project Alpha. Based on this analysis and the identified risks, Caltrans accepts the risks identified in the risk management worksheet.

7.2.7 Risk Mitigation

Preventive measures will be taken in each of the risk areas to mitigate the chances of risk occurrence. These measures are identified in the risk management worksheet. As new risks are identified throughout the project life cycle, appropriate preventive measures will be developed. Key risk-mitigation strategies include implementing COTS software solutions, using pilots and other phasing of functionality, and contracting for project management and project oversight/IV&V support.

7.2.8 Risk Sharing

Efforts to share risks will be set in place by contracting with a reputable and competent Integration Partner to develop and implement the solution. Service-level agreements and other contractual stipulations will be established to share the risk of the project as much as is appropriate.

7.3 Risk Tracking and Control

7.3.1 Risk Tracking

As stated above, the Integration Partner will be required to complete a full Risk Assessment and Risk Management Plan as one of its initial deliverables. The plan shall include a system for tracking identified risks through all phases of the project.

The Integration Partner will also be responsible for developing and maintaining a risk tracking system that will include a database tool that:

- Assigns a unique number to each risk.
- Tracks the assigned ratings, as well as efforts to mitigate the risk.
- Will provide the capability to review and report on risks to the rest of the project team.

The project team and responsible parties will meet regularly to review ongoing efforts to mitigate risk, as well as to assess any newly identified risks.

7.3.2 Risk Control

Risk control is necessary to help prevent failure on a project. The project team will ensure the Risk Management Plan is executed so that it can respond to risk events before they become serious problems. As risk events occur, the project team will implement the appropriate contingency plans to ensure the success of the project. The Risk Management Plan will be updated as anticipated risk events occur or are surpassed, and as actual risk events are evaluated and resolved.

The next section of the feasibility study for Project Alpha is a thorough economic analysis of the impacts of the proposed solution introduced in Section 5, Proposed Solution. The following Economic Analysis Worksheets outline the costs of the current baseline financial management environment, the fiscal impact of Project Alpha's proposed solution and a second viable alternative, and identification and quantification of funding streams for the project across fiscal years.

8.0 Economic Analysis Worksheets

The worksheets included in this section provide a comparative analysis of the costs associated with the two alternatives for implementation of enterprise resource planning, application integration, and a data warehouse.

The instructions for the Economic Analysis Worksheets require full analysis of only those alternatives that "satisfactorily meet the objectives and functional requirements." The existing system does not fully meet these requirements without significant modifications. As identified in the Alternatives Analysis, the alternative that would meet the minimum requirements is a COTS solution. As such, the cost-benefit analysis addressed the two viable approaches within this alternative:

- Alternative 3a) COTS Suite for ERP, EAI and Data Warehouse
- Alternative 3b) COTS Suite for ERP, Best-of-Breed for EAI and Data Warehouse

An explanation of the contents of each worksheet can be found in the Department of Finance Economic Analysis Worksheets guidelines.

8.1 Existing System Cost Worksheet

EXISTING SYSTEM/BASELINE COST WORKSHEET

Department: California Department of Transportation

All costs to be shown in whole (unrounded) dollars.

Date Prepared: 9/19/05

Project: Integrated Financial Management System (IFMS) - Project Alpha

	FY 2005/06		FY 2006/07		FY 2007/08		FY 2008/09		FY 2009/10		FY 2010/11		TOTAL	
	**PYs	**Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts
Continuing Information Technology Costs														
Staff (salaries & benefits)	50.5	4,191,865	151.6	12,886,000	151.6	12,886,000	151.6	12,886,000	151.6	12,886,000	151.6	12,886,000	**808.5**	**68,621,865**
Hardware Lease/Maintenance		283,825		851,476		877,020		903,331		930,431		958,344		**4,804,427**
Software Maintenance/Licenses		423,825		1,271,476		1,309,620		1,348,909		1,389,376		1,431,057		**7,174,264**
Contract Services		0		0		0		0		0		0		**0**
Data Center Services		1,500,000		4,500,000		4,635,000		4,774,050		4,917,272		5,064,790		**25,391,111**
Agency Facilities		0		0		0		0		0		0		**0**
Other		0		0		0		0		0		0		**0**
Total IT Costs	**50.5**	**6,399,516**	**151.6**	**19,508,952**	**151.6**	**19,707,641**	**151.6**	**19,912,290**	**151.6**	**20,123,078**	**151.6**	**20,340,191**	**808.5**	**105,991,668**
Continuing Program Costs:														
Program Staff	200.0	17,000,000	600.0	51,000,000	600.0	51,000,000	600.0	51,000,000	600.0	51,000,000	600.0	51,000,000	**3200.0**	**272,000,000**
Other		0		0		0		0		0		0		**0**
Total Program Costs	**200.0**	**17,000,000**	**600.0**	**51,000,000**	**600.0**	**51,000,000**	**600.0**	**51,000,000**	**600.0**	**51,000,000**	**600.0**	**51,000,000**	**3200.0**	**272,000,000**
TOTAL EXISTING SYSTEM COSTS	**250.5**	**23,399,516**	**751.6**	**70,508,952**	**751.6**	**70,707,641**	**751.6**	**70,912,290**	**751.6**	**71,123,078**	**751.6**	**71,340,191**	**4008.5**	**377,991,668**

** **IMPORTANT:** For FY 05/06, costs were prorated to align with estimated launch of Project Alpha activities in March, 2006.

Assumptions

The following existing costs have been estimated:

Staff (salaries and benefits)

- The average PY work year is assumed to be 1,750 hours.
- A total of 151.6 PYs at a cost of $12,886,000, provide support for financial management systems throughout Caltrans. These costs were derived as follows and are substantiated in the table below:
  - **Headquarters IT**: A total of 62.6 PYs at a cost of $5,321,000 was derived using identified staff classifications. If no classification was provided, then the loaded PY cost of $85,000 as defined in the Existing Application Production Costs spreadsheet was used.
  - **Divisions**: A total of 89 PYs at a cost of $7,565,000 was derived using identified staff classifications. If no classification was provided, then the loaded PY cost of $85,000 as defined in the Existing Application Production Costs spreadsheet was used.

Hardware Lease/Maintenance

- Total hardware lease and maintenance cost for division and headquarters in support of existing legacy systems is approximated at $851,476 comprised of data gathered from a Caltrans Integration Study conducted in July 2004. This cost is estimated to be half of total hardware and software fees which were estimated at $1,702,952.

Software Maintenance/Licenses

- Total software lease and maintenance cost for division and headquarters in support of existing legacy systems is approximated at $851,476 comprised of data gathered from a Caltrans Integration Study completed in July 2004. This cost is estimated to be half of total hardware and software fees which were estimated at $1,702,952.
- In addition, there is an existing software maintenance contract for two applications developed in Queo, ARS, and COMS/EAS totaling $420,000 per year. Due to the additional granularity available for this contract, original figures for Queo were extracted from the Caltrans Integration Study completed in July 2004.

Contract Services

- There are no current costs for contract services related to the existing financial management systems.

Data Center Services

- A number of Caltrans' legacy financial management systems are hosted at the Department of Technological Services (DTS). Annual costs are estimated to be $4,500,000 and are assumed to increase three percent annually. These fees represent hosting costs for the legacy systems in operation at Caltrans.
- For FY 05/06, costs were prorated to align with estimated launch of Project Alpha activities in March, 2006. Data Center Services costs in 05/06 are estimated to be

$1,500,000 then averaging approximately $4,500,000 year growing at three percent per year.

CONTINUING PROGRAM COSTS

- The average PY work year is assumed to be 1,750 hours.
- An estimated total of 600 PYs at a cost of $51,000,000, perform financial management functions that fall under the scope of IFMS.
  - For FY 05/06, costs were prorated to align with estimated launch of Project Alpha activities in March, 2006. Program PY costs in 05/06 are estimated to be 200 PYs at a cost of $17,000,000; the cost is approximately 51,000,000 from FY 06/07 on.
  - Assumes an average salary, including benefits, of $85,000 per PY.

8.2 Alternative System Cost Worksheet

8.2.1 Proposed Solution — COTS Suite for ERP, EAI and Data Warehouse

PROPOSED ALTERNATIVE COTS Suite for ERP, EAI and Data Warehouse

Date Prepared: 9/19/05

Department: California Department of Transportation

All Costs Should be shown in whole (unrounded) dollars.

Project: Integrated Financial Management System (IFMS) - Project Alpha

	FY 2005/06		FY 2006/07		FY 2007/08		FY 2008/09		FY 2009/10		FY 2010/11		TOTAL	
	**PYs	**Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts
One-Time IT Project Costs														
Staff (Salaries & Benefits)	2.9	248,200	16.7	1,418,650	32.5	2,765,050	32.1	2,730,200	0.0	0	0	0	84.3	7,162,100
Hardware Purchase		0		0		0		0		0		0		0
Software Purchase/License/Training		0		0		1,160,000		2,320,000		0		0		3,480,000
Telecommunications		0		0		0		0		0		0		0
TOTAL Contract Services		0		1,196,800		4,752,000		4,646,400		0		0		10,595,200
Data Center Services		0		0		0		0		0		0		0
Procure Assistance/DGS/IV&V/Proj Oversight		269,199		755,067		650,000		650,000		0		0		2,324,266
Other (Travel)		30,000		60,000		0		0		0		0		90,000
Total One-time IT Costs	**2.9**	**547,399**	**16.7**	**3,430,517**	**32.5**	**9,327,050**	**32.1**	**10,346,600**	**0.0**	**0**	**0.0**	**0**	**84.3**	**23,651,566**
Continuing IT Project Costs														
Staff (Salaries & Benefits)	0.0	0	0.0	0	0.0	0	0.0	0	16.0	1,360,000	16.0	1,360,000	32.0	2,720,000
Hardware Lease/Maintenance		0		0		0		0		0		0		0
Software Maintenance/Licenses		0		0		0		0		591,600		591,600		1,183,200
Telecommunications		0		0		0		0		0		0		0
Contract Services		0		0		0		0		0		0		0
Data Center Services		0		717,184		738,700		760,861		783,686		807,197		3,807,627
Agency Facilities		0		0		0		0		0		0		0
Other - Training		0		0		0		0		295,800		295,800		591,600
Total Continuing IT Costs	**0.0**	**0**	**0.0**	**717,184**	**0.0**	**738,700**	**0.0**	**760,861**	**16.0**	**3,031,086**	**16.0**	**3,054,597**	**32.0**	**8,302,427**
Total Project Costs	**2.9**	**547,399**	**16.7**	**4,147,701**	**32.5**	**10,065,750**	**32.1**	**11,107,461**	**16.0**	**3,031,086**	**16.0**	**3,054,597**	**116.3**	**31,953,993**
Continuing Existing Costs														
Information Technology Staff	48.8	4,145,733	146.1	12,419,350	141.2	11,999,450	144.9	12,317,917	140.6	11,951,000	140.6	11,951,000	762.2	64,784,450
Other IT Costs-Data Center-SW-Maint		2,067,650		5,351,476		5,512,020		5,677,381		2,619,771		2,698,364		23,926,662
Total Continuing Existing IT Costs	**48.8**	**6,213,383**	**146.1**	**17,770,826**	**141.2**	**17,511,470**	**144.9**	**17,995,298**	**140.6**	**14,570,771**	**140.6**	**14,649,364**	**762.2**	**88,711,112**
Program Staff	198.3	16,852,100	588.8	50,049,700	577.5	49,087,500	573.1	48,715,200	592.0	50,320,000	559.0	47,515,000	3088.7	262,539,500
Other Program Costs		0		0		0		0		0		0		0
Total Continuing Existing Program Costs	**198.3**	**16,852,100**	**588.8**	**50,049,700**	**577.5**	**49,087,500**	**573.1**	**48,715,200**	**592.0**	**50,320,000**	**559.0**	**47,515,000**	**3088.7**	**262,539,500**
Total Continuing Existing Costs	**247.0**	**23,065,483**	**734.9**	**67,820,526**	**718.7**	**66,598,970**	**718.0**	**66,710,498**	**732.6**	**64,890,771**	**699.6**	**62,164,364**	**3850.9**	**351,250,612**
TOTAL ALTERNATIVE COSTS	**250.0**	**23,612,882**	**751.6**	**71,968,227**	**751.2**	**76,664,720**	**750.2**	**77,817,958**	**748.6**	**67,921,857**	**715.6**	**65,218,961**	**3967.1**	**383,204,605**
INCREASED REVENUES		0		0		0		0		0		0		**0**

** **IMPORTANT:** For FY 05/06, costs were prorated to align with estimated launch of Project Alpha activities in March, 2006.

Assumptions

The following **One-time IT Project Costs** have been estimated:

Staff (salaries and benefits)

- The average PY work year consists of 1,750 hours and the average loaded salary, with benefits is estimated at $85,000.
  - A month is calculated as 4.33 weeks.
  - A full work week is defined as 33.68 hours (1,750 hours/month/4.33 weeks) dedicated to the project.
- Internal PY estimates that represent the various program and IT Caltrans employees involved in Project Alpha were made across phases based on prior Caltrans projects, information from previous public sector ERP implementations, and Gartner research. The estimates, by fiscal year:
  - 2.92 PYs in FY 05/06
  - 16.69 PYs in FY 06/07
  - 32.53 PYs in FY 07/08
  - 32.12 PYs in 08/09
- *Phase 1 – Procurement*
  - An estimated 8.77 PY, costing $745,420, are required for the 12-month procurement phase. The PYs are a composite figure comprised of a number of program and technical resources detailed below.
  - Project manager and the technical project manager will dedicate 100% of their time to this phase.
  - Project sponsor will dedicate an average of two hours per week to this phase.
  - PMO will dedicate an average of eight hours per week to this phase.
  - One program and one technical resource will dedicate 24 hours per week to this phase to assist the aforementioned project managers with administrative and other duties.
  - Ten program resources from the Division of Accounting, the Division of Budgets, the Division of Procurement and Contracts, and other district and employees will contribute to this phase. All resources will dedicate an average of 12 hours per week to requirements development and RFP development activities; three of these resources will also dedicate an average of 20 hours per week for evaluation and selection.
  - Five program resources from Headquarters IT, and other district IT employees will contribute to this phase. All resources will dedicate an average of 10 hours per week to requirements development and RFP development activities; three of these resources will also dedicate an average of 20 hours per week for evaluation and selection.

- *Phase 2 – System Development*
  - An estimated 62.36 PY, costing $5,300,403, are required for the 24-month system development phase that spans three fiscal years. The PYs are a composite figure comprised of a number of program and technical resources detailed below.
  - Project manager and technical project manager will dedicate 100% of their time to this phase.
  - Project sponsor will dedicate an average of two hours per week to this phase.
  - PMO will dedicate an average of 16 hours per week to this phase.
  - One program and one technical resource will dedicate 100% of their time to this phase to assist the aforementioned project managers with administrative and other duties.
  - Twenty program resources from the Division of Accounting, the Division of Budgets, the Division of Procurement and Contracts, and other district and employees will contribute to this phase. All resources will dedicate an average of 33.7 hours per week to system development activities.
  - Eight technical resources from Headquarters IT, and other district IT employees, will contribute to this phase. All resources will dedicate an average of 33.7 hours per week to system development activities.
- *Phase 3 – Deployment and Training*
  - An estimated 13.14 PY, costing $1,116,845, are required for the nine month deployment and training phase that spans three fiscal years. The PYs are a composite figure comprised of a number of program and technical resources detailed below.
  - Project manager and technical project manager will dedicate 100% of their time to this phase.
  - Project sponsor will dedicate an average of two hours per week to this phase.
  - PMO will dedicate an average of 16 hours per week to this phase.
  - One program and one technical resource will dedicate 100% of their time, or 33.7 hours per week, to this phase to assist the aforementioned project managers with administrative and other duties.
  - Twenty program resources from the Division of Accounting, the Division of Budgets, the Division of Procurement and Contracts, and other district and employees will contribute to this phase. All resources will dedicate an average of 33.7 hours per week to system development activities.
  - Eight technical resources from Headquarters IT, and other district IT employees, will contribute to this phase. All resources will dedicate an average of 33.7 hours per week to system development activities.

Hardware Purchase

- There are no hardware purchase costs for this project; required hardware will be leased from DTS as a service listed under *Data Center Services.*

Software Purchase/License

- Software Licenses: The one-time ERP Software license costs for COTS are estimated to be $3,480,000. The cost estimate is based on 60 Professional Named Users at $8,000 per user and 1,000 Limited Professional Named Users at $3,000 per user. The ERP cost estimate includes general ledger, accounts payable, and accounts receivable functionality. These license fees also include all of the one-time software tools needed for application integration, business intelligence (BI), and database/business intelligence tools. Estimates are based on Gartner research and supplementary data sources, and includes standard license maintenance and support services. Cost estimates are based on the assumption that maintenance fees will be incurred in the same annual sequence as the one-time license purchases and that there will be some growth in the total number of licenses required. Price estimates are comprised of the following:
  - New Report/BI software license fees are estimated as follows:
    - Report Software (viewer bundle) – The initial viewer bundle licenses are treated as one time project costs. New viewer licenses will have to be purchased as a Limited Professional User Fee under the ERP license.
    - Business Intelligence Analysis Software (report developer licenses) – The initial licenses are treated as one time costs under the ERP license. New viewer licenses will have to be purchased as a Limited Professional User Fee under the ERP license.
  - Report/BI software maintenance fees are estimated as follows:
    - Covered under ERP agreement.
  - Database Management System software maintenance is estimated as follows:
    - Covered under ERP license and existing.

Telecommunications

- There are no additional telecommunications costs for this project.

Total Contract Services

- Independent Project Oversight Consultant (IPOC) services are estimated to be $150,000 for each year of the project for a total of $500,000. The services begin in March 2006 and are distributed as follows:
  - **FY 05/06**: $50,000 (4/12)
  - **FY 06/07**: $150,000
  - **FY 07/08**: $150,000
  - **FY 08/09**: $150,000
- Independent Verification and Validation (IV&V) costs are estimated to be $300,000 for each year spanning Phases 2 and 3 of the project for a total of $700,000. The services begin in March 2006 and are distributed as follows:
  - **FY 06/07**: $100,000
  - **FY 07/08:** $300,000

- **FY 08/09**: $300,000

- Procurement vendor costs for procurement assistance services will assist Caltrans in defining their detailed business and technical requirements, preparing the request for Proposal (RFP) and evaluating and selecting the Integration Partner. The estimated cost is $300,000 for procurement assistance and $100,000 for evaluation and selection for a total of $400,000. These services will span March 2006 to March 2007.
- DGS Fees are estimated at 600 hours of time at $90 per hour. Total of $54,000 for DGS fees. These Fees will be incurred starting in March, 2006 and last through the duration of implementation.
- Costs for project management mentoring services are estimated at $200,000 annually.
- Data Center Costs are estimated at 40 hours of time to participate in the procurement process at $90 per hour. Total of $3,600 for data center procurement charges.
- Total Contract Costs (Not including Integration Partner Costs)

	FY05-06 (Prorated)	FY06/07	FY07/08	FY08/09
IPOC	$50,000	$150,000	$150,000	$150,000
IV&V		$100,000	$300,000	$300,000
Procurement Vendor	$133,333	$266,667		
DGS	$18,000	$36,000		
Project Management	$66,666	$200,000	$200,000	$200,000
Data Center Procurement	$1,200	$2,400		
Total	**$269,199**	**$755,067**	**$650,000**	**$650,000**

Integration Partner implementation services are comprised of the costs in the following table, broken down by hours per implementation task, and cost per task. These costs are based on the average system integrator cost of $200 per hour based on an after-installation analysis of a similar implementation with a similar state agency, and industry experience.

Table 49. Estimated Integration Partner Implementation Costs During Phases 2 and 3 — COTS

	F06/07		F07/08		F08/09	
	Total Hours	Cost	Total Hours	Cost	Total Hours	Cost
Phase 2 — System Development						
Change Management	2,640	528,000	6,336	1,267,200	5,808	1,161,600
Requirements Analysis/Validation	880	176,000	1,584	316,800		
Process Optimization	1,056	211,200				
Process and Solution Design/Tech Arch	1,408	281,600	2,112	422,400		
Database and Reporting Design			1,584	316,800		
System Design			2,112	422,400		
Train Caltrans IT Staff			1,056	211,200		
Production Environment Deployment Planning			1,584	316,800		
Develop/Configuration of S/W Functionality			1,584	316,800	1,056	211,200
Interface Development			1,408	281,600	2,816	563,200
Conversion to ERP			2,288	457,600		
Archive Legacy System Data (DW Repository)			1,584	316,800	1,056	211,200
ETL/Batch			528	105,600	528	105,600
Report Development					2,112	422,400
Testing					1,408	281,600

	F06/07		F07/08		F08/09	
Phase 3 — System Deployment and Training						
Train Pilot District Office Users					704	140,800
Solution at Pilot offices					1,760	352,000
Pilot review and Acceptance					1,056	211,200
Train Remaining Caltrans Staff					2,112	422,400
Deploy Solution at remaining District Offices					2,112	422,400
Final Acceptance					704	140,800
Decommission Appropriate Legacy Systems						
	Total	**$1,196,800**	**Total**	**$4,752,000**	**Total**	**$4,646,400**

- Caltrans travel expenses associated with internal implementation assistance are estimated to cost $30,000 for the last 4 months of FY 05/06 and $60,000 for the first eight months of FY 06/07. Cost estimates are comprised of the following:
  - Assumes average costs of $200 for airfare, $200 for hotel accommodations, and $100 for car rental.
  - Assumes 20 staff members and 9 trips per staff member during the procurement and implementation.

The following **Continuing IT Project Costs** have been estimated:

Staff (salaries and benefits)

- The average PY work year consists of 1,750 hours and the average loaded salary, with benefits is estimated at $85,000.
  - A full work week is defined as 33.7 hours dedicated to the project.
  - A month is calculated as 4.33 weeks.
  - A total of 16 technical resources will be required to support the IFMS system upon final acceptance. One complete year of support will cost $1,360,000; support will begin in July 2009.

Hardware Purchase

- There are no hardware purchase costs for this project; required hardware will be leased from DTS as a service listed under *Data Center Services.*

Software Maintenance/Licenses

- ERP software maintenance will be approximately $591,000 based on 17% of the initial ERP licensing fee.

Contract Services

- There are no ongoing contract services involved with this project.

Training

- Ongoing ERP, DW, and application integration training will be approximately $295,000 per year, or 50% of software maintenance costs.

Data Center Services

- Caltrans will lease the processing power from DTS for a total of $717,184, equivalent to 42 additional processors. These costs will start in FY 06/07 to allow for development, testing, etc.. A 3% growth rate per year is assumed. Costs are comprised of:
  - 16 processors will be used in the production environment and two will be used to support a test and development environment at a cost of $231,624 annually.
  - 16 processors will used to support application integration at a cost of $250,440 annually.
  - 8 processors will be used to support web and portal at a cost of $152,488 annually.

- 2 single processors will be used to develop and test at a cost of $41,316 each, annually.

- Caltrans should be able to leverage existing router and related intrusion detection software to establish a security firewall. The estimated one-time costs for the hardware and software are included in the processor lease costs. This equipment will be leased beginning in FY 07/08.
- Total hardware lease and maintenance costs are based on data gathered from the Caltrans Integration Study conducted July 2004. The data was then corrected to account for 2005 hardware and software leasing rates. In 09/10, continuing existing costs will ultimately be reduced from $4.500,000 to $2,016,032 each FY (Note: With prorating and growth rates taken into account, FY06/07 number is increased from 4.5M to 4.545 M and the same applied to the 2.016 cost introduced in FY09/10).
  - As part of the 2004 Integration Report, the original $7,602,259 was estimated for data center costs. Based on the timing of the report and the availability of more accurate data, the costs have been reduced to from $7,602,259 to an estimated $4.500,000 for the financial management systems in scope. In the original 2004 Integration Report, it was estimated that by retiring the systems replaced by Alpha, Caltrans would save $3,405,866 in data center costs. Based on the same ratio leveraged to reduce the data center fees from $7,602,259 to $4,500,000 (i.e. 44.8% of $7,602,259), it is estimated that the $3,405,866 savings would reduced the costs to $2,016,032.
- The above ratio was also used to reduce the original Hardware/Software costs supported at the data center from $2,876,951 to 1,702,952 and the anticipated savings cost from $2,216,238 to $1,311,856.
- Storage: 500 GB at $100 per GB per month = $50,000 annually; assumes 3% growth annually.

Total <u>One-time COTS Project</u> cost is $23,651,566, the <u>Continuing COTS Project</u> cost is $8,302,427 and the <u>Total COTS Project</u> cost is $31,953,993.

8.3 Alternative System Cost Worksheet

8.3.1 Alternative Solution — COTS Suite for ERP, Best-of-Breed for EAI and Data Warehouse

ALTERNATIVE #1 **COTS Suite for ERP, Best of Breed for EAI and Data Warehouse**

Date Prepared: 9/19/05

Department: California Department of Transportation

All Costs Should be shown in whole (unrounded) dollars.

Project: Integrated Financial Management System (IFMS) - Project Alpha

	FY 2005/06		FY 2006/07		FY 2007/08		FY 2008/09		FY 2009/10		FY 2010/11		TOTAL	
	**PYs	**Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts
One-Time IT Project Costs														
Staff (Salaries & Benefits)	2.9	248,200	16.7	1,418,650	32.5	2,765,050	32.1	2,730,200	0.0	0	0.0	0	84.3	7,162,100
Hardware Purchase		0		0		0		0		0		0		0
Software Purchase/License/Training		0		0		1,489,333		2,978,667		0		0		4,468,000
Telecommunications		0		0		0		0		0		0		0
TOTAL Contract Services				1,569,920		6,061,440		6,001,600		0		0		13,632,960
Data Center Services		0		0		0		0		0		0		0
DGS/IV&V/Proj Oversight		269,199		755,067		650,000		650,000		0		0		2,324,266
Travel		60,000		140,000		0		0		0		0		200,000
Total One-time IT Costs	**2.9**	**577,399**	**16.7**	**3,883,637**	**32.5**	**10,965,823**	**32.1**	**12,360,467**	**0.0**	**0**	**0.0**	**0**	**84.3**	**27,787,326**
Continuing IT Project Costs														
Staff (Salaries & Benefits)	0.0	0	0.0	0	0.0	0	0.0	0	19.0	1,615,000	19.0	1,615,000	38.0	3,230,000
Hardware Lease/Maintenance				0		0		0		0		0		0
Software Maintenance/Licenses		0		0		0		0		986,200		986,200		1,972,400
Telecommunications		0		0		0		0		0		0		0
Contract Services		0		0		0		0		0		0		0
Data Center Services		0		717,184		738,700		760,861		783,686		807,197		3,807,627
Agency Facilities		0		0		0		0		0		0		0
Training		0		0		0		0		1,043,000		1,043,000		2,086,000
Total Continuing IT Costs	**0.0**	**0**	**0.0**	**717,184**	**0.0**	**738,700**	**0.0**	**760,861**	**19.0**	**4,427,886**	**19.0**	**4,451,397**	**38.0**	**11,096,027**
Total Project Costs	**2.9**	**577,399**	**16.7**	**4,600,821**	**32.5**	**11,704,523**	**32.1**	**13,121,327**	**19.0**	**4,427,886**	**19.0**	**4,451,397**	**122.3**	**38,883,353**
Continuing Existing Costs														
Information Technology Staff	48.8	4,145,460	145.6	12,377,720	139.7	11,874,500	144.9	12,317,917	140.6	11,951,000	140.6	11,951,000	760.2	64,617,597
Other IT Costs-Dat Ctr-SW-Maint		2,067,650		5,351,476		5,512,020		5,677,381		2,619,771		2,698,364		23,926,662
Total Continuing Existing IT Costs	**48.8**	**6,213,110**	**145.6**	**17,729,196**	**139.7**	**17,386,520**	**144.9**	**17,995,298**	**140.6**	**14,570,771**	**140.6**	**14,649,364**	**760.2**	**88,544,259**
Program Staff	198.3	16,852,100	588.8	50,049,700	577.5	49,087,500	573.1	48,715,200	592.0	50,320,000	559.0	47,515,000	3088.7	262,539,500
Other Program Costs		0		0		0		0		0		0		0
Total Continuing Existing Program Costs	**198.3**	**16,852,100**	**588.8**	**50,049,700**	**577.5**	**49,087,500**	**573.1**	**48,715,200**	**592.0**	**50,320,000**	**559.0**	**47,515,000**	**3088.7**	**262,539,500**
Total Continuing Existing Costs	**247.0**	**23,065,210**	**734.4**	**67,778,896**	**717.2**	**66,474,020**	**718.0**	**66,710,498**	**732.6**	**64,890,771**	**699.6**	**62,164,364**	**3848.9**	**351,083,759**
TOTAL ALTERNATIVE COSTS	**250.0**	**23,642,609**	**751.1**	**72,379,717**	**749.7**	**78,178,543**	**750.2**	**79,831,825**	**751.6**	**69,318,657**	**718.6**	**66,615,761**	**3971.2**	**389,967,112**
INCREASED REVENUES		0		0		0		0		0		0		**0**

** **IMPORTANT:** For FY 05/06, costs were prorated to align with estimated launch of Project Alpha activities in March, 2006.

Assumptions

The following **One-time IT Project Costs** have been estimated:

Staff (salaries and benefits)

- The average PY work year consists of 1,750 hours and the average loaded salary, with benefits is estimated at $85,000.
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  - PMO will dedicate an average of eight hours per week to this phase.
  - One program and one technical resource will dedicate 24 hours per week to this phase to assist the aforementioned project managers with administrative and other duties.
  - Ten program resources from the Division of Accounting, the Division of Budgets, the Division of Procurement and Contracts, and other district and employees will contribute to this phase. All resources will dedicate an average of 12 hours per week to requirements development and RFP development activities; three of these resources will also dedicate an average of 20 hours per week for evaluation and selection.
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  - An estimated 62.36 PY, costing $5,300,403, are required for the 24-month system development phase that spans three fiscal years. The PYs are a composite figure comprised of a number of program and technical resources detailed below.
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  - One program and one technical resource will dedicate 100% of their time to this phase to assist the aforementioned project managers with administrative and other duties.
  - Twenty program resources from the Division of Accounting, the Division of Budgets, the Division of Procurement and Contracts, and other district and employees will contribute to this phase. All resources will dedicate an average of 33.7 hours per week to system development activities.
  - Eight technical resources from Headquarters IT, and other district IT employees, will contribute to this phase. All resources will dedicate an average of 33.7 hours per week to system development activities.
- *Phase 3 – Deployment and Training*
  - An estimated 13.14 PY, costing $1,116,845, are required for the 9-month deployment and training phase that spans three fiscal years. The PYs are a composite figure comprised of a number of program and technical resources detailed below.
  - Project manager and technical project manager will dedicate 100% of their time to this phase.
  - Project sponsor will dedicate an average of two hours per week to this phase.
  - PMO will dedicate an average of 16 hours per week to this phase.
  - One program and one technical resource will dedicate 100% of their time, or 33.7 hours per week, to this phase to assist the aforementioned project managers with administrative and other duties.
  - Twenty program resources from the Division of Accounting, the Division of Budgets, the Division of Procurement and Contracts, and other district and employees will contribute to this phase. All resources will dedicate an average of 33.7 hours per week to system development activities.
  - Eight technical resources from Headquarters IT, and other district IT employees, will contribute to this phase. All resources will dedicate an average of 33.7 hours per week to system development activities.

Hardware Purchase

- There are no hardware purchase costs for this project; required hardware will be leased from DTS as a service listed under *Data Center Services.*

Software Purchase/License

- *Software Licenses*: The one-time ERP Software license costs for COTS are estimated to be $3,480,000. The cost estimate is based on 60 Professional Named Users at $8,000 per user and 1,000 Limited Professional Named Users at $3,000 per user. The ERP cost estimate includes general ledger, accounts payable, and accounts receivable functionality. These license fees also include all of the one-time software tools needed for application integration, business intelligence (BI), and database/business intelligence tools. Estimates are based on Gartner research and supplementary data sources, and includes standard license maintenance and support services. Cost estimates are based on the assumption that maintenance fees will be incurred in the same annual sequence as the one-time license purchases and that there will be some growth in the total number of licenses required. Price estimates are comprised of the following:
  - New Report/BI software license fees are estimated as follows:
    - Report Software/BI Software– The initial viewer bundle licenses are treated as one time project costs of $488,000.
    - Middleware License Fees will be approximately $500,000.

Telecommunications

- There are no additional telecommunications costs for this project.

Total Contract Services

- Independent Project Oversight Consultant (IPOC) services are estimated to be $150,000 for each year of the project for a total of $500,000. The services begin in March 2006 and are distributed as follows:
  - **FY 05/06**: $50,000 (4/12)
  - **FY 06/07**: $150,000
  - **FY 07/08**: $150,000
  - **FY 08/09**: $150,000
- Independent Verification and Validation (IV&V) costs are estimated to be $300,000 for each year spanning Phases 2 and 3 of the project for a total of $700,000. The services begin in March 2005 and are distributed as follows:
  - **FY 06/07**: $100,000
  - **FY 07/08**: $300,000
  - **FY 08/09**: $300,000
- Procurement vendor costs for procurement assistance services will assist Caltrans in defining their detailed business and technical requirements, preparing the request for Proposal (RFP) and evaluating and selecting the Integration Partner. The estimated cost is $300,000 for procurement assistance and $100,000 for evaluation and selection for a total of $400,000. These services will span March 2006 to March 2007.
- DGS Fees are estimated at 600 hours of time at $90 per hour. Total of $54,000 for DGS fees.

- Data Center Costs are estimated at 40 hours of time to participate in the procurement process at $90 per hour. Total of $3,600 for data center procurement charges.
- Costs for project management mentoring services are estimated at $200,000 annually
- Total Contract Costs (Not including Integration Partner)

	FY05-06 (Prorated)	FY06/07	FY07/08	FY08/09
IPOC	$50,000	$150,000	$150,000	$150,000
IV&V		$100,000	$300,000	$300,000
Procurement Vendor	$133,333	$266,667		
DGS	$18,000	$36,000		
Project Management	$66,666	$200,000	$200,000	$200,000
Data Center Procurement	$1,200	$2,400		
Total	**$269,199**	**$755,067**	**$650,000**	**$650,000**

- Integration Partner implementation services are comprised of the costs in the following table, broken down by hours per implementation task, and cost per task. These costs are based on the average system integrator cost of $200 per hour based on an after-installation analysis of a similar implementation with a similar state agency, and industry experience.
- Integration Partner implementation services are comprised of the costs in the following table, broken down by hours per implementation task, and cost per task. These costs are based on the average system integrator cost of $200 per hour based on an after-installation analysis of a similar implementation with a similar state agency, and industry experience.

Table 50. Integration Partner Implementation Costs During Phase 2 and 3 — Best of Breed

	F06/07		F07/08		F08/09	
	Total Hours	Cost	Total Hours	Cost	Total Hours	Cost
Phase 2 — System Development						
Change Management	3,168	633,600	7,603	1,520,640	6,970	1,393,920
Requirements Analysis/Validation	1,232	295,680	2,218	443,520		
Process Optimization	1,373	274,560				
Process & Solution Design/Tech Arch	1,830	366,080	2,746	549,120		
Database and Reporting Design			1,901	380,160		
System Design			2,746	549,120		
Train Caltrans IT Staff			1,267	253,440		
Production Environment Deployment Planning			1,901	380,160		
Develop/Configuration of S/W Functionality			2,376	475,200	1,267	253,440
Interface Development			2,112	422,400	4,224	844,800
Conversion to ERP			2,746	549,120		
Archive Legacy System Data (DW Repository)			2,059	411,840	1,373	274,560
ETL/Batch			634	126,720	686	137,280
Report Development					2,746	549,120
Testing					1,830	366,080
Phase 3 — System Deployment and Training						
Train Pilot District Office Users					915	183,040
Solution at Pilot offices					2,288	457,600
Pilot Review and Acceptance					1,373	274,560
Train Remaining Caltrans Staff					2,746	549,120
Deploy Solution at Remaining District Offices					2,746	549,120
Final Acceptance					845	168,960
Decommission Appropriate Legacy systems						
	Total	**$1,569,920**	**Total**	**$6,061,440**	**Total**	**$6,001,600**

- Caltrans travel expenses associated with internal implementation assistance are estimated to cost $60,000 for the last 4 months of FY 05/06 and $140,000 for the first eight months of FY 06/07. Cost estimates are comprised of the following:
  - Assumes average costs of $200 for airfare, $200 for hotel accommodations, and $100 for car rental.
  - Assumes 20 staff members and 9 trips per staff member during the procurement and implementation.

The following **Continuing IT Project Costs** have been estimated:

Staff (salaries and benefits)

- The average PY work year consists of 1,750 hours and the average loaded salary, with benefits is estimated at $85,000.
  - A full work week is defined as 33.7 hours dedicated to the project.
  - A month is calculated as 4.33 weeks.
  - A total of 19 technical resources will be required to support the IFMS system upon final acceptance. One complete year of support will cost $1,615,000; support will begin in July, 2009.

Hardware Purchase

- There are no hardware purchase costs for this project; required hardware will be leased from DTS as a service listed under *Data Center Services.*

Software Maintenance/Licenses

- ERP software maintenance will be approximately $591,000 based on 17% of the initial ERP licensing fee.
- BI maintenance fees will be approximately $200,000 per year per Gartner research.
- Middleware maintenance fees will be approximately $195,200 per year per Gartner research.

Contract Services

- There are no ongoing contract services involved with this project.

Training

- Ongoing training costs will total $1,043,000 annually , comprised of:
  - ERP training will be approximately $448,000.
  - DW training will be approximately $395,000.
  - Application integration training will be approximately $200,000.

Data Center Services

- Caltrans will lease the processing power from DTS, equivalent to 42 additional processors. These costs will be incurred starting in March 2007.
  - Sixteen processors will be used in the production environment and two will be used to support a test and development environment at a cost of $231,624 annually.
  - Sixteen processors will used to support application integration at a cost of $250,440 annually.
  - Eight processors will be used to support web and portal at a cost of $152,488 annually.
  - Two single processors will be used to develop and test at a cost of $41,316 each, annually.
- Caltrans should be able to leverage existing router and related intrusion detection software to establish a security firewall. The estimated one-time costs for the hardware and software are included in the processor lease costs. This equipment will be leased beginning in FY 07/08.
- Total hardware lease and maintenance costs are based on data gathered from the Caltrans Integration Study conducted July 2004. The data was then corrected to account for 2005 hardware and software leasing rates. In 09/10, continuing existing costs will ultimately be reduced from $4.500,000 to $2,016,032 each FY (Note: With prorating and growth rates taken into account, FY06/07 number is increased from 4.5M to 4.545 M and the same applied to the 2.016 cost introduced in FY09/10).
  - As part of the 2004 Integration Report, the original $7,602,259 was estimated for data center costs. Based on the timing of the report and the availability of more accurate data, the costs have been reduced to from $7,602,259 to an estimated $4.500,000 for the financial management systems in scope. In the original 2004 Integration Report, it was estimated that by retiring the systems replaced by Alpha, Caltrans would save $3,405,866 in data center costs. Based on the same ratio leveraged to reduce the data center fees from $7,602,259 to $4,500,000 (i.e. 44.8% of $7,602,259), it is estimated that the $3,405,866 savings would reduced the costs to $2,016,032.
- The above ratio was also used to reduce the original Hardware/Software costs supported at the data center from $2,876,951 to 1,702,952 and the anticipated savings cost from $2,216,238 to $1,311,856.
- Storage: 500 GB at $100 per GB per month = $50,000 annually; assumes 3% growth annually.

Total <u>One-time BoB Project</u> cost is $27,787,326, the <u>Continuing BoB Project</u> cost is $11,096,027 and the <u>Total BoB Project</u> cost is $38,833,353.

8.4 Economic Analysis Summary

ECONOMIC ANALYSIS SUMMARY

Date Prepared: 9/19/05

Department: California Department of Transportation

All costs to be shown in whole (unrounded) dollars.

Project: Integrated Financial Management System (IFMS) - Project Alpha

	FY 2005/06		FY 2006/07		FY 2007/08		FY 2008/09		FY 2009/10		FY 2010/11		TOTAL	
	**PYs	**Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts
EXISTING SYSTEM														
Total IT Costs	50.5	6,399,516	151.6	19,508,952	151.6	19,707,641	151.6	19,912,290	151.6	20,123,078	151.6	20,340,191	808.5	105,991,668
Total Program Costs	200.0	17,000,000	600.0	51,000,000	600.0	51,000,000	600.0	51,000,000	600.0	51,000,000	600.0	51,000,000	3200.0	272,000,000
Total Existing System Costs	250.5	23,399,516	751.6	70,508,952	751.6	70,707,641	751.6	70,912,290	751.6	71,123,078	751.6	71,340,191	4008.5	377,991,668
COTS	**COTS Suite for ERP, EAI and Data Warehouse**													
Total Project Costs	2.9	547,399	16.7	4,147,701	32.5	10,065,750	32.1	11,107,461	16.0	3,031,086	16.0	3,054,597	116.3	31,953,993
Total Cont. Exist. Costs	247.0	23,065,483	734.9	67,820,526	718.7	66,598,970	718.0	66,710,498	732.6	64,890,771	699.6	62,164,364	3850.9	351,250,612
Total Alternative Costs	250.0	23,612,882	751.6	71,968,227	751.2	76,664,720	750.2	77,817,958	748.6	67,921,857	715.6	65,218,961	3967.1	383,204,605
COST SAVINGS/AVOIDANCES	0.6	(213,366)	(0.0)	(1,459,275)	0.4	(5,957,079)	1.4	(6,905,669)	3.0	3,201,222	36.0	6,121,230	41.4	(5,212,938)
Increased Revenues		0		0		0		0		0		0		0
Net (Cost) or Benefit	0.6	(213,366)	(0.0)	(1,459,275)	0.4	(5,957,079)	1.4	(6,905,669)	3.0	3,201,222	36.0	6,121,230	41.4	(5,212,938)
Cum. Net (Cost) or Benefit	0.6	(213,366)	0.5	(1,672,641)	0.9	(7,629,721)	2.4	(14,535,389)	5.4	(11,334,168)	0.0	0		
Best-of-Breed	**COTS Suite for ERP, Best of Breed for EAI and Data Warehouse**													
Total Project Costs	2.9	577,399	16.7	4,600,821	32.5	11,704,523	32.1	13,121,327	19.0	4,427,886	19.0	4,451,397	122.3	38,883,353
Total Cont. Exist. Costs	247.0	23,065,210	734.4	67,778,896	717.2	66,474,020	718.0	66,710,498	732.6	64,890,771	699.6	62,164,364	3848.9	351,083,759
Total Alternative Costs	250.0	23,642,609	751.1	72,379,717	749.7	78,178,543	750.2	79,831,825	751.6	69,318,657	718.6	66,615,761	3971.2	389,967,112
COST SAVINGS/AVOIDANCES	0.6	(243,093)	0.5	(1,870,765)	1.9	(7,470,903)	1.4	(8,919,535)	0.0	1,804,422	33.0	4,724,430	37.4	(11,975,444)
Increased Revenues		0		0		0		0		0		0		0
Net (Cost) or Benefit	0.6	(243,093)	0.5	(1,870,765)	1.9	(7,470,903)	1.4	(8,919,535)	0.0	1,804,422	33.0	4,724,430	37.4	(11,975,444)
Cum. Net (Cost) or Benefit	0.6	(243,093)	1.0	(2,113,858)	2.9	(9,584,761)	4.4	(18,504,296)	4.4	(16,699,874)	0.0	0		

** **IMPORTANT:** For FY 05/06, costs were prorated to align with estimated launch of Project Alpha activities in March, 2006.

8.5 Project Funding Plan

PROJECT FUNDING PLAN

Department: California Department of Transportation — All Costs to be in whole (unrounded) dollars — Date Prepared: 9/19/05

Project: Integrated Financial Management System (IFMS) - Project Alpha

	FY 2005/06		FY 2006/07		FY 2007/08		FY 2008/09		FY 2009/10		FY 2010/11		TOTALS	
	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts
TOTAL PROJECT COSTS	**2.9**	**547,399**	**16.7**	**4,147,701**	**32.5**	**10,065,750**	**32.1**	**11,107,461**	**16.0**	**3,031,086**	**16.0**	**3,054,597**	**116**	**31,953,993**
RESOURCES TO BE REDIRECTED														
Staff	2.9	248,200	12.7	1,078,650	20.5	1,745,050	24.1	2,050,200	16	1,360,000	16	1,360,000	**92.3**	**7,842,100**
Funds:														
Existing System		0		0		0		0		1,671,086		1,694,597		**3,365,683**
Other Fund Sources		299,199		0		0		0						**299,199**
TOTAL REDIRECTED RESOURCES	**2.9**	**547,399**	**12.7**	**1,078,650**	**20.5**	**1,745,050**	**24.1**	**2,050,200**	**16.0**	**3,031,086**	**16.0**	**3,054,597**	**92.3**	**11,506,982**
ADDITIONAL PROJECT FUNDING NEEDED														
One-Time Project Costs		0	4.0	2,351,867	12.0	7,582,000	8.0	8,296,400		0		0	**24.0**	**18,230,267**
Continuing Project Costs	0.0	0	0.0	717,184	0.0	738,700	0.0	760,861	0.0		0.0		**0.0**	**2,216,744**
TOTAL ADDITIONAL PROJECT FUNDS NEEDED BY FISCAL YEAR	**0.0**	**0**	**4.0**	**3,069,051**	**12.0**	**8,320,700**	**8.0**	**9,057,261**	**0.0**	**0**	**0.0**	**0**	**24.0**	**20,447,011**
TOTAL PROJECT FUNDING	**2.9**	**547,399**	**16.7**	**4,147,701**	**32.5**	**10,065,750**	**32.1**	**11,107,461**	**16.0**	**3,031,086**	**16.0**	**3,054,597**	**116.3**	**31,953,993**
Difference: Funding - Costs	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	**0.0**	**0**

Total Estimated Cost Savings		0	0.0	0	0.0	0	0.0	0	3.0	2,206,183	36.0	5,154,548	**39.0**	**7,360,731**

Assumptions

- Caltrans will redirect $11,506,982 of existing resources (human and technical) during the implementation and for support of the system after acceptance. The Department will submit a Budget Change Proposal (BCP) for a total of $20,447,011for fiscal year 06/07 to pay for the remainder of the $31,953,993 required for Project Alpha.
- Processing improvements will allow the Division of Accounting (D of A) to reduce its budget by 33 Personnel Years (PYs) one year after system acceptance, in FY 10/11. The reduction is composed of 16 PYs currently supporting subsystems that will be replaced by Project Alpha and 17 PYs responsible for reconciliations, error files or rekeying activities that will be eliminated through implementation of the proposed solution. Finally, decommissioning the aforementioned systems will allow for a redirection of 16 PYs and the elimination of 3 PYs of IT support staff upon final acceptance of the project at the end of FY 08/09.
- In addition to the PY savings noted above, the reduction in technical costs (i.e. hardware, software, data center) exceeds the required funding for the technical components of the new IFMS system. This amount is also captured in the cost savings listed in the funding sheet as follows:
  - **FY 09/10** - $1,951,183
  - **FY 10/11** - $2,094,548

Appendices

Appendix A — Functional Requirements

General Requirements

- Ability to process and track financial transactions.
- Ability to allow data sharing and data redirection between disparate existing legacy systems.
- Ability to reduce or eliminate dependencies between legacy financial systems that will not be replaced by the solution.
- Ability to support a legacy account numbering structure during the transition from an existing application.
- Ability for a user to select/sort on any field in the customer or vendor master files.
- Ability to support on-line and batch account validation.
- Ability to perform balancing for on-line and batch transaction input.
- Ability to permit users to carry data from one screen to another without re-keying.
- Ability to support an electronic approval system with proper controls and security including an audit trail of on-line approvals.
- Ability to support user-added memo notes on any file or screen e.g., through text boxes.
- Ability to support hot key combinations and user defined macro commands.
- Ability to allow data entry fields to default to the last entry.
- Ability to perform project cost accounting including flexible assignment of multiple funding sources to projects.
- Ability to track federal approvals and financial participation on projects including project closure.
- Ability to monitor federal obligation authority.

Budgetary Control and Funds Management

- Ability to establish and maintain the Departmental budget.
- Ability to monitor the Department's allocations, encumbrances and expenditures against the approved budget for all open fiscal years.
- Ability to manage multiple funds with varying data, tracking and reporting requirements.
- Ability to determine and revise allocation distribution.
- Ability to allocate State and Local Splits of Federal Funds.
- Ability to reconcile federal fund usage with obligation authority.

General Ledger

- Ability to establish and maintain a user-defined coding structure that is flexible enough to meet future needs.

- Ability to establish and maintain a chart of accounts.
- Ability to process journal entries.
- Ability to reconcile bank deposits on a daily and monthly basis.
- Ability to update the general ledger immediately or at user-controlled time.
- Ability to reconcile financial data with the State Controllers Office and other control agencies.
- Ability to reconcile general ledger accounts.
- Ability to support subsidiary schedules and ledgers.
- Ability to support multiple divisions and districts and various roll up capabilities.
- Ability to calculate and apply overhead rates for indirect costs.
- Ability to support reversing transactions.
- Ability to support distributing costs by user defined formulas.
- Ability to perform month-end closing of the general ledger.
- Ability to perform year-end closing of the general ledger.
- Ability to generate financial statements that are provided to the SCO and the Bureau of State Audits (BOSA).

Accounts Payable

- Ability to establish and maintain vendor files.
- Ability to establish user-defined payment matching criteria.
- Ability to integrate accounts payable functions with procurement functions.
- Ability to process payments (invoices).
- Ability to create paper or electronic SCO claim schedules.
- Ability to establish and maintain EFT transactions with vendors.
- Ability to track sales and use taxes.
- Ability to identify potential duplicate payments.
- Ability to determine and record prompt payment penalty.
- Ability to support an established required approver's ID based on organizational routing, dollar amounts, or account distribution.
- Ability to support restricting orders above a specified price range, selectable by vendor and not applicable to all vendors.
- Ability to support multiple ship-to addresses and multiple purchase addresses.
- Ability to retrieve default vendor information from the vendor file and purchase order.
- Ability to support requiring a federal tax ID number for all vendors.
- Ability to support invoices which can be routed to multiple approvers, each of whom can attach a comment to the invoice.

- Ability to select multiple cash accounts for an invoice payment.
- Ability to support multiple check runs and check number series.
- Ability to process and store electronic procurement, invoice, and receiving documents.

Accounts Receivable

- Ability to establish and maintain customer records.
- Ability to record payroll receivables.
- Ability to record remittance advices.
- Ability to generate invoices.
- Ability to process and apply receivables/revenue.
- Ability to collect payments through cash, check, credit card and EFT.
- Ability to process and track Federal reimbursement billings.
- Ability to process and track rental payments and rental deposits for properties.
- Ability to process and track collection activity for delinquent receivables.
- Ability to account for long-term installment payment plans.

Reporting

- Ability to provide on-line viewing of queries.
- Ability to provide on-line reviewing of standard and ad-hoc reports.
- Ability to support a drill down which allows increasing levels of detail behind summary figures.
- Ability to prepare reports to compare budget to actual.
- Ability to prepare reports outlining activity including, but not limited to the following transaction types:
  - Operating Expenditures.
  - Personal Service Dollar Expenditures.
  - Project Cost Information.
  - Appropriation Balances.
- Ability to support year-to-date financial Statements.
- Ability to support user defined account aging reports.
- Ability to support tracking history and vendor payment performance.
- Ability to generate accounts receivable and billing reports.
- Ability to support monthly financial statements.
- Ability to support year-to-date financial Statements.

Appendix B — Technical Requirements

Security and User Permissions

General

- System must be implemented with a security infrastructure and tools for protection of programs and data from intentional unauthorized access attempts as well as security breaches due to accidental causes.
- Ability to provide an efficient, flexible way to control and administer multiple levels of user access and privileges.
- Ability to provide the ability to customize an entry screen based on the security profile of each user.
- Ability to use a single sign on to access all authorized modules and functions.
- Ability to manage passwords, including, but not limited to password auto-generation, setting password policies, etc.
- Ability to provide various levels of security, including, but not limited to the following:
  - Database level security.
  - Module level security.
  - Functional level security.
- Ability to provide an easily maintainable level of individual access through system tables which are updated by the system administrator.
- Ability to provide audit trail records to show changes by user, workstation and time.
- Ability to maintain a log of unsuccessful login attempts.
- Ability to identify and authenticate the source of an interface execution. This includes insuring that unauthorized attempts to execute an interface or establish a connection are not allowed.
- Ability to encrypt any sensitive data that is transferred across the network.

Interfaces

General

- Ability to utilize industry-standard Application Programming Interfaces (API), adapters, adapter development kits and similar enterprise application integration (EAI) tools to facilitate application-to-application data transmission.
- Ability to integrate and interface the ERP solution with the following legacy systems:
  - Fleet Anywhere (FA)
  - Integrated Maintenance Management System (IMMS)
  - Project Management System (PRSM)
  - Transportation and Operation Project Support System (TOPSS)

  - Federal Financial Management Information System (FMIS)
- Ability to integrate and interface the AP implementation with the following legacy systems:
  - Integrated Right of Way System (IRWS)
  - Right of Way Utility Relocation System (RUMS)
  - Right of Way Property Management System (RWPS)
  - Aeronautics Database System (ADS)
  - Construction Management System (CMS)
- Ability to interface with existing legacy systems via various messaging mechanisms, including, but not limited to:
  - Publish/subscribe
  - Request/reply
  - Synchronous
  - Asynchronous
- Ability to interface systems in multiple modes, including, but not limited to point-to-point, one-to-many and many-to-many.
- Ability to support batch connections including file-based and non-file based interfaces to and from legacy systems. These batch interfaces will be executed at regular intervals such as hourly, daily, weekly, monthly, quarterly and annually.
- Ability to collect statistical information on interface executions, volume of data, number of records, number and type of errors.
- Ability to maintain audit trails for interface data such that data can be tracked from the destination system through the interface back to the source system.
- Ability to trigger an interface based upon near real-time events, including but not limited to the execution of a transaction or the modification or creation of data within the solution system or legacy systems.
- Ability to create interface messaging rules that can be configured for reuse.
- Ability to guarantee that data is delivered to all appropriate target destinations. This includes queuing and retaining data that is currently undeliverable due to a failure to connect to a target system and delivering the data when the connection to the target system can be established.
- Ability to guarantee sequencing of messages such that the data for a particular interface is transmitted and received in the same order in which it was sent.
- Ability to route a message based upon the data source, data structure, contents of the data or any combination of these elements.
- Ability to retain messages/data when an interface transaction fails such that the transaction can be reprocessed once the error has been resolved without the necessity to reprocess the entire message or dataset. However, some situations may necessitate the reprocessing of the entire message or dataset; therefore, this functionality also must exist.

Data Transformation and Translation

- Ability to convert the content and syntax of data in order to reconcile the differences between two systems.
- Ability to split a single message into multiple discrete messages.
- Ability to perform standard character set translation and conversion such as EBCDIC to ASCII.
- Ability to translate data from one standard message format to another standard message format such as IDoc to XML.
- Ability to reformat data elements by padding, truncating, modifying the justification, or any other similar technique.
- Ability to modify contents of data elements based upon codes/translation/conversion tables. This functionality needs to include the ability to perform a one-to-one lookup, a one-to-many lookup and a many-to-many lookup within the translation tables.
- Ability to set error thresholds for translation/transformation errors such that if a specific number of errors occur the execution of an interface will be aborted. This threshold value needs to be configurable for each specific interface.
- Ability to provide notification or alerts when a data translation/transformation error has occurred.

Data Warehouse/Business Intelligence

- Ability to process, store and analyze transactional data as well as historical data for trend analysis.
- Ability to create comprehensive reports utilizing data contained in the data repository combined with data from external sources (e.g., IFMS, external legacy systems, etc.).
- Ability to store and manipulate existing data from the following legacy systems:
  - Federal Projects Reporting System (FPRS)
  - Right of Way Management Information System (RWMIS)
  - Right of Way Management System (TPRC)
  - Earned Value Reporting System (EVRS)
- Ability to provide online access to the current year plus five previous years of all types of data retained in the system in the Data Warehouse, and shall provide archive capabilities thereafter.
- Ability to provide online access to data related to multi-year projects from the inception of the project through the end of the project. Project information must remain available online for a user-defined period of time after the completion of the project and shall provide archive capabilities thereafter.
- Ability to provide for users to selectively copy and/or archive system data to external storage media (e.g., CD-ROM, Digital Video Disk (DVD)) based on user-defined number of years or other user-defined criteria and the evolution of the external data storage industry.

- Ability to provide a secondary process to purge archived documents/data.
- Ability to enable a governing body or external party to be data stewards to ensure:
  - Data quality standards.
  - Data definitions/transformation processes.
  - Metadata management processes.
  - No duplication of records.
- Ability to leverage standard tools for managing and modeling of logical and physical data structures, extraction, loading and transformation of data from more than one data source into the data warehouse.

Accessibility and Reliability

- Ability to access any information via local access, remote access (i.e., district offices).
- Ability to provide concurrent user access to all modules/functions within the system.
- Ability to provide online secure access via browser technologies.
- Ability to provide the ability for authorized Caltrans remote administration.
- Ability to provide real time access to data for users on the LAN/WAN.
- Ability to adhere to reliability metrics agreed upon under a negotiated service-level agreement (SLA) with the software vendor given the current Caltrans technical environment.

Application

- Ability to provide a browser-based user interface for all system applications and modules.
- Ability for the client application to interoperate with Caltrans desktop software standards (e.g., productivity tools, virus protection, etc.).
- Ability to co-exist in an environment that includes multiple applications, including MS Office or its open source equivalent, and must provide interoperability with third-party applications.
- Ability to provide an Integrated Development Environment (IDE) or similar utility to facilitate modification the application to changing business needs.
- System should be developed using the Systems Development Life Cycle (SDLC)or other proven development methodology to ensure quality and reliability of the software.
- Ability to provide operating environments for development, test, training and production.

Audit

- Ability to provide the ability to generate an audit report for all records and transactions.
- Ability to provide audit-tracking reports for user access and usage logs.
- Ability to provide transaction logs to record executed functions to facilitate diagnosis and reconciliation of system errors.

Operating System

- Ability to support industry-standard operating systems (e.g., Windows, Unix, Linux, OS/390) for all client and server-side system components.

Help Functionality

- Ability to provide online, context sensitive help at the module, function/screen and field level.
- Ability to provide online user documentation that is indexed and searchable.
- Ability to provide help functionality at the system administrator level to facilitate common maintenance and administration functions.

Network

- Ability to operate within the existing telecommunications environment.
- Ability to support a telecommunications link between district offices and the database server at DTS.
- Ability to support industry standard network protocols (e.g., TCP/IP).

Import/Export

- Ability to import and export data to external stakeholders (e.g., EDD) in electronic format.
- Ability to provide the ability to import and export data into text flat files.
- Ability to copy and/or archive data to external storage media (e.g., tape, CD-ROM) based on user-defined selection criteria.

Backup and Archive

- Ability to provide native backup and recovery of critical system tables, files and other information according to negotiated service-level agreements.
- Ability to provide native functionality for archive and backup of the application.
- Ability to provide an efficient, flexible way to execute a backup or archive and retrieve the stored data.

Appendix C — Caltrans Core Business Process Descriptions

As noted in the body of the document, Caltrans' financial management requirements are organized into seven main financial functions, four of which are germane to the scope of this FSR, namely:

- Budgetary Control and Funds Management
- Accounts Payable
- Accounts Receivable
- General Ledger

Extensive business process reviews have been conducted during the preparation of the Caltrans Integration Study and the previous feasibility study reports noted in Section 3, Business Case. As such, the following discussion provides a general overview of the financial management business processes and select descriptions of representative business processes. More detailed process reviews are available from the previous reports. A detailed discussion of the method and systems used to accomplish financial functions is provided in Section 4.1.

Of particular note within all of the descriptions below is the complexity of process and system usage for functions that appear to be fairly straightforward in terms of activities and requirements. It is this complexity, much of it an unnecessary burden, that Caltrans hopes to alleviate through Project Alpha and the IFMS Strategic Plan.

Budgetary Control and Funds Management

The following section discuses business processes related to Budgetary Control and Funds Management functionality impacted by Project Alpha. The processes described are listed in the figure below:

Figure 29. Budgets and Funds Management Sub Processes

Processes covered:

- Determine Allocations
- Monitor Appropriations and Allocations
- Revise Allocations
- Determine State and Local Split of Federal Funds
- Reconcile Monthly Federal Funds/ Obligation Authority
- Prepare Budget to Actual Reports
- Prepare Quarterly Financial Reports
- Prepare Annual Financial Reports

Determine Allocations

This description illustrates the process used by Division of Budgeting (DOB) staff to provide Programs with information and reports that is used to help the programs determine how the allocations will be distributed. The DOB prepares the following documents for the Programs:

- Budget year program total spreadsheets.
- Current year listing of limited term positions that will expire June 30.
- Budget year listing of proposed new positions beginning July 1.

- Description of legislative changes.
- Target allocation package.

DOB manually prepares program control totals, and Programs subsequently allocate to sub function and return the information to DOB. Once Programs return allocation detail to DOB and the budget is approved, the data is loaded into the Budget Management System (BMS), the reporting system that monitors the Department's budget and allocations, and final allocations are distributed to divisions, programs, and districts.

Monitor Appropriations and Allocations

DOB regularly reviews appropriation and allocation amounts to determine whether any discrepancies exist. A file that contains PY and dollar information is downloaded monthly from BMS and manually manipulated in an Excel spreadsheet to generate data at the level of detail required by the DOB. Upon review of the data, if a discrepancy exists, DOB staff first will meet with the Budget Program Analyst and subsequently Program representatives to attempt to resolve discrepancies. DOB will then update the BMS file as necessary to reflect changes as required. If a discrepancy cannot be resolved, DOB staff prepares a narrative worksheet that records an explanation for the discrepancy.

Revise Allocations

District, Program and DOB staff request changes to their established allocations by preparing an ACR document. The ACR is a manual process which begins when a Program or District determines the need for a change in allocation and, if necessary, a Position Action Request form for PY changes. These documents are submitted to the Program Manager for review and approval. If not initially approved, the Program has the option to revise and resubmit the ACR.

The Program Budget Analyst receives the ACR and ensures the form is filled out correctly and conforms to budget control policies established by DOF. Once it has been verified that all the data has been provided the form is forwarded to the BMS Coordinator, who loads the ACR data into a pending file within BMS awaiting approval. The BMS Coordinator will also provide the Program Budget Analyst a printout of the input document. The Program Budget Analyst is responsible for obtaining approving signatures from the Office Chief of the Budget Monitoring Unit, and from the Branch Chief of the Governor's Budget Development Office.

Upon receipt of the original approved printout from the Program Budget Analyst, the BMS Coordinator will update BMS with the changes. Finally, the Program Budget Analyst distributes copies of the approved ACR to the program and districts. After the D of A completes month-end processing, the Division of Information Technology (IT) is responsible for initiating the transfer of data from TRAMS and State Controllers Office (SCO) to BMS via manual data input or file upload using a Microsoft Excel file. Allocation data contained on the ACR are manually entered into BMS.

Determine State and Local Split of Federal Funds

Federal Resources staff members within the DOB determine and distribute the amount of state and local split for federal funding to various units. Each year, the FHWA apportions sums authorized by the Highway Act for various programs across the States. Usually, FHWA knows

in October of each year what the apportionment for the states will be and the DOB receives the federal funding notification, assuming responsibility for determining the state and local splits of these funds. The DOB enters this funding data into an Excel spreadsheet and uses various funding formulas to determine the state and local split amounts. Both the federal funding notification and the worksheet containing the state and local split are distributed to the D of A, Local Programs Accounting unit, Programming, Planning and Local Assistance units.

Reconcile Monthly Federal Funds / Obligation Authority

On a monthly basis, Federal Resources staff members within the DOB generate fund usage and adjustment reports that are used to reconcile federal fund usage with obligation authority. Caltrans staff members prepare forms and send to FHWA to authorize the obligation of funds. FHWA prepares the transaction log that Office of Federal Resources (OFR) and D of A can access from the Internet.

Federal Accounting manually keys data from the FMIS transaction log into CBARS and generates a 610 report by fund that they send to OFR and Local Assistance. OFR is able to prepare the monthly federal aid report at the end of the month by comparing previous month end un-obligated balances with current end of month un-obligated balances and D of A's 601 Report with current month obligations. After all adjustments are calculated, the monthly federal aid report is sent to D of A and Local Assistance; DOB maintains spreadsheets manually for the balances. These reports are distributed to Local Program Accounting, Local Assistance, and D of A to reconcile federal fund usage obligations data with data maintained in their individual systems.

Prepare Budget to Actual Reports

DOB staff reviews and monitors the Department's allocations and expenditures against the approved budget. One way this is accomplished is by generating and analyzing Budget to Actual reports. To generate the Budget to Actual reports, the DOB staff downloads allocations, expenditures and personal services dollars data from BMS into Excel worksheets for manipulation.

Prepare Quarterly Financial Reports

In addition to the above reports, DOB staff generates quarterly financial reports that are based on projection data received from Programs. The process begins when the DOB runs quarterly appropriation, allocation, and expenditure reports from BMS and TRAMS. DOB staff then manually rolls up the data and download it into projection spreadsheets that are distributed to Program staff.

Program staff then develops expenditure projections and deliver to the DOB; some programs formulate projections with the addition of District input. DOB staff work with Program staff to clarify issues, if they exist, then generate and distribute quarterly financial reports.

Accounts Payable

The following are business processes related to Accounts Payable functionality impacted by Project Alpha. For clarity and to avoid overwhelming the reader in detail, some processes, - such as the processing of rental car payments and utility invoices, the tracking of freight charges, and the transfer of funds for No Warrant Claims- are not described and can be found in

the Integration Report and previous FSRs. Moreover, literally dozens of sub processes are used for exceptions and due to the decentralized nature of the Department. To facilitate understanding of the core functions and processes, many sub processes and exceptions are not described.

Establish and Maintain Vendor File

D of A, Office of Accounts Payable (OAP) captures data for new vendors and updates existing vendor information on an ongoing basis. Information is entered into the Caltrans Accounts Payable System (CAPS) and is then uploaded to TRAMS for all vendors except the following: refunds, legal, relocations, employees, advances, and damage claims.

The receipt of a vendor validation form or a STD 204 form (payee data record) triggers the addition or update of information. Information from the STD 204 is used by the subsystems to generate 1099 forms. Local programs and governmental agencies must also have a STD 204 form on file with D of A even though they are 1099 exempt. If OAP receives a STD 204 for a new vendor with no other forms attached (such as an invoice, validation form, etc.) the 204 is filed, and every thirty days for up to six months, OAP checks whether any additional forms are submitted. If after six months no other forms are received, the STD 204 is shredded. For existing vendors, minor updates are entered into TRAMS. Validation forms and 204 forms are returned to the originating areas only if they are incorrect.

Process Invoices

Invoices come from the Districts and vendors either by fax or through the mail. D of A receives, scans and indexes Shop Purchase Orders and Contract Delegation Purchase Orders (CDPO), the only two types of payables that are processed using CAPS. The primary function of CAPS is to automate the document processing and transaction recording required to process and pay CDPO and Shop bills incurred by the Department. Once received, a staff accountant audits the documents, the OAP scans and indexes authorization documents, receiving records and invoices, freight bills, and miscellaneous documents.

Identify, Research and Recover Duplicate Payments

The OAP also identifies duplicate payments made by the Department, and notifies the Office of Accounts Receivable (OARPA) to request refunds from vendors as appropriate. The process begins when OAP generates and analyzes payment reports from the Duplicate Payment Reporting System to identify potential duplicate payments. OAP analyzes the Duplicate Payment Report, which is generated 10 days after month closes, to identify potential duplicates. Once the potential duplicates are identified, memos are created and sent to the responsible area.

The area that receives the duplicate payment memo researches the items using the Claim Schedule and determines if it is an actual duplicate. If it is determined that the payment is an actual duplicate then recovery is made through deduction of dollars from future payments, setting up AR, or requesting a check or discharging. Accounts Receivable staff then either establishes an abatement in TRAMS and sends a bill to the vendor or, in some cases, recovers the duplicate payment by offsetting open invoices. OAP staff determines if the duplicate payment can be offset from the current invoice from the vendor. When re-payment is received from the vendor, Accounts Receivable staff clears the duplicate payment from ARS.

Process CAL-Card Invoices

For invoices related to the CAL-Card, a program that allows California state and local agencies to use the VISA card for making purchases of goods and services, handling of the invoice can be performed using Purchase Card Accounting and Requisition System (PCARS) or manually. PCARS automates the accounts payable process for the CAL-Card program and reconciles the file of transactions and monthly Statement of Account (SOA) file received from the bank. If there is a discrepancy, charges can be disputed or a request can be made to have bank errors corrected. If there are no issues with the reconciliation, the statement of account and all matched supporting documentation are forwarded to the Approving Official (AO). Upon approval, the documentation is forwarded to OAP, which audits the package and begins the claim schedule process for payment to the bank.

For manual processing, the cardholder receives the SOA from D of A. After the purchase request, invoice and SOA are reconciled by the cardholder, the documentation is forwarded to the AO for review and approval. Upon approval, the AO sends the documentation to D of A, which manually tracks unpaid items to ensure they eventually get paid.

D of A reconciles the documents against the Visa invoice and completes a NIA (Notification of Invoice Adjustment) form for the bank. D of A then keys payments into TRAMS and schedules payment. When D of A receives the warrant from SCO, the warrant and NIA form are sent to the bank. An Excel spreadsheet is used to list each VISA schedule (usually between 25 and 30 per month) sent to SCO along with warrant numbers after they are received from SCO.

Process Board of Control Claims

When a district, a vendor, an employee or the public believes they are owed payment they have not received, or have been denied, the claimant completes a claim form and submits it directly to the Board of Control. If the claim form is first received by the Special Services Branch within OAP, the branch will forward the form to the Board of Control. The Board reviews the claim and requests the appropriate department to submit a recommendation as to whether the claim should be honored. The recommendation is reviewed by the Board, which then makes the final decision regarding payment. If the request is denied, the Board notifies the requestor of the denial via a letter. If approved for payment, the Board submits a request to begin payment procedures. SCO prepares the journal entries to move cash and expenditures authority from Caltrans appropriations to Board of Control. Board of Control orders warrants to be issued from the Department of General Services Checking Account.

Process Refunds for Overpayments

When a refund request is received by OAP, TRAMS is accessed to retrieve the vendor number. The vendor number is then recorded on the refund request. A/R accesses ARS to determine if a dishonored check (DC) exists for the payee. If a DC exists, a determination is made as to whether the DC amount is less than or greater than the requested refund amount to OAP. For DC's that are greater than the refund amount, the refund is not processed, and the DC is offset in part, or entirely, as appropriate ARS. If the refund amount exceeds the DC amount, the DC is offset in ARS and a refund will be issued for the difference.

Track Sales and Use Taxes

Sales tax applies to purchases from California vendors, while use tax applies to purchases from out-of-state vendors. In-state vendors are required to add sales tax to their invoices and report it to the Board of Equalization (BOE). If a vendor is located out-of-state, the use tax will be manually calculated by Accounting and reported to the BOE. The OAP reports and remits sales and use taxes to the BOE. Because BOE collects local sales tax in addition to the state sales tax, OAP also must report the counties in which the sales (e.g. of plans, publications, maps) occurred. Once invoices are audited, OAP prepares accounting entries in TRAMS and schedules sales and use tax payments to BOE.

Determine and Record Prompt Payment Penalty

If payments are not made on time, OAP is responsible for automatically calculating and paying any penalties associated with that payment. The OAP determines that a vendor is due a late payment penalty because the payment date is more than 45 days after the date stamp on the corresponding invoice or the invoice data. CAPS calculate penalties automatically by the received date/invoice date. The penalty amount is then calculated based on the number of penalty days, and the penalty rate, which is based on the type of vendor. An interest penalty calculation form (STD 208) is then completed and included with the claim schedule that gets sent to SCO; interest penalty information is stored in an offline Access database. Payments to vendors made via direct pay through the SCO, or payments made via the revolving fund are subject to penalties for delayed payment.

Audit and Route Invoices for PO's and Contracts

D of A audits invoices for purchase orders and contracts for local and non-local assistance projects. For local assistance projects, invoices are logged in TRAMS and Local Programs Accounting Management System (LPAMS) is used to support Local Assistance Program accounting by tracking local assistance project status and appropriation dollars. When invoices are received by Local Program Accounting, they are audited against various criteria. Invoices initially go to the individual responsible for PO/Contract for approval and cost coding. Office of Financial Accounting and Analysis (OFAA) staff audit/review and a project manager approves invoices for proper service period, and sufficient fund allocation and encumbrance prior to payment.

Checks are made to determine whether the invoice is a duplicate, has already been paid, has an invalid project number, has an incorrect status, or is for an amount greater than authorized. If an invoice has already been paid, the invoice is filed and no action is taken. If the invoice is a duplicate or has an invalid project number, the invoice is returned to the local agency. Invoices are paid up to the authorized amount. Invoices that pass the initial audit are logged into TRAMS and are forwarded to the program accountant for audit. Invoices that do not pass the program accountant's audit are returned to the local agency.

For non-Local Assistance Invoices, OAP is responsible for auditing invoices for purchase orders and contracts that have been approved by the Divisions. When a vendor submits an invoice to the Department, invoices are reviewed and approved by the District or Program before they are forwarded to OAP for audit. If a payment package or invoice is incorrect, OAP returns the invoice to the District or Program for correction and then return to OAP. SCATS (Service Contracts Automated Tracking System), CAPS, and TRAMS are utilized heavily in this process. SCATS is used to monitor service contract payments and balances while CAPS and TRAMS

record transaction information required to pay bills incurred by the Department, based on the type of invoice.

If no contract exists, OAP checks the invoice amount against the purchase order (PO) or authorizing document amount. The invoices are coded, batch, scanned and indexed. If an invoice is received without approval, then the invoice is copied and the original is sent back to the individual listed on the purchase order. If the invoice amount exceeds the PO amount by more than ten percent, OAP requests a PO amendment. If the amount in excess is less than ten percent, or if the invoice amount equals the PO amount, an entry is made in CAPS or TRAMS and the documents are filed until the claim schedule is prepared.

Process SHOP and CDPO Payments

Using the Payment Processing Module in CAPS, Equipment SHOP and CDPO documents are sorted, and matched documents are verified. In CAPS payments are considered “matched” when the necessary components are scanned and indexed. Once matched documentation is found, vendor information is verified, the discount percentage is posted, sales tax is calculated and discount rates are entered in CAPS. If the invoice amount is not within the contract balance, the vendor is contacted. If the invoice amount is within the contract balance, CAPS deducts discounts and calculates payments. Detailed transaction data is entered in CAPS and transaction data is uploaded to TRAMS. When a transaction has been processed, the payment is ready to be reviewed and approved by the Supervisor.

Create Claim Schedules

When a District or Program receives goods that have been ordered, the invoices and supporting documentation are submitted to OAP for processing. The invoices, receiving record and contract/purchase order are matched against encumbrances in the system in TRAMS if necessary. A claim schedule number is retrieved and the transactions are entered into TRAMS. The claim schedule face sheet and remittance advice is printed from TRAMS, and the claim schedule packet is forwarded to the unit supervisor for review. The Office of Local Program Accounting keys local invoice payments directly into LPAMS which assigns a schedule number and downloads into TRAMS nightly. A claim schedule and remittance advice is then generated from TRAMS. After the supervisor reviews and signs the claim schedule, the claim schedule packet is special-delivered to SCO for payment on a daily basis.

Process Payments

Approved claim schedules are processed by the SCO, and warrants are produced and mailed to the vendor by the SCO, unless special handling instructions exist. The D of A attaches a Special Handling Request to a claim if warrants are to be returned to the Headquarters Cashiering Office rather than being sent to the vendor by SCO. For a claim schedule with special handling instructions attached, the warrant is mailed to the D of A or can be specially handled by SCO to Federal Express, or other parties. Special handling notice may also indicate that less than 6 vendors are included on a Claim Schedule.

Establish and Maintain Electronic Funds Transfer

Many payees, such as rail bonds, leases, and utilities are examples use Electronic Funds Transfer (EFT) to process payments. Caltrans establishes the EFT for payment by verifying the payee’s EFT Enrollment Form and entering the information into Contract Administration System (CASPAYS) and Progress Estimate Tracking System (PETS). TRAMS operations load EFT

enrollment form information into TRAMS for Local Programs. LPAMS downloads all vendor information nightly. When LPA staff processes disbursement transaction in LPAMS, vendor number selected determines if payment will go EFT or not.

TRAMS operations verifies the route and account information by sending out a letter to the appropriate financial institution. Once verified, TRAMS OPS will update TRAMS plus the control input form in the EFT Enrollment Form Database. SCO verifies the payment information in the Union Bank of California system for EFTs, approves the EFT payment and notifies the STO, which contacts the bank and wires the money to the payee.

Record Claim Corrections

The OAP is also responsible for making corrections to claims submitted for payment that have been determined to be in error by the SCO. SCO emails the liaison with “potential” claim cut and the liaison notifies the appropriate staff for correction and resubmission to SCO. It is given to the appropriate personnel for correction and resubmitted to SCO. If no discrepancy is detected, OAP works with the SCO to clarify the issue. For valid discrepancies, either the necessary supporting documentation will be provided to the SCO, or the claim is sent back.

Process Interagency Agreement Invoices

Through Interagency Agreement (IAs), Caltrans and other State agencies can undertake work for each other. Invoices from an interagency agreement can be paid one of two ways: through the standard payment process described earlier or through a direct transfer process. Using the direct transfer process, the other agency will send one copy of the invoice to the SCO and another copy of the invoice with supporting documentation to OFAA. The SCO transfers money from Caltrans to the other agency and OFAA will record the journal entry made by the SCO transferring the money from Caltrans to the other agency. Upon receipt of the invoice with District and agency billing code numbers, OFAA will record the expenditure to the District or Division in TRAMS. Upon District review of the invoice, invalid invoices are returned to Accounting for adjustment. Accounting staff then contacts the agency to request adjustment, and a notation is made on the journal entry for future correction.

Accounts Receivable

The following are business processes related to Accounts Receivable functionality impacted by Project Alpha.

Create and Maintain Customer File

Accounts Receivable staff creates and maintains customer file information in the Accounts Receivable System (ARS). The process begins when the D of A’s Office of Accounts Receivable (OAR) receives documentation on a new customer or receives updated or modified information regarding an existing customer. If a customer does not currently exist in ARS, the documentation received is used to establish that customer in ARS. Once the billing information being input has been verified for accuracy, ARS automatically assigns an invoice number. For customers who already exist in ARS, the information received is compared to data currently maintained in the system. Customer data is then updated as necessary according to the documentation received. Currently, the number of customer changes is not tracked and not all customers have a customer file.

Create Revenue Invoice

There are many types of revenue invoices, for signal and lighting, right of way, and other uses, but two examples are provided to convey the general mechanics of the process as representative of creation of other invoice types. This description illustrates the process followed by District employees and D of A staff to issue permits and corresponding invoices for encroachment and transportation permits.

Encroachment permits are required for any persons, corporations, cities, counties, utilities or other governmental agencies that intend to conduct any activity, other than by Caltrans, within, under or over the State Highway Right of Way. Issuance of encroachment permits is intended to help ensure the safety of both highway users and permittees, and ensure that the encroachment is compatible with the primary uses of the state highway system. There are three types of billing for encroachment permits:

- Cash Permits for private companies.
- Deferred billing permits for utilities and large work projects of private companies.
- Deposits.

The process begins when a permittee applies for a permit. The district permit engineer determines the fee necessary to issue the encroachment permit, which includes review of the permit and field inspection. The districts use a PC-based Encroachment Permits Tracking System (EPTS) to maintain permit information. Once the District Permit Engineer determines and collects the fee, a Cash State Report (CSR) is prepared. The deposit of cash then is made to the Bank of America. Headquarters Cashiering keys the CSR into ARS to record the deposit. Cash received is applied to the monthly cash invoice generated for the type of revenue received.

For invoices related to transportation permit fees, the Department charges a fee for the issuance of transportation permits to recover costs of administering the related regulatory provisions. These fees are collected in each District, and are deposited in local banks. D of A is responsible for entering CSR transactions into ARS. California is divided into two Transportation Permitting Regions, each of which uses a Microsoft Access database program for permit processing. The approximately 16,000 permits are issued on a per trip basis or via an annual permit option that allows the transportation unit to travel indefinitely during the permit period.

The permitting process begins when a transportation permit is prepared and district staff checks ARS to determine whether the trucking company has an account established with the Department. If not, a customer file must be created.

A debtor number can be assigned to a customer meeting certain criteria. A debtor number facilitates the permitting process by allowing the customer to request a permit using that number. Also, Accounting staff are able to charge multiple permits for a given customer under a single debtor file number, rather than entering data for each permit separately into ARS.

If a debtor is found in ARS, the District Microsoft Access database for Permits is updated with new permit information, and a daily debtor permit report is generated and submitted to the Accounts Receivable Revenue unit. Accounts Receivable staff then enters data into ARS to

generate the invoices. If a debtor number cannot be found, customer information first must be entered into ARS. The district cashier prepares a Cash State Report (CSR) and sends it to Headquarters Cashiering, who enters the CSR into ARS.

Reimburse

Reimbursement agreements are contracts wherein all or part of the capital or support costs of work performed or administered by Caltrans is paid by an entity other than Caltrans. Typically, these include but are not limited to contracts for cooperative work, privately funded highway improvements, freeway maintenance, inter-agency, inter-governmental and work for other entities. Before this type of work can begin, a signed, legally binding agreement with the external entity must exist. The D of A, Reimbursement Section is responsible for ensuring that all contractual financial language is in compliance with Departmental and State financial policies.

The reimbursement agreements originate at the district level. The District Cooperative Agreement Coordinator, the Caltrans project manager and the local agency contributing to the project funding prepare the agreements. Based on the project, costs are estimated for both support and capital outlay funds. The agreement identifies the project, the responsibilities, and performance measurement for each party as well as the funding sources and terms for payment of project costs. The Cooperative Agreement is the legal authority used by the D of A to obtain or remit payment for project costs.

The Reimbursement Section reviews the draft agreement for compliance with financial policies and procedures. Once the review is complete, the agreement is returned to the originator for any text corrections. The final agreement is sent to the Headquarters Cooperative Agreement Unit where it is reviewed and forwarded once again to the AR staff for final review and signature by the Reimbursement Section Chief. Then the agreement is forwarded to the Legal Division for final approval and signature.

In conjunction with the execution of the agreement, D of A sets up a contributor number in TRAMS. The contributor number is entered into TRAMS and the expenditure authorization (EA) is set up through COMS/EAS. The district establishes a project EA through the COMS/EAS system, which updates the TRAMS EA Master File. TRAMS then automatically update the Reimbursements Subsystem.

The reimbursement billing process begins once the agreement is executed. Usually terms of the agreement require an advance deposit, necessitating the Reimbursement staff to prepare an invoice for the advance as specified in the agreement or as estimated by the Reimbursement Accountant. Invoices are then prepared monthly, or as often as is specified in the agreement terms, for actual incurred expenditures. To assist in the determining construction project billable costs the Reimbursement staff utilize the Project Information System and Analysis (PISA) for the construction contractor payments and TRAMS. The monthly project expenditure reports are used to identify and bill for other construction and all support costs. Billing information is entered into ARS to generate invoices that are submitted to the contributors. The Department accepts cash, checks, money orders, credit cards or Electronic Fund Transfers (EFT) for payment of reimbursement invoices.

There are several databases that are used for the large contributors (ACTA, BATA, SMCTA and CCTA) to provide project level expenditure detail information in support of invoices. These are

stand-alone databases and are not supported by the Office of Fiscal Systems (OFS). Excel spreadsheets are used as backup documentation on all invoices that are sent to the contributor.

When a contributor submits a payment via EFT, Cashiering staff informs Reimbursements staff when funds have been wired to the bank. Reimbursements staff then prepares and sends a deposit slip to Cashiering.

Once Cashiering staff receives the deposit slip, a cash state report is prepared, and the payment is applied in ARS. The Reimbursement staff monitors invoices until it is paid in full. The project is monitored to ensure billings exceed expenditures.

Monitoring, reporting on, and closing reimbursement agreements are other key sub process within Caltrans. The contributors, especially the local tax measures, have detailed reporting requirements, which are unique to each contributor, to monitor the progress of the projects. Billing accountants require detailed information to help them monitor reimbursement projects, submit progress bills, and ensure that expenditures do not exceed collections or cooperative agreement maximums.

Upon project completion, a final progress payment voucher is issued and the Resident Engineer (RE) provides cost segregation information. If the project has federal funding, Federal Program Accounting clears undetermined expenditures in TRAMS and prepares a Project Cost Summary (PCS). If the project did not have federal funding, the AR Reimbursement section completes a PCS for contributor portion of project costs. Based on this information, Reimbursements staff determines whether to issue a final billing to the contributor or to request Accounts Payable staff to issue a refund for overpayment.

Reimburse Federal Highway Administration (FHWA)

District local assistance engineers input electronic E-76's (Request for Authorization to Proceed) into the Federal Aid (FADS) system. An E-76 does the following:

- Provides the authority to begin claiming reimbursement from the FHWA for eligible costs.
- Increases/decreases the project encumbrance in the LPAMS and the Current Billing and Reporting System (CBARS) to reflect the current authorized amount of funds.
- Is required to establish the federal portion of an EA; is consistent with program supplement, detail estimate and finance letter from the Division of Local Assistance Engineers.

FHWA's Financial Management Information System (FMIS) is updated with E-76 data. Once the agreement is finalized by FHWA, FMIS transactions are downloaded to LPAMS, P2000, CBARS, and to the Internet. A Federal Project/Agreement is set up in the CBARS.

TRAMS tracks the receivable through the EAs that were set up during the establishment of the encumbrance and the expenditure(s). Data is transferred to CBARS nightly via an interface between TRAMS and CBARS, selecting federally eligible expenditures, and then the federal bill batch is run. This process checks to see whether the federal bill amount is over the threshold. If it is not, a file is created in CBARS for federal bills to be billed and they are held until the

amount exceeds the threshold. If the federal bill is over the threshold, a federal bill is created in CBARS and sent to FHWA for payment. Information between FMIS and CBARS is reconciled monthly.

Record Payroll Receivables

Human resources (HR) works with employees to determine payment terms and notifies SCO of the payroll receivable information via email. Depending on the timing of the notification from HR and the stage of Payroll processing by the SCO, the employee's payroll is automatically debited or a receivable is established. SCO sends a tape to IT showing all payroll receivable transactions. IT inputs the tape into the Payroll Accounts Receivable and Reports (PARR) system, which establishes the receivable in PARR and generates several reports manually.

D of A receives the reports from SCO and PARR and prepares journal entries for payroll deduction/correction. If the receivable will be cleared by a payroll deduction, D of A receives notification of transfer from SCO and TRAMS and PARR is updated through separate manual input. If the receivable will be cleared by the collection of a check, HR waits for the check from non-state employees and sends the check to Cashiering.

There is a monthly reconciliation between PARR and TRAMS. PARR information from the last day of the month and fiscal month close information in TRAMS, reports, are used to perform the reconciliation.

Perform Collections and Process Receipts

When payments are received by either the District or by Headquarters, the monies are deposited. Payment is applied to the respective account in ARS, which then updates its invoice file and sends transactions to TRAMS for processing. If the payment received exceeds the invoiced amount, a refund will be issued. If payment is not received, past due notices are generated in ARS system and mailed to customers. If payment still is not received, the invoice is considered not collectable by the Department, and may be forwarded to an agency for collection. Not all past due invoices are sent for collection; the Department takes other actions, such as repossession of land, for example when excess land payments are not received.

Perform Daily Cashiering and Deposits

Payers begin this process by mailing or delivering payments to HQ Cashiering or District Cashiering, calling HQ Cashiering to pay their invoices with a credit card, or giving their credit card number to charge for plans and specifications to the staff at the Plans Counter in the Office of Engineer.

The Office of Engineer forwards the information to OFAA Assets and Reconciliation where they are processed through FileMaker Pro and VISA POS-Partner to charge the credit card. After the batches have been balanced and settled, Assets and Reconciliation prepares a deposit slip and forwards it and a copy of the batch report to Cashiering. Cashiering processes deposits in a number of easy that are not detailed here.

All deposit information must be captured in ARS, which then generates two copies of the CSR. The breakdown of payments per customer is performed by the staff at the program site. The Office of Financial Accounting and Analysis (OFAA) accountants at month-end post the payments for ODA and TODS to TRAMS at a summary level. HQ cashiering reconciles

collections recorded in ARS with Bank of America deposit statements, and State Treasurer Office records for centralized state treasury system account 081. Accounts Receivable reconciles ARS transactions and uploads to TRAMS.

Prepare and Record Remittance Advice

D of A cashiering staff prepares and records remittance advices (RA), which provide a breakdown by revenue source of money being transferred (or remitted) from the Centralized State Treasury System (CSTS) to Caltrans' State Highway Account (SHA), Fund 042. An Excel spreadsheet generates the remittance advice and remittance advice numbers are recorded in a logbook.

Cashiering deposits receipts into a Zero Balance Account (ZBA) at Bank of America. The receipts are recorded in D of A subsystems that are uploaded and processed nightly in TRAMS. The monies are automatically swept from ZBA into the CSTS Account 081 overnight. The following day, cashiering staff faxes a no-warrant remittance advice to the State Treasurer's Office (STO) that transfers the monies to SHA, Fund 042. Other D of A units initiate remittance advice activity that may or may not be accompanied with a check or warrant. Cashiering staff forwards the items to STO and retains copies of remittance advice(s). The respective units within D of A record appropriate accounting entries into TRAMS or TRAMS subsystems.

General Ledger

The following are business processes related to General Ledger functionality impacted by Project Alpha.

Establish and Maintain Coding Structure

Caltrans utilizes several sub process to add, delete or update the coding structure to record financial transactions. The process begins when a coding change or need is identified. Three different processes are used to implement coding structure changes

- C-memos to request system changes.
- T-memos to request TRAMS table changes.
- Problem Tickets to document production problems.

System changes are documented and requested through C-memos. The systems impacted by coding structure changes vary. For example, C-memos would be used to modify the EA coding structure in the COMS/EAS system or to modify the TRAMS edits. Additions, deletions and updates to TRAMS tables are documented and requested through T-memos. For example, T-memos are used to update the coding structure for Appropriation Symbols, General Ledger Accounts, Program Codes and Transaction codes.

When there is a proposal to add, delete or modify an account or any other part of the coding structure, D of A evaluates the request and determines whether a change to a system or a TRAMS table is necessary. If no changes to a system or TRAMS table are required the requestor is informed of the decision and/or solution.

TRAMS Operation staff in D of A maintain logs of C-memos, T-memos and Problem Tickets. For system changes TRAMS may or may not be the only system requiring update. TRAMS interfaces with many systems, either sending the update directly or receiving updates from a

subsystem. After the system or table is updated, Coding Manual changes are manually routed for review and approval prior to being updated on the Internet.

Perform Reconciliation for Bank Deposits

D of A performs daily remittance reconciliation and monthly deposit reconciliation. For daily Remittance Advice (RA) reconciliation, the Cashiering Office compares department deposit information with detail deposit information from Bank of America. If the Department has over remitted, a remittance correction letter is prepared and sent to the State Treasurer. If the Department has under remitted, the subsequent remittance advice will be adjusted. Bank errors are handled on a monthly basis and identified as part of the following monthly reconciliation process.

Cashiering prepares a monthly deposit reconciliation report that is submitted to the Office of Financial Accounting and Analysis. To prepare this report, information from source reports, and input balances are reconciled and manual adjustments are made as necessary. If an adjustment to a bank entry is required, a correction letter is sent.

Perform Overhead Assessments

The Department has multiple sets of overhead assessment rates that are designed to comply with different policy requirements, including:

- State Administrative Manual's 'Full Cost Recovery Policy' on reimbursed work for others projects.
- Senate Bill 45 reporting requirements on 'State Transportation Improvement projects' (a.k.a. Capital Outlay Support-SB45).
- Office of Management and Budget Circular A-87 on cost principles and standards for determining reimbursement cost with State, Local, and tribal governments on Federal projects.

Overhead assessment rates are updated annually by D of A with the development cycle beginning and ending at different times for each set of rates. The methodology for rate development, approvals, implementation, and maintenance varies with each set of rates.

D of A reviews regulations, statues, policies and procedures applicable for the particular set of rates. Each set begins with data gathering and analyzing for proper inclusion or exclusion to rates. Completed rates are submitted for review and approval in accordance with individual set requirements. Different sets of rates are implemented on different fiscal cycles. The Department's multiple sets of overhead assessment rate are applied by means of numerous methods. Some are applied monthly during month-end closing where as others are applied quarterly. Once month end processes are complete, manual adjustments of overhead assessment expenditures are made between programs and funds to comply with Budget requirements for rates.

Inter-district/Inter-fund Clearing

Inter-district/inter-fund numbers are used in a decentralized accounting system. Inter-district/inter-fund clearing numbers are used on accounting transactions where one half of the

transaction is posted in one work area or in one fund and the other half of the accounting transaction is posted in another work area or fund. An inter-district clearing number is required on all accounting entries that post to general ledger account 7972. To ensure both sides of this entry are being posted, a TRAMS H20 report is created to list any one-sided entries still un-cleared. An inter-fund clearing number is required on all accounting entries that post to general ledger account 7750. To ensure both sides of this entry are being posted, a TRAMS I05 report was created to list any one-sided entries still un-cleared. These reports are run from RAMIS then split up and disbursed to each area of the D of A which has any inter-district/inter-fund clearing numbers still un-cleared at month's end. These output reports are not reconciled to any subsystem or general ledger account.

Reconcile Information

Since the majority of the Core and Non-Core Financial Systems are interfaced with TRAMS and produce flat files that TRAMS updates, there is a significant amount of reconciliation between systems that must occur. Examples of internal systems involved in reconciliation activities are BMS, RPS, ARS, CBARS, NOW, LPAMS, TOPPS and PISA. Several systems from external entities such as the State Controllers Office, Franchise Tax Board, various power companies, Federal Highway Administration, Federal Rail Authority and Federal Transit Authority also interface with TRAMS.

There are also more than 1,200 edits existing in TRAMS which are applied against accounting entries to help ensure the validity of data posting to the accounting system. These include more than 650 edits that are applied against accounting transactions. The other edits are applied against table updates, error-correcting entries, and labor subsystem transactions.

Some of these edits are applied on-line, enabling the user to correct the problem with an accounting transaction before submitting it for processing in TRAMS. Only a limited number of edits are applied on-line, however; and even then the user is allowed to "force" the entry past the on-line edit and submit it for processing in TRAMS. A more thorough discussion of TRAMS on-line editing is contained in page III-1 through III-2 of Chapter III, Volume III of the TRAMS Procedures Manual.

TRAMS error and edit processing occurs in batch. Only field errors are identified online. TRAMS also produces batch error reports that are used by D of A staff to identify and make corrections to TRAMS. Errors are held in an error file, which needs to be cleared when the transactions in errors are cleared in TRAMS. Errors not corrected during the on-line entry process are caught during the batch processing which takes place overnight. Transactions that do not pass all the edits are placed in an error suspense file. Reports, both standard and ad hoc, are run against this file, and accountants use these reports to identify the problem with each transaction so that it can be corrected.

Some transactions are rejected in TRAMS and appear on a "rejection" report, the FIS800-1 report, but they are not really lost. The transactions that generated these rejected transactions are on the suspense file – they appear on the FIS800-2 report and when these originating transactions are corrected, they re-generate the generated transactions. Accounting staff makes use of the FIS800 reports to analyze the transactions that are in error and to correct them. For a thorough discussion of the error correction process, please refer to the attached Chapter VI of Volume III of the TRAMS Procedures Manual.

Perform Reconciliation of TRAMS' Subsystems to TRAMS (Non-Core Subsystems)

This description illustrates the process followed by staff from various offices to reconcile data in TRAMS to data in their respective subsystems.

Numerous non-core subsystems have been created outside of TRAMS to assist users in the monitoring of specific functions as the need arose. Many of these non-core subsystems perform operations that are directly linked to TRAMS processes. This link necessitates that data transfer is complete thereby maintaining the integrity of the TRAMS database. Additionally the link provides for data integrity for all reconciliations between TRAMS and the non-core subsystem. Generally, reports are generated from the non-core subsystem and compared to respective TRAMS data reflected on various TRAMS reports. Any reconciling items are identified and documented in excel spreadsheets. Adjustments are made in either the TRAMS system and/or the non-core subsystem as appropriate.

Usage Reporting System (URS) subsystem

The primary function of the Usage Reporting System is to post into TRAMS the possession (rental) charges of the Department's Division of Equipment fleet users/renters. Ad hoc TRAMS reports are compared to URS generated reports to ensure accuracy in data transmittal. URS reports are generated weekly from a record file created after a batch of transactions have posted to the system. Subsequently, the file creation occurs and ad hoc TRAMS reports are produced that match the period covered by the URS file. These two reports are then reconciled. Errors are identified during the reconciliation and documented using excel spreadsheets. Any discrepancies (reconciling items) are researched with appropriate staff and adjusted in the applicable system as appropriate.

Perform Monthly General Ledger Reconciliation (TRAMS to Rail Bond Access Database – Fund 703 – Proposition 116)

This description illustrates the monthly process followed by the Fund Manager for Fund 703 – Proposition 116 to reconcile data in the Rail Bond Database to TRAMS and the State Controller's Agency Reconciliation and the Fund Balance Reconciliation. Monthly, TRAMS current year expenditures and un-liquidated encumbrance balances are reconciled to the Rail Bond Accounting System database status report. TRAMS and the Rail Bond Accounting System database current year expenditures and appropriation balances are reconciled to the State Controller reports. When reconciling items exist between TRAMS, the Rail Bond Accounting System database balances, and State Controller's reconciliation reports, they are identified by PUC Section and EA, and adjustments are made in TRAMS and/or the database and State Controller's as necessary. Reconciliations and workpapers are filed upon completion.

FUND 703 – Proposition 116 is not a Caltrans Fund. Caltrans performs the expenditure accounting for Proposition 116 projects only. The Department of General Services performs the proprietary accounting, which includes the required year-end financial statements, and accounting for the support costs payable from Proposition 116 proceeds.

Money is continuously appropriated to the California Transportation Commission (CTC), without regard to fiscal year, for allocation for grants to itself, Caltrans, the Department of Parks and Recreation, and to local agencies. Projects funded with Proposition 116 are not initially

programmed in the State Transportation Improvement Program, but amended to it. These expenditures are not subject to the North/South split and county minimum requirements as Proposition 116 specifies by Public Utilities Code (PUC) Section where the money is to be spent.

CTC Resolution allocates money for specific projects to local agencies and Caltrans. A bond sale is conducted by the State Treasurer's Office to finance the project costs. The bond sale is not projecting specific. A Fund Transfer Agreement (FTA) is entered into between Caltrans and the local agency. This document is used to establish a project encumbrance and refers back to the CTC Resolution. The FTA amount may be less than the CTC Resolution.

This fund has been designated by the State Controller's Office as the Clean Air and Transportation Improvement Fund (703) budgeted under the California Transportation Commission. The project accounting for this fund is centralized with all claim schedules prepared manually by D of A, Office of Financial Accounting and Analysis, Public Transportation Funds section. Caltrans has entered into a Memorandum of understanding authorizing the State Controller to pay from Fund 703.

Perform Monthly General Ledger Reconciliation (Rail Database to TRAMS and SCO Fund Balance – Prop 108 – Fund 756 only)

This description illustrates the monthly process followed by the Fund Manager for Fund 756 – Proposition 108 to reconcile data in the Rail Bond Database to general ledger data in TRAMS and then to the State Controller's Office.

Prior to reconciling to the State Controller's Office, the Rail Bond Accounting System Database is reconciled to a TRAMS Ad Hoc Report disclosing current year expenditures and un-liquidated encumbrances. The Rail Bond Accounting System provides a monthly status report disclosing the current year expenditures and the appropriation balance.

To assist in the reconciliation process, the State Controller's Office provides two on-line reconciliation reports, the Agency Reconciliation Report and the Fund Reconciliation Report. The Office of Financial Accounting and Analysis prints and distributes these reports to the respective manager by the 5th of each month. By the 10th of each month, TRAMS generates the general ledger reports for the Fund Manager to analyze against the SCO agency/fund reconciliation reports. Once all necessary documentation are gathered, a reconciliation is prepared on an excel spreadsheet. The analyst compares the data on the SCO reconciliation reports to TRAMS. Any difference requires an adjustment to the Department's accounting records and/or the State Controller's records. Once the reconciliation is completed and the "adjusted" TRAMS balance is the same as the "adjusted" State Controller's balance, the fund manager prepares a certification of general ledger account reconciliation (schedule III) that is signed by the functional manager. A copy of the Schedule III is provided to the unit responsible for maintaining the list of required general ledger reconciliations for the D of A. The reconciliation workpapers are then filed.

Perform General Ledger Reconciliation (ARS to TRAMS)

These descriptions illustrate the daily and monthly processes followed by Accounts Receivable staff to reconcile data in the Accounts Receivable System (ARS) to data in TRAMS. ARS is the system that processes the majority of the Department's Accounts Receivables.

Daily, data from source documents is entered into ARS. Reconciliation report FIS711 is generated from TRAMS and R604 from ARS. Data in the two reports are reconciled to identify any differences. In addition, several reports are generated that detail the TRAMS edit activity for transactions that pass ARS edits, but fail TRAMS edits. Errors are corrected via the error file or, adjusting entries are manually posted to TRAMS. The adjustments or correction in ARS will be downloaded to TRAMS. Then the TRAMS error file will the “cleared” based on the adjustments to the ARS. FIS 048 report used to reconcile AR GL to G01 by Fund subsidiary account.

Monthly, numerous reconciliation reports are generated from TRAMS after ARS and TRAMS monthly processing is complete, approximately the 6th and 12th of the month respectively. Reconciliation reports are run in ARS after completing the month-end close. When the adjusted balances are compared, and differences are identified, the reconciling items are documented on a worksheet. Adjusting/correcting entries are made to TRAMS and/or ARS, as appropriate. If no adjusting entries are necessary, the reconciliation work papers are filed.

Perform General Ledger Reconciliation (CBARS to TRAMS)

This description illustrates the monthly process followed by Accounts Receivable staff to reconcile data in the Current Billing and Accounts Reporting System (CBARS) to data in TRAMS. CBARS captures federally eligible costs from TRAMS for billing to the Federal Highway Administration.

Monthly, several reconciliation reports (federal aid billing reports) are generated from TRAMS, and reconciliation reports are run in CBARS. When the adjusted balances are compared, and differences are identified, the reconciling items are documented on a worksheet. As appropriate, manual adjusting entries are made to TRAMS and/or CBARS. If no adjusting entries are necessary, the reconciliation workpapers are filed.

Perform General Ledger Reconciliation (ELMS to TRAMS)

This description illustrates the monthly process followed by Right of Way Accounting Section staff to reconcile data in ELMS to data in TRAMS. ELMS is the Excess Land Management System that is used to maintain records of all parcels identified as excess land.

Monthly, reconciliation reports are generated from TRAMS. Report SO1 from TRAMS provides the ending balance in each district for the excess land subsidiary account. A Monthly Excess Land Reconciliation form is completed for each district. This form provides a record of any differences between the two systems so they may be researched. Manual adjusting entries are made to TRAMS and/or ELMS as necessary.

To ensure that the excess lands inventory (ELMS) agrees with the fiscal records (TRAMS), a monthly reconciliation is prepared. The monthly reconciliation of excess lands is the comparison of the Excess Land Inventory Account, Fund 042, General Ledger 2310, Subsidiary Account 00781000 on the TRAMS S01, “Report of Subsidiaries on File” and the grand total of the RWM 863-B, “Inventory of Ordinary Excess Lands and Rescinded Routes Parcels”. Right of Way Accounting Section completes the reconciliation within thirty days of the available reports.

Perform General Ledger Reconciliation (RFS to TRAMS)

This description illustrates the monthly process followed by Office of Accounts Payable staff to reconcile data in the Revolving Fund System (RFS) to data in TRAMS. RFS generates a series of reports that provide D of A staff with the necessary information to reconcile and manage the Revolving Fund Account. Monthly, reconciliation reports are generated from TRAMS and RFS. When the adjusted balances are compared, and differences are identified, the reconciling items are documented on a worksheet. As appropriate, manual adjusting entries are made to TRAMS and/or RFS. If no adjusting entries are necessary, the reconciliation workpapers are filed.

Perform General Ledger Reconciliation (RWPMS to TRAMS)

This description illustrates the daily and monthly process followed by Accounts Receivable staff to reconcile data in the Right of Way Property Management System (RWPMS) to data in TRAMS. RWPMS is the system used to maintain inventory and financial information for property owned by the Department.

Monthly, numerous expenditure reports (revenue, abatement, and reimbursement) are generated from TRAMS and RWPMS. The reconciliation compares the RWPMS accounts with the ending balance recorded in TRAMS and identify the dollar amount of any existing discrepancies. These differences are the reconciling items and are documented on a worksheet. As appropriate, adjusting entries are made to TRAMS and/or RWPMS. After adjusting entries are made or no adjusting entries are necessary, the reconciliation work papers are filed.

Generate Reports for FHWA

Caltrans has FHWA reporting requirements tied to funds received. Before the final reports can be generated, ad hoc reports are first run from TRAMS data. The data from these reports is analyzed, and subsequent revenue and expenditure reports are manually generated. FHWA reports are completed by D of A and submitted to the Office of Transportation Information Systems. That office compiles the Caltrans revenue and expenditure data along with data reported by other agencies and submits the final package of financial reports to FHWA.

The department's data for the FHWA reports is generated from RAMIS reports, year-end financial statements and reports for the state funds, TRAMS Q25 microfiche reports for the same funds, and SCO agency reconciliation reports. A number of work/spreadsheets are prepared to compile and restate Caltrans' receipts data by sources and revenue types per FHWA guidelines and definitions.

Perform Month End Close

The month-end closing processes in TRAMS are automated processes performed by IT personnel. The TRAMS Operations Section in OFAA works with IT to create the calendar of activities for each month. This helps to ensure that the correct automated programs are processed, that they are processed timely and in the proper sequence with respect to each other.

Many subsystems and automated processes internal to TRAMS are run as part of month-end closing. They must be run after the normal monthly transactions are processed but before the month closes altogether. In addition, indicators in certain TRAMS tables, such as the

Organizational Control Table, are changed at critical times during month-end closing – the month closes gradually, with different transaction types being closed at each indicator change. Working closely with IT, staff ensures that the processing is scheduled and implemented according to D of A's needs.

On the first working day of each month, "rollover" occurs. This process includes updating the financial fields to reflect the change in month (e.g., dollar amounts in the "current month" fields are moved to the "prior month" fields), and then the TRAMS master files and tables are backed up, and monthly versions of files are created. Encumbrance Refresh and recalculations programs are run as well. This process is very labor intensive on the part of IT Data Guidance staff.

The year-end closing process in the D of A begins in the spring, when year-end closing instructions are reviewed and updated by accounting staff. The critical dates are set for the year to be closed, and responsible accounting staff is identified for the critical activities.

The year is closed in stages, with different transaction types being cut off with each successive stage. This staged closing process is done via changes to the Organizational Control Table, similar to the way the month is closed in stages. Certain indicators are changed at critical times to indicate what set is being processed, so that TRAMS will know which T-Codes are allowable. Working closely with IT ensures that the processing is scheduled and implemented according to D of A's needs.

Many subsystems and automated processes internal to TRAMS are run as part of year-end closing. This is similar to the closing process for month-end, except that the entire process is more complex. Before moving to the next set, reports from the set just closed must be reviewed and approved by D of A staff.

Perform Reconciliation with State Controllers Office

The SCO provides two monthly reconciliation reports by the third working day after the calendar month closes. One report is called the Agency Reconciliation Report and the other is called the Fund Reconciliation Report. The Agency Reconciliation Report is used to reconcile the Controller's appropriation balance to the D of A appropriation balance. For each account, this report displays the beginning balance, transactions that occurred during the month, and the ending balance. The Fund Reconciliation Report is used to reconcile the General Ledger account balance with like balances maintained by SCO.

The OFAA prints and distributes the State Controller's reconciliation reports for the D of A by the 5th working day of each month to the respective Fund Managers. By the 10th of each month, TRAMS generates the general ledger reports for the Fund Manager to analyze against the SCO agency/fund reconciliation reports. Once all necessary documentation is gathered the reconciliation is prepared. The analyst compares the data on the SCO reconciliation reports to TRAMS. Any required adjustment to the Department's accounting records and/or the State Controller's Office records is performed at this time and noted on the reconciliation as a reconciling item. Once the reconciliation is completed and "adjusted" TRAMS balance is the same as the "adjusted" State Controller's balance, the fund manager is required to prepare a certification of general ledger account reconciliation signed by the Functional Manager.

Prepare Financial Statements

D of A staff prepares all financial statements that are required by the SCO and the Bureau of State Audits (BOSA). Financial reporting is largely an effort to assess financial performance, that is, how well or how poorly the government performed with money entrusted to it. Government Code Section 12461.2 authorizes SCO to withhold any or all-operating funds from a department if that department fails to submit complete and accurate financial reports, as required in the State Administrative Manual (SAM), to SCO.

Accounting consists of recording, classifying and summarizing the transactions of the entity. Reports are prepared by the entity from accounting records and provide the financial operation in relationship to the budget. Accounting receives financial information from the SCO and manually re-keys into Excel spreadsheets. RAMIS and subsystem financial data is manually keyed into spreadsheets.

Pre-closing trial balance and subsidiary reports are generated from TRAMS. Additional subsidiary reports for payables and receivables are generated from CAPS and ARS respectively. The post-closing trial balance is created in TRAMS and numerous other reports are received from various sections within the Department. Accrual worksheets are created in and Excel spreadsheet. A preliminary set of financial statements is complied. Manager's and/or supervisors in the D of A review the reports. Based on the review, all necessary financial report updates are completed. The financial statements are then printed and hand-delivered to SCO and BOSA.

Record Labor Costs

SCO electronically sends payroll data to the Labor Distribution System (LDS) and to PARR. LDS processes monthly and weekly Time Sheet and Maintenance Daily Reports and creates accounting transactions as input into TRAMS. PARR tracks employee receivables due to payroll.

If the appropriations are sufficient to cover the total monthly labor costs, payroll data is balanced against the SCO reports; and copies of the report are filed. Any required corrections identified during the balancing of the data to the SCO reports, are sent either to SCO or made in TRAMS by D of A staff. Accounting staff must work with Budget staff to augment the necessary appropriations if they are insufficient.

Labor transaction batches which successfully go through the edits from TOPSS and Integrated Maintenance Management System (IMMS) are sent to LDS for processing. LDS will cost out labor at the "loaded rate" (the monthly salary plus the Payroll Reserve Assessment Rate) and create the accounting transactions for input into Trams with Batch Type M (for Maintenance labor) and L (labor time sheets). Error transactions from IMMS and TOPSS are posted to LDS in two separate error files- Maintenance and Labor.

Corrections are made by District Maintenance personnel and Trams Operations Labor Expenditure Section in D of A. Error transactions from TRS, IMMS, and Paper timesheets posted to the LDS are in two separate error files – Maintenance and Labor. Corrections to these error file transactions are online and made by District Maintenance personnel and Labor Expenditure Section in D of A. Error corrections for TRAMS transaction are made by Labor Expenditure Section in D of A.

PARR downloads SCO tapes and prepares the monthly "Payroll Expenditure Report" with the amounts of gross salary and employee benefits which is made by the SCO on behalf of Department to be paid to other parties. Once the amount from PARR is balanced against the amounts from SCO'S CLO, the payroll expenditure from PARR is manually entered into TRAMS by Labor Expenditure Section in D of A.

Payroll variance is defined as the difference between what SCO pays for employees' salaries and benefits and the labor expenditure recorded in TRAMS. Through the process of payroll variance distribution, based on pre-determined distribution rations, the payroll variance results are distributed to Districts and Programs in an EA.

The recording of Salaries, Wages and Benefits as costs within the Accounting system and the subsequent distribution of those costs, as expenditure to Projects are two distinct and separate processes. Salaries and Benefits are recorded in the General Ledger Account Number 9011, Expenditures – Payroll Reserves and Variance – TRA. Project Labor Expenditures are recorded in General Ledger Account Number 9000, expenditures.

SCO is responsible for adding or deleting employees from the central payroll file as well as changing employee pay status upon the direction of Caltrans Personnel. SCO also processes payroll data received from the department, writes and disburses all payroll warrants, and records payroll expenditures in the individual department accounts maintained by the Controller.

The amounts of SCO Salaries, along with additional Benefits are transferred electronically from the SCO and downloaded into the PARR (Payroll Accounts Receivable Reporting) database monthly. These costs are summarized in the database and the Labor Expenditures Section posts the summarized transactions to GL 9011. These additional Benefits include such items as Life Insurance, Flexible Benefits, Salary Bonuses, OASDI, Retirement Contributions, Medical, Dental and Vision Care Insurance Premiums, Industrial and Non-Industrial Disability payments.

A few other types of Benefits are paid through the Claim Schedule process. These include Passes and Vanpool Rider Subsidies, Unemployment Compensation Payments, and State Compensation Insurance Fund Payments. All of these costs add up to the "Total Amount Paid for Employee Salary and Benefits."

SAM Section 8740 describes the methodology for determining hourly rates when billing for labor. Caltrans conforms to the requirements in these two sections by developing an hourly additive rate (the Payroll Reserve Assessment Rate) that is factored in with an individual employee's salary to generate expenditures to Projects at an hourly rate that fully accounts for Salary, Wage and Benefit costs. This rate is developed annually and monitored monthly to ensure its accuracy. Ratios are also established based on estimated leave usage for the approved leave types: Vacation, Sick Leave, Military Leave, Jury Duty, Bereavement Leave, Annual Leave, Personal Leave, Holiday Credit, Holiday Informal Time Off, and Personal Holiday. The composite of these ratios makes up the Combined Payroll Reserve Assessment Rate. The rate will be raised or lowered accordingly should there be changes to the costs of the estimated items.

All departmental employees record their productive and non-productive time (leave usage) in one of two 'front-end' or feeder systems – Online-Time or the Integrated Maintenance Management System (IMMS). The collected hours are then passed to the Labor Distribution Subsystem (LDS) where they are edited and processed. Once the transactions have

successfully cleared the LDS edits, they are passed to TRAMS where additional edits test transaction validity and correctness. Any errors that are generated are researched and corrected by the Labor Expenditures Section staff.

As with any rate-driven recovery process, there are variances. Payroll variances are distributed to the Programs and Funds. This has been done as both a part of the year end closing process and on a monthly basis.

Respond to Financial Information Inquiries

A requestor, such as an internal or external auditor or project or program manager, can submit an inquiry for information via phone, fax, e-mail, and regular mail or in person. Some areas of D of A have developed forms for the users to document their requests. Others simply maintain log sheets of their requests, while others maintain no record of the requests. Many requests for financial information follow and are not tracked. TRAMS data is not readily accessible or easily interpreted by most non-accountants, therefore the D of A staff are routinely contacted to provide financial information. The majority of the requests involve expenditures and/or encumbrances, however; D of A staff occasionally is asked to provide information on revenues, transfers and other financial activity.

It is extremely rare when standard reports exist that satisfy these requests. In most cases the time required to collect the data from standard reports is cost and time prohibitive. For this reason, staff must rely on RAMIS to extract data from TRAMS. Requests vary from very specific to general in nature. Most requests are for information about one or more of the following types of transactions:

- Operating Expenditures
- Personal Service Dollar Expenditures
- Encumbrances
- Project Cost Information
- Appropriation Balances

When new requests for information arrive, D of A staff assists users by identifying existing and potential sources of information, queries and reports. When an existing query, report, or microfiche is identified and available, the user is provided with that information. If the initial recipient of the request cannot find an existing report, the request is forwarded to the supervisor, then the system analyst, then the IT analyst, until resolved.

Similar data is available from a large variety of sources, many of which are used for reporting purposes. Many types of expenditures are provided to TRAMS from feeder subsystems, such as SVS, TOPSS, PISA, IMMS, EAS-COMS, and others. Data can often be extracted from these subsystems to satisfy specific reporting needs. Once these transactions are passed from the subsystems to TRAMS, several additional transactions may be generated that post to as many as five or six different Financial Files with different levels of detail. Occasionally, data is passed from TRAMS back to these subsystems with “enhanced” financial data.

There have been some applications developed to assist with reporting, most notably the Budget Monitoring System (BMS). BMS is built with RAMIS and provides Appropriation, Allocation, Expenditure and Encumbrance information. Other databases that are seeing extensive use are the Budget Allocation System (BAS), a Microsoft Access database that is available statewide and a Filemaker Pro Database that resides locally on individual users' computers known as "TRAMS-lite." The data in these applications is extracted directly from TRAMS Financial Files, resulting in these subsets, that data can be gleaned from with relative ease and quickness.

The Labor Expenditure Section is one area in D of A that provides several monthly reports that are distributed electronically to various users throughout the Department. There are a few other reports produced by the Division that are distributed monthly as well, including reports on Encumbrances and Travel Expenditures. When the TRAMS Operations Section receives new requests for reports, they develop programs specifically for the requestors that generate the reports. They then provide the JCL, RAMIS program (and a brief training) to the requestors in order to allow them to run the reports themselves when needed.

Budgetary Control and Monitoring

Reports for budgetary control and monitoring are manually prepared. The sources of the information are primarily gathered from SCO Fiscal System Reports and TRAMS then manually enter onto different spreadsheets. The reports are distributed to D of A manager's and DOB. Budget uses the reports provided to generate reports to CTC. The forecast for SHA/TRA is 6 months rolling forecast with the collaboration from Budgets. The forecast is based on historical data plus projections provided by Budgets such as amounts of FTF reimbursements from AC conversion. Any other available information is incorporated into the forecast.

Prepare Plan of Financial Adjustment

D of A staff prepares the Plan of Financial Adjustment (PFA) and the advance to Transportation Revolving Account (TRA) from the ultimate fund. PFA is defined as a plan proposed by the Department and accepted by the SCO to permit the Controller to transfer moneys from one fund to another within the Department.

The TRA was established July 1, 1977 under Section181 of the Streets and Highway Code to pay for the departmental expenditures. It allows one payment to be issued to the vendor for an invoice that may have multiple funding sources. To ensure an adequate cash balance is maintained in TRA to promptly pay for expenditures incurred by the Department the TRA staff will initiate the advance process at the beginning of each fiscal year after the Governor's Budget is signed.

Each month after the expenditure file is reconciled by TRAMS Operation, all ultimate fund managers run expenditure RAMIS reports to determine the amount to be reimbursed to TRA for expenditure paid for by the fund and submit PFA to SCO for the transfer.

The Controller transfers the funds upon receipt of a letter from the Department stating the amount to be transferred. The PFA is prepared after month-end TRAMS files have been reconciled. Data from these reports are entered into spreadsheets, which is then reviewed and adjusted by accounting staff. Once all adjustments are made, the spreadsheet is reconciled. If variances exist, the spreadsheet is corrected. The worksheet is printed and prepared for approval with the PFA letters. The General Ledger Supervisor approves the PFA letter and

forwards the original to the SCO. SCO makes the necessary journal entries and forwards them to the Department for update in TRAMS.

Appendix D — Caltrans System Acronyms and Descriptions

A&E Database	**Architecture and Engineering Database.**
ADS	**Aeronautics Database System** is the airports inventory system.
AMI	**Asset Management Inventory.**
ARPS	**Automated Remittance Processing System.**
ARR	**Accounts Receivable Reconciliation.** The COBOL portion of the Accounts receivable System (ARS) performs invoice reconciliation between the ARS and TRAMS systems.
ARS	**Accounts Receivable System.** Processes the majority of Caltrans' accounts receivables: billing, collection, invoice and installment bill processing, invoice aging, queries and reporting.
AVL	**Active Vendor Listing** reports vendors doing business with the Department.
BAS	**Allocation Tracking System** provides report of statewide budget allocations.
BBA	**Bridge Bid Analysis System** is used as a tool in estimating new bridge development by accessing past records of installed bridges (PISA subsystem).
BEES	**Basic Engineering Estimating System** is a subsystem of Project Information System and Analysis (PISA). The PISA systems track the detail of project costs through the estimating, bidding and progress pay phases.
BFI	**Bulk Fuel Invoices Payment System** performs pre-audit steps by matching records, calculating discounts, and preparing TRAM batch input documents.
BID	**Bid Opening System** facilitates verification of bids returned by construction firms for contracts advertised and administered by the Department (PISA)
BMS	**Budget Monitoring System** is an ad hoc reporting tool for allocations, expenditures and encumbrances.
BMS	**Bridge Management System**
CADb	District 4 data collection and reporting for the District Construction Program.
Capital	Capital Allocations Database records approved allocation for all capital outlay projects.

CAPS	**Caltrans Accounts Payable System** tracks invoices submitted from vendors and generate checks to vendors. It also interfaces with SCO and includes document management.
CAS	**Construction Administration System** supports construction contract administration by tracking contract items, CCOs, funding, contractor payments, etc., and initiates a voucher to the State Controller to pay contractors for contract work completed.
CATS	**Contract Administration and Tracking System** tracks contracts and provides canned or ad hoc reports.
CBARS	**Current Billing and Reporting System** captures federally eligible costs from TRAMS for billing to the Federal Highway Administration.
CBAS	**Contract Boilerplate Assembly System** will process all MS Word form templates used by contract analysts. Depending on the contract type and based on the information set up in the configuration file, CBAS will build a contract with all required clauses automatically.
CCIS	**Construction Contract Information System** tracks individual disputes throughout life of contract.
CCS	**Centralized Conference Section.**
CDPOS	**Contract Delegation Purchase Order System** creates purchase orders and purchase estimates.
CFPIS	**Completed Federal Project Inventory System** tracks the status of the final voucher and project close-out activities.
CLELR	Right of Way **Claim Log and Excess Land Transactions Reporting System.**
CLMS	**Construction Land Management System.**
CLS	Accounts Payable **Control Log System.**
CMS	**Construction Management System.**
COMS/EAS	**Capital Outlay Monitoring System/Expenditure Authorization System** expedites, track and processes expenditure authorizations and encumbrance posting.
COSOAR	**Capital Outlay Support Overhead Assessment Rates** provides SB45 rate calculation and generates entries to TRAMS (replacement system in development).
CSTS	**Contracts Status Tracking System.**
CTIFS	**California Transportation Infrastructure Funding System.**

CTIPS	**California Transportation Improvement Project System** is the single data source for MPO/STIP data statewide. MPOs and Caltrans staffs enter project information for processing with the CTC and FHWA.
CUC	**Construction Unit Cost System** maintains contract item descriptions and contract item cost data.
DCP	SCO Daily **Direct Claims Paid System.**
DPRS	**Duplicate Payment Reporting System** designed to detect the possibility of duplicated payments that may have been paid to a vendor.
DTS	**Direct Transfer System.**
EBR	Electronic **Equipment Budget Request System** is used to order replacement fleet vehicles. It tracks and reports budget dollars available for generating an equipment order.
ECR	**Engineering Cost Reporting System** provides project-to-date expenditures from TRAMS data.
ECS	**Equipment Charge Statement** Application generates a billing charge statement to customers for the rental of fleet vehicles.
EDI	**Electronic Data Interchange** is the front end processor for PUBS for electronic utility bills.
EFTD	**Electronic Fund Transfer Database** tracks enrollment application and payment information.
ELI	**Excess Land Interest Reporting System** creates yearly 1098s for Excess Land payments.
EPTS	**Encroachment Permits Tracking System** tracks permit receipt and approval process.
EVRS	**Earned Value Reporting System.**
EWB	**Extra Work Billing** allows construction contractors to submit extra work bills electronically and provides automated entry and data edits.
FA	Fleet Management manages highway equipment maintenance and usage.
FADS	**Federal Aid Data System** transmits project data to FHWA's FMIS system for state and local projects to be funded with federal funds.
FPRS	**Federal Projects Reporting System.**
GASB 34	GASB 34 Prospective Process — FY 02/03 (in development).
GIS	**Geographic Information System.**
iBID	iBID (proposed).

ICRS	**Independent Contractor's Reporting System.**
IMMS	**Integrated Maintenance Management System** tracks purchases, material usage, equipment usage, physical inventory, and enables expenditures analysis.
IRWS	**Integrated Right of Way System** tracks and manages acquisitions of property for highway projects.
LDS	**Labor Distribution System** tracks labor costs and benefits.
LP2000	**Local Programs 2000** supports local assistance fund management and project implementation.
LPAMS	**Local Programs Accounting and Management System** tracks Local Assistance project status and appropriation dollars. Electronically submits new and supplemental EAs to COMS/EAS and financial transactions to TRAMS.
NOW	**No Warrant System** transfers funds electronically.
NZ	**Net Zero System** backs out previously expended costs at the Program level.
OAR	**Overhead Assessment Reimbursement and Billing System** generates reports and transactions for overhead assessment. Creates overhead charges that feed into TRAMS on reimbursement projects. Overhead on labor only.
OET	**Operating Expense Tracking** is used by a few districts to track contracts, purchase and payment information.
PARR	**Payroll Account Receivable and Reporting System** tracks payroll expenditures based on information received from the SCO and tracks payroll receivables. Generates TRAMS batch input documents for manual input.
PCARS	**Purchase Card Accounting and Requisition System** electronically matches VISA card receipts and statements for verification and payment.
PCU	**Private Car Usage** (also known as Private Car Mileage Reporting System) reports information.
PDIS	**Publications and Document Inventory System.**
PETS	**Progress Estimate Tracking System** collects data from PISA and CASPAU and displays data on the Internet.
PMCS	**Project Management and Control System** tracks project from initial study through the Construction Phase.
PMDW	**Project Management Data Warehouse** maintains XPM (project management) and timesheet information, operating file and EA table information.

PMS/TSN	**Pavement Management System** is the portion of TSN that stores and tracks information collected from the field on pavement condition.
PSH	**PETS Special Handling.**
PTAS	**Position Tracking Automated System.**
PUBS	**Paper Utility Bills System** processes Caltrans' paper-based (as opposed to electronically delivered) utility bills.
PUSV	**Personal Use of State Vehicles** reports personal use vehicles and relocation taxable fringe benefits.
RBR	**Rail Bonds/TCI Reporting System** downloads expenditures from TRAMS and reports status on Propositions 108 and 116.
RFS	**Revolving Fund System** reconciles Caltrans' revolving fund.
RPS	**Reportable Payment System** collects and sends 1099 data to FTB.
RRS	**Rental Rates System** maintains rental rate for all Caltrans equipment based on actual costs. Generates charges to users of Caltrans fleet. Includes use on projects that are federally reimbursable. Generates reports of American Petroleum Institute-API credit card purchases.
RUMS	**Right of Way Utility Relocation System** tracks utility relocations on Caltrans right of way.
RWMIS	**Right of Way Management Information System** produces monthly and ad-hoc reports.
RWPS	**Right of Way Property Management System** is the inventory and billing system for property owned by Caltrans.
SAL	**Salary Advance Monitoring System.**
SB45	SB 45 Mainframe Overhead Calculation (in development, will replace COSOAR).
SCATS	**Service Contracts Automated Tracking System** monitors contract balance and payments made.
SCH3	**Schedule 3** Reconciliation (in development).
SCOPE	SCOPE.
SLB	**Signals and Lighting Billing** tracks signals and lighting costs and billings/receipts from locals.
SPEA	**Single Project Expenditure Authorization.**
STOCK	**Stock System** records material transfers from warehouse to Maintenance Units.

SUBS	**Statewide Utility Billing System** processes electronic bills from utility companies.
SVI/PCMS	**Property Control Inventory System** tracks HQ expendable and nonexpendable equipment and creates files used for reporting.
SVS	**Service and Supply Material Management System** maintains inventories of materiel and supplies at numerous district locations throughout the State and at OPAC's central warehouse.
TAMS	**Travel Advance Monitoring System** tracks travel advances issued by D of A.
TBUS	**Telephone Billing Upload System.**
TERP	TEC: Reportable Payment Reporting System downloads TRAMS data for W-2 reporting of travel expense reimbursement.
TMS	**Transportation Management System Database.**
TOMIS	**Traffic Operations Management Information System** (planned) will track production rates, expenditures and personnel information.
TOPSS	**Transportation Operation and Project Support System** contains personnel information, time and leave balances, certification, licensing.
TPRC	**Right of Way Management System** tracks workload production.
TPRX	**Right of Way Excess Lands Systems** contains inventory of excess lands (also known as ELMS).
TRAMS	**Transportation Accounting System.**
TSN	Migration of Legacy (TASAS, Traffic Volumes, State Highway Inventory) to Oracle.
UNC	Uncleared FAE 8 Transactions.
URS	**Vehicle Usage Reporting System** tracks state vehicle usage.
VISA	VISA Download from the bank for reports.
WCCP	**Construction Contract Payments.** A report from Accounting's data posted on the Internet displaying contractor payment information.
XPM	**Expert Project Manager** tool provides scheduling and resource leveling capabilities.