



**Washington State
Department of Transportation**



Critical Applications Implementation Feasibility Study

June 29, 2009



DYE MANAGEMENT GROUP, INC.



**Washington State
Department of Transportation**

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Table of Contents



Executive Summary	1
A. Project Scope	1
B. Problem Statement.....	2
C. Proposed Solution.....	3
D. ERP Alternatives Analyzed	4
E. Recommended Approach.....	5
F. Proposed Program Schedule	8
G. Cost Estimate	8
H. Business Case	10
I. Introduction.....	12
II. Project Background.....	14
A. Overview of the Critical Applications	14
B. WSDOT Business Functions Supported by the Critical Applications.....	18
C. Business Challenges with the Critical Applications	21
D. 2005-2007 Critical Applications Assessment Study	23
E. 2007-2009 Critical Applications Implementation Feasibility Study	24
III. Study Objectives and Approach	25
A. Project Objectives.....	25
B. Guiding Principles	25
C. Project Approach	26
D. Project Governance.....	29
IV. Proposed Solution	31
A. Overview of Proposed Solution.....	31
B. Enterprise Resource Planning (ERP) Application	35
C. Enterprise Time, Leave, and Labor Distribution (TLLD) Application.....	38
D. Transportation Asset Management	42
E. Project Management Reporting System (PMRS)	48
F. Preconstruction Management	49
G. Construction Management.....	50
H. WSDOT Geographic Information System (GIS).....	50
I. Business Warehouse	51
V. Alternative Approaches Considered for Implementing the ERP Application	53
A. ERP Alternatives Analyzed	53
B. Alternative 1-Utilize OFM’s planned Roadmap initiative as the core of the solution	53
C. Alternative 2-Implement an agency level ERP application that can serve as the first phase of a statewide ERP.....	56
D. Alternative 3-Implement the latest release of WSDOT’s current financial management software solution to provide an interim solution	58
E. Evaluation Criteria.....	60
F. Comparison of Alternatives.....	61
G. Recommended Alternative and Rationale	64
VI. Proposed Project Schedule.....	65
A. Overall Program Schedule.....	65

B.	Scope Definition of Individual Project Components	68
VII.	Cost Estimate	75
A.	Estimated Implementation Cost.....	75
B.	Ongoing Maintenance Costs.....	83
C.	Estimated Lifecycle Costs	83
D.	Cost Estimate Assumptions	86
E.	Other Financing Strategies	88
VIII.	Business Case	89
A.	Potential quantifiable benefit opportunities.....	89
B.	Other Anticipated Benefits for WSDOT	106
C.	Benefits to Other Agencies and the State	106
IX.	Risk Management	109
A.	Risk Management Objectives	109
B.	Risk Management Process.....	109
C.	Business/Organizational Risks	110
D.	Technical Risks.....	115
X.	Key Success Factors	122
A.	Establishing appropriate project management and governance.....	122
B.	Planning and structuring the procurement process	123
C.	Ensuring agency readiness for implementation	124
D.	Defining appropriate risk mitigation strategies for developing enterprise solutions	126
	Appendix A – Definition of Critical Application Business Functions	130
	Appendix B – Partial List of WSDOT Systems That May Be Candidates for Decommissioning As Result of the Critical Applications Replacement Program.....	156

Executive Summary

The Washington State Department of Transportation (WSDOT) is a very large enterprise with a biennial budget of over \$5.7 billion dollars, 7,800 employees, 18,500 lane miles of roads, 3,500 bridges, and the largest ferry system in North America. As such, WSDOT executive management, the Governor, and the Washington State Legislature need comprehensive, accurate, and timely data to manage by and set policy. This information is required to enhance traveler safety, safeguard taxpayer investment in the state's transportation system, deliver projects on time and on budget, optimize mobility, and exercise proper stewardship over resources.

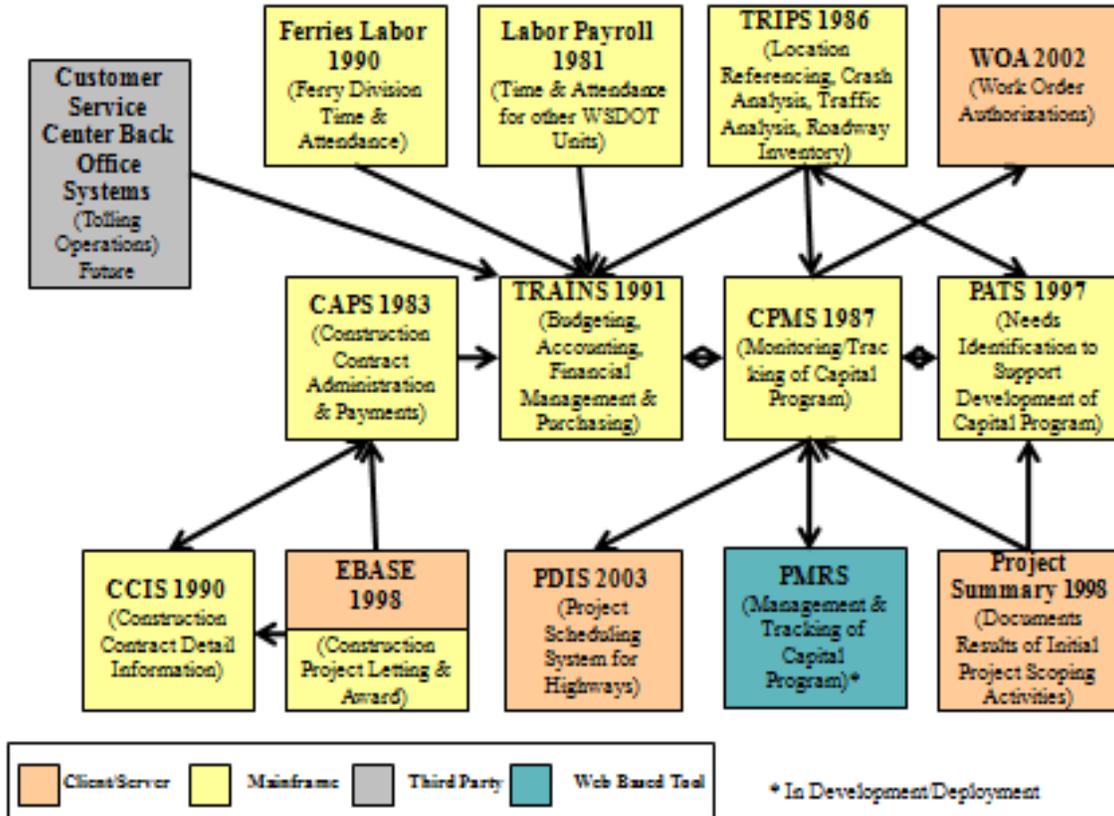
WSDOT's core enterprise financial, program and project management systems, known collectively as the "Critical Applications," are wholly inadequate to provide this information. Because of these deficiencies, the Washington State Legislature directed the department during the 2007-2009 biennium to prepare a detailed plan for replacing these systems. WSDOT performed this planning effort in collaboration with the Office of Financial Management (OFM) and the Department of Information Services (DIS) who participated on the project steering committee. WSDOT engaged Dye Management Group, Inc. to assist the department with this study. This is the final report of this planning effort for the proposed Critical Applications Replacement Program.

A. Project Scope

The "Critical Applications" consist of fourteen systems that constitute the department's primary financial management, timekeeping, program management, project management, and asset management systems. These systems are depicted in Exhibit ES-1. These systems perform a range of business functions for the department including needs identification and project prioritization, development and monitoring of the department's capital construction program, asset management, project management, procurement, management of the revenue cycle, and financial reporting and general ledger.



Exhibit ES-1: Washington Department of Transportation Critical Applications



B. Problem Statement

The Critical Applications present a number of business challenges for WSDOT. These include:

- There is a significant potential for loss of credibility with the Washington State Legislature, other stakeholders, or the public as a result of the difficulty and length time required to obtain information from the current systems, and the potential for multiple versions of the truth depending on which systems are used to obtain the information.
- These systems do not provide WSDOT with the information needed by managers to effectively deliver the department’s programs. This includes an inability to easily identify the real cost of projects or operations and difficulty in measuring actual outcomes against management objectives.
- The Critical Applications do not meet all of the department’s business requirements for complying with Federal regulations or monitoring compliance with collective bargaining agreements.
- There is a lack of internal controls in some of the Critical Applications, as reported by the State Auditor in the 2007 WSDOT Administration and Overhead Performance Audit.



- The Critical Applications are complex, fragile, and require constant monitoring by WSDOT Office of Information Technology staff. For the most part, only mandated changes are made in order to maintain system stability.
- Because of limitations in the Critical Applications, numerous standalone systems have been developed both by WSDOT's Office of Information Technology and by various business units. The feasibility study team has identified more than 140 applications that could potentially be decommissioned with the replacement of the Critical Applications by an integrated solution. These standalone applications substantially increase the cost of maintaining WSDOT's information technology portfolio.
- There is diminishing expertise within WSDOT to support these systems. Thus, there is the potential for system failure if existing resources cannot keep up with the demands for application changes or if they are not available to perform necessary production support activities.
- There is duplication of effort in supporting multiple systems that perform the same or nearly the same function including two timekeeping systems and the department's own standalone financial management system.

C. Proposed Solution

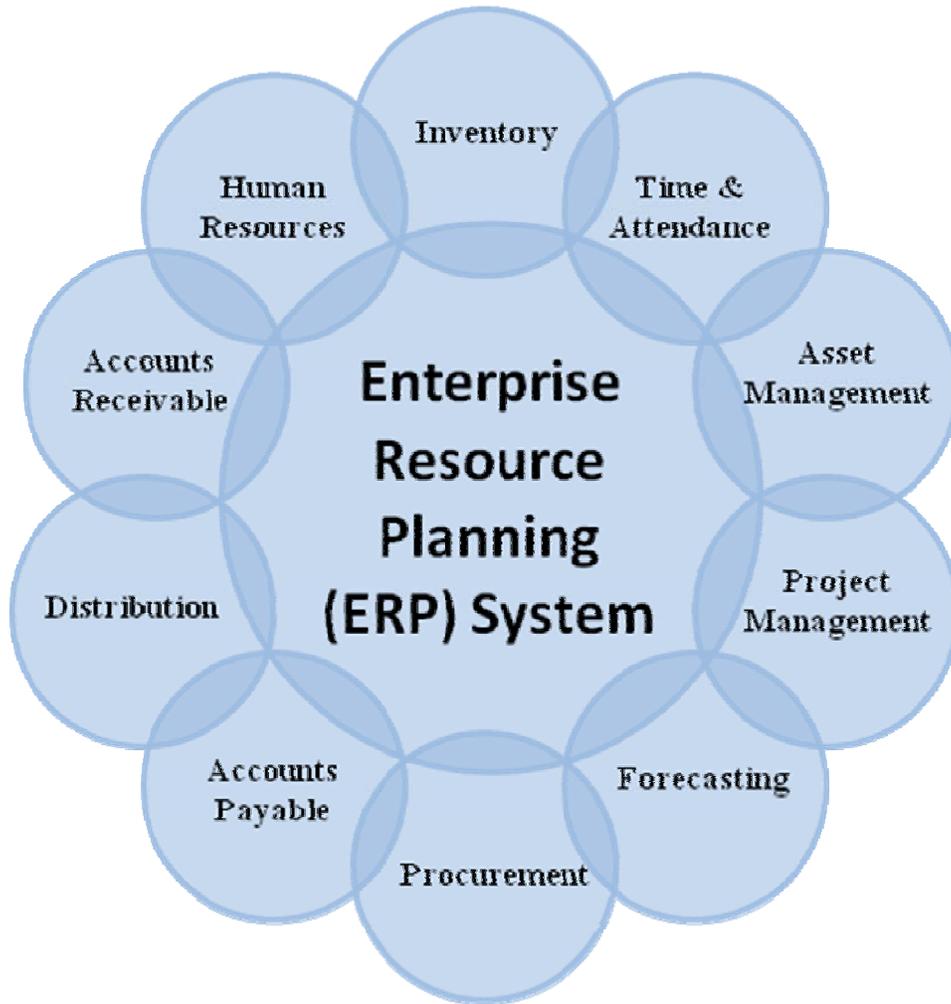
To address these business challenges, WSDOT is proposing to replace the various Critical Applications and a number of related standalone applications, with an integrated Enterprise Resource Planning (ERP) application, supplemented by commercially available best of breed software solutions¹ where required to provide functionality not available within the ERP application.

As depicted in Exhibit ES-2, an ERP provides an integrated suite of software in which information is captured at its source and made available across various system functions.

¹ Best of breed refers to utilizing the best software product available for performing a particular business function as opposed to supporting the business function through one or more modules of an integrated enterprise resource planning system



Exhibit ES-2: Typical Functions in an Enterprise Resource Planning (ERP) System



In terms of ERP software solutions, the state has made an initial investment in SAP, which is the basis for the state's Human Resource Management System (HRMS). OFM has conducted systems planning over the last several years for a statewide ERP application potentially using SAP to meet the common needs of all agencies through its Roadmap initiative.

D. ERP Alternatives Analyzed

WSDOT evaluated three alternatives for proceeding with the Critical Applications Replacement Program. These included:

- **Alternative 1:** Utilize OFM's planned Roadmap initiative as the core of the solution, supplemented by additional ERP modules and best of breed applications where necessary. This alternative would be dependent on OFM's project schedule for delivery of the statewide Roadmap solution. In the interim, WSDOT would focus its efforts on those systems such as transportation asset management, preconstruction management, and construction



management that would not be included in the scope of the Roadmap project and thus WSDOT's responsibility to develop.

- **Alternative 2:** Implement an agency level ERP application that can serve as the first phase of a statewide ERP, with additional best of breed applications as required. This implementation would be accomplished through close collaboration with OFM, DIS, and representatives of other state agencies to establish a solid enterprise design for the ERP solution. This solution would support the future migration of the ERP application to other state agencies and its adoption as the statewide enterprise solution envisioned by the OFM Roadmap project.
- **Alternative 3:** Implement the latest release of WSDOT's current financial management software solution to provide an interim solution for agency financial and procurement requirements, along with additional best of breed applications as required.

E. Recommended Approach

WSDOT is proposing to proceed with the Critical Applications Replacement Program under Alternative 2. The rationale for this recommendation is:

- Alternative 2 would address the significant information system problems facing WSDOT and provide extensive benefits.
- The timeline for the OFM Roadmap project is unclear due to budget constraints, so it is difficult to develop an implementation plan based on the Roadmap timeline. At the same time, WSDOT has immediate, high priority system needs.
- The recommended approach jump-starts the planned Roadmap initiative by establishing the enterprise design for the new statewide ERP. Implementation of an ERP at WSDOT will be phase one of the statewide ERP effort, with the software configured through this process available for implementation by other agencies in a future phase 2.
- Alternative 2 fully meets WSDOT needs but requires less upfront investment for the state before the project can be initiated than would be required to initiate the full Roadmap program.
- Alternative 2 leverages the state's existing investment in SAP technology.
- An approach similar to Alternative 2 has been proven to work in other states such as North Carolina and Colorado where the department of transportation has initiated the ERP effort as the lead agency and then this investment has been leveraged as the basis for the statewide solution.

The key elements of the recommended approach include:

- Implementing a SAP-based ERP application to meet WSDOT's business requirements and serve as the first phase of a statewide ERP.

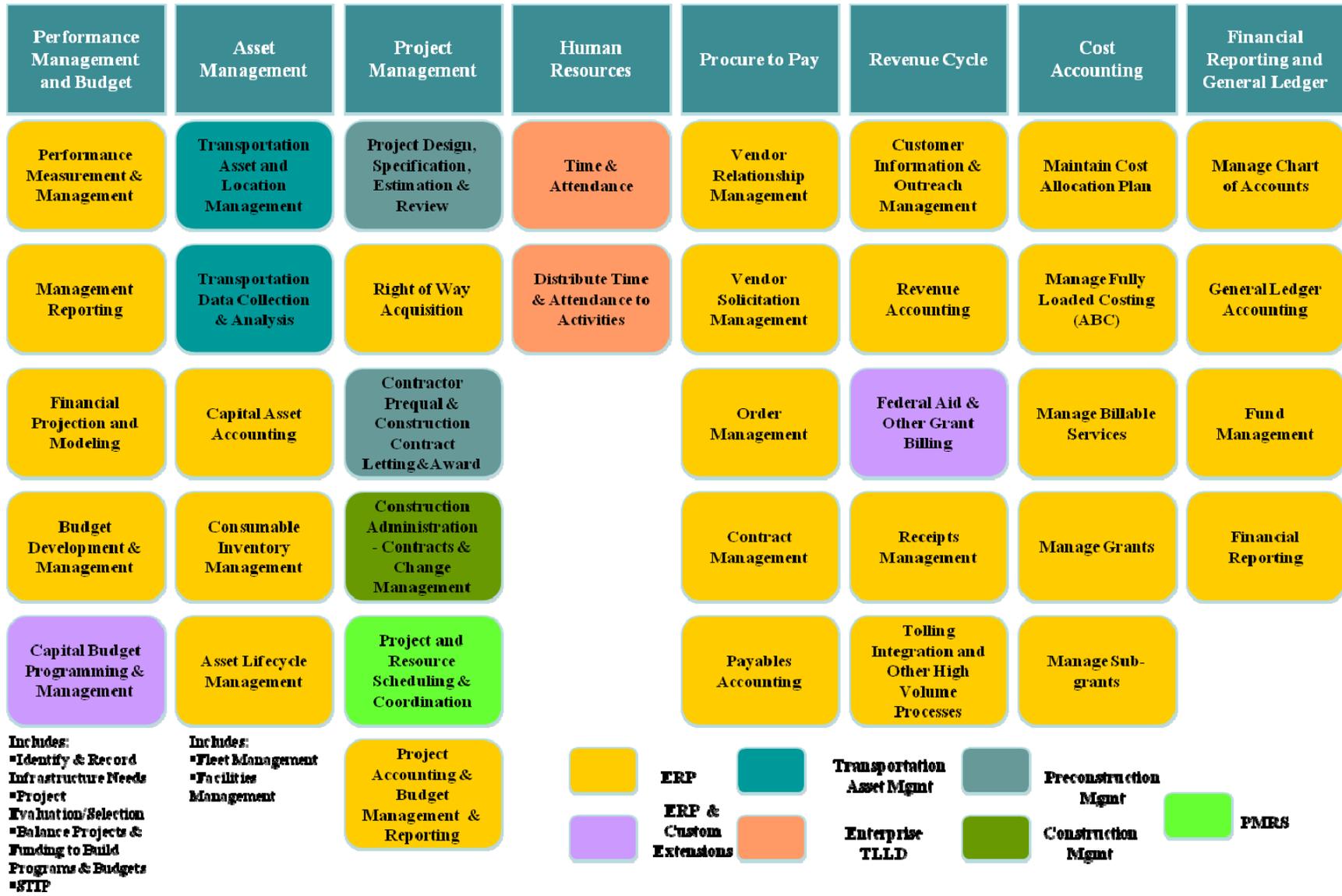


**Washington State
Department of Transportation**

- Implementing the proposed SAP and best of breed enterprise Time, Leave, and Labor Distribution (TLLD) solution.
- Executing the implementation project in close collaboration with OFM, DIS, and representative staff from other state agencies to ensure development of an enterprise design that will support future deployment to other agencies.
- Implementing additional best of breed software solutions where required to meet specific WSDOT requirements not optimally provided by an ERP. This includes solutions for transportation asset management, traffic analysis, crash analysis, location referencing, and preconstruction management.
- Extending the capabilities of WSDOT's Program Management Resource Systems (PMRS) by deploying additional capabilities of the Primavera software, in conjunction with the ERP, to support construction management.

Exhibit ES-3 depicts how the various elements of this approach will be utilized to support the business functions within the project scope.

Exhibit ES-3: Critical Applications Program Conceptual Architecture



F. Proposed Program Schedule

WSDOT has defined a program of related projects to implement the Critical Applications Replacement initiative over a six-year period. Exhibit ES-5 outlines the preliminary schedule for this program. Significant program activity would begin in the 2011-2013 biennium, with only support for integrating the new hosted tolling operations systems (funded separately as part of the tolling initiative) and some initial process improvement work and acquisition planning work on the enterprise Time, Leave, and Labor Distribution application planned during the 2009-2011 biennium.

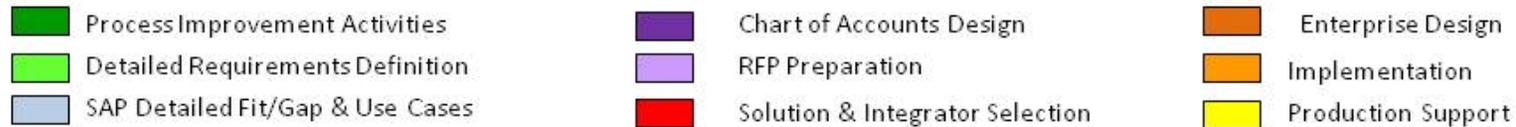
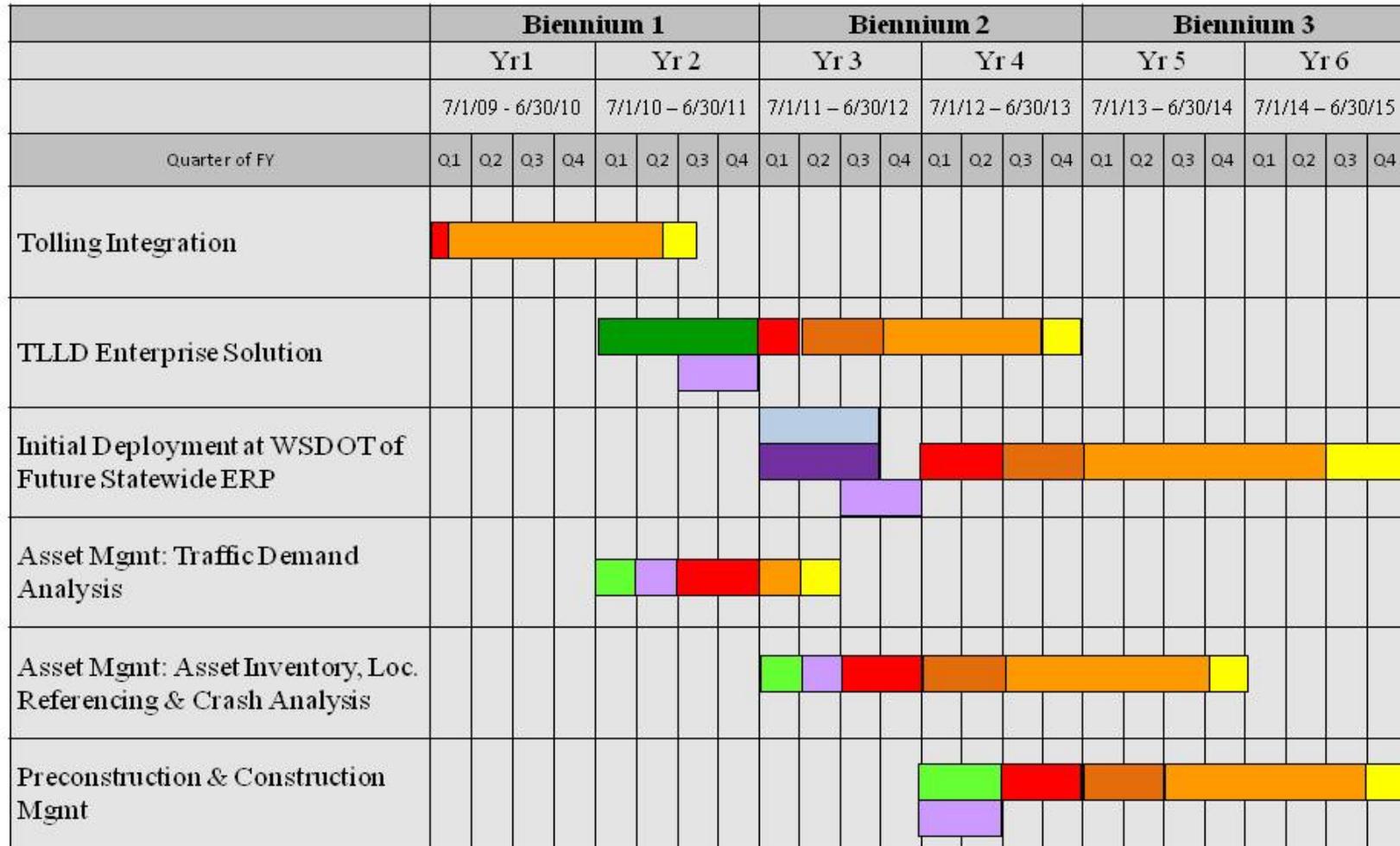
G. Cost Estimate

The total estimated implementation cost for the Critical Applications Program is \$145 million based on assuming financing of eligible expenses. Exhibit ES-4 summarizes the implementation cost by component and provides a cross reference to the current Critical Applications that are replaced by each project component of the proposed program.

Exhibit ES-4: Estimated Implementation Costs by Project

Program Component	Critical Applications Decommissioned	Estimated Cost (millions)
Enterprise Time, Leave, and Labor Distribution Solution	WSDOT Labor and WSF Labor	\$19.9
WSDOT Deployment of Future Statewide ERP	TRAINS, CPMS, WOA, PDIS, Project Summary, PATS	\$45.5
Transportation Asset Management Phase 1 - Traffic Demand Analysis	Part of TRIPS	\$ 1.0
Transportation Asset Management Phase 2 - Location Referencing, Asset Inventory and Crash Analysis	Remainder of TRIPS	\$14.2
Preconstruction and Construction Management	CCIS , CAPS and EBASE	\$15.1
Critical Applications Program Office		\$ 3.4
Quality Assurance and Independent Validation and Verification (IV&V)		\$ 2.5
Contingency		\$19.6
Sub-Total Cost of Critical Applications Replacement Program Excluding Interest Expense		\$121.4
Estimated Interest Expense Assuming Eligible Costs Are Financed		\$23.9
Total Cost: Critical Applications Replacement Program		\$145.3

Exhibit ES-5: Proposed Schedule for Critical Applications Replacement Program



H. Business Case

The Critical Applications Replacement Program feasibility study team has identified a range of potential quantitative benefits from the implementation of this program across various WSDOT business processes and program areas. When the Critical Applications Replacement Program is fully implemented and WSDOT begins to fully realize all of the potential benefits, it is estimated that the department has the potential to achieve quantifiable benefits in the range of \$26 million per year. These savings are the result of a combination of faster cost recovery, cost savings from efficiencies, future cost avoidance, and redirection of staff from transaction processing activities to higher value and program specific work.

Examples of some of these potential benefits include:

- **Increased efficiency in the delivery of the transportation program:**
 - A reduction in the cost to deliver a project through improved program and project management tools including enhanced project budgeting and costing
 - More cost effective project programming decisions through enhanced needs identification, project scoping, project prioritization and selection tools
 - Reduction in construction contract change orders, claims, project delays and overruns through more effective contract management and monitoring tools
- **Improved management of assets and consumable inventory:**
 - More effective use of the existing maintenance budget through improved lifecycle cost management as a result of implementation of an integrated transportation asset management solution with lifecycle cost modeling, needs identification, trade-off analysis, and performance-based budgeting capabilities
 - Reduced spend on consumable inventory by reducing inventory turns and more frequently negotiating volume discounts
- **Automation, streamlining and consolidation of accounting and other support functions:**
 - Avoidance of payroll overpayments based on enhanced business rules and edits at the point of time entry and improved internal controls
 - Opportunity to redirect the time of some accounting, timekeeping, payroll and procurement staff through capturing data at the source, and through the use of employee and vendor self-service capabilities
 - Potential for consolidation of regional and program supported budgeting, cashiering, procurement, contract management, accounting, and payroll functions under an agency “shared services” model

- **Enhanced billing and revenue collection practices:**
 - Ability to improve collection rates for accounts receivable through enhanced billing, collection, and monitoring
 - Ability to offset receivables from and payables to local jurisdictions and other entities through the use of common identifiers and enhanced collection management capabilities
- **Enhanced procurement practices:**
 - Ability to take discounts on vendor payments through enhanced accounts payable management capabilities
- **Reduced information technology costs:**
 - Decommissioning of the WSDOT mainframe
 - Redirection of the WSDOT information technology staff to supporting other line of business applications as a result of the elimination of the Critical Applications and most of the other 140+ standalone systems performing related functions

The Critical Applications Replacement Program also has the potential to provide a number of other benefits for the department. These qualitative benefits include:

- Facilitating implementation of the One-DOT concept by consolidating duplicate systems and implementing and automating standardized accounting, procurement and other administrative processes
- More effectively meeting current WSDOT business requirements and providing a platform for being more agile in addressing future changes in agency business needs
- Reduced business risk in terms of complying with regulatory requirements and monitoring collective bargaining agreements

In addition to the benefits to WSDOT, there are other intangible benefits for other agencies and the state as a whole. Implementation of an ERP application and the Time, Leave, and Labor Distribution application for WSDOT will help to jump-start the Roadmap initiative by providing an ERP solution that is highly scalable and able to meet the enterprise financial, procurement, timekeeping, and project management needs of all state agencies. Likewise, the implementation of centrally supported enterprise systems and standardized business processes is consistent with the Governor's management objective to implement and leverage shared services environments.

I. Introduction



This deliverable represents the final packaging and publication of the findings and recommendations of the Critical Applications Implementation Feasibility Study. It serves as the final report to the Washington State Legislature on the Washington State Department of Transportation's (WSDOT) planning efforts during the 2007-2009 biennium for replacing the Critical Applications. It is intended that this report will provide the Washington State Legislature, WSDOT, OFM, and DIS with the information required to determine the feasibility of the proposed investment in the Critical Applications Replacement Program.

The remainder of this document is organized as follows:

Section II: Project Background – This section provides background on and an introduction to WSDOT's Critical Applications Replacement Program. It includes an overview of the Critical Applications, a discussion of the business functions supported by these systems and a discussion of business challenges the department is facing with these systems. It also includes a summary of the findings from the previous Critical Applications Assessment project.

Section III: Study Objectives and Approach – This section briefly describes the objectives of the Critical Applications Implementation Feasibility Study effort. It also outlines the approach for performing the work and a set of guiding principles that provided a framework for project activities.

Section IV: Proposed Solution – This section defines and outlines the key elements of the proposed solution. It provides an overview of an Enterprise Resource Planning (ERP) application, the core component of the proposed Critical Applications Replacement Program. It also describes each of the anticipated best of breed solution components.

Section V: Alternative Approaches Considered for Implementing the ERP Application – This section describes the three alternative approaches for providing the ERP component of the Critical Applications Replacement Program that were evaluated by the study team, the criteria utilized to perform this evaluation, the recommended approach for going forward and the rationale for this recommendation.

Section VI: Proposed Program Schedule – This section outlines a proposed program of projects over a five-year period to implement the Critical Applications Replacement Program.

Section VII: Cost Estimate – This section presents the estimated costs for implementing the Critical Applications Replacement Program. It also provides an estimate of the total cost of ownership for the Critical Applications Replacement Program through June 30, 2020.

Section VIII: Business Case – This section outlines the anticipated business case for the proposed Critical Applications Replacement Program. It provides an outline of anticipated quantifiable benefits. It also identifies a number of intangible benefits for WSDOT, as well as other agencies and the state as a whole.

Section IX: Risk Management – This section identifies potential organizational and technical risks to program success, and delineates potential mitigation strategies to address these risks.

Section X: Key Success Factors – This section briefly describes several key success factors that will be required to successfully implement the Critical Applications Replacement Program.

II. Project Background



This section provides background on WSDOT's Critical Applications Replacement Program. It includes an overview of the Critical Applications, a discussion of the business functions supported by these systems and a discussion of business challenges the department is facing with these systems. It also includes a summary of the findings from the previous Critical Applications Assessment project.

A. Overview of the Critical Applications

The Critical Applications consist of fourteen systems that constitute the department's primary financial management, timekeeping, program management, project management, and asset management systems.

Exhibit II-1 provides a schematic illustration of the Critical Applications and the relationships between these various systems. The applications in yellow are mainframe based, while the salmon colored applications are client-server based. Those that are both colors are split across platforms. The blue colored application is the new Project Management and Reporting System (PMRS) that is currently under development. The gray shaded application is the outsourced tolling operations systems that are being procured at the time of this report.

Exhibit II-1: Washington Department of Transportation Critical Applications

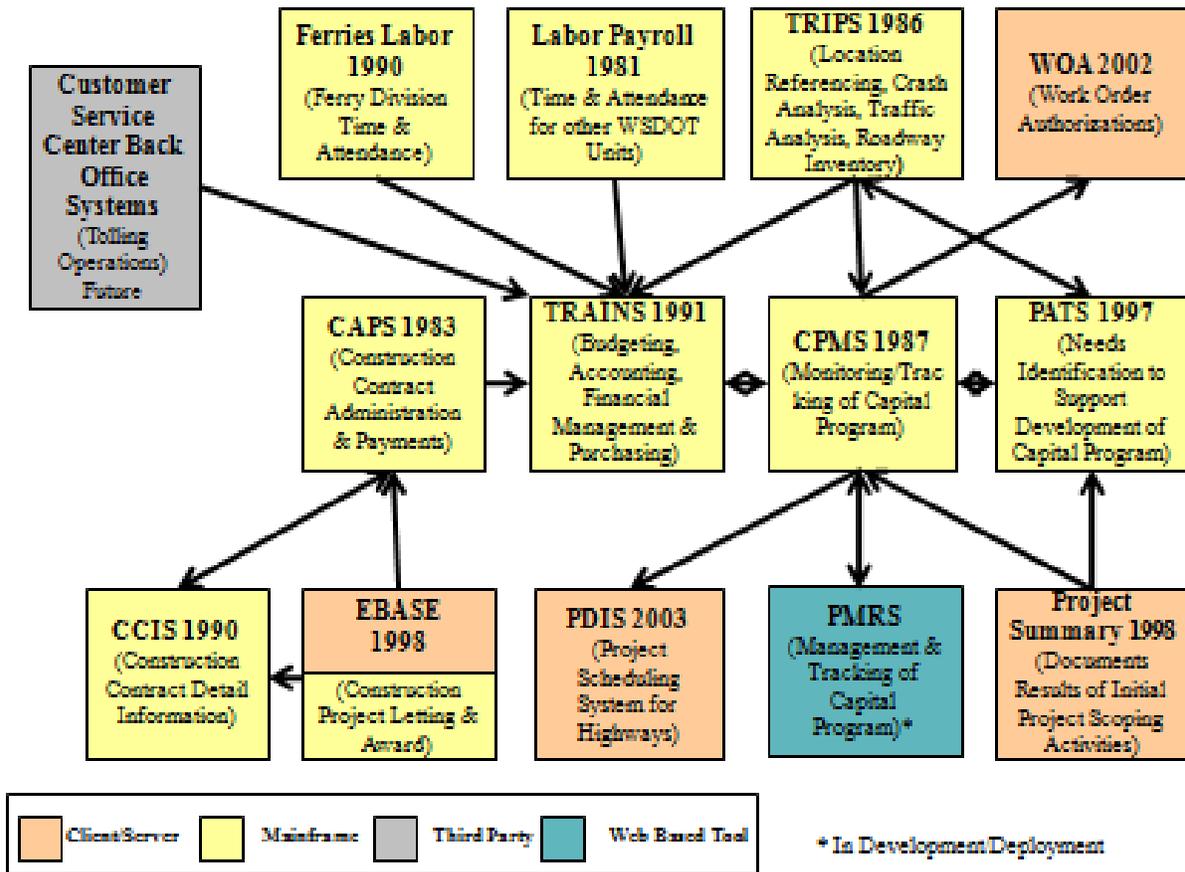


Exhibit II-2 briefly outlines the scope and business function of each of the Critical Applications.

Exhibit II-2: Scope and Business Function of the WSDOT Critical Applications

System Name	Acronym	Purpose/Business Function
1. Transportation Reporting and Accounting Information System	TRAINS	This mainframe system provides accounting support for all of WSDOT's revenues, expenditures, receipts, disbursements, resources, and obligations. It is a highly customized version of an American Management Systems (AMS now CGI) software package. This application also includes the budget system that is known as TRACS.
2. Labor Collection and Distribution System/Payroll	Labor	This system processes employee hours worked, leave taken, and financial (cost accounting) details associated with labor hours for WSDOT employees and WSF Merit 1 employees. Data from this system is provided to the Department of Personnel's (DOP) Human Resource Management System (HRMS) to support payroll processing.

System Name	Acronym	Purpose/Business Function
3. Washington State Ferries Labor System	Ferries Labor	This system processes employee hours worked, leave taken, and financial (cost accounting) details associated with labor hours for WSF Merit 5 employees. The application is a sister system to the WSDOT Labor application. Data from this system is provided to DOP's HRMS application to support payroll processing.
4. Capital Program Management System	CPMS	This system supports development, monitoring, managing, and delivering of WSDOT's capital construction program.
5. Work Order Authorization	WOA	This application provides an online work flow driven process for requesting authorization of work orders or additional funding for work orders. The application, however, is not integrated with TRAINS or CPMS. Thus, while WOA partially automates what was a manual process, the request once it is fully approved in WOA, must still be manually entered into CPMS and TRAINS.
6. Priority Array Tracking System	PATS	This system collects, maintains, and tracks WSDOT's capital highway program deficiencies to support development of the capital highway construction program.
7. Project Summary	Project Summary	This system documents the results of the project scoping process in which the merits of candidate transportation projects are assessed and evaluated.
8. Transportation Information Planning and Support System	TRIPS	This application manages current and historical data about WSDOT's roadway network, traffic volumes and classifications, collisions, and collision severity. It includes a roadway inventory component and a location referencing system that is utilized by a number of other systems across the department.
9. Contract Administration and Payment System	CAPS	CAPS is one of two Critical Applications that support management of construction contracts. This system maintains administrative and payment information about highway and ferry construction contracts and creates payment vouchers to pay contractors.
10. Construction Contracts Information System	CCIS	CCIS is also used to help manage construction contracts. This system is mainframe based with client server components. It tracks construction contract details such as start dates and end dates, percent of the project complete, fair hiring practices, fair wage rates, and percent of work sublet.

System Name	Acronym	Purpose/Business Function
11. Estimate and Bid Analysis System	EBASE	EBASE supports developing project specifications, preparing engineers estimates and managing the construction contract letting process. This system is mainframe based with client server components. The bid information collected in this system is uploaded into CAPS after contract award for the bidder awarded the project.
12. Project Delivery Information System	PDIS	This system supports management of the transportation project delivery process by capturing and tracking high-level project data, including milestone dates. PDIS is targeted to be replaced over time by PMRS once it is fully implemented
13. Project Management and Reporting System	PMRS	This system will provide enhanced web-based project scheduling, project reporting and content management tools to support management of the delivery of the capital program. It is primarily based on the Primavera suite of project management tools.
14. Customer Service Center Back Office Systems	Tolling Operations	This system will be a hosted solution maintained by the vendor operating the Tolling Division's Customer Service Center. It will be the primary revenue accounting and customer relationship management system for WSDOT's tolling operations. It will interface with TRAINS to provide financial data for tolling operations at a high level, with the subsidiary detail maintained in this system. A request for proposal (RFP) to select the Customer Service Center operator is in process at the time of this report.

As originally defined in 2004, the Critical Applications consisted of eleven systems. During this current planning effort, WSDOT has added three systems to the definition of the Critical Applications scope. The first of these systems is the Washington State Ferries (WSF) Labor application that provides timekeeping and labor distribution functions for WSF's Merit 5 employees. It is a sister system to the WSDOT Labor system and any replacement effort would be targeted at replacing both of these systems with a common solution. This strategy will reduce system support costs. It is also consistent with the State Auditor's recommendation in the 2007 WSDOT Administrative and Overhead Performance Audit to consolidate these systems, and supports the department's vision of One-DOT.

The second application added to the scope of the Critical Applications is PMRS. WSDOT initiated development of this application in 2006 to provide additional project management scheduling and reporting capabilities for the agency's preconstruction and construction project managers. This application is dependent on several of the Critical Applications for information and would be tightly integrated with any solution implemented to replace the Critical Applications. In addition, one of the guiding principles of this planning effort was to identify opportunities to leverage the department's existing investment in PMRS by potentially utilizing the Primavera project management software modules that are at the heart of PMRS to support some related business functions.

The third application added to the definition of Critical Applications is the WSDOT Tolling Division's Customer Service Center Back Office Systems. This outsourced system will serve as the revenue accounting and customer management system for the department's tolling operations and will be the subsidiary general ledger for WSDOT's tolling business. As such, it will be interfaced to or integrated with the department's current and future financial management systems.

B. WSDOT Business Functions Supported by the Critical Applications

From a business function perspective, these systems support a range of business processes for the department including needs identification and project prioritization, development and monitoring of the department's capital construction program; asset management; project management; procurement of, and payment for, goods and services (procure to pay); management of the revenue cycle; and, financial reporting and general ledger.

Exhibit II-3 on the following page outlines the functional scope of the Critical Applications. Each of the primary functional areas is described briefly below. A more detailed description of each function and sub-function is included as Appendix A of this report.

Exhibit II-3: Functional Scope of the WSDOT Critical Applications

Performance Management and Budget	Asset Management	Project Management	Human Resources	Procure to Pay	Revenue Cycle	Cost Accounting	Financial Reporting and General Ledger
Performance Measurement & Management	Transportation Asset and Location Management	Project Design, Specification, Estimation & Review	Time & Attendance	Vendor Relationship Management	Customer Information & Outreach Management	Maintain Cost Allocation Plan	Manage Chart of Accounts
Management Reporting	Transportation Data Collection & Analysis	Right of Way Acquisition	Distribute Time & Attendance to Activities	Vendor Solicitation Management	Revenue Accounting	Manage Fully Loaded Costing (ABC)	General Ledger Accounting
Financial Projection and Modeling	Capital Asset Accounting	Contractor Prequal & Construction Contract Letting & Award		Order Management	Federal Aid & Other Grant Billing	Manage Billable Services	Fund Management
Budget Development & Management	Consumable Inventory Management	Construction Administration - Contracts & Change Management		Contract Management	Receipts Management	Manage Grants	Financial Reporting
Capital Budget Programming & Management	Asset Lifecycle Management	Project and Resource Scheduling & Coordination		Payables Accounting	Tolling Integration and Other High Volume Processes	Manage Sub-grants	
Includes: •Identify & Record Infrastructure Needs •Project Evaluation/Selection •Balance Projects & Funding to Build Programs & Budgets •STIP	Includes: •Fleet Management •Facilities Management	Project Accounting & Budget Management & Reporting					

Performance Management and Budgeting – This business function includes setting strategic goals and measuring performance against these goals. It also includes developing and submitting agency budget requests and tracking performance against the approved budget. In addition, this function includes the department’s needs identification, project prioritization, and project scoping process. It also includes the functionality to develop and manage the department’s capital construction program. This incorporates the ability to perform various what-if scenarios with different funding alternatives prior to locking in a proposed budget scenario for submission to the Washington State Legislature and the on-going management and tracking of the approved program.

Asset Management – This business function includes managing all aspects of the department’s asset base. This includes both traditional assets such as equipment, facilities and fixtures, as well as the point assets and linear assets on the state’s transportation network. This functional area includes asset inventory, capital asset accounting, and lifecycle management. This function also includes the management of the department’s consumable inventory such as stockpiles of aggregate, sand and salt. Likewise, this function includes the capabilities to location reference assets or events such as collisions or construction projects on the network and the capability to perform traffic demand analysis and crash analysis.

Project Management - This business function includes the management of all aspects of WSDOT’s transportation project delivery process from project inception through completion of the construction phase and project closeout. It includes establishing and monitoring project budget and schedules and performing other project accounting activities. It also includes managing the acquisition of any right of way required for a project, the preparation of project specification packages, preparation for and support of the contract letting process, and the management of construction contracts.

Human Resources - This business function involves the management of employee schedules; the capture of employee time scheduled and worked, employee leave requests and approvals and monitoring leave balances. It also includes the transfer of employee time worked information to DOP’s HRMS application for payroll purposes, the distribution of actual costs/charges to WSDOT’s financial system, and the capability to perform historical reporting on employee time data as required.

Procure to Pay - This function involves all aspects of managing the procure to pay business process. This includes the initial requisition for a product or service; procurement activities and the purchasing of the good or service; receipt of the good or service; and payment of the vendor’s invoice. It also includes managing vendor information and supporting contract management activities.

Revenue Cycle - This function includes maintaining and managing information about the department’s customers, funding partners; and, performing revenue accounting activities. It also includes performing Federal-Aid billing to request reimbursement for eligible highway construction expenses from the Federal Highway Administration (FHWA), along with billing for other grants, managing receipts, and integrating with tolling and any other high-volume customer transaction environments.

Cost Accounting – This business function includes all cost accounting functionality including maintaining the cost allocation plan and managing fully loaded costing and billable services. It also includes grants management capabilities to support situations where the department is both the grantor and the grantee. This includes grant administration, management, and tracking (revenue and expenditures).

Financial Reporting and General Ledger – This includes all of the general accounting functions of the department. Sub-functions include managing the chart of accounts, maintaining the general ledger, budgetary accounting, funds management, and financial reporting.

C. Business Challenges with the Critical Applications

The Critical Applications have a number of functional and technical gaps that affect their ability to fully meet WSDOT's business requirements:

- These systems do not provide WSDOT with the information needed by managers to effectively deliver the department's programs. This includes an inability to easily identify the real cost of projects or operations, and difficulty in measuring actual outcomes against management objectives.
- There is a significant potential for loss of credibility with the Washington State Legislature, other stakeholders, or the public. This is a result of the difficulty and length of time required to obtain information from the current systems. Likewise, there is the potential for multiple answers or versions of the truth depending on which systems are used to obtain the information.
- The Critical Applications do not meet all of the department's business requirements for complying with Federal regulations or monitoring compliance with collective bargaining agreements. As an example, the current WSDOT Labor and WSF Labor systems do not support all of the requirements of either the Fair Labor Standards Act or the Family and Medical Leave Act. As a result, WSDOT has had to implement a number of manual processes to comply with all of these requirements, including needing to keep signed paper time sheets on file for all overtime-eligible employees.
- There is a lack of internal controls in some of the Critical Applications. The State Auditor in the 2007 WSDOT Administrative and Overhead Performance Audit also noted this limitation. Examples include no restriction on what account codes an employee can charge to, no structured and standardized approval process for changes to timesheets, and limited audit trailing of system changes.
- The current system environment is highly manual with numerous standalone applications required in order to meet gaps in the functionality provided by the Critical Applications. This results in frequent duplicate entry of the same information and the need to review and reconcile data between systems. Examples include:

- Contractor invoices are entered into TRAINS for payment processing and then are entered a second time by the Contracts office into a contract management application in order to track the balance available in a contract.
 - Employees in WSDOT's Office of Bridge and Structures enter their time into an online application maintained by the Bridge unit that was developed to help streamline time capture for their employees who needed to charge their time to a variety of different projects. Timekeepers in the Office of Bridge and Structures then re-key this information into the WSDOT Labor system for actual payroll processing.
 - The work order authorization process was automated through the WOA application to expedite review of a request to authorize or adjust the approved budget of a work order. However, because WOA does not automatically interface with TRAINS or CPMS, once the request is authorized, it must be manually entered by accounting staff into TRAINS and CPMS.
- The Critical Applications are complex, fragile, and require constant monitoring by WSDOT Office of Information Technology staff. For the most part, only mandated changes are made in order to maintain system stability. Often, unintended consequences have occurred when changes are made to the current applications.
 - As a result of the inability to easily make system changes, 'workarounds' are necessary to keep pace with changing rules and procedures. WSDOT program staffs utilize numerous spreadsheets and desktop databases to verify and track transactions and program costs. These off-line systems lead to duplicate sources of data that may contain potentially conflicting information. In addition, maintaining these off-line systems divert the time of business unit staff that could be spent supporting program operations.
 - Because of limitations in the Critical Applications, numerous standalone systems have been developed both by WSDOT's Office of Information Technology and by various business units. These standalone applications substantially increase the cost of maintaining WSDOT's information technology portfolio. These standalone applications also create a number of duplicate data entry processes, significantly complicate management reporting and in some cases divert business unit staff from program activities. The feasibility study team has identified more than 140 applications that could potentially be decommissioned with the replacement of the Critical Applications by an integrated solution. An inventory of these systems is provided in Appendix B.
 - There is diminishing expertise within WSDOT in the mainframe computer languages used to build and maintain many of these programs. Most programmers knowledgeable in these mainframe languages are retiring or have updated their skills to more modern computer languages, leaving only a handful of WSDOT staff that are very familiar with a number of these applications. Thus, there is the potential for system failure if existing resources cannot keep up with the demands for application changes or if they are not available to perform necessary production support activities.
 - Taken together, these issues result in increased operating costs for WSDOT as a result of:

- Manual efforts by staff required to research and obtain information from the systems
- A lack of integration between systems
- A large number of manual processes
- A lack of controls that can lead to over/under payments of payroll and mistakes in leave processing and managing leave balances
- A need for time consuming review and reconciliation processes between various systems
- Duplication of effort in supporting multiple systems performing similar functions including two time keeping systems, a number of standalone applications and the department's own standalone financial management system

D. 2005-2007 Critical Applications Assessment Study

In response to the types of issues identified above, the Washington State Legislature, in a budget provision for the 2005-2007 biennium, directed WSDOT to conduct a “financial and capital project system needs assessment for future automation development and enhancements.” This Critical Applications Modernization and Integration Strategy project or the “Critical Applications Assessment” as it is commonly called was completed in early 2006. It addressed both the business and technical needs of WSDOT’s financial and capital project systems.

The goal of the 2005-2007 Critical Applications Assessment Study was to determine whether or not WSDOT’s business needs were supported by the Critical Applications. The team conducted a gap analysis of where the business requirements were in comparison to the system functionality. The Critical Assessment effort identified a number of issues with the systems and, based on the results of the gap analysis, WSDOT identified several potential high-level alternatives/strategies for addressing the issues with the Critical Applications:

- Do nothing – retaining the existing Critical Applications
- Modify/extend through additional customizations some or all of the existing mainframe applications
- Develop an action plan for replacing the Critical Applications – such as partnering with other agencies, or aligning with the OFM Roadmap initiative

The alternatives were then evaluated to determine the most advantageous functional, technical, and financial approach for WSDOT to replace its Critical Applications. Based on this analysis, the Critical Applications Assessment team made the following recommendations:

- The existing systems have to be retooled and need to incorporate WSDOT’s required geographic and location referencing capabilities
- There is limited potential for WSDOT to save, reuse, or extend the existing Critical Applications (not including PMRS or the Tolling Back Office Systems)

The 2005-2007 Critical Applications Assessment team did not focus on the “do nothing” option because WSDOT relies on these systems to support its business operations and the system shortcomings were putting the business at risk. Likewise, while the assessment team felt that partial replacement of systems could deliver some benefits, it was concluded that unless WSDOT replaced all of the Critical Applications, it would incur increasing maintenance costs while achieving decreased return in the value of these systems over time.

E. 2007-2009 Critical Applications Implementation Feasibility Study

Based on the recommendations of the Critical Applications Assessment, WSDOT requested funding for the 2007-2009 biennium to produce a Critical Applications Implementation Feasibility Study that would specify a detailed plan for replacing these systems. The Washington State Legislature included funding for this effort in the 2007-2009 biennium budget and directed WSDOT to submit a report to the Washington State Legislature by June 30, 2009 detailing this plan.

WSDOT initiated this project in the fall of 2007. The Office of Financial Management (OFM) and the Department of Information Services (DIS) collaborated with WSDOT in this effort through representation on the project steering committee. WSDOT engaged Dye Management Group, Inc. to provide consulting assistance to the department with this study. This document is the final report of this systems planning effort.

III. Study Objectives and Approach



This section briefly describes the objectives of the Critical Applications Implementation Feasibility Study effort. It also outlines the approach for performing the work and a set of guiding principles that provided a framework for project activities.

A. Project Objectives

The Washington State Legislature directed WSDOT to complete during the 2007-2009 biennium a plan for replacing the department's Critical Applications. The objectives of this project included:

- Confirm the recommendations from the 2005-2007 assessment effort concerning the replacement of the Critical Applications.
- Document at a feasibility study level of detail WSDOT's business and technical requirements for the business functions supported by the Critical Applications.
- Analyze potential alternatives for replacing the Critical Applications including the relative merits, cost, benefits, and risk of each alternative. This should include defining and ensuring alignment between the Critical Applications Replacement Program, the OFM Roadmap initiative, and WSDOT's ongoing PMRS implementation.
- Provide a recommended approach for moving forward with the Critical Applications Replacement Program and the rationale for this recommendation.
- Provide a multi-year high-level implementation strategy for the recommended alternative that outlines a series of projects for accomplishing the goals of the Critical Applications Replacement Program.
- Submit the proposed plan to the Washington State Legislature by June 30, 2009.

B. Guiding Principles

To help provide direction in achieving the project objectives, the study team worked with WSDOT executive management and the project steering committee to establish a set of guiding principles to utilize in defining and evaluating potential solution alternatives and approaches. These guiding principles included:

- Utilize commercially available off the shelf solutions as the first choice to meet business requirements. Using commercially available solutions to replace the Critical Applications should reduce the cost and risk of implementing the new systems, as well as the cost to maintain and operate these systems in the future.

- Change business processes first whenever possible to adapt to the capabilities of the commercially available off the shelf solutions, developing customizations only where absolutely required due to gaps in the capabilities of the commercially available solutions or very specific legal, statutory or regulatory requirements. Customizations should require a specific business case and program steering committee approval. Limiting customizations reduces the cost and risk of the development effort. It also simplifies and reduces the cost of future software upgrades, thus reducing the total lifecycle cost to own and maintain the system.
- Utilize a single integrated enterprise resource planning or ERP suite to meet as much of the required functionality as possible; other commercially available best of breed solutions should only be added to this suite where needed to address material gaps in the business functionality provided by the ERP suite. Utilizing the single ERP suite as much as possible reduces the complexity of the applications environment. This makes future software upgrades easier and less expensive, since there are fewer software packages whose future product releases must be synchronized with each other.
- Implement and leverage enterprise solutions including the proposed OFM Roadmap to the extent possible. WSDOT should only implement agency-supported applications where these systems are required to meet specific department of transportation program requirements.
- Leverage the state's existing investment in the SAP enterprise resource planning software suite and WSDOT's existing investment in PMRS and Primavera technology to the extent possible.
- Implement solutions that are consistent with WSDOT's and the state's technology direction to the extent possible.

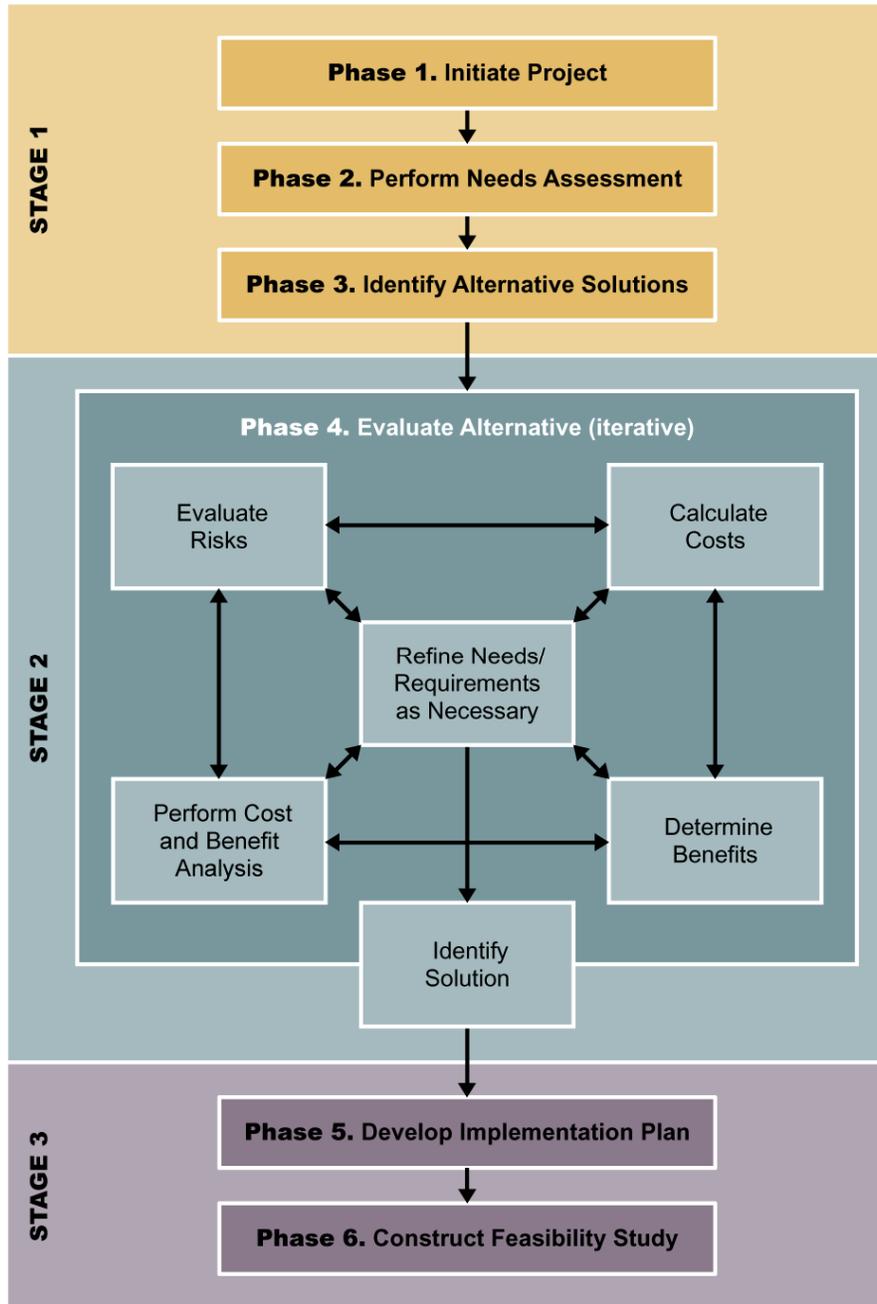
C. Project Approach

Exhibit III-1 outlines the project approach utilized to conduct the study and achieve the project objectives. This approach consisted of three primary stages:

- Stage 1: Identify needs and solutions
- Stage 2: Develop and evaluate alternatives
- Stage 3: Construct an implementation plan and feasibility study

Each of these stages is described briefly below.

Exhibit III-1: Feasibility Study Approach



1. Stage 1: Identify needs and solutions

During this first stage, the feasibility study team identified WSDOT’s needs by defining high-level business and technical requirements; performed a fit/gap analysis with the scope of the OFM Roadmap project and WSDOT’s PMRS initiative; identified potential solutions available in the market place; and conducted vendor demonstrations of a representative set of potential solutions.

Based on a review of WSDOT's business processes, industry best practices and the consulting team's knowledgebase of systems requirements from work with other state transportation agencies, the study team developed draft business requirements for each of the functional areas within the project scope. These draft requirements were then provided to various WSDOT staff for review. A set of workshops was then conducted in each functional area to review, validate, and update the draft requirements. More than 200 WSDOT technical staff and business owners participated in one or more of these workshops during the summer and fall of 2008.

The team also developed a baseline set of application architecture and technical architecture requirements. These requirements were also developed by the team as a draft, then validated, and updated based on input from various WSDOT Office of Information Technology staff.

Based on these functional and technical requirements, the study team then conducted a fit/gap analysis of WSDOT's requirements with the anticipated scope of the OFM Roadmap project. The goal of this effort was to identify those functional areas where WSDOT's requirements were not likely to be met by the OFM Roadmap initiative and thus would require additional systems development efforts at the agency level by WSDOT. Representatives from OFM Accounting and OFM Information Technology participated in this effort.

The study also conducted a fit/gap analysis with the WSDOT PMRS initiative team. The goal of this step was to understand how PMRS would integrate into the future replacement of the Critical Applications. This included establishing the extent to which the current scope of PMRS would support the department's project management requirements and to what extent Primavera applications licensed by the department for PMRS may have additional functionality, not configured for PMRS, which could support other business functions, specifically preconstruction or construction management.

The study team then identified a number of commercially available solutions that provide either ERP functionality and/or best of breed solutions for specific functions. In conjunction with the project steering committee, the team then identified a subset of these solutions to invite for demonstrations during November 2008 through March 2009. Twelve different vendor demonstrations were conducted including:

- Two (2) demonstrations of enterprise resource planning solutions
- Two (2) demonstrations of best of breed timekeeping applications
- Three (3) demonstrations of transportation asset management solutions
- A demonstration of a construction management and preconstruction management solution marketed by the American Association of State Highway Transportation Officials (AASHTO)
- Two (2) demonstrations of specific solutions for location referencing
- One (1) demonstration of a crash analysis solution, and one (1) demonstration of a traffic analysis solution

2. Stage 2: Develop and evaluate alternatives

In this second stage, the study team identified a number of potential alternative solutions for moving forward with the Critical Applications Replacement Program. Specific emphasis was placed on evaluating different approaches for addressing the ERP component of the Critical Applications, as this was the primary differentiator in various alternatives. Most of the best of breed components identified in the alternative solution evaluations are represented in the proposed solution.

Initial analysis was performed on these alternatives and iterative discussions were conducted with the project steering committee and WSDOT executive management. Based on this initial analysis, adjustments in the list of potential alternatives were made to arrive at the three alternatives for implementing the ERP component of the program that were fully analyzed and are presented in this report. These three alternatives were then analyzed in detail based on a variety of factors and a preliminary recommendation established.

This detailed analysis and recommendation was then presented and validated with the project steering committee, WSDOT executive management, and key stakeholders from OFM and DIS.

3. Stage 3: Construct an implementation plan and feasibility study

During the third stage, an implementation plan was developed and a high-level business case was developed for the recommended alternative. This feasibility study report was then created in draft form and reviewed with project stakeholders. The final feasibility study report was then published for submission to the Washington State Legislature.

D. Project Governance

A project governance structure was established to guide the feasibility study effort with an executive sponsor, project executive, and a project steering committee with representation from across WSDOT and from key stakeholders outside the department.

Mr. Bill Ford, Assistant Secretary for Administration was the Executive Sponsor and Mr. Grant Rodeheaver, Director of Information Technology was the Project Executive. Mr. Noel Morgan of WSDOT's Office of Information Technology was the WSDOT Project Manager. Ms. Kristi Hubble of WSDOT's Office of Information Technology was the WSDOT Lead Analyst and day-to-day point of contact with the consultant project team for most of the project effort.

Exhibit III-2 provides a list of Critical Applications Implementation – Feasibility Study Steering Committee members.

**Exhibit III-2: Critical Applications Implementation – Feasibility Study Steering
Committee**

Steering Committee Member	Organization/Title
Washington State Department of Transportation	
Bill Ford	Assistant Secretary, Administration
Jon Bauer	General Manager, Transportation Data Office
John Broome	Director, Administrative Services
Bob Covington	Director, Division of Accounting and Financial Services
Jeff Carpenter	Director, Project Control and Reporting
Cindy Kay	Financial Systems Manager, Division of Accounting and Financial Services
Noel Morgan	Enterprise Implementation Manager, Office of Information Technology
Grant Rodeheaver	Director, Office of Information Technology
Brian Smith	Director, Strategic Planning and Programming
Tim Smith	Director, Terminal Engineering, Ferries Division
Doug Vaughn	Director, Budget and Financial Analysis
John Wynands	Assistant Region Administrator, Olympic Region
Office of Financial Management	
Sadie Hawkins	Senior Assistant Director of Accounting
Department of Information Services	
Tom Parma	Management Consultant, Management and Oversight of Strategic Technologies

IV. Proposed Solution



This section provides an overview of the proposed solution for the Critical Applications Replacement Program, followed by brief descriptions of each of the main components of the proposed solution. For several of the solution components where alternative approaches to providing the required functionality were evaluated by the study team, a brief discussion of the alternatives that were considered is provided, along with the recommended approach for providing the functionality and the rationale for the recommendation. The analysis of the alternatives for providing the ERP component of the solution is described in further detail in Section V of this report.

A. Overview of Proposed Solution

The proposed solution for the Critical Applications Replacement Program consists of an integrated Enterprise Resource Planning or ERP application and the enterprise Time, Leave, and Labor Distribution application, supplemented by commercial off the shelf (COTS) best of breed solutions where necessary to fill gaps in the ERP application offering.

SAP is assumed to be the ERP solution that will be implemented since this will leverage the state's current investment in this application suite. The Time, Leave, and Labor Distribution solution will be accomplished through a combination of a best of breed timekeeping solution and SAP for labor distribution. The other best of breed solutions are primarily needed to address specific State transportation business requirements such as transportation asset inventory, crash analysis, traffic demand analysis, and preconstruction management.

WSDOT's Primavera-based Project Management and Reporting System (PMRS) will provide project scheduling, tracking, and reporting tools. The Cost Manager component of Primavera will be extended to meet, in conjunction with the ERP application, the requirements for construction management.

Each of these functional applications will utilize a common location referencing system within the transportation asset management component to support the geospatial location of either the department's assets, or any events in the system, where events can range from a construction project to a vehicle crash to traffic counts. This also includes the capability to record and report on where financial expenditures take place by a geographic location, an asset or group of assets or other parameters.

This location referencing system will either be a best of breed solution or a custom solution, depending on how vendor capabilities mature prior to the implementation of this application. Currently, there is some concern on the part of WSDOT staff that the existing vendor capabilities cannot meet a number of the department's requirements.

The functional application components will also integrate with the department's existing geographic information system, which is based on ESRI tools.

The entire system solution will integrate with SAP's Business Warehouse that will provide the data warehouse, business intelligence, and management reporting capabilities of the solution. The SAP Business Warehouse is designed to tightly integrate with SAP applications. Integration with other application components will need to be developed as part of implementation activities.

Exhibit IV-1 illustrates the proposed WSDOT enterprise systems architecture. Exhibit IV-2 provides a mapping of the individual solution components to the functionality of the Critical Applications. Each component of the proposed solution is then described in the subsections below.

Exhibit IV-1: Overview of Proposed Solution for the Critical Applications Replacement Program

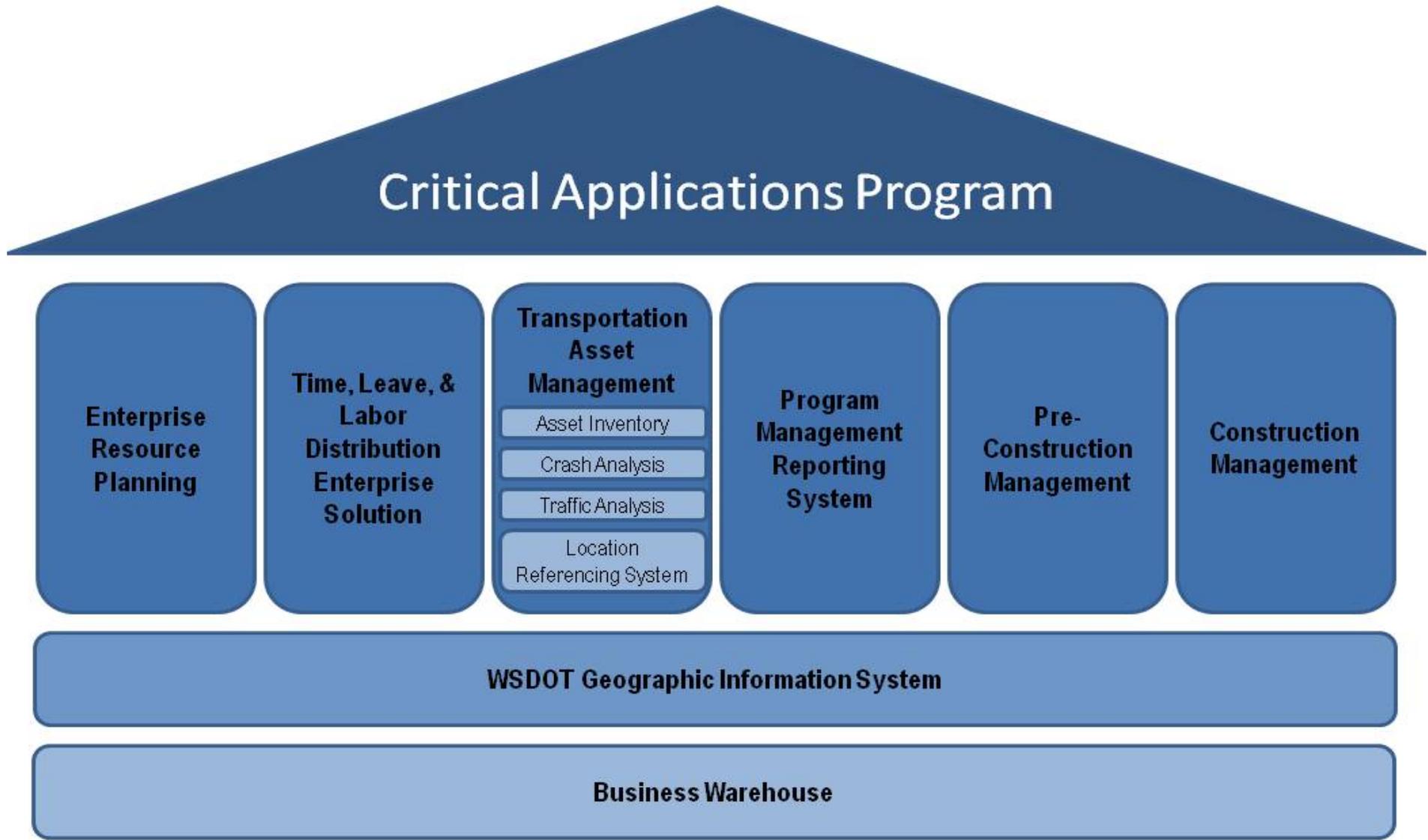


Exhibit IV-2: Mapping of Proposed Solution Components to the Scope of the Critical Applications

Performance Management and Budget	Asset Management	Project Management	Human Resources	Procure to Pay	Revenue Cycle	Cost Accounting	Financial Reporting and General Ledger
Performance Measurement & Management	Transportation Asset and Location Management	Project Design, Specification, Estimation & Review	Time & Attendance	Vendor Relationship Management	Customer Information & Outreach Management	Maintain Cost Allocation Plan	Manage Chart of Accounts
Management Reporting	Transportation Data Collection & Analysis	Right of Way Acquisition	Distribute Time & Attendance to Activities	Vendor Solicitation Management	Revenue Accounting	Manage Fully Loaded Costing (ABC)	General Ledger Accounting
Financial Projection and Modeling	Capital Asset Accounting	Contractor Prequal & Construction Contract Letting & Award		Order Management	Federal Aid & Other Grant Billing	Manage Billable Services	Fund Management
Budget Development & Management	Consumable Inventory Management	Construction Administration - Contracts & Change Management		Contract Management	Receipts Management	Manage Grants	Financial Reporting
Capital Budget Programming & Management	Asset Lifecycle Management	Project and Resource Scheduling & Coordination		Payables Accounting	Tolling Integration and Other High Volume Processes	Manage Sub-grants	

	ERP		Transportation Asset Mgmt		Preconstruction Mgmt
	ERP & Custom Extensions		Enterprise TLLD		Construction Mgmt
					PMRS

B. Enterprise Resource Planning (ERP) Application

An ERP application provides an integrated suite of software in which information is captured at its source and made available as required across various system functions. Exhibit IV-3 outlines some of the typical functions of an ERP solution for the public sector. These include financial management, asset management, human resource management, payroll, procurement and project management among others.

Exhibit IV-3: Typical Functions in an Enterprise Resource Planning (ERP) System for the Public Sector



An ERP system is a commercial off the shelf system that provides an integrated platform for most back-office applications. ERP systems are designed in a very different way than the mainframe systems of the past. They have proven to be invaluable in increasing integration of business processes and communications between departments. Additionally, they have been proven to enable businesses to reduce both the number of siloed systems and interface programs, as well as the reducing the overall requirement for technical support.

Data in an ERP is stored in modules, organized by functional area, such as Finance, Human Capital Management, and Supply Chain Management. Each module has its own menu and security set up, such that, for example, an accounting clerk would not have visibility to another agency employee’s salary data, and a payroll clerk would not be able to execute the accounts payable check run.

The value of the ERP design is that it enables visibility to key data that is integrated and available across many business functions. Position data is visible to the Human Resources, Payroll, and Accounting functions. People data is available to Accounts Payable, Accounts Receivable, Payroll, Projects, and Human Resources. The integration of accounting information with projects information enables immediate access to reporting data for project costing, and drilling down into the employees (and others, if kept in the system) who are assigned to those projects. When data is keyed into any module of the ERP system, by design it is immediately available to all modules for use in business operations and for reporting. This integration reduces the need for specialized data loads, interface programs, and reporting databases as more and more of the core business data is contained in one official system of record.

Exhibit IV-4 provides a partial list of ERP functionality organized by the modules or functionality groupings typically used by ERP software vendors.

Exhibit IV-4: Partial List ERP Functionality by Module

ERP Module	Functionality
Financials	Accounts payable Accounts receivable Budgeting Cash management Fixed assets Cost accounting General ledger and financial reporting
Human Capital Management	Workforce management/scheduling Applicant tracking Payroll and payroll tax processing Position management Compensation management Benefits administration Time and attendance



ERP Module	Functionality
Supply Chain Management	Inventory control Supply chain planning Supplier scheduling Claim processing Order entry and order management Purchasing
Projects	Costing Billing Activity management
Data Warehouse	Cross functional enterprise reporting

An ERP application was selected as the core element of the Critical Applications Replacement Program because it will provide a number of important benefits for WSDOT. These benefits include:

- Reduced operating costs through tighter integration of business processes
- Improved access to information resulting in:
 - Enhanced strategic planning and measurement of performance outcomes
 - Easier access to information and a single version of the truth
 - Improved credibility with policy makers and other stakeholders
- A simplified IT environment as a result of the decommissioning of numerous silo systems and replacement of these systems with a single integrated application

1. ERP Implementations in Washington state government

The Department of Personnel (DOP) selected the SAP ERP suite as the core of its Human Resource Management System (HRMS). DOP implemented SAP’s human capital management and payroll functionality, along with partial implementations of its general ledger and accounts payable functionality in 2005.

The Department of Natural Resources (DNR) implemented SAP’s real estate management, accounts receivable, and general ledger functionality to support management of its land leasing program in 2006.

2. OFM Roadmap

OFM, DOP, General Administration (GA), and DIS, with participation from a number of operating agencies including WSDOT, have been developing a blueprint for statewide financial systems. One alternative for implementing this Roadmap has been based on utilizing an ERP model. Roadmap is intended to achieve the following objectives:

- Increase the internal integration of statewide financial systems and integration with unique agency financial systems
- Enhance the efficient application, distribution, and reporting of financial data
- Provide clear guidance as to scope and boundaries for new financial systems and policies
- Establish clear financial information standards
- Maximize access to financial information by all customers

The implementation schedule for the OFM Roadmap is currently unclear due to the impact of budget constraints. This has complicated the assessment of how the OFM Roadmap can meet WSDOT's ERP requirements for the Critical Applications Replacement Program.

3. ERP Alternatives Considered

The study team evaluated three alternatives in detail for providing the ERP component of the Critical Applications Replacement Program. These alternatives included:

- **Alternative 1:** Utilize OFM's planned Roadmap initiative
- **Alternative 2:** Implement an agency level ERP application, in close collaboration with OFM, DIS, and representatives of other state agencies, that can serve as the first phase of a statewide ERP
- **Alternative 3:** Implement the latest release of WSDOT's current financial management software to provide an interim solution for agency financial and procurement requirements

The study team is recommending Alternative 2, which would involve the implementation of an SAP ERP solution to meet WSDOT requirements but which would be the first phase of a statewide ERP, with other state agencies adopting this solution in the future as the enterprise ERP application. This alternatives analysis, a discussion of the recommended approach and the rationale for this recommendation is described in detail in Section V of this report.

C. Enterprise Time, Leave, and Labor Distribution (TLLD) Application

This subsection describes the primary elements of the proposed Time, Leave, and Labor Distribution solution. This solution was conceptualized through a feasibility study completed during the 2007-2009 biennium by WSDOT and DNR in collaboration with OFM and DOP.

1. Scope of Solution Component

The implementation of the new Time, Leave, and Labor Distribution application will be based on, and support, a substantial shift in business processes, as the work of entering time and leave information will become the responsibility of the employees instead of timekeepers in the different business units. Managers and supervisors will then approve time on-line through a



workflow driven approval process. Managers and supervisors will also maintain employee schedules on-line, as well as certain position and employee data required for timekeeping.

The Time, Leave, and Labor Distribution application will support the following business processes:

- Maintaining foundational timekeeping data including the ongoing management of work schedules, pay types, shifts, and other employee data needed to support timekeeping.
- Managing leave requests and approvals including employee submission of leave requests on-line, with a workflow driven approval process for managers and supervisors.
- Capturing employee time data including doing so through predefined online templates and other time capture devices. This includes integration with time collection devices such as kiosks or personal data assistants to support time capture from field staff.
- Reviewing and approving employee time data through on-line, workflow driven procedures.
- Managing and reporting on employee time data to support analysis and predict staffing and scheduling requirements.
- Allocating human capital and related costs to various cost activities.
- Managing and tracking equipment usage.
- Providing an enhanced application and technical architecture including:
 - Extensive use of work-flow driven review processes, with electronic sign-offs and approvals
 - Role based security
 - Improved internal controls over time-keeping and labor distribution processes
 - Detailed audit trails of changes to system information including master data, business rules, and employee time and leave data

2. Alternatives Considered

The WSDOT and DNR Time, Leave, and Labor Distribution feasibility study team analyzed three potential alternatives in detail for implementing the new application. These three alternatives are:

- **Alternative 1: Utilize SAP** - This is the SAP-based alternative, which is intended to leverage the state's existing investment in SAP technology. It utilizes SAP core functionality and extends the SAP capabilities implemented for HRMS to perform the time capture and labor distribution functionality. Under this alternative, the native SAP application will be supplemented by two SAP co-developed solutions to provide some limited additional time



capture capabilities. Under this alternative, however, any integration with time capture devices such as a kiosk, personal data assistant or a badge reading system would require custom program extensions.

- **Alternative 2: Utilize a third party best of breed solution to perform the required functions** - This is the best of breed alternative in which time and leave processing and labor distribution takes place in a best of breed product, which is integrated with the existing HRMS application. A number of the best of breed applications have supported integration with a range of time capture devices. Some of the best of breed applications have labor distribution functionality included as part of their out of the box solution, but may require custom program extensions to fully meet DNR and WSDOT's requirements. For some best of breed applications, however, the labor distribution functionality would be entirely a customization. In addition, this alternative would require design and development of data integration architecture with the existing HRMS application.
- **Alternative 3: Utilize a third party best of breed solution for timekeeping and leave processing, and perform labor distribution in SAP** - This alternative is a hybrid of the first two alternatives. In this scenario, time and leave processing is performed in the best of breed solution, while labor distribution is performed in SAP. This alternative will provide supported integration with a number of time collection devices. At the same time, the labor distribution functionality can be performed using core SAP functionality, avoiding customizations, which may be required under Alternative 2. In addition, several of the best of breed applications have supported integration with SAP reducing the risk of integrating with SAP and HRMS. Likewise, this approach is a proven solution as a number of large organizations including the Commonwealth of Pennsylvania for its enterprise SAP application have implemented a best of breed timekeeping solution as a front-end to SAP.

3. Recommended Approach

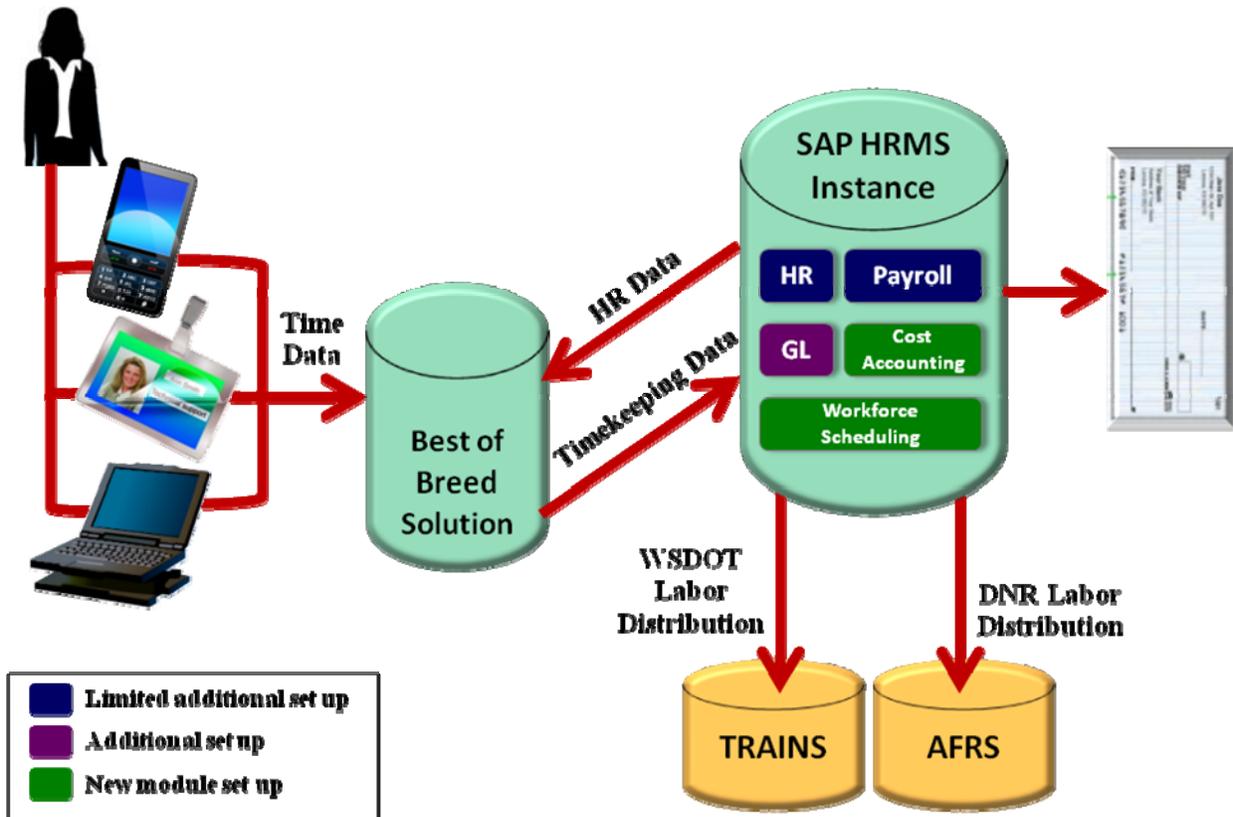
A hybrid solution consisting of a combination of a best of breed solution for timekeeping and SAP for labor distribution processing was adopted as the recommended approach for the Time, Leave, and Labor Distribution application.

Under this approach, the Time, Leave, and Labor Distribution application will consist of a best of breed timekeeping front end to capture time and perform leave processing, with labor distribution processing performed in SAP. The Time, Leave, and Labor Distribution application will be tightly integrated with the state's existing HRMS application, which is responsible for payroll processing. It will also interface with WSDOT's TRAINS application (until the ERP component is deployed) and the Automated Agency Financial Reporting System (AFRS), the state's current financial system to support labor distribution reporting for other state agencies.

Exhibit IV-5 provides a conceptualization of the new enterprise Time, Leave, and Labor Distribution application. While this diagram shows the interface to the current WSDOT TRAINS financial system, this interface would be needed on an interim basis only pending implementation of the proposed ERP application.



**Exhibit IV-5: Conceptual Overview of the Proposed Time, Leave, and Labor Application
Using a Hybrid Solution**



This hybrid approach for Time, Leave, and Labor Distribution was selected by the DNR and WSDOT feasibility study team for a number of reasons:

- The hybrid approach meets most of the timekeeping requirements as delivered, resulting in few custom extensions being required. This hybrid approach also provides supported integration with a number of time collection devices. At the same time, the labor distribution functionality can be provided using core SAP functionality, avoiding customizations that would be required with a best of breed solution. In addition, several of the best of breed applications have supported integration with SAP reducing the technical complexity and risk of integrating with SAP and HRMS.
- A solution using only SAP modules and certain SAP co-developed add-on tools to support time collection would have required significant customization to meet the requirements of WSDOT and other state agencies, including the need for custom integration with various time capture devices such as kiosks to support time collection from field staff.
- Best of breed solutions meet most of the state’s timekeeping requirements as delivered and provide supported integration to time collection devices. However, the labor distribution functionality would need to be partially customized or entirely customized in a best of breed solution. In addition, an integration approach with SAP and HRMS would need to be developed.

- The hybrid approach is a proven solution as a number of large organizations including the Commonwealth of Pennsylvania for its enterprise SAP application have implemented a best of breed timekeeping solution as a front-end to SAP.
- By using SAP for labor distribution, the hybrid solution design lays the groundwork for the ERP application and it fully supports the Governor's vision for shared services environments.
- The hybrid solution provides the state with its best opportunity to maximize the potential benefits from the Time, Leave, and Labor Distribution application. It provides the opportunity to fully eliminate any entry of timesheets by timekeepers through supporting out of the box integration with various time capture devices. Likewise, the vendor-supported integration between the timekeeping best of breed solution and SAP, will substantially reduce the manual and time consuming reconciliation issues that currently exist between WSDOT's two timekeeping applications and HRMS.

D. Transportation Asset Management

The Transportation Asset Management application component provides an integrated inventory of the assets on WSDOT's transportation network. It also includes a set of robust analysis tools that support needs identification and other analysis utilizing data in the asset inventory, in conjunction with other information such as condition data, crash records, and traffic counts.

The functionality of this application includes four distinct sub-components:

- Asset inventory
- Location referencing system
- Crash analysis tools
- Traffic analysis tools

Each of these sub-components is described briefly below, followed by a discussion of the alternatives considered for providing this functionality and a description of the recommended approach.

1. Asset Inventory

The asset inventory function includes a complete, detailed inventory of the linear and point assets existing on the transportation network. This function will replace the roadway inventory application currently in TRIPS, as well as allow for decommissioning of a number of other standalone asset inventory databases. This asset inventory would store inventory and attribute information on a range of asset types including but not limited to:

- Barriers
- Culverts

- Detectors
- Guardrails
- Mitigation sites
- Pavement markings and treatments
- Roadside features
- Roadway lighting
- Signs
- Signals
- Supports and structures for signs, signals, and lighting

The asset inventory function will also provide the following capabilities:

- Support for locating assets via multiple geo-referencing strategies
- A means of capturing the history of the conditions of each asset and of creating management reports comparing current or historical conditions against levels of service for various organizational units within WSDOT
- A means of capturing treatments performed on each asset and integrating with/updating condition data based on treatments performed
- Support for integrating with data capture tools to maintain a current asset inventory and condition history
- Performance-based budgeting capabilities based on the work required to move from the average current condition for an asset type to the targeted level of service for an asset type
- Life-cycle cost modeling, needs identification, trade-off analysis, and project prioritization within an asset class
- Construction history for an asset
- Major maintenance history for an asset

In addition, while not specifically included in the scope of the Critical Applications Implementation Feasibility Study effort, this function could also be extended at a moderate incremental cost to provide support for a new highway maintenance management system that was recommended by the 2007 WSDOT Administrative and Overhead Performance Audit. Best of breed solutions available in the market place to perform the asset management functions in the scope of the Critical Applications Replacement Program also typically provide the planning, scheduling, and work order management functionality needed to support WSDOT's highway maintenance operations. Colorado, Louisiana, North Carolina, Pennsylvania, and Wyoming have all chosen to address their needs for a highway maintenance management system in parallel with their ERP and/or Transportation Asset Management applications using a combination of the ERP and Transportation Asset Management software solutions to perform this function.

2. Location Referencing System (LRS)

The Location Referencing System (LRS) is a service module that will provide location reference and location validation capabilities to the ERP and other WSDOT applications. Some of the key requirements of this service utility include:

- Allow WSDOT staff to create and maintain line work (roadway geometry) both dynamically and in a batch mode
- Support multiple location reference methods including geospatial referencing and WSDOT's existing county, route, and milepost referencing scheme
- Support translation and transformation between multiple location reference methods
- Translate back and forth between single-line representation and dual-line representation of the transportation network and allow for locating data on both representations
- Provide the ability to determine various jurisdictions for any particular location such as federal and state political boundaries, city, county, etc.
- Incorporate temporal location references that support obtaining a view of the transportation network at a snapshot point in the past including locations, names, and descriptions
- Support temporal topology such as reversible lanes or other items that change based on time of day

3. Crash Analysis Tools

The crash analysis subcomponent consists of a set of analytical tools to allow WSDOT to identify safety needs by integrating data available in the asset inventory application and the existing Collision Location Analysis System (CLAS). Key requirements for the crash analysis function include:

- Support identification of high crash locations by various criteria including:
 - All accidents in a given time period
 - Types of accidents (car, motorcycle, truck, pedestrian, bicycle, etc.)
 - Severity
 - Other user defined criteria
- Spatially display results sets from these ad-hoc queries by integrating with WSDOT's GIS Workbench
- Allow a user to dynamically create collision diagrams for crashes identified by the analysis tools using either pre-defined or user-defined schematics

- Support drill-down to the actual crash report data in the Collision Location Analysis System and display available information in the crash report based on user security
- Aggregate, classify, and support publication of crash data by various criteria for distribution to authorized partners
- Provide web-based access to the crash analysis capabilities for authorized partners

4. Traffic Analysis Tools

This is a set of tools that facilitates performing traffic demand analysis by integrating asset information with traffic data collected by WSDOT. Traffic data is typically collected by WSDOT using one of two methods: permanent data collection sites obtain traffic data through imbedding sensors in the roadway and connecting them to specialized computers that continuously capture traffic data, and short-term collection sites are temporary data collection efforts such as tallies of visually observed vehicles or counts obtained through the temporary installation of traffic data collection equipment. The traffic information obtained through these data collection processes such as traffic volume, vehicle classification, speed, and weight data is then integrated with asset inventory information through the location referencing system and stored for analysis.

The traffic analysis toolset implemented through the Critical Applications Replacement Program will:

- Maintain inventory and attribute information about both permanent and short-term data collection sites
- Support analysis of data collected from permanent and short-term data collection sites
- Allow analysis of the WSDOT transportation network by a variety of factors including roadway volumes, speed, vehicle classification, length classification, and weight
- Support reporting required by the Federal Highway Administration's (FHWA) Highway Performance Management System (HPMS)
- Support publishing of traffic data to partner agencies
- Support web-based access to traffic analysis capabilities for authorized partners

5. Alternatives Considered

WSDOT completed a detailed feasibility study for this Transportation Asset Management component during the 2007-2009 biennium. This study was known as the Transportation Information Planning and Support System (TRIPS) Replacement Feasibility study since part of the functionality of this component will replace capabilities provided today by the existing TRIPS application.

Dye Management Group, Inc. in conjunction with the TRIPS feasibility study core team and the project steering committee identified three alternative approaches for implementing a new transportation asset management application. These three alternatives are presented below:

Alternative 1:

- Custom develop the linear referencing system and the roadway inventory/asset management system. Existing WSDOT TRIPS data marts would be retained for data retrieval.
- Utilize a COTS solution for traffic analysis.
- Utilize one or more COTS solutions with custom extensions for crash analysis.

Alternative 2:

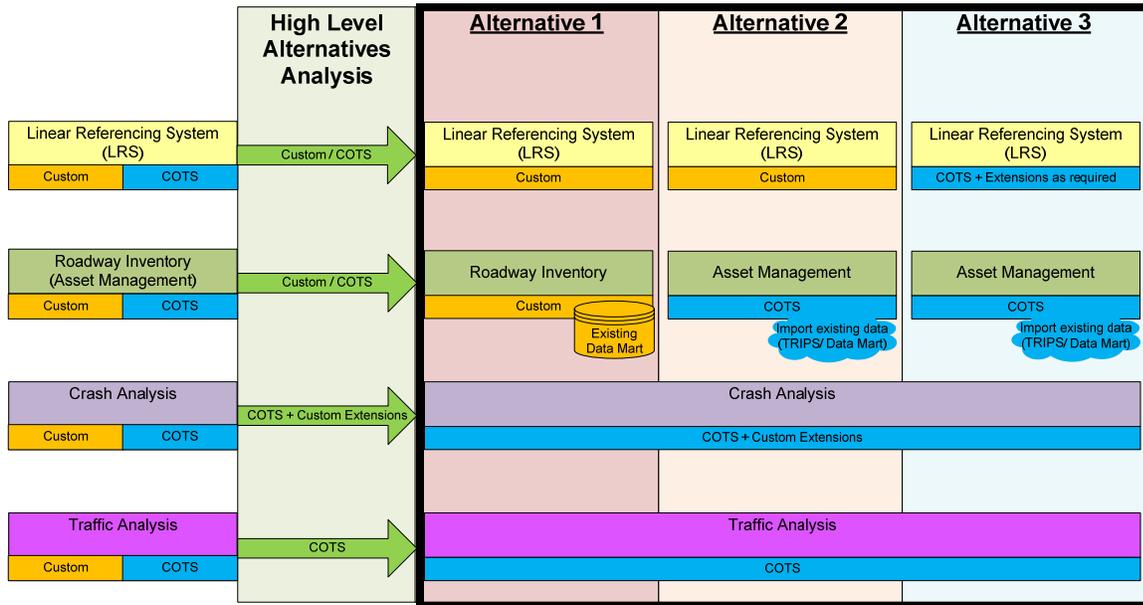
- Custom develop the linear referencing system.
- Implement a COTS transportation asset management solution to provide the required roadway inventory functionality currently in TRIPS. Import data from existing TRIPS data marts into the replacement system.
- Utilize a COTS solution for traffic analysis.
- Utilize one or more COTS solutions with custom extensions for crash analysis.

Alternative 3:

- Implement a COTS transportation asset management solution and any custom extensions (if required) to provide the linear referencing and roadway inventory functionality. Import data from existing TRIPS data marts into the replacement system.
- Utilize a COTS solution for traffic analysis.
- Utilize one or more COTS solutions with custom extensions for crash analysis.

Exhibit IV-6 provides an overview of the alternatives listed above.

Exhibit IV-6: Alternatives Considered for Providing Transportation Asset Management Functionality



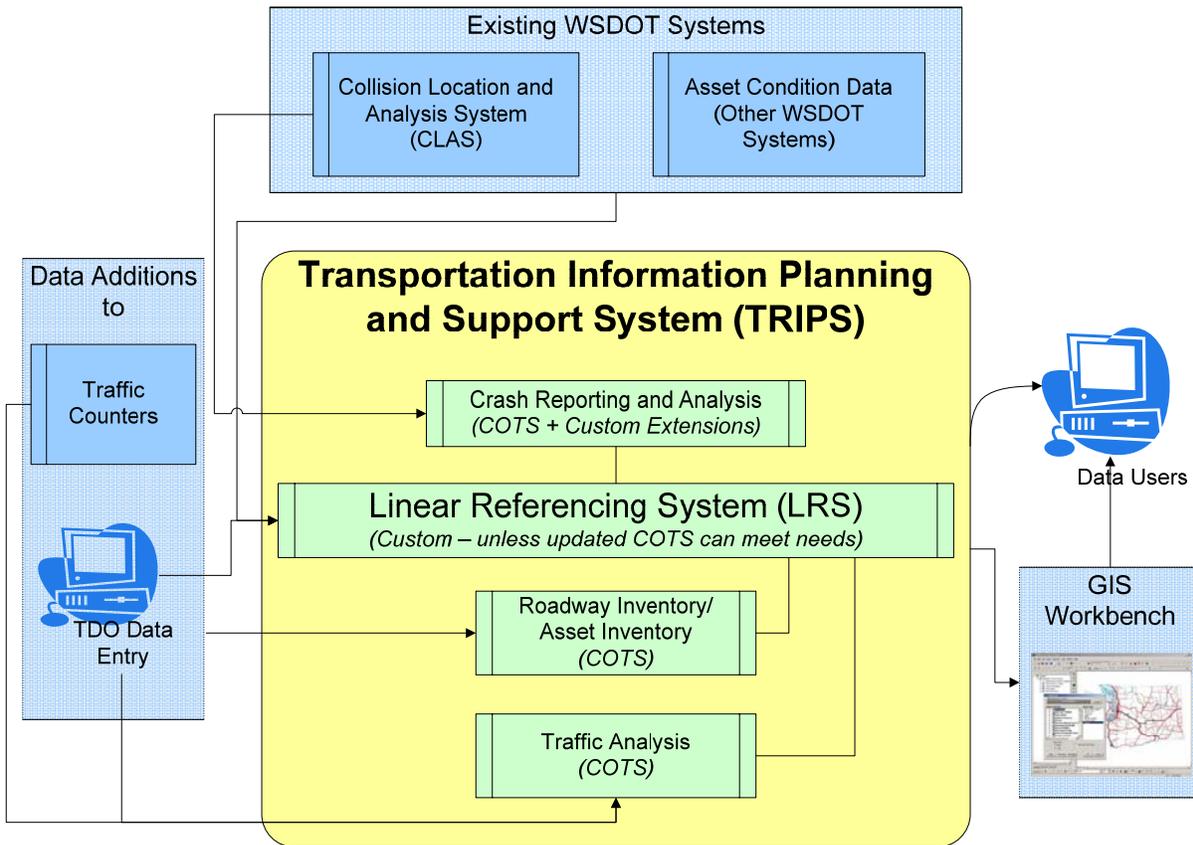
6. Recommended Approach

Based on the analysis performed by the Transportation Information Planning and Support System Replacement feasibility study team, the Transportation Asset Management capabilities will be provided as follows:

- Asset inventory and traffic analysis capabilities will be provided by best of breed solutions. There are multiple commercially available solutions that will meet the needs of WSDOT for these functions.
- Crash analysis will be provided by one or more best of breed solutions, with custom extensions and custom integration between the best of breed components. Our market research suggests that while there is a range of commercially available crash analysis solutions, more than one solution may be required to fully meet WSDOT's requirements. In addition, some customization of one or more of these best of breed solutions or some custom integration of the various commercially available solutions will likely be required to meet WSDOT's requirements.
- The location referencing system will be provided by a custom solution unless best of breed solutions have matured to the point where they are able to provide all or most of WSDOT's requirements. Based on the market research activities performed during this study and the more detailed analysis of the replacement of the TRIPS application, there is some concern on the part of WSDOT staff that the current vendor best of breed offerings cannot meet a number of WSDOT's requirements.

Exhibit IV-7 illustrates the recommended conceptual architecture of the Transportation Asset Management component of the Critical Applications program.

Exhibit IV-7: Proposed Conceptual Architecture for the Transportation Asset Management Component of the Critical Applications Replacement Program



E. Project Management Reporting System (PMRS)

WSDOT’s Project Management and Reporting System (PMRS) will provide the project scheduling, project resourcing, and project tracking tools capabilities for the capital construction program. At the time of this report, the PMRS application is currently being deployed. PMRS will integrate with the project budgeting and project costing components of the ERP to provide an integrated snapshot of a project’s financial and schedule status.

The feasibility study team did assess the potential for meeting all of WSDOT’s project management requirements through the ERP application. However, the project management capabilities available in the SAP ERP application are much more generalized versus being specifically tailored to support a highway construction program. Meeting WSDOT’s project management requirements entirely through the SAP ERP application would have required significant configuration and customization of the SAP Projects module whereas WSDOT has already invested in tailoring the Primavera tools that are part of PMRS to meet these business requirements. PMRS, however, was not designed to be a project budgeting or project costing tool and these functions will be performed by the ERP application.

F. Preconstruction Management

The preconstruction management component of the Critical Applications Replacement Program supports the development and cost estimating of a project concept; preparation of the bid package for the project; the receipt of bids for a project; and the letting and award of the construction contract. It also includes managing prequalification and other information about potential bidders on construction contracts. The preconstruction management component includes the following capabilities:

- Manage the bid item master
- Update and publish standard specifications
- Maintain contractor and subcontractor information
- Manage contractor prequalification
- Prepare planning and scoping level estimates for a project
- Prepare the detailed engineer's estimate of the cost of a project
- Manage development of plans and specifications for a project
- Prepare proposals to obtain bids for a project
- Manage the letting and award process including publishing the proposals for bidding by vendors, receiving bids electronically or on paper and performing initial analysis of the bids for compliance with department policies
- Conducting various historical bid analyses
- Maintaining historical bid prices by item and location and other factors to support pricing construction change orders and preparing future project estimates
- Support various contractor self-service capabilities such as the ability to submit required pre-qualification information electronically

Based on the market research performed during the Critical Applications Replacement feasibility study, the SAP ERP procure to pay functionality will not meet a number of the transportation specific requirements of the preconstruction management function. This includes preparing high-level and detailed cost estimates, performing various bid analyses and some elements of the specification and proposal development process.

To address these gaps, the study team recommends that WSDOT utilize a best of breed product known as Trns•port for the preconstruction management component and tightly integrate this best of breed solution with the procure to pay capabilities of the ERP. Trns•port is marketed by the American Association of State Highway Transportation Officials (AASHTO) as part of its joint development software program to provide specific transportation software solutions to meet the common needs of its members. Trns•port is a modular program providing support for both preconstruction and construction functions. Currently, more than 41 state departments of transportation utilize at least one module of Trns•port.

G. Construction Management

The construction management component supports WSDOT's management of the construction contract from contract award through completion of construction and project closeout. Required capabilities include:

- Set-up and manage contract information
- Prepare a materials sampling and testing plan for the project to identify and track required testing activities
- Prepare daily diaries to record contractor work activity
- Generate progress estimates for periodic payments to contractors reflecting work completed to date
- Establish and manage contractor force accounts
- Document and support tracking of the review and approval of contract change orders
- Document and track resolution of project issues
- Track contractor compliance with civil rights requirements
- Prepare contractor's final estimate
- Support project close-out
- Provide a variety of contractor self-service capabilities including submitting a number of required documents electronically, reviewing status of progress payments, reviewing status of change orders, and viewing various approved project documentation

The Critical Applications Implementation Feasibility Study evaluated two potential approaches for meeting the required construction management functionality:

- Utilizing a best of breed product such as the SiteManager component of AASHTO's Trns•port application
- Extending the Primavera Cost Manager component of PMRS, in conjunction with the contracts management capabilities of the ERP application

Based on the fit/gap analysis of PMRS and market research of vendor offerings conducted during the Critical Applications Implementation Feasibility Study, the contracts management capabilities of the ERP and the existing PMRS application, with additional configuration of the Primavera Cost Manager module, should meet the requirements for this capability. This approach leverages both the ERP application and WSDOT's existing investment in PMRS and Primavera tools.

H. WSDOT Geographic Information System (GIS)

This component is based on leveraging and integrating WSDOT's existing ESRI-based GIS environment and WSDOT's GIS Workbench application to support managing and reporting on

all types of system data spatially. GIS integration will allow for easy access to financial, project, and asset information by numerous location-based criteria including highway segment or segments, counties, cities or other jurisdictions, and political boundaries such as Senate, House, and Congressional districts among others. GIS integration capabilities will include:

- Spatially mapping and displaying within the GIS environment a specific data item such as the boundaries of a project or proposed project; an asset on the transportation network; a vehicle crash event; or other items stored in the ERP or other application components
- Spatially displaying the results of any pre-defined reports within the ERP or other application components
- Allowing users to perform ad-hoc queries in the ERP or other application components and displaying the results of these queries spatially

I. Business Warehouse

The Business Warehouse will provide the business intelligence, management reporting, and statistical analysis capabilities of the system. The Business Warehouse component will have the following capabilities:

- Pre-defined reports
- Ad-hoc query capabilities
- Metadata modeling capabilities to maintain attribute information about the data in the business warehouse
- Pre-built integration with the ERP application
- Extract, transform and load utilities for developing integration with other systems

This capability will be provided by SAP's Business Information Warehouse solution that has pre-built integration with the SAP ERP suite. This will replace many of WSDOT's existing data marts, while integrating with those that remain to provide the agency's full data warehouse capability.

The SAP Business Information Warehouse is comprised of three distinct functional components:

- **Data Warehousing** - The data-warehousing component is focused on the integration, transformation, and storage of the data. Data modeling, extraction, and administration are the key processes of data warehousing.
- **Business Intelligence Platform** - The SAP Business Intelligence component provides the technological infrastructure for the analytical function of the data warehouse. These functions include:
 - Online Analytical Processing which configures the data to perform complex analytical and ad-hoc queries with a rapid execution time



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- Metadata repository, which maintains data about the data in the business warehouse
 - Business planning and simulation
 - Data mining
 - Reporting agent, which is the report engine for pre-defined system-generated reports
- Business Intelligence Suite - The SAP Business Intelligence suite provides the end-user querying, reporting, and analysis tools.

V. Alternative Approaches Considered for Implementing the ERP Application



This section describes the three implementation alternatives evaluated for moving forward with the ERP component of the Critical Applications Replacement Program. It outlines the evaluation criteria used to assess the degree of fit of each alternative and provides a summary of the analysis conducted. It then documents the team's recommendation to proceed under Alternative 2 and the rationale for this recommendation.

A. ERP Alternatives Analyzed

WSDOT evaluated three alternatives for proceeding with the ERP component of the Critical Applications Replacement Program. These included:

- **Alternative 1:** Utilize OFM's planned Roadmap initiative as the core of the solution, supplemented by additional ERP modules and best of breed applications where necessary. This alternative would be dependent on OFM's project schedule for delivery of the statewide Roadmap solution. In the interim, WSDOT would focus its efforts on those systems such as transportation asset management, preconstruction management, and construction management that would not be included in the scope of the Roadmap project and thus WSDOT's responsibility to develop.
- **Alternative 2:** Implement an agency level ERP application that can serve as the first phase of a statewide ERP, with additional best of breed applications as required. This implementation approach would be accomplished through close collaboration with OFM, DIS, and representatives of other state agencies to establish a solid enterprise design for the ERP solution. This solution would support the future migration of the ERP application to other state agencies and its adoption as the statewide enterprise solution envisioned by the OFM Roadmap project.
- **Alternative 3:** Implement the latest release of WSDOT's current financial management software to provide an interim solution for agency financial and procurement requirements, along with additional best of breed applications as required.

Each of these alternatives is described in further detail in the sections below, followed by a comparison of the three alternatives, a discussion of the recommended approach and the rationale for this recommendation.

B. Alternative 1-Utilize OFM's planned Roadmap initiative as the core of the solution

This alternative involves WSDOT implementing the ERP application envisioned as part of the OFM Roadmap project. Timing of WSDOT's implementation of the ERP component of the

Critical Applications Replacement Program would be dependent on OFM's delivery schedule of a fully integrated solution.

The fit/gap analysis conducted by the team of the Roadmap solution indicated some gaps in which the Roadmap as currently scoped will not support business functions required by WSDOT. It is assumed that the Roadmap team will add these modules to their implementation scope at WSDOT's request, but the full implementation costs of these modules would be the responsibility of WSDOT. In addition, there are some functions where, based on the experience to date of other state departments of transportation, it is believed significant customization of the ERP will be required to meet WSDOT functionality. Examples are federal-aid billing, the needs identification and project prioritization process and the capital budget development or transportation programming process. It is assumed that the cost of these customizations would also be the responsibility of WSDOT.

Exhibit V-1 outlines the approach for supporting each of the Critical Applications business functions under a Roadmap ERP solution. This exhibit depicts those functions supported by the Roadmap ERP modules within the original Roadmap project scope in a golden-rod color. It depicts business functions that would require additional ERP modules added to the Roadmap scope to support WSDOT requirements in pink and business functions where significant custom program extensions to the ERP modules will be required in purple. This exhibit also shows in light red the functions supported by the Time, Leave, and Labor Distribution module; the functions provided by the transportation asset management module in an aqua color; functions provided by the PRMS application in light green; and the functions provided by the preconstruction management application in gray and the construction management application in dark green.

Exhibit V-1: Solution Mapping for Alternative 1: Roadmap ERP

Performance Management and Budget	Asset Management	Project Management	Human Resources	Procure to Pay	Revenue Cycle	Cost Accounting	Financial Reporting and General Ledger
Performance Measurement & Management	Transportation Asset and Location Management	Project Design, Specification & Review	Time & Attendance	Vendor Relationship Management	Customer Information & Outreach Management	Maintain Cost Allocation Plan	Manage Chart of Accounts
Management Reporting	Transportation Data Collection & Analysis	Right of Way Acquisition	Distribute Time & Attendance to Activities	Vendor Solicitation Management	Revenue Accounting	Manage Fully Loaded Costing (ABC)	General Ledger Accounting
Financial Projection and Modeling	Capital Asset Accounting	Contractor Prequal & Construction Contract Letting & Award		Order Management	Federal Aid & Other Grant Billing	Manage Billable Services	Fund Management
Budget Development & Management	Consumable Inventory Management	Construction Administration - Contracts & Change Management		Contract Management	Receipts Management	Manage Grants	Financial Reporting
Capital Budget Programming & Management	Asset Lifecycle Management	Project and Resource Scheduling & Coordination		Payables Accounting	Tolling Integration and Other High Volume Processes	Manage Sub-grants	
Includes: •Identify & Record Infrastructure Needs •Project Evaluation/Selection •Balance Projects & Funding to Build Programs & Budgets •STIP	Includes: •Fleet Management •Facilities Management	Project Accounting & Budget Management & Reporting					

	Roadmap ERP		ERP & Custom Extensions		Enterprise TLLD		Construction Mgmt
	ERP Modules		Transportation Asset Mgmt		Preconstruction Mgmt		PMRS

C. Alternative 2-Implement an agency level ERP application that can serve as the first phase of a statewide ERP

This alternative involves WSDOT implementing an agency level ERP that is designed to become the enterprise ERP for the state. WSDOT would execute this project, in close collaboration with OFM, DIS, and representatives of other state agencies. The end solution would ideally be centrally supported by a SAP/Enterprise Systems Center of Excellence function.

OFM and DIS staff would likely be on the project team and staff from other state agencies would be invited to participate on a part-time basis in workshops and design discussions to ensure that the resulting applications can be adopted as the enterprise solution. Some of the project activities in which other agencies would likely be involved are in an advisory role for the selection of the systems integrator; as participants in workshops and software configuration and validation sessions during enterprise design; and as participants in some parts of user acceptance testing.

Alternative 2 is very similar to Alternative 1 in terms of how each business function is supported by the ERP; which functions require custom extensions to the ERP; and the functions supported by the various best of breed modules. The key difference between Alternative 1 and Alternative 2 is that all required ERP modules are defined as part of the original project scope since they would be needed to meet specific WSDOT requirements.

Exhibit V-2 outlines the approach for supporting each of the Critical Applications business functions under an initial implementation of the statewide ERP for WSDOT. This exhibit depicts those functions supported by ERP modules in a golden-rod color. It depicts business functions that would require significant custom program extensions to the ERP modules in purple. This exhibit also shows in light red the functions supported by the Time, Leave, and Labor Distribution module; the functions provided by the transportation asset management module in an aqua color; functions provided by the PRMS application in light green; and the functions provided by the preconstruction management application in gray and the construction management application in dark green.



Exhibit V-2: Solution Mapping for Alternative 2: Agency ERP as First Phase of a Statewide ERP

Performance Management and Budget	Asset Management	Project Management	Human Resources	Procure to Pay	Revenue Cycle	Cost Accounting	Financial Reporting and General Ledger
Performance Measurement & Management	Transportation Asset and Location Management	Project Design, Specification, Estimation & Review	Time & Attendance	Vendor Relationship Management	Customer Information & Outreach Management	Maintain Cost Allocation Plan	Manage Chart of Accounts
Management Reporting	Transportation Data Collection & Analysis	Right of Way Acquisition	Distribute Time & Attendance to Activities	Vendor Solicitation Management	Revenue Accounting	Manage Fully Loaded Costing (ABC)	General Ledger Accounting
Financial Projection and Modeling	Capital Asset Accounting	Contractor Prequal & Construction Contract Letting & Award		Order Management	Federal Aid & Other Grant Billing	Manage Billable Services	Fund Management
Budget Development & Management	Consumable Inventory Management	Construction Administration - Contracts & Change Management		Contract Management	Receipts Management	Manage Grants	Financial Reporting
Capital Budget Programming & Management	Asset Lifecycle Management	Project and Resource Scheduling & Coordination		Payables Accounting	Tolling Integration and Other High Volume Processes	Manage Sub-grants	
Includes: •Identify & Record Infrastructure Needs •Project Evaluation/Selection •Balance Projects & Funding to Build Programs & Budgets •STIP	Includes: •Fleet Management •Facilities Management	Project Accounting & Budget Management & Reporting					

	ERP		ERP and Additional COTS		Modify ERP to Support		Statewide TLLD		Additional COTS
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D. Alternative 3-Implement the latest release of WSDOT's current financial management software solution to provide an interim solution

This solution envisions implementing the current release of the CGI AMS Advantage software. The CGI AMS Advantage solution is the software on which TRAINS, WSDOT's current accounting and financial system, was originally based before being heavily customized. The most current production version of the CGI AMS Advantage software is being implemented by CalTrans as an interim solution pending the development of the California statewide financial system.

This implementation alternative would provide a significant increase in functionality for WSDOT. It would also provide WSDOT staff with a more user-friendly, robust, state of the art financial and procurement system. Likewise, there could be some organizational change management and user training advantages as the new version of the CGI AMS software uses much of the same terminology as the current TRAINS application. In addition, this alternative would require significantly less customization to support federal-aid billing or transportation programming. These are relatively strong elements in the Advantage software solution.

There are some functional gaps, however, between the CGI AMS solution and the business functions WSDOT would like to support through an ERP. This would necessitate implementing some additional best of breed modules. One example of an additional best of breed module would be to support facilities and equipment management as this capability is not included within the capabilities of the Advantage software. In addition, a third party contracts management function such as AASHTO Trns•port SiteManager would likely be needed for the construction management component versus using the ERP module in conjunction with Primavera's Cost Manager software.

Exhibit V-3 outlines the approach for supporting each of the Critical Applications business functions under this alternative including those functions supported by the Advantage solution and best of breed solutions. This exhibit depicts those functions supported by the Advantage software in a golden-rod color. Business functions for which additional best of breed software solutions will be required because of gaps in the Advantage software are depicted in pink. It depicts business functions that would require significant custom program extensions to the Advantage software in purple. This exhibit also shows in light red the functions supported by the Time, Leave, and Labor Distribution module; the functions provided by the transportation asset management module in an aqua color; functions provided by the PRMS application in light green; and the functions provided by the preconstruction management application in gray.

Exhibit V-3: Solution Mapping for Alternative 3: Implement Latest Release of WSDOT's Current Financial Management Solution



E. Evaluation Criteria

Each of the three ERP alternatives was analyzed against a set of evaluation criteria agreed to by the Critical Applications Implementation – Feasibility Study Steering Committee. Each of the evaluation criteria are described briefly below.

- **Degree of fit with WSDOT business requirements** – This criterion refers to the extent to which an alternative meets WSDOT’s business requirements for the ERP component without requiring additional best of breed components or significant customizations.
- **Degree of fit with state/agency strategic business direction** – This criterion refers to the extent to which the alternative is aligned with State of Washington and WSDOT business objectives and strategic plans and this includes support for implementation of the Governor’s shared services goals.
- **Cost to develop** – This criterion is based on the cost to configure and implement each of the alternatives and includes the cost of software licenses; software maintenance during the project period; the development of any custom program extensions or interfaces required; hardware and operating system software; the systems integrator and the state resources on the project team among other items.
- **Life cycle costs/total cost of ownership** – This criterion is based on a comparison of the cost of supporting the system over its lifecycle. For purposes of this analysis, the cost of ownership is being analyzed from July 1, 2011 (program initiation for the ERP components) through June 30, 2020. This includes the cost for internal staff to support the system, ongoing end user licenses, one software upgrade cycle and a refresh of the hardware environment.
- **Degree of risk** – This criterion is based upon the relative degree of risk of each alternative, including the risk associated with the development approach (extent of customization required) and the relative risk of the availability and stability of the development team during development and post-deployment.
- **Consistency with the state/agency IT direction** – This criterion refers to the extent to which an alternative will fit with State, and WSDOT, information technology standards and direction. This includes the extent to which it will leverage and/or support the implementation of the envisioned Roadmap program for statewide financial systems. Other aspects to be considered under this criterion include customer service capability, system sustainability, process efficiencies, security, development platform, database management software, system integration, and reduction of redundant agency or shadow systems, among others.
- **Speed of implementation** – This criterion refers to the expected duration of the initial implementation project from the procurement through go-live, and with a period of post go-live support.
- **Long-term support considerations** – This criterion is designed to address the degree of ease in which an alternative can be supported by WSDOT and/or the state following initial implementation. Factors to be considered under this criterion include whether the solution can be centrally supported as an enterprise solution, whether the state will be dependent on a

third party for software upgrades, the ease of completing and implementing these upgrades, and the type and number of staff and skills required for WSDOT to maintain the application internally.

The next section provides a comparison of these three ERP alternatives against these evaluation criteria.

F. Comparison of Alternatives

This subsection provides a brief comparison of the three ERP alternatives against the evaluation criteria.

1. Degree of fit with WSDOT business requirements

Alternative 1 and Alternative 2 do not require additional best of breed modules beyond those other solutions such as Transportation Asset Management, Preconstruction Management and Construction Management envisioned as part of the Critical Applications Replacement Program solution set. Alternative 3 does require some additional modules to support equipment, fleet and facilities, construction contract administration and support for and integration with high volume transaction processing environments. Alternative 3, however, will likely require less program extensions to support the Federal-Aid billing process and potentially the transportation programming process.

2. Degree of fit with state/agency strategic business direction

Alternative 1 and Alternative 2 are consistent with the state's direction towards shared services environments and enterprise systems. Alternative 3 requires WSDOT to continue to maintain its own standalone financial management system.

3. Cost to develop

The estimated cost to develop the ERP component under Alternative 1 is \$35 million. This is based on assuming WSDOT's share of the cost to develop the ERP component based on central service agency charge backs. This cost was determined by allocating 20% of the preliminary high-level cost estimate of \$150 million for the statewide ERP implementation to WSDOT for a total cost of \$30 million. An additional \$5 million was estimated in agency-level project management, user training and other costs. The \$150 million cost estimate for the statewide implementation was established based on benchmarking recent experience by other states, as well as estimates previously prepared by the OFM Roadmap team.

The cost to develop the ERP component of Alternative 2 is estimated at \$55.9 million including quality assurance, internal verification and validation and contingency, which are allocated to this project component, but not including any debt service costs. This includes software, hardware, system integration services, state staff costs and other project cost components. While this is considered all WSDOT costs for purposes of this analysis, these costs include development of the enterprise design of the software, which will be utilized by other agencies in the future. As part of planning the statewide implementation, OFM should include funding to

apply a partial credit back to WSDOT for the value of the enterprise design to the statewide implementation project, as this is work that would have otherwise had to have been completed as part of a statewide implementation effort.

The estimated cost of the ERP component of Alternative 3 is \$47 million including contingency but not debt service costs. This cost estimate includes systems integration, hardware, state resources and other costs. This is based on information provided to the study team by CGI AMS, adjusted to include the cost of acquiring additional best of breed modules for equipment, fleet and facilities management.

4. Life cycle costs/total cost of ownership

WSDOT's share of the lifecycle cost of the OFM Roadmap ERP component in Alternative 1 is estimated to be \$55 million. This is based on total annual operating costs for the state for the Roadmap initiative in the range of \$20 million to \$30 million per year, with \$4 million of this allocated to WSDOT as data processing services and other charge backs. Based on this formula, WSDOT's share of the cost to maintain the Roadmap from July 1, 2015 through June 30, 2020 would be \$20 million resulting in a total lifecycle cost of \$55 million (the initial \$35 implementation cost and the \$20 million cost to operate from July 1, 2015 through June 30, 2020).

The lifecycle cost of the ERP component of Alternative 2 is estimated to be \$91.6 million through June 30, 2019. This includes operating costs of \$35.7 million in addition to the \$55.9 million estimated cost to develop and implement the software. The lifecycle cost under Alternative 2 is assumed to be all WSDOT costs at this time. However, when other agencies adopt the ERP component, WSDOT's costs will be reduced based on other agencies helping to cover the overhead costs of the system.

The lifecycle cost of Alternative 3 is \$90.5 million. This is based on a cost of \$43.5 million to operate the system from project go-live through June 30, 2020, in addition to the \$47 million cost to develop and implement the software. The cost to maintain and operate Alternative 3 will always be the responsibility of WSDOT. In addition, this lifecycle cost does not include the cost of a possible future migration to the Roadmap as envisioned under this interim solution, which would substantially increase the cost of ownership under Alternative 3.

5. Degree of risk

Alternative 1 has significant development risk based on an unknown project schedule due to budget constraints. In addition, as a statewide implementation, Alternative 1 also has additional risk associated with the size of the implementation effort and the risk of agency specific needs not being met. Alternative 1 also has risk due to custom program extensions needed in some key areas such as Federal-Aid Billing.

Like Alternative 1, Alternative 2 has some development risk associated with required custom program extensions. Alternative 2 also has some project and operational risk around the challenges in balancing an agency specific implementation and developing a system design that can be adapted to be an enterprise solution.

The project risks associated with Alternative 3 are related to the additional effort to integrate other best of breed solutions. The operational risks related to Alternative 3 are related to the need for WSDOT to maintain its own financial management system. However, Alternative 3 has lower risk from an organizational change management perspective since the terminology used in the Advantage system is similar to the nomenclature used in the existing TRAINS application.

6. Consistency with the state/agency IT direction

All three alternatives are architecturally consistent with WSDOT and state IT direction. However, Alternative 3 is inconsistent with the stated direction to utilize centrally supported enterprise systems for common functions required by all state agencies.

7. Speed of implementation

The implementation timeline for Alternative 1 is unknown due to budget constraints. This makes developing an overall program schedule under Alternative 1 difficult. The implementation timeline for Alternative 2 and 3 are fairly similar, though Alternative 3 would probably require three to six months less total elapsed time due to a potentially shorter acquisition cycle.

8. Long-term support considerations

Alternative 1 and Alternative 2 will both be centrally supported, allowing WSDOT to transfer some of the responsibility and risk associated with long-term system support to central services partners. Under Alternative 3, WSDOT is responsible for the long-term support of the application.

Exhibit V-4 outlines a comparison of the three alternatives against the evaluation criteria. The rating is from 0 to 5 with 0 being the least optimal to 5 being the most optimal.

Exhibit V-4: Comparison of ERP Implementation Alternatives against Evaluation Criteria

Evaluation Criteria	Alternative 1	Alternative 2	Alternative 3
Degree of fit with WSDOT business requirements	4	4	3
Consistency with agency and/or state business strategic direction	5	5	3
Cost to develop	4	2	4
Life cycle costs / total cost of ownership	4	4	3
Degree of risk	2	4	3
Consistency with agency and/or state IT direction	5	5	3

Evaluation Criteria	Alternative 1	Alternative 2	Alternative 3
Speed of Implementation	1	3	4
Long-term support considerations	5	5	3
Total Rating	30	32	26

G. Recommended Alternative and Rationale

WSDOT is proposing to proceed with the Critical Applications Replacement Program under Alternative 2. The rationale for this recommendation is:

- Under Alternative 3, WSDOT would still need to support its own financial system versus adopting an enterprise solution. Likewise, while the intent of the alternative is for WSDOT to utilize the Advantage application as an interim solution and move to the Roadmap when it is deployed, there is significant risk that WSDOT would ultimately not move to the Roadmap application. After WSDOT staff becomes familiar with the new version of the Advantage software, it is uncertain that there would be a strong business case for WSDOT to move from a WSDOT-tailored solution to an enterprise ERP solution.
- Alternative 2 meets WSDOT's immediate, high priority system needs and delivers significant benefits earlier. The timeline for the OFM Roadmap project is unclear due to budget constraints. It could be many years before the Roadmap would be implemented. The recommended approach will jump-start the planned Roadmap initiative by establishing the enterprise design for the new statewide ERP. Implementation of an ERP at WSDOT will be phase one of the statewide ERP effort, with the software configured through this process available for implementation by other agencies in a future phase 2.
- Alternative 2 fully meets WSDOT needs but requires less upfront investment for the State before the project can be initiated, as opposed to the upfront investment that would be required to initiate the full State Roadmap program.
- Alternative 2 leverages the State's existing investment in SAP technology.
- An approach similar to Alternative 2 has been proven to work in other states such as North Carolina and Colorado where the department of transportation has initiated the ERP effort as the lead agency and then this investment has been leveraged as the basis for the statewide solution.

VI. Proposed Project Schedule



This section outlines the proposed schedule for the Critical Applications Replacement Program. It also briefly describes the scope of each project component within the overall program schedule.

A. Overall Program Schedule

WSDOT has defined a program of related projects to implement the Critical Applications Replacement initiative over a five-year period. Exhibit VI-1 outlines the preliminary schedule for this program.

Significant program activity would begin in the 2011-2013 biennium. During the 2009-2011 biennium, only three program activities are planned. These are supporting the integration of the new hosted tolling operations systems (funded separately as part of the tolling initiative); some initial process improvement work, and acquisition planning work on the enterprise Time, Leave, and Labor Distribution application beginning in July 2010; and requirements definition and acquisition planning work on the traffic demand analysis software solution beginning in July 2010.

Highlights of this proposed program schedule include:

Time, Leave, and Labor Distribution - Detailed business process design and Request for Proposal (RFP) preparation activities will begin on July 1, 2010, with solution selection and implementation activities beginning in July 2011. Based on this schedule, the Time, Leave, and Labor Distribution application will be deployed in production beginning in April 2013. Deploying this application prior to the ERP is possible due to the modular nature of this application component. It also allows WSDOT to begin to address earlier a number of challenges with its existing timekeeping systems. Likewise, it enables WSDOT to begin achieving the benefits related to the new Time, Leave, and Labor Distribution application, while other components of the program are still in deployment.

Transportation Asset Management Phase I – This will include selection and implementation of a traffic analysis software solution. Detailed requirements definition and RFP preparation activities will begin in July 2010. The implementation phase will begin in July 2011, with implementation completed by December 31, 2011. This phase of work can be advanced from the other transportation asset management components due to its smaller size and reduced complexity and the fact it is relatively standalone from the other transportation asset management components.

ERP - Additional requirements definition and acquisition planning activities for the ERP component would begin in July 2011, with software selection and implementation beginning after July 2012. Go-Live for the ERP component would take place in January 2015.

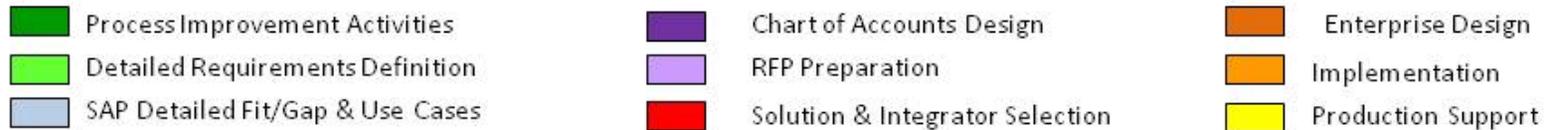
Transportation Asset Management Phase II - Requirements definition and acquisition planning activities for the remainder of the Transportation Asset Management components would begin in July 2011, with implementation taking place in January 2014. This timeline provides sufficient time to fully integrate and test the location referencing system with the new ERP component that will be relying on this service utility for geo-referencing ERP information.

Construction Management and Preconstruction Management - Requirements definition, confirmation of solution direction and acquisition activities for the construction management and preconstruction management components will begin in July 2012, with go-live of these components scheduled for approximately three months after the ERP in April 2015.



Exhibit V-1: Proposed Schedule for Critical Applications Replacement Program

	Biennium 1								Biennium 2								Biennium 3							
	Yr1				Yr 2				Yr 3				Yr 4				Yr 5				Yr 6			
	7/1/09 - 6/30/10				7/1/10 - 6/30/11				7/1/11 - 6/30/12				7/1/12 - 6/30/13				7/1/13 - 6/30/14				7/1/14 - 6/30/15			
Quarter of FY	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Tolling Integration	[Red, Orange, Orange, Yellow]																							
TLLD Enterprise Solution					[Green, Green, Green, Red]				[Orange, Orange, Orange, Yellow]															
Initial Deployment at WSDOT of Future Statewide ERP									[Light Blue, Purple]				[Red, Orange, Orange, Orange]				[Yellow]							
Asset Mgmt: Traffic Demand Analysis					[Light Green, Purple, Red, Orange, Yellow]																			
Asset Mgmt: Asset Inventory, Loc. Referencing & Crash Analysis									[Light Green, Purple, Red, Orange, Orange, Orange]				[Yellow]											
Preconstruction & Construction Mgmt													[Light Green, Red, Orange, Orange, Orange]				[Yellow]							



B. Scope Definition of Individual Project Components

Brief descriptions of the scope of each of the five related project components within the Critical Applications Replacement Program are provided below.

1. Enterprise Time, Leave, and Labor Distribution Solution

This project consists of the selection of the best of breed timekeeping solution and the implementation of this timekeeping solution and SAP for labor distribution. It is anticipated that this project will be performed jointly with DNR, in collaboration with OFM and DOP.

The project schedule assumes that WSDOT and DNR staff, with some consultant assistance, would initiate the Planning and Acquisition phase beginning in July 2010. There is also an opportunity to advance some of this work to the extent it can be performed by existing WSDOT staff prior to July 2010 through existing operating budgets.

The scope of effort for this project includes the following tasks:

Planning and Acquisition Phase

- Performing detailed process improvement work to further detail and delineate how the conceptual future business model developed during the feasibility study will be implemented in various WSDOT business units. This process improvement work will especially focus on the impact on field units such as Ferry Operations and Highway Maintenance and what time capture technologies may need to be deployed to support timekeeping in these business units.
- Updating the system requirements developed during the 07-09 biennium as needed based on the detailed process improvement work.
- Preparing an RFP to select the best of breed timekeeping software and systems integrator, (this is assumed to be a single procurement).
- Selecting the timekeeping best of breed product and systems integrator and negotiating contracts. Representatives from other agencies should participate in this process in an advisory capacity since the Time, Leave, and Labor Distribution application is targeted to become an enterprise solution.
- Preparing an organizational change management plan.

Implementation Phase

- Conducting training or having WSDOT and other state project team members take vendor training courses on SAP and the selected timekeeping best of breed software.
- Performing enterprise design to configure the software and design integration with HRMS, TRAINS, AFRS (for DNR) and other WSDOT and DNR line of business systems; involvement from other state agencies in design workshops and software configuration sessions is anticipated during this task.

- Coding and unit testing interfaces, data conversion routines, and any required custom program extensions.
- Conducting system testing and user acceptance testing activities to confirm the system meets the functional and technical requirements; the scope of the testing involves the configured software, any customizations and any interfaces. It should also include testing of data conversion processes and utilize converted data in the testing process. This may be another task for which it is appropriate to include staff from other agencies.
- Executing the organizational change management plan throughout this phase.
- Conducting end-user training.
- Migrating the system to production including performing any required manual and automated data conversion activities.
- Providing three months of production support.

2. Initial Deployment at WSDOT of the Future Statewide ERP

This project consists of finalizing the enterprise chart of accounts; the further detailing of user requirements and development of use cases for those areas where customizations to the SAP ERP application are most likely; further detailing of interface and integration requirements; selection of a systems integrator; and the enterprise design, development, testing and deployment of the ERP application for WSDOT.

This project will be executed in close collaboration with OFM and DIS. In addition, staff from other agencies should be involved in some activities on a part-time basis to ensure that the resulting enterprise design of the SAP ERP software meets the core requirements of other state agencies.

It is assumed that this project will be initiated beginning in July 2011. There is an opportunity to advance some of the Planning and Acquisition phase work such as the chart of accounts design, detailed user requirements, and use cases to the extent that WSDOT staff funded through existing operating budgets are able to perform the work.

This project consists of the following tasks:

Planning and Acquisition Phase

- Designing the enterprise chart of accounts (COA) to facilitate the set-up of the SAP ERP application. This will involve confirming and completing the COA design work begun by the Roadmap team. This effort will involve staff from OFM, WSDOT and other state agencies in order to ensure the COA design supports and has buy-in on a statewide basis.
- Conducting training for, or having WSDOT and other state staff participate in, SAP Boot Camp training for various modules within the implementation scope.

- Extending user requirements and developing use cases for those functional areas where the SAP ERP application may not fully support WSDOT business requirements. It is not necessary to develop detailed requirements in every area but it is essential that the appropriate level of detail requirements be developed for those areas where the initial fit/gap analysis suggests some custom extensions will be required. Some examples include the needs identification; project scoping; project prioritization and selection; transportation programming; and federal-aid billing business processes.
- Determining what existing WSDOT systems will actually be decommissioned (please see partial list of opportunities in Appendix B) and then defining detailed requirements for interfaces to those systems that will remain and any other existing WSDOT systems.
- Preparing an RFP for a systems integrator.
- Selecting the systems integrator and negotiating contracts. It may be valuable for representatives from other agencies to participate in this process in an advisory capacity since the ERP application will become an enterprise solution.
- Preparing an organizational change management plan.

Implementation Phase

- Performing enterprise design to configure the software and design integration with existing WSDOT and other agency systems such as HRMS and AFRS; staff from other agencies should participate in workshops, design walkthroughs and verification of the software configuration since the SAP ERP application will become an enterprise solution.
- Coding and unit testing interfaces, data conversion routines and any required custom program extensions.
- Conducting system testing and user acceptance testing activities to confirm the system meets the functional and technical requirements; the scope of the testing involves the configured software, any custom extensions and any interfaces. It should also include testing of data conversion processes and utilize converted data in the testing process. This may be another task for which it is appropriate to include staff from other agencies.
- Executing the organizational change management plan throughout this phase.
- Conducting end-user training.
- Migrating the system to production including performing any required manual and automated data conversion activities.
- Providing six months of production support (the longer period being the result of the breadth of the scope of the application).

3. Transportation Asset Management – Phase I

This project consists of the selection of a best of breed traffic analysis tool and the implementation of this software solution. It is anticipated the requirements definition and RFP preparation tasks would be completed by WSDOT staff beginning in July 2010, with software selection and implementation occurring early in the 2011-2013 biennium.

The scope of the project effort includes:

Planning and Acquisition Phase

- Preparing system requirements at a level of detail appropriate for inclusion in an RFP.
- Preparing the RFP.
- Selecting the traffic analysis software solution.

Implementation Phase

- Performing system design to configure the software solution, define any interfaces to other WSDOT systems, define any required custom reports from the traffic analysis software and establish any conversion requirements.
- Providing vendor training to WSDOT project team members.
- Coding and unit testing of any interfaces, data conversion routines and custom reports.
- Conducting system testing and user acceptance testing activities to confirm the system meets the functional and technical requirements; the scope of the testing involves the configured software, any customizations and any interfaces.
- Conducting end-user training.
- Migrating the system to production including performing any required manual and automated data conversion activities.
- Providing three months of part-time, on-call production support.

4. Transportation Asset Management – Phase II

This project consists of selecting a best of breed transportation asset inventory solution, best of breed crash analysis tool, and either selecting a best of breed location referencing system or custom developing the location referencing system component.

This project will be initiated beginning in July 2011. It consists of the following tasks:

Planning and Acquisition Phase

- Defining system requirements for the asset inventory, crash analysis and location referencing system applications at a level of detail appropriate for an RFP.
- Preparing an RFP to select a systems integrator and a set of solutions proposed by the integrator. This RFP will require best of breed solutions for the asset inventory and crash analysis components, with custom extensions as required. The RFP will indicate a preference for a best of breed solution for the location referencing system, but allow the vendors flexibility to propose either a best of breed solution with custom extensions or a custom solution for this component. This approach is based on concerns that best of breed offerings do not yet fully meet WSDOT requirements, but with recognition that vendor offerings in this area are continuing to expand and that one or more best of breed solutions may support all or most of WSDOT's requirements by the summer/fall of 2011. In addition, because this project is being performed in relative parallel with the ERP project, WSDOT may choose to release one integrated RFP. Both Louisiana (for a statewide solution including the department of transportation) and the Wyoming Department of Transportation included ERP and asset management capabilities in a single, integrated RFP for software and services.
- Selecting the systems integrator and best of breed solutions and negotiating contracts.
- Preparing an organizational change management plan for the project.

Implementation Phase

- Performing enterprise design to configure the software; design integration with existing WSDOT systems and the future SAP ERP application; and define data conversion processes.
- Coding and unit testing interfaces, data conversion routines and any required custom program extensions or a custom location referencing system.
- Conducting system testing and user acceptance testing activities to confirm the system meets the functional and technical requirements; the scope of the testing involves the configured software, any custom program extensions or customizations and any interfaces. It should also include testing of data conversion processes and utilize converted data in the testing process.
- Executing the organizational change management plan for this project.
- Conducting end-user training.
- Migrating the system to production including performing any required manual and automated data conversion activities.
- Providing three months of production support.

5. Preconstruction Management and Construction Management

This project consists of the implementation of a best of breed software solution to support preconstruction management activities including preparing cost estimates, preparing specifications and proposals, managing the letting and award process and managing construction vendor information. For planning purposes, it is assumed that the American Association of State Highway Transportation Officials (AASHTO) Trns•port solution, tightly integrated with the procure to pay capabilities of the SAP ERP, will be implemented to support this function.

This project will also consist of the implementation of a construction management solution to support monitoring of construction activities and management of construction contracts. This solution is envisioned to be supported by both the contracts management capabilities of SAP ERP and an extension of the PMRS application to support this functionality. This will involve utilizing additional capabilities of Primavera's Cost Manager.

This project will be initiated in July 2012 and is scheduled to go-live approximately three months after the ERP. Depending on the ability to slightly shorten the timeline for the Planning and Acquisition phase, there may be opportunities to consolidate this project into a single go-live with the ERP. However, this will expand the number of users and range of functionality being deployed at the ERP go-live. If the production deployment dates between the ERP project and this project remain staggered, some temporary interfaces between the existing EBASE, CAPS and CCIS applications or a temporary manual process work around will be required as an interim solution.

The scope of this project consists of the following tasks:

Planning and Acquisition Phase

- Developing detailed system requirements for preconstruction and construction management at an RFP level of detail.
- Conducting a fit/gap analysis of the detailed preconstruction management requirements with AASHTO Trns•port to verify this direction.
- Conducting a fit/gap analysis of the detailed construction management requirements with Primavera and SAP ERP capabilities.
- Preparing an RFP for integration services or incorporating this work into the ERP integrator's scope of work and negotiating an effort and cost estimate.
- Selecting the systems integrator or completing negotiations with the ERP integrator to add this project effort to their scope of work.
- Providing training for WSDOT staff on the appropriate Trns•port, SAP and Primavera modules.
- Preparing an organizational change management plan.

Implementation Phase

- Performing system design to configure the software; design integration with existing WSDOT systems and the future SAP ERP application; and define data conversion processes.
- Coding and unit testing interfaces, data conversion routines and any required custom program extensions.
- Conducting system testing and user acceptance testing activities to confirm the system meets the functional and technical requirements; the scope of the testing involves the configured software, any customizations and any interfaces. It should also include testing of data conversion processes and utilize converted data in the testing process.
- Executing the organizational change management plan.
- Conducting end-user training.
- Migrating the system to production including performing any required manual and automated data conversion activities.
- Providing three months of production support.

VII. Cost Estimate



This section outlines the estimated implementation costs and total cost of ownership of the Critical Applications Replacement Program. It also provides a summary of the key assumptions used in developing these cost estimates.

A. Estimated Implementation Cost

The estimated implementation cost for the Critical Applications Replacement Program is \$145 million. This cost estimate assumes financing of eligible expenses using Certificates of Participation.

Exhibit VII-1 summarizes the implementation cost by component and provides a cross reference to the current Critical Applications that are replaced by each project component of the proposed program.

Exhibit VII-1: Estimated Implementation Costs by Project

Program Component	Critical Applications Decommissioned	Estimated Cost (millions)
Enterprise Time, Leave, and Labor Distribution Solution	WSDOT Labor and WSF Labor	\$19.9
WSDOT Deployment of Future Enterprise ERP	TRAINS, CPMS, WOA, PDIS, Project Summary, PATS	\$45.5
Transportation Asset Management Phase 1 - Traffic Demand Analysis	Part of TRIPS	\$ 1.0
Transportation Asset Management Phase 2 - Location Referencing, Asset Inventory and Crash Analysis	Remainder of TRIPS	\$14.2
Preconstruction and Construction Management	CCIS, CAPS and EBASE	\$15.1
Critical Applications Program Office		\$ 3.4
Quality Assurance and IV&V		\$ 2.5
Contingency		\$19.6
Sub-Total Cost of Critical Applications Replacement Program Excluding Interest Expense		\$121.2
Estimated Interest Expense Assuming Eligible Costs Are Financed		\$23.9
Total Cost: Critical Applications Replacement Program		\$145.1

Exhibit VII-2 summarizes the program implementation cost by each of the components of the program such as integration services, hardware and software.

Exhibit VII-2: Estimated Implementation Costs by Component

Cost Element	Estimated Cost (millions)
Systems Integration Services	\$46.6
Software Acquisition and Licensing During Project	\$8.5
Hardware Acquisition and Maintenance During Project	\$ 5.8
Contracted Program and Project Management After Year 2	\$5.2
Quality Assurance and IV&V Consultant	\$2.7
Subtotal: Project Costs Eligible for Financing	\$68.8
State Staff Salaries and Benefits	\$27.7
Contracted Program and Project Management for Year 2	\$0.04
RFP and Acquisition Consulting Services	\$1.4
End User Training	\$1.5
Training for State Project Team Staff	\$0.4
Project Team Facilities	\$0.9
Data Processing Charges	\$1.0
Contingency	\$19.6
Subtotal: Other Project Costs Not Financed	\$52.6
Sub-Total Cost of Critical Applications Replacement Program Not Including Debt Service	\$121.4
Estimated Debt Service	\$23.9
Total Cost: Critical Applications Replacement Program	\$145.3

Exhibit VII-3 outlines the costs by project by fiscal year. Exhibit VII-4 provides this same breakout by cost component. Exhibit VII-5 provides an estimated cash payout schedule based on an assumption of projects being financed.

Exhibit VII-3: Costs by Project by Fiscal Year

Program Component	Total Estimated Cost	Biennium 1	Biennium 2		Biennium 3		Future
		Year 2	Year 3	Year 4	Year 5	Year 6	
		7/1/10-6/30/11	7/1/11-6/30/12	7/1/12-6/30/13	7/1/13-6/30/14	7/1/14-6/30/15	7/1/15-6/30/24
Enterprise Time, Leave, and Labor Distribution Solution	\$ 19,922,489	\$458,399	\$ 7,068,099	\$12,395,991	\$ -	\$ -	\$ -
WSDOT Deployment of Future Enterprise ERP	\$ 45,483,493	\$ -	\$ 1,026,141	\$ 9,403,309	\$16,712,648	\$18,341,395	\$ -
Transportation Asset Management Phase 1 - Traffic Demand Analysis	\$ 977,567	\$ 34,332	\$ 943,235	\$ -	\$ -	\$ -	\$ -
Transportation Asset Management Phase 2 - Location Referencing, Asset Inventory and Crash Analysis	\$ 14,224,627	\$ -	\$ 580,654	\$ 5,995,239	\$ 7,648,734	\$ -	\$ -
Preconstruction and Construction Management	\$ 15,106,740	\$ -	\$ -	\$ 590,598	\$ 6,709,734	\$ 7,806,409	\$ -
Critical Applications Program Office	\$ 3,383,858	\$ 41,431	\$ 895,778	\$ 940,567	\$ 987,595	\$ 518,487	\$ -
Quality Assurance and IV&V	\$ 2,719,200	\$ -	\$ 348,480	\$ 934,560	\$ 832,260	\$ 603,900	\$ -
Contingency	\$ 19,637,945	\$ 96,830	\$ 1,946,160	\$ 5,863,939	\$ 6,380,675	\$ 5,350,341	\$ -
Total Cost of Critical Applications Replacement Program Excluding Debt Service	\$ 121,455,920	\$630,992	\$12,808,547	\$36,124,203	\$39,271,646	\$32,620,532	\$ -

		Biennium 1	Biennium 2		Biennium 3		Future
		Year 2	Year 3	Year 4	Year 5	Year 6	
Program Component	Total Estimated Cost	7/1/10-6/30/11	7/1/11-6/30/12	7/1/12-6/30/13	7/1/13-6/30/14	7/1/14-6/30/15	7/1/15-6/30/24
Estimated Debt Service	\$ 23,885,943	\$ -	\$ 311,320	\$ 1,488,795	\$ 2,783,001	\$ 3,765,589	\$15,537,238
Total Cost: Critical Applications Replacement Program	\$ 145,341,863	\$630,992	\$13,119,867	\$37,612,997	\$42,054,647	\$36,386,121	\$15,537,238

Exhibit VII-4: Costs by Project by Component

Program Component	Total Estimated Cost	Biennium 1	Biennium 2		Biennium 3		Future
		Year 2	Year 3	Year 4	Year 5	Year 6	
		7/1/10-6/30/11	7/1/11-6/30/12	7/1/12-6/30/13	7/1/13-6/30/14	7/1/14-6/30/15	7/1/15-6/30/24
Systems Integration Services	\$ 46,571,983	\$ -	\$ 2,869,318	\$13,554,963	\$18,548,099	\$11,599,603	\$ -
Software Acquisition and Licensing During Project	\$ 8,517,500	\$ -	\$ 440,000	\$ 1,612,600	\$ 1,991,800	\$ 4,473,100	\$ -
Hardware Acquisition and Maintenance During Project	\$ 5,774,000	\$ -	\$ 500,000	\$ 2,190,000	\$ 570,000	\$ 2,514,000	\$ -
Contracted Program and Project Management After Year 2	\$ 5,181,316	\$ -	\$ 996,978	\$ 1,612,447	\$ 1,497,445	\$ 1,074,447	\$ -
Quality Assurance and IV&V Consultant	\$ 2,719,200	\$ -	\$ 348,480	\$ 934,560	\$ 832,260	\$ 603,900	\$ -
Subtotal: Project Costs Eligible for Financing	\$ 68,763,999	\$ -	\$ 5,154,776	\$19,904,570	\$23,439,604	\$20,265,049	\$ -
State Staff Salaries and Benefits	\$ 27,691,145	\$317,731	\$ 4,259,361	\$ 8,938,244	\$ 8,223,367	\$ 5,952,442	\$ -
Contracted Program and Project Management for Year 2	\$ 41,431	\$ 41,431	\$ -	\$ -	\$ -	\$ -	\$ -
RFP and Acquisition Consulting Services	\$ 1,392,500	\$175,000	\$ 901,250	\$ 316,250	\$ -	\$ -	\$ -
End User Training	\$ 1,521,400	\$ -	\$ 37,000	\$ 301,200	\$ 618,000	\$ 565,200	\$ -
Training for State Project Team Staff	\$ 410,000	\$ -	\$ 190,000	\$ 140,000	\$ 80,000	\$ -	\$ -
Project Team Facilities	\$ 900,000	\$ -	\$ 180,000	\$ 360,000	\$ 180,000	\$ 180,000	\$ -
Data Processing Charges	\$ 1,097,500	\$ -	\$ 140,000	\$ 300,000	\$ 350,000	\$ 307,500	\$ -
Contingency	\$ 19,637,945	\$ 96,830	\$ 1,946,160	\$ 5,863,939	\$ 6,380,675	\$ 5,350,341	\$ -
Subtotal: Other Project Costs Not Financed	\$ 52,691,921	\$630,992	\$ 7,653,771	\$16,219,633	\$15,832,042	\$12,355,483	\$ -

		Biennium 1	Biennium 2		Biennium 3		Future
		Year 2	Year 3	Year 4	Year 5	Year 6	
Program Component	Total Estimated Cost	7/1/10-6/30/11	7/1/11-6/30/12	7/1/12-6/30/13	7/1/13-6/30/14	7/1/14-6/30/15	7/1/15-6/30/24
Total Cost of Critical Applications Replacement Program Not Including Debt Service	\$ 121,455,920	\$630,992	\$12,808,547	\$36,124,203	\$39,271,646	\$32,620,532	\$ -
Estimated Debt Service	\$ 23,885,943	\$ -	\$ 311,320	\$ 1,488,795	\$ 2,783,001	\$ 3,765,589	\$15,537,238
Total Cost: Critical Applications Replacement Program	\$ 145,341,863	\$630,992	\$13,119,867	\$37,612,997	\$42,054,647	\$36,386,121	\$15,537,238

Exhibit VII-5: Estimated Cash Payout Schedule Based on an Assumption of Projects being Financed

			Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
		Total	7/1/2010	7/1/2011	7/1/2012	7/1/2013	7/1/2014	7/1/2015	7/1/2016
Project Costs Not Financed		\$ 52,691,921	\$630,992	\$7,653,771	\$16,219,633	\$15,832,042	\$12,355,483	\$ -	\$ -
Sale	Estimated Amount of Sale	Monthly Payment							
Bond Sale 1 - Year 3	\$ 5,154,776	\$ 57,878	\$ 6,945,345	\$ -	\$ 694,535	\$ 694,535	\$ 694,535	\$ 694,535	\$ 694,535
Bond Sale 2 - Year 4	\$19,904,570	\$223,489	\$ 26,818,644	\$ -	\$ -	\$ 2,681,864	\$ 2,681,864	\$ 2,681,864	\$2,681,864
Bond Sale 3 - Year 5	\$23,439,604	\$263,180	\$ 31,581,612	\$ -	\$ -	\$ -	\$ 3,158,161	\$ 3,158,161	\$3,158,161
Bond Sale 4 - Year 6	\$20,265,049	\$227,536	\$ 27,304,340	\$ -	\$ -	\$ -	\$ -	\$ 2,730,434	\$2,730,434
Total: Bond Sales	\$68,763,999								
Subtotal: Principal and Interest Payments			\$ 92,649,941	\$ -	\$ 694,535	\$ 3,376,399	\$ 6,534,560	\$ 9,264,994	\$9,264,994
Total: Annual Project Cash Outlay			\$145,341,863	\$630,992	\$8,348,306	\$19,596,032	\$22,366,603	\$21,620,477	\$9,264,994

			Total	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
				7/1/2017	7/1/2018	7/1/2019	7/1/2020	7/1/2021	7/1/2022	7/1/2023
Project Costs Not Financed			\$ 52,691,921	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Sale	Estimated Amount of Sale	Monthly Payment								
Bond Sale 1 - Year 3	\$ 5,154,776	\$ 57,878	\$ 6,945,345	\$ 694,535	\$ 694,535	\$ 694,535	\$ 694,535	\$ -	\$ -	\$ -
Bond Sale 2 - Year 4	\$19,904,570	\$223,489	\$ 26,818,644	\$2,681,864	\$2,681,864	\$2,681,864	\$2,681,864	\$2,681,864	\$ -	\$ -
Bond Sale 3 - Year 5	\$23,439,604	\$263,180	\$ 31,581,612	\$3,158,161	\$3,158,161	\$3,158,161	\$3,158,161	\$3,158,161	\$3,158,161	\$ -
Bond Sale 4 - Year 6	\$20,265,049	\$227,536	\$ 27,304,340	\$2,730,434	\$2,730,434	\$2,730,434	\$2,730,434	\$2,730,434	\$2,730,434	\$2,730,434
Total: Bond Sales	\$68,763,999									
Subtotal: Principal and Interest Payments			\$ 92,649,941	\$9,264,994	\$9,264,994	\$9,264,994	\$9,264,994	\$8,570,460	\$5,888,595	\$2,730,434
Total: Annual Project Cash Outlay			\$145,341,863	\$9,264,994	\$9,264,994	\$9,264,994	\$9,264,994	\$8,570,460	\$5,888,595	\$2,730,434

B. Ongoing Maintenance Costs

The estimated ongoing maintenance cost of the proposed solution components is \$74.5 million. These costs have been estimated from the go-live of each component through June 30, 2020. Exhibit VI-6 breaks out this maintenance cost by system component.

Exhibit VI-6: Estimated Lifecycle Cost by System

System	Estimated Cost of Ongoing Maintenance from Go-Live through June 30, 2020 (millions)
Enterprise Time, Leave, and Labor Distribution Solution	\$18.7
WSDOT Deployment of Future Enterprise ERP	\$35.7
Transportation Asset Management	\$10.3
Preconstruction and Construction Management	\$9.8
Total: Cost to Maintain Critical Application Replacement Systems	\$74.5

The maintenance costs include software maintenance, hardware maintenance, and application and technical support staff. In addition, a technology refresh for hardware and one system upgrade for the application software is also assumed. This typically takes place in the fourth year after implementation.

In this analysis, maintenance costs for the ERP and the Time, Leave, and Labor Distribution component were assumed to be entirely the responsibility of WSDOT. Some reduction in WSDOT's costs for these components should occur, however, as other agencies adopt these systems as enterprise solutions, (for example DNR, in the case of Time, Leave, and Labor Distribution), and start to contribute to the overhead elements of the support cost which initially would be the total responsibility of WSDOT.

C. Estimated Lifecycle Costs

The estimated lifecycle costs of the Critical Applications Replacement Program from program initiation through June 30, 2020 is \$193.5 million. This cost includes debt service, project costs that were not financed and paid as an expense each year during the implementation effort, and ongoing system maintenance costs beginning with the go-live of each of the implementation projects.

Exhibit VI-7 provides a breakout of the estimated lifecycle costs of the Critical Applications Replacement Program. Exhibit VI-8 outlines these costs by fiscal year.

**Exhibit VI-7: Estimated Lifecycle Costs for Critical Applications Replacement Program
Through June 30, 2020**

Cost Component	Estimated Cost Through June 30, 2020 (millions)
Project Costs Incurred (not financed)	\$52.7
Debt Service	\$66.2
Ongoing Cost of Maintenance	\$74.5
Total Lifecycle Cost of Ownership	\$193.5

Exhibit VI-8: Estimated Lifecycle Costs By Fiscal Year for Critical Applications Replacement Program Through June 30, 2020

		Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11
Cost Component	Total	7/1/2010	7/1/2011	7/1/2012	7/1/2013	7/1/2014	7/1/2015	7/1/2016	7/1/2017	7/1/2018	7/1/2019
Project Costs Not Financed	\$ 52,691,921	\$ 630,992	\$ 7,653,771	\$ 16,219,633	\$ 15,832,042	\$ 12,355,483	\$ -	\$ -	\$ -	\$ -	\$ -
Subtotal: Principal and Interest Payments	\$ 66,195,458	\$ -	\$ 694,535	\$ 3,376,399	\$ 6,534,560	\$ 9,264,994	\$ 9,264,994	\$ 9,264,994	\$ 9,264,994	\$ 9,264,994	\$ 9,264,994
Ongoing Cost of Maintenance **	\$ 74,551,213	\$ -	\$ 51,388	\$ 204,310	\$ 2,942,521	\$ 3,666,131	\$ 8,248,704	\$ 14,597,061	\$ 11,914,649	\$ 14,364,923	\$ 18,561,527
Total: Lifecycle Cost through 6/30/2020	\$193,438,593	\$ 630,992	\$ 8,399,694	\$ 19,800,342	\$ 25,309,123	\$ 25,286,608	\$ 17,513,698	\$ 23,862,055	\$ 21,179,643	\$ 23,629,917	\$ 27,826,521

**Note: Ongoing Cost of Maintenance fluctuates year to year due to hardware replacement cycles and software upgrade cycles.

D. Cost Estimate Assumptions

This subsection highlights some of the key assumptions underlying these cost estimates.

1. ERP and Best of Breed Software

Assumptions related to ERP and best of breed software include the following:

- Approximately \$5.5 million was included for SAP licenses for WSDOT across the ERP and Time, Leave, and Labor Distribution components of the solution. This cost is based on informal discussions with SAP. We believe this cost assumption for SAP licenses is conservative in that it does not assume WSDOT can utilize any of the existing licenses for the SAP Business Suite owned by DOP or DNR (which it should be able to do, subject to agency agreement and negotiations with SAP).
- Acquisition costs for other best of breed software components were based on a survey of market prices, informal discussions with various best of breed software vendors, and costs recently paid by other states.
- The timing of the software acquisition cost is typically divided between the start-up of implementation activities where approximately 20% of the licenses are acquired and just prior to the deployment of the application component where the larger proportion of the licenses are acquired. This allows WSDOT to better manage its cash flow and avoid paying maintenance on licenses it is not going to utilize during the development period. However, this approach will be subject to negotiation with each software vendor.
- Ongoing software licensing costs of 22% of the acquisition price are included in the cost estimate beginning in the year following the acquisition of the software. These costs are escalated 5% annually.

2. Hardware, Operating System Software and Database Licenses

Assumptions in the cost estimates related to hardware, operating system software, and database licenses include the following:

- The cost of a new development and production installation were included in the cost of each project component. This included hardware, operating system software, and SQL server database licenses. These cost estimates were based on high-level estimates from software vendors and information from WSDOT Office of Information Technology staff.
- The development installation was assumed to be acquired at the start of the Implementation phase for each project and the production installation just prior to deployment of the application.
- Maintenance for the hardware, operating system software and database licenses was included at 20% of the acquisition price, beginning in the year following acquisition. These costs are escalated 5% annually.

- Funding was included in each project component to support establishment of a disaster recovery environment for that project component (either its own environment or one shared with other applications).
- The cost of a hardware refresh was included in the lifecycle cost of all systems, typically in the fourth or fifth year after initial implementation.

3. Systems Integration and Other Professional Services

Assumptions in the cost estimates related to hardware, operating system software, and database licenses include the following:

- Systems integrator costs for each project component were established based on the estimated level of effort for each project component, the skill sets required and competitive rates for the skill sets needed for that project. Detailed planning level estimates were completed for each project component.
- Cost was included in each project component for a consultant to assist with the completion of implementation planning, development of detailed requirements and preparation of required RFPs. The exception is the implementation of the traffic analysis software in Transportation Asset Management Phase I where this work is assumed to be performed internally because of the specialized nature of the requirements for the traffic analysis application and the strong internal knowledge of these requirements by staff in WSDOT's Transportation Data Office.
- The cost of a consultant to provide quality assurance and independent verification and validation services was included in all project costs except for the implementation of the traffic analysis software in Transportation Asset Management Phase I where the size and complexity of the project does not require independent quality assurance.
- WSDOT's overall program manager and the state's project manager for all projects except Transportation Asset Management Phase I were assumed to be contracted resources. The one exception is Transportation Asset Management Phase I where it is assumed that a WSDOT resource will be the project manager due to the smaller size of the project and the specialized engineering nature of the solution that aligns well with skills available in-house.
- WSDOT and other state staff were included in the cost estimate for each project component based on the skill mix and time commitments needed for each project. The cost of state staff was determined by using either the current state information technology, engineering or finance/accounting salary scales, escalated by 5% annually. Generally, no costs were included for assisting business units with replacing staff members assigned to the project team since it is assumed the person's current position is already in the business unit's budget. The exception to this was for the Time, Leave, and Labor Distribution project where some funding for this purpose was included in the budget established during the feasibility study prepared jointly by WSDOT and DNR.
- The cost of one software upgrade is included in the cost estimate for the ongoing support cost for each system, typically in the fourth or fifth year after initial implementation.

4. Other Costs

Other cost assumptions include:

- The Time, Leave, and Labor Distribution project costs were assumed for purposes of this report to be 100% WSDOT costs. This is viewed as a conservative assumption of project costs. DNR is expected to participate in this project as a partner, which would reduce the cost to WSDOT based on the project sharing agreement negotiated between the two agencies.
- Debt service cost was estimated based on utilizing ten-year certificates of participation (COP) at 6.25% interest. It assumes the sale of COPs each year during the Implementation phase of the project for eligible expenses to be incurred during that year.
- Costs were included for facilities for the team for the ERP and Time, Leave, and Labor Distribution projects at market rates for the Olympia area. It is assumed that members of the project teams for other projects could share some of this space, work in existing WSDOT facilities or in the case of the system integrators potentially in the vendor's facilities.
- Cost was included in all project cost estimates for vendor training for the assigned WSDOT or other state agency staff. For example, cost was included for team members working on the ERP application to attend SAP "boot camp" training for various modules. These training costs are based on vendor estimates of the cost of training classes for various software applications.

E. Other Financing Strategies

In addition to the use of certificates of participation depicted in the cost models in this report, WSDOT may want to consider requesting FHWA to partner with WSDOT on or all or part of the Critical Applications Replacement Program. Under this scenario, FHWA would participate in this program as they do other federal-aid eligible projects, likely in an 80% federal and 20% state funding split. Other states have been successful in getting FHWA to agree participate in the development of enterprise systems that support the planning, execution, management and monitoring of the transportation delivery program.

FHWA, for example, participated fully in the cost of the SAP implementation for the North Carolina Department of Transportation (NCDOT). NCDOT treated the cost of the SAP implementation during the project effort as an overhead expense that was allocated each month to all active projects, federal and state based on the project's total charges that month. Other state departments of transportation have also obtained federal participation for enterprise systems supporting delivery of their program by including the project as an item in the Statewide Transportation Improvement Program (STIP), approved by FHWA.

VIII. Business Case



This section describes the anticipated business case for the Critical Applications Replacement Program. It outlines a range of potential quantifiable benefit opportunities. It also describes a number of additional qualitative benefits of this program for WSDOT, as well as other agencies and the state as a whole.

A. Potential quantifiable benefit opportunities

The Critical Applications Implementation Feasibility Study team identified a range of potential quantitative benefits from the implementation of this program across various WSDOT business processes and program areas. When the Critical Applications Replacement Program is fully implemented and WSDOT begins to fully realize all of the potential benefits, it is estimated that the department has the potential to achieve quantifiable benefits in the range of \$26 million per year. These savings are the result of a combination of faster cost recovery, cost savings from efficiencies, future cost avoidance, and redirection of staff from transaction processing activities to higher value and program specific work.

These savings can be divided into the following categories:

- Increased efficiency in the delivery of the transportation program
- Improved asset management and consumable inventory tools
- Automation, streamlining and consolidation of accounting functions
- Improved procurement practices
- Enhanced billing and revenue collection practices
- Reduced information technology costs

Each of these categories of potential benefits is described in further detail below.

1. Increased efficiency in delivery of the transportation program

Increased efficiency in delivery of the transportation program provides WSDOT with the opportunity to let more projects or meet additional needs within the existing transportation capital budget. This benefit category is estimated to be in the range of \$12 million per year and is the result of:

- Expediting the letting of projects, thus reducing the overall cost of the project through improved project management and scheduling tools.

- Reduction in the cost to deliver a project through improved program and project management tools, including enhanced project budgeting and costing.
- More cost effective project programming decisions through enhanced needs identification, project scoping, project prioritization and selection tools.
- Reduced construction bid costs through improved letting management processes including the ability to better package projects into lettings, to reduce the number of projects with the same skill and material requirements that are let at the same time.
- Reduction in construction contract change orders, claims, project delays and overruns, through more effective contract management and monitoring tools.

Exhibit VIII-1 outlines the efficiency opportunities in the delivery of the transportation program as result of the Critical Applications Replacement Program, the basis for estimating the size of the benefit stream and the system components required to achieve the benefit stream.

Exhibit VIII-1: Potential Benefits Resulting from Increased Efficiency in the Delivery of the Transportation Program

Anticipated Benefit	Projected Benefit Stream	Estimating Methodology	Estimated Annual Benefit	System Components Required
Expediting letting of projects through improved program and project management tools	Opportunity to fund additional projects for the same budget within WSDOT's transportation program by reducing the cost of delivering projects by expediting the letting of projects by at least two months through enhanced project and program management tools	¼ % of an average \$800 million annual construction program, based on assuming savings of 25% of the typical monthly percentage cost increase of ½% per month (1% for two months) for a project as established by the FHWA construction cost index since 1993	\$2,000,000	ERP and integration of ERP with PMRS
Reduction in cost to deliver a project through improved program and project management tools including enhanced project budgeting and costing	Opportunity to fund additional projects for the same budget within WSDOT's transportation program by improved cost control across the project lifecycle	¼% of an average \$800 million annual construction program	\$2,000,000	ERP and integration of ERP with PMRS

Anticipated Benefit	Projected Benefit Stream	Estimating Methodology	Estimated Annual Benefit	System Components Required
Better and more informed project programming decisions through enhanced needs identification, project scoping, project prioritization and selection tools	Opportunity to fund additional projects within the WSDOT transportation program by reducing the cost of program delivery through improved project scoping and selection processes that result in projects being programmed with more cost effective solutions to meet the identified needs, better cost estimates and risk identification	½% of an average \$800 million annual construction program	\$4,000,000	ERP
Reduced construction bid costs through improved letting management processes including the ability to better package projects into lettings so as to reduce the number of projects with the same skill and material requirements that are let at the same time	Opportunity to fund additional projects for the same budget within the transportation program by obtaining more competitive bids through better balancing the type and mix of projects that are let together	¼% of WSDOT’s annual \$800 million construction program	\$2,000,000	Preconstruction Management

Anticipated Benefit	Projected Benefit Stream	Estimating Methodology	Estimated Annual Benefit	System Components Required
Improved contract management tools for monitoring the status of construction projects	Reduction in construction claims, contract change orders, project delays and overruns through more effective contract management and monitoring tools. Also, better enforcement of performance penalties through enhanced monitoring	¼% of WSDOT's annual \$800 million construction program	\$2,000,000	Construction Management

2. Improved Asset Management and Consumable Inventory Tools

WSDOT will be able to make more effective use of its existing maintenance budget through improved lifecycle cost management as a result of implementation of an integrated transportation asset management solution with lifecycle cost modeling, needs identification, trade-off analysis, and performance-based budgeting capabilities.

In addition, the department will be able to more effectively manage and control the cost of its consumable inventory through implementation of the ERP. This will result in reduced inventory turns and more opportunities to negotiate volume discounts, leading to reduced overall spend on consumable inventory.

The benefit streams in this category are estimated to be approximately \$3.7 million per year as outlined in Exhibit VIII-2.

Exhibit VIII-2: Potential Benefits Resulting from Efficiencies in Asset Management and Consumable Inventory

Anticipated Benefit	Projected Benefit Stream	Estimating Methodology	Estimated Annual Benefit	System Components Required
Improved lifecycle asset cost management through enhanced asset management tools including lifecycle cost modeling, needs identification, trade-off analysis, and performance-based budgeting capabilities	Opportunity to redirect maintenance budget dollars to highest priority needs through a better understanding of the current conditions of assets and the ability to more effectively make replace/maintain decisions	½% of WSDOT’s annual \$400 million highway maintenance program	\$2,000,000	ERP and Transportation Asset Management
Reduced consumable inventory expenditures	Implementing ERP will provide efficiencies that will result in an increased “turn rate” (the number of times in a year that inventory turns over) for inventory items. Increasing the number of inventory turns will reduce the amount of inventory required to be kept on hand. This will reduce the overall cost of inventory	5% reduction in total consumable inventory spend of \$22 million annually spend by reducing inventory turns	\$1,100,000	ERP



Anticipated Benefit	Projected Benefit Stream	Estimating Methodology	Estimated Annual Benefit	System Components Required
Reduced cost for consumable inventory by making greater use of negotiated discounts	By making it easier to record items into inventory, additional items will be recorded into inventory. For items which are ordered in significant bulk, this will increase the amount that can be predicted for ordering from a vendor annual contract, thus improving the discount rate	Implementing a 10% percent discount on the \$6 million annual order of snow and ice control chemicals; Currently about \$2 million in purchases of this commodity is not recorded in inventory, making it impossible to take advantage of a discount rate for the full \$6 million	\$600,000	ERP



3. Automation, streamlining and consolidation of accounting functions

There are a number of potential benefits as a result of automation, streamlining and consolidation of accounting functions. These include:

- Cost avoidance of payroll overpayments based on enhanced business rules and edits at the point of time entry and improved internal controls
- Opportunity to redirect staff time currently spent performing entry of timesheets across the department into additional analytical and other higher value activities
- Opportunity to redirect staff time spent managing employee leave balances across the department into additional analytical and other higher value activities
- Redirection of WSDOT Payroll staff resource time previously spent reconciling issues between WSDOT Labor, WSF Labor and DOP's HRMS application
- Potential for consolidation of regional and program supported budgeting, cashiering, procurement, contract management, accounting, and payroll functions under an agency "shared services" model

The benefit streams in this category are estimated to be approximately \$1.5 million per year as outlined in Exhibit VIII-3.

Exhibit VIII-3: Potential Benefits Resulting from Automation, Streamlining and Consolidation of Accounting Functions

Anticipated Benefit	Projected Benefit Stream	Estimating Methodology	Estimated Annual Benefit	System Components Required
Avoidance of future payroll overpayments	Cost avoidance of overpayments of payroll based on enhanced business rules, edits at the point of time entry and improved internal controls	¼% of WSDOT's \$400 million payroll. This is based on benchmarks across various industries that show elimination of overpayments of up to 1% of payroll based on implementation of enhanced timekeeping solutions	\$100,000	Time, Leave, and Labor Distribution
Elimination of business unit timekeeper function	Opportunity to redirect staff time spent performing entry of timesheets across the department into additional analytical and other higher value activities	7,500 employees x 5 minutes x 2 timesheets per month x 12 months for timekeepers with an average fully loaded salary of \$65,000	\$470,000	Time, Leave, and Labor Distribution
Elimination of leave tracking function in business units	Opportunity to redirect staff time spent managing employee leave balances across the department into additional analytical and other higher value activities	7,500 employees x 5 minutes per month for timekeepers with an average loaded salary of \$65,000	\$230,000	Time, Leave, and Labor Distribution

Anticipated Benefit	Projected Benefit Stream	Estimating Methodology	Estimated Annual Benefit	System Components Required
Elimination of manual review and reconciliation efforts between WSDOT's timekeeping and labor distribution systems and DOP's HRMS	Redirection of the time of WSDOT payroll staff resources previously spent reconciling issues between WSDOT Labor, WSF Labor and DOP's HRMS application	Three full time equivalents at an average fully loaded salary of \$80,000 a year	\$240,000	Time, Leave, and Labor Distribution
Potential for consolidation of regional and program supported budgeting, cashiering, procurement, contract management, accounting, and payroll functions under an agency "shared services" model	Opportunity to redirect staff time across the department into additional analytical and other higher value activities	Estimated re-direction of 6 full time equivalents department wide at average loaded salary of \$80,000 a year	\$480,000	ERP and Time, Leave, and Labor Distribution

4. Improved procurement practices

There are several benefit opportunities resulting from improved procurement practices as a result of enhanced payables and purchasing functionality within the ERP application. Benefits in this category include:

- Ability to take discounts on vendor payments through enhanced accounts payable management capabilities
- Opportunity to redirect staff time through vendor self-service, automated two or three way matching and workflow review and approval processes

The benefit streams in this category are estimated to be approximately \$600,000 per year as outlined in Exhibit VIII-4.

Exhibit VIII-4: Potential Benefits Resulting from Improved Procurement Practices

Anticipated Benefit	Projected Benefit Stream	Estimating Methodology	Estimated Annual Benefit	System Components Required
Ability to take discounts on vendor payments through enhanced accounts payable management capabilities	\$253,880,255 in goods and services expense in FY 2006/07. Assuming 10% subject to discount.	2% net 10 on 10% of payables for goods and services object	\$500,000	ERP
Ability to support vendor self-service, automated two or three way matching and workflow review and approval processes	Opportunity to redirect staff time across the department into additional analytical and other higher value activities as a result of vendor self-service and additional automation	Currently, there are ten Accounting and Financial Services staff in contract and vendor payments. Potential to redirect at least 1 full time equivalent department wide at average loaded salary of \$80,000 a year	\$80,000	ERP

5. Enhanced billing and revenue collection practices

Anticipated benefits in this category include:

- Ability to bill for cost recovery from grant makers both earlier and more frequently
- Ability to improve collection rates for accounts receivable through enhanced billing, collection, and monitoring
- Ability to offset receivables from and payables to local jurisdictions and other entities through the use of common identifiers and enhanced collection management capabilities

The benefit streams in this category are estimated to be approximately \$900,000 per year as outlined in Exhibit VII-5.



Exhibit VIII-5: Potential Benefits Resulting from Enhanced Billing and Revenue Collection Practices

Anticipated Benefit	Projected Benefit Stream	Estimating Methodology	Estimated Annual Benefit	System Components Required
Ability to bill for cost recovery from grant makers both earlier and more frequently	Advancing billing by at least one day	\$600,000,000 for 1 day at 6.25% a year	\$100,000	ERP
Ability to improve collection rates for non third party billing and other miscellaneous accounts receivable through enhanced billing, collection, and monitoring	15% reduction in receivable balances at 6.25% for a year	15% of \$15,000,000 at 6.25% annual interest rate	\$140,000	ERP
Ability to offset receivables from and payables to local jurisdictions and other entities through the use of common identifiers and enhanced collection management capabilities	\$280,782,758 in grants and loans to other entities per year. Potential to offset with amounts owed to WSDOT by same entities is high	Amounts due to WSDOT which would be retained by WSDOT and not paid is estimated at ¼ % of grants and loans made to other entities per year	\$700,000	ERP

6. Reduced information technology costs

There are a number of opportunities for reductions in information technology costs as a result of decommissioning the Critical Applications, a large number of other related systems and implementing an integrated, centrally supported solution. These benefits include:

- Decommissioning of the WSDOT mainframe
- Redirection of business unit staff supporting standalone and silo systems
- Redirection of the WSDOT information technology staff to supporting other line of business applications as a result of the elimination of the Critical Applications and most of the other 140+ standalone systems performing related functions
- Opportunity to redirect staff time across the department into additional analytical and other higher value activities as a result of improved access to information and a corresponding reduction in the staff effort required to obtain the information

The benefit streams in this category are estimated to be approximately \$6.8 million per year as outlined in Exhibit VIII-6.

Exhibit VIII-6: Potential Benefits Resulting from Reduced Information Technology Costs

Anticipated Benefit	Projected Benefit Stream	Estimating Methodology	Estimated Annual Benefit	System Components Required
Decommissioning of WSDOT mainframe	Redirection of costs spent to operate the WSDOT mainframe based on the decommissioning of the Critical Applications	\$4.5 million a year based on current expenditures	\$4,500,000	All
Elimination of Critical Applications and most of the other standalone systems performing related functions	Opportunity to redirect WSDOT information technology staff time to increase the level of service provided for other line of business information technology systems	Ten full time equivalents at an average loaded salary of \$120,000 a year	\$1,200,000	All
Redirection of business unit staff supporting standalone and silo systems	Opportunity to redirect staff time in business units across the department spent supporting standalone or silo information technology applications to program activities	Estimated re-direction of five full time equivalents department wide at an average loaded salary of \$90,000 a year	\$450,000	All
Improved access to information, reducing the staff effort to perform research and improving the quality of the information available for management and policy maker decision making	Opportunity to redirect staff time across the department into additional analytical and other higher value activities	Estimated re-direction of eight full time equivalents department wide at an average loaded salary of \$80,000	\$640,000	All

B. Other Anticipated Benefits for WSDOT

In addition to quantifiable benefit opportunities, the implementation of the Critical Applications Replacement Program has the potential to provide a number of other benefits for the department. These qualitative benefits include:

- Facilitating implementation of the One-DOT concept by consolidating duplicate systems and implementing and automating standardized accounting, procurement and other administrative processes
- More effectively meeting current WSDOT business requirements and providing a platform for more easily addressing changes in agency business needs in the future
- Reduced business risk in terms of complying with regulatory requirements and monitoring collective bargaining agreements
- Strengthened internal controls to meet the recommendations of the State Auditor's 2007 WSDOT Administrative and Overhead Performance Audit
- Improved customer service to WSDOT partners and employees
- Implementing standardized reporting capabilities with timely and accurate data
- Implementing electronic workflow and approval capabilities for many agency business functions
- Eliminating or significantly reducing the number of silo systems within WSDOT
- Accurately capturing and securely storing WSDOT agency data
- Incorporating self-service functionality for employees, partners and suppliers
- Providing solid performance measurement capabilities
- Providing the ability to interface with existing and future internal / external systems including high volume transaction processing environments such as Tolling
- Implementing a solution which is easy to learn, use, and maintain
- Implementing a solution which utilizes a strong internet based architecture using current web technologies

C. Benefits to Other Agencies and the State

In addition to the benefits to WSDOT, there are other intangible benefits for other agencies and the state as a whole. Implementation of an ERP application and the Time, Leave, and Labor Distribution application for WSDOT will help to jump-start the Roadmap initiative by providing

an ERP solution that is highly scalable and able to meet the enterprise financial, procurement, timekeeping, and project management needs of all state agencies.

In addition, the implementation of centrally supported enterprise systems and standardized business processes is consistent with the Governor's management objective to implement and leverage shared services environments.

Exhibit VIII-7 provides a mapping of some of the anticipated outcomes of the Critical Applications Replacement Program to the Governor's Shared Services Directive and the findings of the State Auditor's 2007 WSDOT Administrative and Overhead Performance Audit.

Exhibit VIII-7: Mapping of Select Critical Application Replacement Program Objectives to Governor Gregoire’s Shared Services Goals and the State Auditor’s Findings

Governor Gregoire’s Shared Services Directive and State Auditor’s Findings ⇔ Critical Applications Opportunities ↓	Improved Efficiency	Improved Accuracy of Data	Standardized Procedures and Processes	Integrated Agency Data Management and Reporting	Elimination of Redundant Systems and Interfaces
Increased efficiency in the delivery of the transportation program through enhanced program, project and contract management tools	✓	✓	✓	✓	
Improved asset management and consumable inventory tools	✓	✓	✓	✓	✓
Automation, streamlining and consolidation of accounting functions	✓	✓	✓	✓	✓
Improved procurement practices	✓	✓	✓		
Enhanced billing and revenue collection practices	✓	✓		✓	
Reduced information technology costs through implementing enterprise solutions, eliminating duplicate systems, decommissioning numerous standalone systems and providing improved access to data	✓	✓	✓	✓	✓

IX. Risk Management



This section identifies potential organizational and technical risks to program success and delineates potential mitigation strategies to address these risks.

A. Risk Management Objectives

The objectives of project risk management are to decrease the probability and impact of events adverse to the project. Risk management begins during project planning and continues throughout the lifecycle of the project. Any assumptions made in the development of a plan, schedule, or resource allocation should be considered for documentation as a risk. Factors external to the project may also have an impact on the team's ability to deliver and should be included.

B. Risk Management Process

The following steps have been utilized to identify, assess impact, and define mitigation strategies for the Critical Applications Replacement Program².

- **Risk Identification** - This is the process of identifying risks that could affect the program and their characteristics. We utilized several techniques to identify potential risks including the experience of the consultant team, informal discussions with WSDOT executive management and staff, and discussions with other project stakeholders. Each identified risk was then documented in a risk log. For each risk that was identified, the team classified the risk as either business, organizational, or technical. The risk is also classified as internal (under the control of the WSDOT or a partner agency) or external (the result of factors over which the project has limited to no control).
- **Risk Analysis and Prioritization** - For each risk that was identified, the team then assessed the probability of occurrence using a standard probability scale (from 0.1 to 1.0) and the level of impact using a standard impact assessment matrix (from 1 to 10 based on team member judgment) in the event that the risk does occur. The impact may be to the program, a project within the program, or to a component of a project. The product of multiplying the probability and the impact yielded the risk score to the impacted program or project area. This score will help to determine risk planning. Risks that have a risk score of 6.0 or higher are considered "High" risk, those with a risk score between 2.5 and 6.0 are considered "Medium" risk, and those with a risk score less than 2.5 are considered "Low" risk.
- **Risk Planning** - This step involved identifying an owner of the risk and devising a risk response plan for handling each of the high-priority and medium-priority risks identified in risk analysis and prioritization. During the feasibility study, this activity primarily involved

² Partially adapted from A Guide to the Project Management Body of Knowledge (PMBOK® Guide) Fourth Edition

iterative discussion with WSDOT management and staff. Going forward, we would expect this to be an on-going process involving the Critical Applications Replacement Program executive sponsor, the Critical Applications Program Steering Committee, the Critical Applications Replacement Program Office, and the project management teams of the various project components within the program. Guidance may also be received from the quality assurance consultant and members of specific project steering committees or the Roadmap steering committee.

- **Risk Control and Monitoring** - This step includes executing the appropriate risk response plan during the project lifecycle to reduce the probability of a risk occurring or to mitigate its impact should it occur. This includes monitoring the progress in handling all risks that have occurred and continuing to identify and assess new risks that may emerge throughout the program.

C. Business/Organizational Risks

This subsection identifies high and medium priority business and organizational risks associated with the proposed Critical Applications Replacement program. The impact of any identified risks is assessed and potential risk response strategies are defined for each of these risks. Business risks include those risks that impact the existing WSDOT business operations. For example, risks in this category could include items such as the need to change existing processes and procedures, the need for organizational change management, and the need to implement standardized processes.

Organizational risks relate to the impact of the project on WSDOT's organization and the organization of other state agencies involved in the project. Issues that should be considered in this regard include items such as:

- Level of executive and staff support for the change being proposed
- Agency's demonstrated ability to manage projects of this size and complexity
- Skills and experience available to implement this approach
- Agency's ability to manage internal and external (contractor) staff
- Number of users impacted
- Level of training that might be required
- Length of time the agency has to complete the project or implement an alternative

Exhibit IX-1 highlights the high and medium business and organizational risks identified to date for the Critical Applications Replacement Program. Business and organizational risks rated as high risks have their risk score highlighted in red. Medium risks have their risk score highlighted in yellow.

Exhibit IX-1: Critical Applications Risk Register Log for Business and Organizational Risks

Risk ID	Risk Category	Risk Description	Risk Classification Internal External	Probability 0.1 – 1.0	Impact 1 – 10	Risk Score (PxI)	Risk Owner	Response (Accept / Avoid / Mitigate / etc.)	Risk Response Strategy and Notes
BUS01	Business	Need to change existing business process to effectively utilize the new software	Internal	0.9	9	8.1	Program Steering Committee	Mitigate	<ul style="list-style-type: none"> Establish organizational change management program Engage stakeholders from various business units in defining process changes
BUS02	Business	Inconsistent processes and standards across WSDOT business units could impact drive to standardize business processes	Internal	0.9	9	8.1	Program Steering Committee	Mitigate	<ul style="list-style-type: none"> Establish organizational change management program Engage stakeholders from various agencies in defining process changes
BUS03	Business	Concern in various WSDOT business units about apparent loss of tailored functionality	Internal	0.8	8	6.4	Program Steering Committee	Mitigate	<ul style="list-style-type: none"> Encourage early involvement by key business units Ensure Change Management and Communication Plan emphasizes benefits of enterprise solution Ensure consistent and ongoing senior management support
ORG01	Organizational	Changes in WSDOT or other agency executive management can impact project	External	0.9	8	7.2	Program Steering Committee and Program Office	Mitigate	<ul style="list-style-type: none"> Immediately brief new management on project objectives and status Engage existing Steering Committee members to assist in presenting project benefits to new management team members Include career staff in some key program roles for continuity
ORG02	Organizational	Delay in obtaining funding for all or part of proposed program effort	External	0.6	10	6.0	Program Steering Committee	Avoid & Accept	<ul style="list-style-type: none"> Actively engage with stakeholders and policy makers to obtain approval Revisit budgets at each steering committee meeting; economic factors should be on agenda for discussion where appropriate. Adjust program schedule as necessary based on timing of funding Identify activities that could continue in the interim (process analysis, etc.) to maintain momentum

Risk ID	Risk Category	Risk Description	Risk Classification Internal External	Probability 0.1 – 1.0	Impact 1 – 10	Risk Score (PxI)	Risk Owner	Response (Accept / Avoid / Mitigate / etc.)	Risk Response Strategy and Notes
ORG03	Organizational	Less funding than requested is approved for the program effort	External	0.6	10	6.0	Program Steering Committee	Avoid & Accept	<ul style="list-style-type: none"> Actively engage with stakeholders and policymakers to obtain approval Revisit budgets at each steering committee meeting; economic factors should be on agenda for discussion where appropriate. Adjust scope and/or program schedule as necessary based on timing of funding
ORG004	Organizational	No defined state owner for ERP components and/or SAP Center of Excellence not established	External	0.6	10	6.0	Central Service Agencies Executives	Avoid	<ul style="list-style-type: none"> Initiate early discussions on ownership of ERP environment by central services agency management Monitor status of resolution to ensure it is resolved prior to start of program efforts
ORG005	Organizational	Policy issues not resolved in a timely manner	Internal	0.6	10	6.0	WSDOT and Central Service Agency Executives	Avoid	<ul style="list-style-type: none"> Initiate early discussions Monitor and track resolution Ensure management understands required timeline for resolution and cost/schedule impact of not resolving
BUS04	Business	Difficulty in getting project stakeholders to take an enterprise view and/or in reaching consensus on enterprise needs versus needs of specific agencies	Internal	0.6	9	5.4	Program Office	Mitigate	<ul style="list-style-type: none"> Encourage stakeholders to take "agency" or "business unit" hat off and put "state" hat on during project activities Encourage team members to explain "why something can't work for me" Identify and communicate benefits of enterprise solution to team members Leverage best practices experience of pre-planning and implementation consultants
BUS05	Business	Specialized requirements or significant gaps identified in one or more business units within WSDOT or other state agencies	External	0.7	8	5.6	Program Office	Avoid and Mitigate	<ul style="list-style-type: none"> Assess potential for modifying business processes in individual business units or modifying enterprise process slightly Assess need for additional third-party software and/or minor customizations as a last resort Encourage active executive sponsorship to help resolve concerns of specific business unit managers

Risk ID	Risk Category	Risk Description	Risk Classification Internal External	Probability 0.1 – 1.0	Impact 1 – 10	Risk Score (PxI)	Risk Owner	Response (Accept / Avoid / Mitigate / etc.)	Risk Response Strategy and Notes
BUS06	Business	Desired business benefits not achieved	Internal	0.5	10	5.0	Program Office	Avoid	<ul style="list-style-type: none"> Adhere to requirements, involve stakeholders and tie scope decisions to performance measures and anticipated benefits to ensure success Incorporate business process training and mentoring into the work plan
BUS07	Business	Potential that OFM or other state agencies will not be able to agree on the Time, Leave, and Labor Distribution best of breed software solution that best fits the needs of all agencies	Internal	0.3	10	3.0	Program Office	Avoid	<ul style="list-style-type: none"> Ensure extended team works together on developing requirements Conduct vendor demos during the planning phase to try to identify potential differences in requirements and/or expectations early on Pay careful attention to evaluation factors to ensure weighting is consistent with each agencies' business priorities
BUS08	Business	Potential that OFM or other state agencies will not be able to agree on the enterprise design/software configuration of the Time, Leave, and Labor Distribution or ERP components	Internal	0.3	10	3.0	Program Office	Avoid	<ul style="list-style-type: none"> Engage representative staff from other agencies in enterprise design activities Establish clear issue resolution process for Steering Committee resolution of significant design decisions Ensure active executive level involvement from OFM and WSDOT
ORG06	Organizational	Staff not being able to participate in workshops or review deliverables within schedule	Internal	0.6	8	4.8	Program Office	Mitigate	<ul style="list-style-type: none"> Utilize a project approach that leverages best practices as a starting point for discussions to better leverage staff time Proactively identify resource constraints and escalate in a timely manor Re-assign some responsibilities of key extended team members Reprioritize some activities assigned to extended team members
ORG07	Organizational	Changes in state priorities impact funding and/or priority of program implementation	External	0.5	9	4.5	Program Steering Committee	Mitigate & Accept	<ul style="list-style-type: none"> Keep executive management , the Governor, OFM, DIS and the Legislature apprised of project status and anticipated benefits Adjust project scope/timelines based on priority changes, remaining focused to the extent possible on implementing highest payback areas first in any project plan revisions

Risk ID	Risk Category	Risk Description	Risk Classification Internal External	Probability 0.1 – 1.0	Impact 1 – 10	Risk Score (PxI)	Risk Owner	Response (<i>Accept / Avoid / Mitigate / etc.</i>)	Risk Response Strategy and Notes
ORG08	Organizational	Change in the priorities of the state or central services agencies impacting ERP implementation and driving changes to ERP project costs and timeline	External	0.5	10	5.0	Program Steering Committee	Mitigate & Accept	<ul style="list-style-type: none"> Adjust project scope/timelines based on any state or central service agency priority changes and the impact of these changes on ERP. In making adjustments, minimize additional costs to ERP and keep focused to the extent possible on implementing highest payback areas first in any project plan revisions

D. Technical Risks

This subsection identifies high and medium technical risks for the proposed Critical Applications Replacement Program, assesses the impact of these risks, and delineates potential risk response strategies for each of these risks.

Examples of technical risks include the system implementation effort itself, the need to integrate or interface with other systems, the need to implement new technology infrastructure, the technical skill sets required to implement or support the new system, and any skill set gap with current staff and other similar items.

Exhibit IX-2 highlights the high and medium technical risks identified to date for the Critical Applications Replacement Program. Technical risks rated as high risks have their risk score highlighted in red. Medium risks have their risk score highlighted in yellow.

Exhibit IX-2: Critical Applications Risk Register Log for Technical Risks

Risk ID	Risk Category	Risk Description	Risk Classification Internal External	Probability 0.1 – 1.0	Impact 1 - 10	Risk Score (Pxl)	Risk Owner	Response (Accept / Avoid / Mitigate / etc.)	Risk Response Strategy and Notes
TEC01	Technical	Changes in requirements during implementation	Internal	1.0	9	9.0	Program Office	Mitigate	<ul style="list-style-type: none"> • Involve business unit staff in developing initial requirements • Require formal sign-off by project steering committee on requirements • Implement well defined scope change process including project steering committee approval and program steering committee approval for any changes impacting budget and schedule
TEC02	Technical	Need to provide large number of employees with training on various new system functions	Internal	1.0	8	8.0	Program Office	Mitigate	<ul style="list-style-type: none"> • Initiate organizational change management program from start of program • Develop training strategy for each project component early and monitor status of training effort closely
TEC03	Technical	Some employees may not have easy access to PCs or the Internet to utilize employee self-service functions or other system functions	Internal	0.8	9	7.2	Program Office	Mitigate	<ul style="list-style-type: none"> • Identify potential issues prior to implementation • Work with individual business units to determine potential for providing some access to public workstations • Assess feasibility of alternate data capture devices

Risk ID	Risk Category	Risk Description	Risk Classification Internal External	Probability 0.1 – 1.0	Impact 1 - 10	Risk Score (Pxl)	Risk Owner	Response (Accept / Avoid / Mitigate / etc.)	Risk Response Strategy and Notes
TEC04	Technical	Lack of WSDOT, OFM, or other central service agency IT experience with selected ERP software solution	Internal	0.9	9	8.1	Steering Committee	Mitigate	<ul style="list-style-type: none"> • Develop detailed technical training plan that is initiated upon software selection • Include maintenance option within systems integrator agreement to allow for application support for some period of time following implementation • Initiate joint planning for application and technical support with other agencies
TEC05	Technical	Project scope too large or complex and/or implementation strategy attempts to implement too much at one time	Internal	0.5	9	4.5	Program Steering Committee	Avoid	<ul style="list-style-type: none"> • Limit scope to replacing business functionality currently provided by Critical Applications • Establish implementation plan carefully developed and linked to business benefits • Link project scope to business benefits • Careful review by program steering committee of requirements and implementation plan before approving implementation go-ahead • Develop scope change process that requires demonstrated link to targeted business benefits and program steering committee approval of any proposed scope changes

Risk ID	Risk Category	Risk Description	Risk Classification Internal External	Probability 0.1 – 1.0	Impact 1 - 10	Risk Score (Pxl)	Risk Owner	Response (Accept / Avoid / Mitigate / etc.)	Risk Response Strategy and Notes
TEC06	Technical	Vendor proposals exceed cost estimate	External	0.5	10	5.0	Program Office	Mitigate	<ul style="list-style-type: none"> • Prepare detailed estimates to the extent possible during development of the business case • Conduct vendor software demos to assess the fit of vendor solutions with WSDOT and agency requirements • Identify key gaps and their impacts as early as possible • Benchmark costs incurred by other states who have recently implemented ERP solutions • Request modular costing of functionality by vendors to allow going with less than total functionality
TEC07	Technical	Complexity of integrating new ERP with existing legacy applications	Internal	0.5	9	4.5	Program Office	Avoid	<ul style="list-style-type: none"> • Develop interface strategy that utilizes same layout and format used today between Critical Applications and other existing downstream systems • Ensure early engagement of business and IT owners of these other systems

Risk ID	Risk Category	Risk Description	Risk Classification Internal External	Probability 0.1 – 1.0	Impact 1 - 10	Risk Score (Pxl)	Risk Owner	Response (Accept / Avoid / Mitigate / etc.)	Risk Response Strategy and Notes
TEC08	Technical	Specialized requirements of one or more WSDOT business units or other state agencies in future phases identified at time of implementation, resulting in unplanned time and/or cost impacts	Internal	0.5	10	5.0	Program Steering Committee, Roadmap Steering Committee and Program Office	Avoid	<ul style="list-style-type: none"> Encourage early and active involvement by both WSDOT business units and representative from other agencies in requirements definition, definition of enterprise design and initial configuration of selected COTS solution Design implementation plan to be a "roll-in" of system functionality to the extent possible where focus during implementation of other agencies is then on agency-specific issues such as interfaces and data conversion from individual agency systems
TEC09	Technical	Availability of WSDOT and other state agency resources (business and technical) to support implementation	Internal	0.6	9	5.4	Program Office	Avoid	<ul style="list-style-type: none"> Develop detailed estimates of resource requirements as early as possible as part of pre-implementation planning Develop an implementation strategy and work plan that is in sync with availability of state resources Obtain specific commitment of resources from WSDOT and other agency management prior to start of implementation

Risk ID	Risk Category	Risk Description	Risk Classification Internal External	Probability 0.1 – 1.0	Impact 1 - 10	Risk Score (Pxl)	Risk Owner	Response (Accept / Avoid / Mitigate / etc.)	Risk Response Strategy and Notes
TEC10	Technical	Delay in implementation of one project component within the overall program could impact the remainder of the schedule and affect stakeholder confidence	Internal	0.5	9	4.5	Program Office	Avoid	<ul style="list-style-type: none"> Establish reasonable schedule for all projects within the program including schedule contingency Plan for multiple project implementation teams to allow for balance of deployment work and production support of components already deployed
TEC11	Technical	Complexity of converting data from multiple agency shadow systems into new ERP solution	Internal	0.7	8	5.6	Program Office	Avoid	<ul style="list-style-type: none"> Ensure adequate time is included in ERP project schedule for assessment of conversion requirements, design of load routines from existing agency systems to put data into standard formats required by ERP
TEC12	Technical	Complexity of establishing interfaces between ERP and multiple existing WSDOT systems	Internal	0.7	8	5.6	Program Office	Avoid	<ul style="list-style-type: none"> Eliminate shadow systems and migrate functionality into new ERP solution to extent practical Include adequate time in implementation schedule for assessment of interface requirements, design of load routines from existing WSDOT systems to put data into standard formats required by ERP solution

Risk ID	Risk Category	Risk Description	Risk Classification Internal External	Probability 0.1 – 1.0	Impact 1 - 10	Risk Score (Pxl)	Risk Owner	Response (Accept / Avoid / Mitigate / etc.)	Risk Response Strategy and Notes
TEC13	Technical	Quality of data in existing WSDOT systems impacting conversion efforts	Internal	0.7	8	5.6	Program Office	Mitigate	<ul style="list-style-type: none"> Identify early potential quality issues during pre-implementation planning Build adequate time into the project schedule for data clean-up Initiate data clean-up efforts as early as possible Utilize strategy of cleaning up data in current systems and not during the conversion process Ensure sufficient involvement by WSDOT personnel familiar with data
TEC14	Technical	Project completes late and/or over budget	Internal	0.6	9	5.4	Program Office	Avoid	<ul style="list-style-type: none"> Utilize fixed price systems integration contracts, with potential penalties for late delivery Adhere to project success factors Monitor project schedule budget on a continuing basis
TEC15	Technical	Less skilled resources than expected provided by selected systems integrator	External	0.6	9	5.4	Program Office	Avoid	<ul style="list-style-type: none"> Require WSDOT approval of project staff Include in contract protections such as process for removing staff Use of performance bond or other incentives or disincentives to ensure vendor performance within agreed-to schedule

X. Key Success Factors

This section describes some key success factors that will be integral to ensuring the success of the WSDOT Critical Applications Replacement Program. These include:

- Establishing appropriate project management and governance
- Planning and structuring the procurement process
- Ensuring agency readiness for implementation
- Defining appropriate risk mitigation strategies for enterprise solutions

Each of these key success factors are discussed in further detail below.

A. Establishing appropriate project management and governance

Strong project management and effective project governance are integral to the success of any business or technology change initiative. For the Critical Applications Replacement Program, this is especially true given the agency wide scope of the effort within WSDOT and the coordination with other agencies required in order to develop enterprise designs for the Time, Leave, and Labor Distribution and SAP ERP components of the program.

To ensure the appropriate level of project management and governance, the following steps are recommended:

- WSDOT should engage contracted program and project managers with experience implementing ERP applications in complex multi-business unit environments. Our proposed cost estimate assumes a contracted overall WSDOT program manager and contracted state project managers for all program components except for Transportation Asset Management – Phase 1.
- WSDOT should establish a program organization responsible for planning and implementing the entire Critical Applications Replacement Program. This program organization should be directed by an overall program steering committee, with individual project subcommittees or steering committees responsible for providing issue resolution on specific project components of the program. DNR, OFM, DIS, and DOP would participate on the steering committee for the Time, Leave, and Labor Distribution project component. OFM and DIS and potentially one or two other representative agencies would participate on the project steering committee for the SAP ERP component. Overall guidance for all elements of the program would be provided by the Critical Applications Replacement Program Office who would be responsible for coordination and issue resolution between individual project teams.

- WSDOT should then establish a project organization for each individual project component that is based on a partnering approach between the systems integrator(s) and the WSDOT team. WSDOT team members should participate on each team, working side by side. Typically, the systems integrator team members will bring knowledge of the software solutions and the WSDOT team members will provide knowledge of state and WSDOT business needs and operations.

B. Planning and structuring the procurement process

Careful consideration will need to be given by the WSDOT executive sponsor and the Critical Applications Program Office to a number of procurement strategy decisions. These include:

- Selecting a single prime integrator to drive the implementation effort to the extent possible
- Structuring the systems integrator and software solution selection process
- Negotiation of the systems integrator contract and commercial off the shelf software licenses

Each of these items is described briefly below.

1. Selecting a single prime integrator to drive the implementation effort

WSDOT should seek to the extent possible to have a single prime integrator responsible for the implementation of the Critical Applications Replacement Program. This will allow WSDOT to transfer some risk to its integration partner and minimize the amount of cross component integration that will be the responsibility of the department.

That being said, it may not be practical to hire only one prime integrator due to the timing and phasing of some project activities and/or the need for specialized skills. For example, requirements for one project component may not be completed at the time integration services for earlier project components are being procured. In addition, some specialized pieces like traffic demand analysis may be as efficiently handled by contracting directly with the specialized software firms who provide this type of solution.

2. Structuring the systems integrator and software solution selection process

WSDOT needs to define evaluation criteria and the relative weighting of these criteria upfront. It should also establish a pre-defined issue resolution process for addressing with the executive sponsor and other executive team members as appropriate any issues, which arise during the evaluation process.

Evaluation of proposals from systems integrators and evaluation of proposed software solutions should be based upon three areas:

- How well the software meets WSDOT requirements (per the vendor's proposal document)

- The viability and stability of the systems integrator and software vendor (if different)
- The ability of the vendors to prove their software meets key requirements by performing scripted software demonstrations

Demonstration scripts should be developed by WSDOT's subject matter experts, with assistance from the department's RFP/Acquisition Planning consultant. These scripts should focus on mandatory and high priority requirements.

3. Negotiation of the systems integrator contract and software licenses

WSDOT and its central service agency partners will need to make a number of decisions surrounding the systems integrator contract(s) and software licenses for the SAP ERP solution and other best of breed software solutions. These include:

- Degree of vendor/integrator participation in post-implementation activities and the length of time for these services. Options may include "through two or three month-end closings" or "through the first upgrade." For the cost estimates presented in this report, it was assumed the systems integrator would provide three months of production support for each project component.
- Any caps that will be placed on the size of the annual increase in the cost of software maintenance.
- The warranties provided by the systems integrator and/or software vendor.
- Timing of the purchase of software licenses – WSDOT will want to acquire the end-user licenses it needs "just in time" and not purchase all of the licenses up front unless the software vendor is proposing a substantial discount to do so that can be justified when compared to the cost of financing. This strategy will allow the state to purchase enough licenses for initial development and the remaining licenses just prior to deployment of the new system.
- Locking-in the price of purchasing additional licenses – this is critical given the intention of making the Time, Leave, and Labor Distribution and the SAP ERP applications enterprise solutions.

C. Ensuring agency readiness for implementation

Effective management of the impact of a change initiative on the organization is integral to successful implementation. Early and proactive organizational change management will be essential to the ultimate success of the Critical Applications Replacement Program.

Making changes in large organizations is really about changing people. Change only occurs when the people who are responsible for executing the day-to-day processes actually implement

a new way of accomplishing the work. This makes managing organizational change a human problem.

Looking at change management as a human issue identifies the three most important critical success factors for institutionalizing organizational change. First, sponsors of change need to help the people impacted understand why they need to change and what it will look like when the change is done. Second, sponsors must provide employees with the resources and skills that they need to actually design and execute the change. Third, sponsors must empower employees to implement the change and hold them accountable for completing the change. Assuring that these critical success factors are met is the primary role of leadership in large-scale change initiatives.

Committed sponsorship from the WSDOT executive management team will be critical to implementing change successfully. Implementing change, however, is not just a sponsorship challenge; it is also a management challenge. This is particularly true when the proposed changes affect multiple organizational units, require new working relationships or processes, are expected to be implemented while maintaining current production or performance levels, and are planned to be implemented simultaneously. The role of managers or team leaders during a complex change process is to assure that the change envisioned by sponsors is translated into action plans; to reinforce with the staff the case for change and change vision developed by the sponsors; to assure timely and complete implementation of the action plans; and to monitor, measure, and provide feedback to sponsors about both the implementation progress and the overall success of the change agenda.

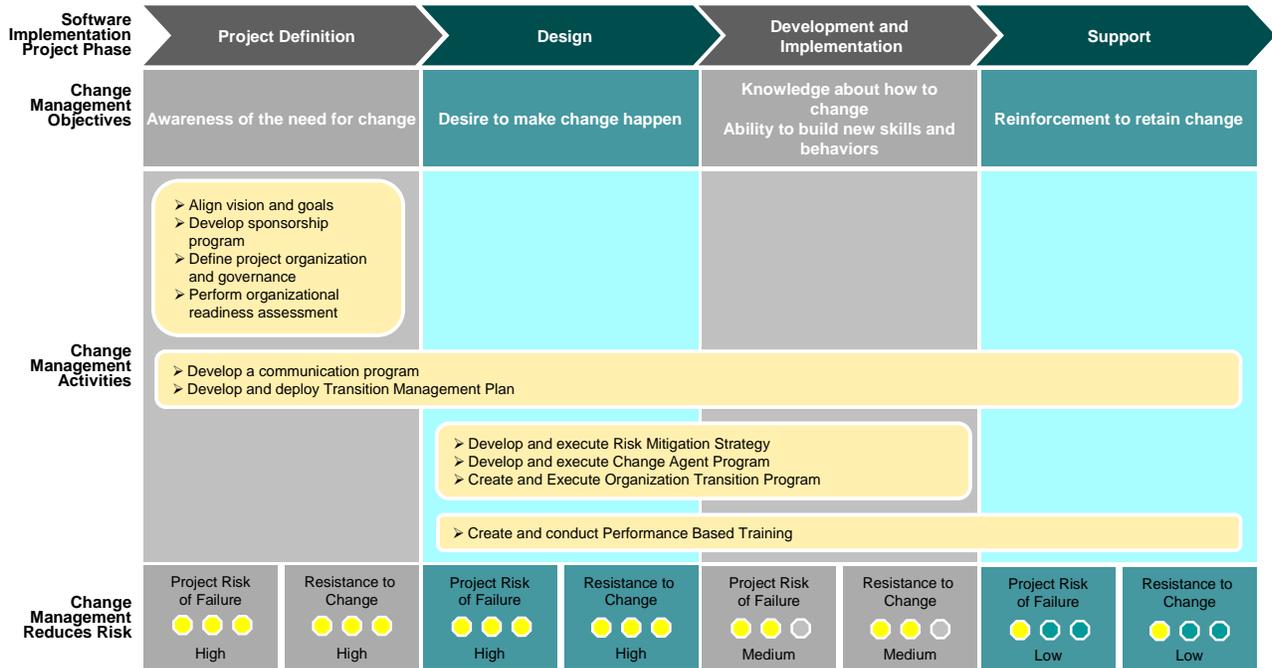
Successful change management is complex. It requires that all of the steps of the change management process are completed and implemented and that change enablers are in place. Often organizations assume that existing management structures, relationships, and processes are sufficient to guarantee change implementation. This is rarely the case. The current management system is in place to handle the day-to-day work. Rather than being explicitly designed, these existing management systems are often the result of implicit adaptation to the culture and values of the organization. Often weaknesses in the current management and communications processes are one of the root causes for the change agenda in the first place. Finally, an organization rarely has the luxury of reducing performance or production while implementing change. It must be done simultaneously. This “expectation overload” can strain the existing management structure. This strain on the existing management system can make it feel as though the organization is in change chaos. One of the goals of change management planning is to manage explicitly and thoughtfully all aspects of the change process to eliminate this sense of chaos through a structured, well planned and executed change management process.

Organizational change management activities must span all phases of the project lifecycle and have dedicated resources assigned to it. An Agency Readiness team has been included as a part of each project team within the Critical Applications Replacement Program to guide this effort.

Focusing on organizational change management throughout the project is essential to achieving buy-in at all levels of the organization. Keeping people informed, setting clear expectations, and addressing concerns from management and staff members is essential to achieving this buy-in.

Exhibit X-1 illustrates the organizational change management process and types of organizational change management and agency readiness activities that should occur across the project lifecycle of each project within the Critical Applications Replacement Program.

Exhibit X-1: Organizational Change Management and Agency Readiness across the Project Lifecycle



D. Defining appropriate risk mitigation strategies for developing enterprise solutions

This subsection highlights several risk mitigation strategies that will be integral to implementing the Critical Applications Replacement Program and positioning the SAP ERP and Time, Leave, and Labor Distribution components as enterprise solutions. These include:

- Establishing an appropriate governance structure that achieves a balance between individual agency needs and enterprise solutions with clear decision-making authority
- Including staff from other agencies in some project activities
- Defining the appropriate ownership and support structure at the state level for SAP and other new enterprise applications
- Establishing specific service level agreements consistent with industry best practices between WSDOT and the new centralized SAP/Enterprise Systems Center of Excellence
- Identifying super users within the WSDOT organization

Each of these strategies is discussed in further detail below.

1. Establishing an appropriate governance structure

Establishing an appropriate governance structure that achieves a balance between WSDOT needs and the development of enterprise solutions is integral to the successful implementation of the Critical Applications Replacement Program. It is also critical that this governance structure have clearly defined decision-making authority to allow for timely resolution of project issues.

Development of a multi-agency or enterprise solution requires collaboration, ownership, and buy-in from all of the participating agencies. For the SAP ERP and Time, Leave, and Labor Distribution implementation projects, we are recommending this be accomplished through project specific steering committees with representatives from other agencies included on these steering committees. These project steering committees would work with the WSDOT Critical Applications Program Steering Committee from the perspective of WSDOT specific needs and the existing Roadmap Steering Committee as an advisory committee to these two project efforts to provide guidance from the perspective of enterprise solutions.

At the same time, these two project efforts will frequently require issue resolution and other decision-making on a short turnaround. Thus, it is important that the Critical Applications Replacement Program Office and the selected systems integrator(s) clearly understand the project decision-making process and that there be clear accountability for final decision-making. We recommend that the WSDOT Program Sponsor (in conjunction with the DNR Project Sponsor for the Time, Leave, and Labor Distribution project) be assigned this final sign-off and decision-making role. In this way, the WSDOT Program Sponsor will have final decision-making authority and full accountability for the successful completion of the Critical Applications Replacement Program.

2. Including staff from other agencies in some project activities

In keeping with the state's goal of implementing the SAP ERP and the Time, Leave, and Labor Distribution applications as enterprise systems, these solution components need to be flexible enough in their design in order to eventually support all agencies. These systems will need to be configured such that it will "scale up" for a large agency, and yet "scale down" for a mid-sized or smaller agency. In order to increase the likelihood of project success, and reduce the risk of system configuration issues during the future statewide deployment, representatives from several different agencies should be invited to participate in an advisory capacity for the ERP and Time, Leave, and Labor Distribution components. Staff from other agencies should be involved at a minimum in the procurement process, during Enterprise Design to help establish the configuration of the software and to assist in user acceptance testing activities.

3. Defining the appropriate ownership and support structure for SAP

Prior to initiating the ERP and Time, Leave, and Labor Distribution project components, it is essential that executive management from the four central services agencies (OFM, DOP, DIS and General Administration) establish the approach for owning and managing the current and

future SAP applications and other enterprise systems. This includes establishing who the business owners of the various system components are; how the systems will be supported; where the application and technical support for these applications will reside; and where the applications will be hosted and operated.

For purposes of the Critical Applications Replacement Program feasibility study, we have made the following assumptions in this regard:

- There will be distinct business owners at the state level responsible for setting policy direction and managing the content of the software configuration from the perspective of the future enterprise systems for the various elements of the SAP application suite as follows:
 - Budgeting, Accounting, Financial Management, Timekeeping, and Labor Distribution – OFM
 - Human Capital Management and Payroll – DOP
 - Procurement – General Administration

These business owners will be responsible for coordinating with WSDOT during the implementation project and providing timely and clear direction on any policy or design issues that arise. The WSDOT Program Sponsor will have the authority to make required decisions to ensure the timely implementation of the ERP and Time, Leave, and Labor Distribution applications at WSDOT should the business owners not be able to provide the needed direction in the required timeframe to meet the project schedule.

- An SAP/Enterprise Systems Center of Excellence will be established either as a new central services unit or as a part of an existing central services agency. This Center of Excellence will consist of functional specialists knowledgeable in configuring SAP and the Time, Leave, and Labor Distribution best of breed software solution; designers and developers who would be responsible for any required program extensions and interfaces with other systems; and application database administrators and technical specialists.
- The SAP ERP application and the Time, Leave, and Labor Distribution application will be hosted centrally in a DIS or other data center to be determined. The data center will have the responsibility for providing any required system programmers and other required operations staff.

4. Establishing service level agreements

Because central services staff and not WSDOT staff will be supporting the SAP ERP and Time, Leave, and Labor Distribution applications, it is critical, given the role these systems play in supporting WSDOT's daily operations, that service level agreements (SLAs) be established between WSDOT and the Center of Excellence. These SLAs should specify service costs, the processes for requesting system enhancements, agreed to up times for the systems, and the Center of Excellence's service turnaround times for various activities. These SLAs should be written much the same, as they would be with a private sector partner, with clearly defined

escalation timelines and procedures for issue resolution. In addition, it is a best practice to include penalty clauses for the central services agency in these SLAs for failing to meet agreed to system up times or turnaround times.

5. Identifying super users within the WSDOT organization

WSDOT must identify a number of super users within its organization to help support the operation of the SAP ERP and Time, Leave, and Labor Distribution applications. These super users should be identified prior to the implementation efforts and included at least on a part-time basis in these project efforts.

While the application and technical support of the SAP ERP and Time, Leave, and Labor Distribution components will be the responsibility of a centralized SAP/Enterprise Systems Center of Excellence, it is still critical for WSDOT to have staff with a baseline understanding of these applications to facilitate providing day-to-day support within WSDOT. The roles of super users would include:

- Providing Level 1 application support
- Training new users
- Assisting with the deployment of any new system functionality
- Performing data analysis and complex ad-hoc queries to support management reporting needs

It is envisioned that there would be three to four staff acting at least part-time as super users at WSDOT headquarters and one or two staff performing this role in each region and at WSF headquarters.

It is recommended that these super users have a dual reporting relationship to their assigned organizations and to an SAP/Enterprise System user support function established within WSDOT.

Appendix A – Definition of Critical Application Business Functions

Exhibit A-1 depicts the functional scope of the Critical Applications Replacement Program. Exhibit A-2 provides brief definitions of the scope of each of the functions and sub-functions within the overall Critical Applications scope. It also indicates whether this function was planned to be supported in the OFM Roadmap scope, based on the results of the fit/gap analysis conducted with the OFM Roadmap team.



Exhibit A-1: WSDOT Business Functions Supported by the Critical Applications

Performance Management and Budget	Asset Management	Project Management	Human Resources	Procure to Pay	Revenue Cycle	Cost Accounting	Financial Reporting and General Ledger
Performance Measurement & Management	Transportation Asset and Location Management	Project Design, Specification, Estimation & Review	Time & Attendance	Vendor Relationship Management	Customer Information & Outreach Management	Maintain Cost Allocation Plan	Manage Chart of Accounts
Management Reporting	Transportation Data Collection & Analysis	Right of Way Acquisition	Distribute Time & Attendance to Activities	Vendor Solicitation Management	Revenue Accounting	Manage Fully Loaded Costing (ABC)	General Ledger Accounting
Financial Projection and Modeling	Capital Asset Accounting	Contractor Prequal & Construction Contract Letting & Award		Order Management	Federal Aid & Other Grant Billing	Manage Billable Services	Fund Management
Budget Development & Management	Consumable Inventory Management	Construction Administration - Contracts & Change Management		Contract Management	Receipts Management	Manage Grants	Financial Reporting
Capital Budget Programming & Management	Asset Lifecycle Management	Project and Resource Scheduling & Coordination		Payables Accounting	Tolling Integration and Other High Volume Processes	Manage Sub-grants	
Includes: •Identify & Record Infrastructure Needs •Project Evaluation/Selection •Balance Projects & Funding to Build Programs & Budgets •TIP	Includes: •Fleet Management •Facilities Management	Project Accounting & Budget Management & Reporting					

Exhibit A-2: WSDOT Business Functions Supported by the Critical Applications

Business Function	Functional Process	Functional Sub Process	Definition	Anticipated in Roadmap?	Comments
Performance Management and Budget			Set strategic goals, measure performance and report results; model and project revenue streams for various funding sources and match to program spending scenarios; and develop and submit expenditure and capital construction program budgets	Partially	
	Performance Measurement and Management		Define metrics related to organizational goals; collect and analyze relevant data about inputs, outputs, and outcomes; and present results to stakeholders	Partially	
		Determine Strategic Goals and Objectives	Determine strategic goals and intended outcomes over time and metrics by which to measure outcomes	No	
		Performance Measurement	Define the specific metrics related to strategic goals and objectives by which to measure outcomes	Yes	
		Performance Management	Assess effectiveness and efficiency of programs, projects, and organizations based on defined metrics	Yes	
	Management Reporting		Present financial and statistical information and accompanying analysis related to program and project costs and performance across the agency at various levels of detail	Yes	
		Agency Management Reporting	Analyze and present performance results related to the effectiveness and efficiency of programs, projects, and organizations as well as to meet accountability requirements	Yes	

Business Function	Functional Process	Functional Sub Process	Definition	Anticipated in Roadmap?	Comments
	Financial Projection and Modeling		Develop financial representations of some, or all, agency programs/projects under a variety of assumptions and identify anticipated revenue streams from various funding sources as well as capital and operational costs	Partially	
		Identify Funding Sources	Estimate funding from all sources (grants and other revenue), workforce availability, and budget targets by program	Yes	
		Identify Program Costs	Estimate delivery cost of programs, projects, and organizations required to meet strategic goals over time	No	
		Balance Estimated Costs to Funding	Balance mix of programs, projects, and organizations with funding targets based on strategic goals and objectives	Yes	
	Budget Development and Management		Prepare and monitor expenditure budgets by program, region, and/or functional area; compare budgeted to actual revenues and spending, and make adjustments to budgeted amounts to reflect changes to grants, revenues, and cost projections	Yes	
		Develop Budget	Develop and submit agency budget requests	Yes	
		Allocate Approved Budget	Allocate appropriations and legislated allotments to programs by fiscal period, establishing Federal Aid Project and other grant agreements	Yes	
		Adjust Budget	Update allotments to programs to reflect changes to revenue and cost projections over time	Yes	

Business Function	Functional Process	Functional Sub Process	Definition	Anticipated in Roadmap?	Comments
		Compare Budget to Actual Spending, Funding, and Outcomes	Review and report progress on planned program activities by revenues received, amount spent, value earned, and outcomes achieved	Yes	
	Capital Budget Programming and Management		Identify and document infrastructure (capital budget) needs by region, program area, type, and anticipated outcome; group the needs into candidate projects; evaluate and rank the relative priority of the potential projects; and make recommendations for the programming (scheduling and funding) of projects	No	
		Identify and Record Deficiencies and other Infrastructure Needs	Identify and locate deficiencies by region, group by function, associate with litigation information, and list associated potential solutions	No	
		Evaluate and Select Projects	Complete cost-benefit analysis and prioritize deficiencies for project solutions by fiscal period	No	
		Identify Funding Sources	Estimate funding from all sources and budget targets by program	No	
		Balance Projects to Funding	Balance mix of most cost effective projects with funding targets to address strategic goals	No	
		Prepare STIP and other Planning Documents	Develop and update STIP based on balanced funding, prioritized projects, and goals and objectives by fiscal period	No	

Business Function	Functional Process	Functional Sub Process	Definition	Anticipated in Roadmap?	Comments
Asset Management			Describe, locate, value, analyze, maintain, manage, and plan for the replacement of agency assets, including the State's transportation network, structures, land, trucks, telecommunication and other equipment, and materials	Partially	
	Transportation Asset and Location Management		Capture and maintain information about the location, performance, and condition of Washington state's transportation network and the various point based and linear assets within the network over time	No	
		Collect and Manage Roadway Feature Information	Create, validate, and maintain roadway geometric, feature, structure, and jurisdictional data	No	
		Manage Transportation Network	Create and maintain naming conventions, line work, and jurisdictional location information	No	
		Provide Location Services	Provide temporal and location information for events and features on roadway, making realignment updates and supporting maintenance agreements between jurisdictions	No	
	Transportation Data Collection and Analysis		Collect, maintain, analyze, and report on information related to the use of various point based and linear transportation assets, focusing on issues related to safety and congestion	No	
		Collect Traffic, Collision, and Roadway Condition Information	Collect, poll, validate, format, and store information from various sources, including WSDOT automated and short-count traffic collectors	No	

Business Function	Functional Process	Functional Sub Process	Definition	Anticipated in Roadmap?	Comments
		Manage Traffic, Collision, and Roadway Condition Information	Locate events, create extrapolated statistics based on data received, and link to various roadway and other infrastructure features	No	
		Analyze Traffic, Collision, and Roadway Condition Information	Stratify information by vehicle and corridor, associating with current and projected projects	No	
		Provide Traffic, Collision, and Roadway Condition Information	Respond to requests for information from internal customers, including reporting to meet federal requirements	No	
	Capital Asset Accounting		Record and report on the cost, current value, useful life, and condition of agency assets, verifying the accuracy of the financial records through periodic physical inventory processes	Partially	
		Acquire, Enhance, Transfer, and Dispose of Assets	Create and update (includes enhancements) records describing the useful life, cost, current financial value, current market value, and anticipated salvage value of department and statewide and other capital assets according to department, state, and universal standards. Record removal of assets from department ownership, documenting gain or loss on removal	Yes	Includes: <ul style="list-style-type: none"> • Set-up • Useful Life • Salvage Value
		Periodically Inventory and Value Assets	Verify the existence and condition of assets by location, reviewing and researching exceptions and updating financial records, as appropriate	Yes	

Business Function	Functional Process	Functional Sub Process	Definition	Anticipated in Roadmap?	Comments
		Depreciate Assets	Amortize the cost of department and statewide capital assets over their useful life, accumulating reserves for replacement	Yes	
		Report Asset Condition	Describe and record the condition of the transportation system, identifying and quantifying needs for maintenance, repair, and enhancement	No	
	Consumable Inventory Management		Receive, store, issue, dispose of, and replenish equipment and supplies (inventory stores) used for ongoing support of agency programs	Yes	
		Receive Inventory	Confirm quality, describe, and locate inventory items, calculating or updating average cost information	Yes	
		Store Inventory	Tabulate, age, and validate inventory items by location, updating cost information based on validation results	Yes	
		Issue Inventory	Respond to requests for inventory stores, allocating costs to programs and projects	Yes	
		Transfer/Dispose of Inventory	Record removal of expired and other inventory from department ownership, recording and allocating costs	Yes	
		Replenish Inventory	Replace inventory stores based on threshold levels for re-ordering and current usage patterns	Yes	
	Asset Lifecycle Management		Guide the acquisition, use, and disposal of assets to maximize their future economic benefits and manage related risks and costs over the entire lifecycle	Partially	

Business Function	Functional Process	Functional Sub Process	Definition	Anticipated in Roadmap?	Comments
		Determine Needs and Plan for Acquisition	Anticipate needs for additional assets based on usage patterns, projected growth, condition reporting, and so forth	Yes	Applies to multiple categories of assets including fleet, real estate, technology
		Acquire Assets	Record and update features, location, condition, context, and other non-financial information on statewide and department assets	Partially	
		Manage Asset Operation	Manage Operation – schedule, record and update usage, location, and condition information on statewide and departmental assets	Yes	
		Maintain Assets	Maintain and Repair – prioritize, fund, and complete maintenance and repair activities for statewide and department assets Identify obsolete assets or those at the end of useful life for disposal and replacement	Yes	
Project Management			Scope, schedule, estimate, contract for, manage, report on, and monitor capital program projects from inception through close-out	No	

Business Function	Functional Process	Functional Sub Process	Definition	Anticipated in Roadmap?	Comments
	Project Design, Specification, Estimation, and Review		<p>Establish scope, specifications, schedule, and budget for project and project phases based on identified needs and objectives and available funding</p> <p>Complete initial project risk analysis and environmental screening in support of budget estimates</p> <p>Complete and document results of technical studies and manage permit application process, obtaining necessary approvals to begin work</p>	No	
	Right of Way Acquisition		Identify parcels to be acquired for a project. Monitor and track status of all steps of the acquisition process for each parcel	No	
	Contractor Prequalification and Construction Contract Letting and Award		<p>Initiate and complete acquisition of right of way, manage contractor prequalification, manage preparation of specification and proposals, and carry out the letting and award of construction contracts</p> <p>Compare bid costs to planning estimates</p>	No	

Business Function	Functional Process	Functional Sub Process	Definition	Anticipated in Roadmap?	Comments
	<p>Construction Administration - Contracts and Change Management</p>		<p>Monitor contract and department assigned activities against planned project scope, specifications, schedule, and budget</p> <p>Update project scope, schedule, and budget to reflect current earned value and estimates to complete</p> <p>Initiate and respond to contract change orders and other changes to adjust project scope, schedule, and budget</p> <p>Verify contractor compliance with specifications and plans</p> <p>Make progress and final contract payments (including holdbacks and other retentions) and close contract for procured goods and services, releasing unused budgeted funds</p> <p>Transition asset completed to operational status and monitor outcomes of project activities</p>	<p>No</p>	
	<p>Project Resource Scheduling and Coordination</p>		<p>Establish and update detailed work plan (tasks, schedule, and time allotment) for WSDOT and contracted resources</p> <p>Allocate, assign, and release resources to project activities, balancing and leveling resources</p>	<p>No</p>	

Business Function	Functional Process	Functional Sub Process	Definition	Anticipated in Roadmap?	Comments
	Project Accounting and Budget Management and Reporting		Report project status to internal and external stakeholders Record project expenses, WSDOT resource utilization, estimates to complete, earned value, and other statistics by phase and funding source against baseline and updated budgets	Yes	
Human Resources			Capture and allocate the use of human capital and related resources (equipment) to programs and projects, transferring information to calculate periodic compensation to the State's payroll system	Yes	
	Time and Attendance		Capture, validate, review and approve, and transfer employee time and leave information to the Department of Personnel's Human Resource Management System (HRMS) for payroll purposes, providing information on work patterns and human resource utilization to program managers	Yes	
		Set-up Work Schedules, Crew Lists, Pay Requirements, and Job Classes	Establish, update, and manage work schedules, crew lists, pay requirements and job classes based on job definitions, union contract, and other rules Associate jobs to budgeted positions	Yes	

Business Function	Functional Process	Functional Sub Process	Definition	Anticipated in Roadmap?	Comments
		Capture and Manage Employee Time and Leave	<p>Receive, record, validate, review, and update time worked and leave taken by staff over various time periods based on union contracts and other position and classification rules</p> <p>Determine, track, and monitor leave balances based on accumulated staff time records and employment duration</p>	Yes	
	Distribute Time and Attendance to Activities		Determine fully loaded cost of time worked and leave taken by department staff and other parties and allocate to department programs, projects, and organizations	Yes	
Procure to Pay			Identify needs for, acquire, and purchase equipment, supplies, and services to support program and project activities and performance goals, delivering the best value solution for the agency	Yes	
	Vendor Relationship Management		Establish and manage communication channels and performance metrics with suppliers of goods and services to support agency programs and projects with a focus on reducing costs and mitigating risks associated with purchases through strategic sourcing, negotiation of payment terms, volume acquisitions, performance management, and tools to evaluate vendor financial solvency	Yes	

Business Function	Functional Process	Functional Sub Process	Definition	Anticipated in Roadmap?	Comments
		Manage Vendor Information	Establish and update information on persons and entities with which the department conducts or may conduct business through procurements, grants, and loans	Yes	Including: <ul style="list-style-type: none"> • Subcontractors • Prequalifications • DBE Certifications • Insurance
		Monitor Vendor Performance	Track the results of business interactions with vendors (including grant makers and lenders), recording prices and the level of satisfaction with vendor products and services, for example	Yes	
		Report Vendor Activity	Tabulate and report on planned, current, and historical business interactions with persons or entities to meet internal and external requirements	Yes	1099 and so forth
		Manage Purchase Card Relationships	Establish and maintain agreements with purchase card vendors to provide information on items, costs, dates of payment transactions Interpret and record transactions and impact on orders, receipts, acceptance, inventory, and accounts payable	Yes	
		Collect Market Information	Identify and track pools of potential individuals and entities that meet pre-established criteria for future business interactions with the department	Yes	Through RFI, RF Qualifications

Business Function	Functional Process	Functional Sub Process	Definition	Anticipated in Roadmap?	Comments
	Vendor Solicitation Management		Support the acquisition lifecycle, from developing needs statements for goods and services, to market research and the identification of qualified suppliers, to solicitation document preparation, vendor response evaluation, and apparent successful bidder selection	Yes	
		Identify Purchase Requirements	Identify funding sources, available funds for procurement, and purchasing authority; define and clarify purchasing needs; and determine most effective purchasing method	Yes	
		Manage Bids/Quotes	Prepare solicitation documents for goods and services required, advertise opportunity in marketplace, receive bids, quotes, and technical proposals, evaluate responses against established criteria, and award to the winning provider	Yes	
	Order Management		Place requests for delivery of goods and services using established procurement channels at confirmed prices; receive goods and services ordered; verify the quantity and quality of the goods and services received against established performance measures; and document acceptance of goods and services delivered	Yes	

Business Function	Functional Process	Functional Sub Process	Definition	Anticipated in Roadmap?	Comments
		Order Goods and Services	Request delivery of goods and services procured in a particular quantity, at a specific time, for a particular location, creating pre-encumbrances (obligation) as appropriate based on department policy	Yes	
		Receive Goods and Services	Acknowledge delivery of goods and services ordered in a particular quantity, at a specific time, and at a particular location	Yes	
		Accept Goods and Services	Confirm the adequacy of goods and services delivered based on purchase requirements and procurement terms and conditions, liquidating encumbrances (obligations) and creating accounts payable based on department policy	Yes	
		Manage Purchase Obligations	Record, track, and liquidate commitments to purchase goods and services against fund sources, available funds for procurement (by program or project), and purchasing authority	Yes	Includes encumbrances

Business Function	Functional Process	Functional Sub Process	Definition	Anticipated in Roadmap?	Comments
	Contract Management		Establish and maintain standard terms and conditions and performance measures; prepare and execute contracts with suppliers based on standard language and relevant changes; monitor delivery of goods and services against contract performance requirements and volume/price limitations; confirm compliance with all contract requirements and performance objectives; and close contracts, releasing any associated vendor and agency liabilities	Yes	
		Develop Contract	Manage standard sets of terms and conditions, create and maintain contract templates, and develop, review, negotiate, approve, and execute contracts with business partners (vendors), establishing pre-encumbrances as appropriate based on department policy	Yes	
		Monitor Contract	Track, record, measure, manage, and report risks, changes, amendments, completion levels, delivery timeliness, other performance criteria, payments, and payment holdbacks related to contract components and the achievement of contract objectives	Yes	Includes: <ul style="list-style-type: none"> • Change Orders • Amendments • Retainage Monitoring
		Close Contract	Confirm and report the completion of contract deliverables, disburse payment holdbacks, and release business partner from contracting credit requirements	Yes	

Business Function	Functional Process	Functional Sub Process	Definition	Anticipated in Roadmap?	Comments
	Payables Accounting		Track and manage encumbrances and accruals for goods and services ordered and received for use by agency programs and projects (including those initially funded by employees) and demands for payment by other jurisdictions; approve requests for payment; process approved payments; cancel and reissue payments as necessary; and provide payment information	Yes	
		Manage Goods and Services Payables	Track, manage, and report pre-encumbrances, encumbrances, and accruals, approving requests for payment, processing approved payments, and canceling and reissuing payments to business partners, as necessary Determine or validate shipping charges, taxes, fees, payment discount, penalties, interest, and deductions based on procurement terms, vendor status, scheduling payment to maximize cash retention yet meet prompt payment requirements	Yes	Includes Construction and Non-Construction
		Manage Monetary Distributions to Others	Receive, track, manage, and report requests for employee reimbursement, draws against grants and loans, court orders, and legal settlements, encumbering and then accruing expenses, approving requests for payment, processing approved payments, and canceling and reissuing payments	Yes	Includes Expense Reimbursements and Tort Payments

Business Function	Functional Process	Functional Sub Process	Definition	Anticipated in Roadmap?	Comments
Revenue Cycle			Bill and collect funds from various entities (e.g., the Federal Highway Administration, cities and counties, and citizens) for reimbursement of their share of transportation construction projects; use of department assets (e.g., ferries and tolled network components); and for other capital or nominal budget expenditures	Partially	
	Customer Relationship Management		Collect and maintain information about agency customers, payment methods, and credit worthiness; record customer activity on account; and protect the privacy of sensitive customer data.	Yes	
		Manage Customer Information	Establish and update information on persons and entities to which the department provides goods, services, grants, and loans	Yes	
	Revenue Accounting		Invoice, monitor, and collect loans and other types of debt receivable from or on behalf of the agency's customers, forecasting future collection rates based on historical trends and current environmental factors	Yes	
		Accounts Receivable	Create and update invoices to department customers, including local partners, for goods, services, grants, and loans, transmitting billing information per established agreements Summarize and age outstanding amounts due from customers	Yes	Includes NSF

Business Function	Functional Process	Functional Sub Process	Definition	Anticipated in Roadmap?	Comments
		Collections	Collect outstanding amounts through inter-agency offset, net against account payable, garnishment, and other techniques	Yes	Includes assigning to third party collection agencies
		Revenue Forecasting	Forecast grant, fee, tax, and permit revenues over time by program, project, and organization	Yes	
	Federal Aid and Other Grant Billing		Prepare and submit bills based on expenditures recorded and local requests for federal reimbursement	Yes	
	Receipts Management		Receive, classify, recognize and record monetary receipts from customers; distribute receipts to the appropriate jurisdictions, funds, sources, programs, and projects; issue and make payments against short and long term debt instruments; and project cash availability and use based on verified balances, historical trends, and current environmental factors	Partially	
		Cashiering Management	Receive cash and other liquid assets from customers (including grant makers and lenders) and deposit into appropriate bank accounts	Yes	
		Make Receipts Available	Classify cash and other liquid assets received by fund, account, and source	Yes	
		Distribute Receipts	Allocate revenue, fees, and grant and loan proceeds to programs, projects, and organizations	Yes	
		Manage Refunds and Credits	Apply receipts for refunds and credits to the appropriate expense, organization, project, and program	Yes	

Business Function	Functional Process	Functional Sub Process	Definition	Anticipated in Roadmap?	Comments
		Perform Cash Management	<p>Compare and validate account and banking records for liquid assets, resolving identified differences</p> <p>Anticipate program, project, and organization cash needs and collections by over time, invest liquid assets to maximize return, and plan for loan and other debt instrument draws and sales to minimize debt expense</p>	Yes	Includes Reconciliations and Unclaimed Funds
		Manage Debt Obligations	<p>Create, issue, market, sell, draw down, and track letters of credit, collateralized loans, construction bonds, and other debt instruments, scheduling principal and interest payments, maturity dates, payoff amounts, and other activities over time</p> <p>Prepare reports for credit agencies, private and institutional lenders, and regulatory authorities regarding debt obligations</p>	No	
Cost Accounting			Identify activities, products, and services for which costs need to be measured (cost objectives); establish methodology for measuring and accumulating costs by objective; record, accumulate and distribute direct, indirect, and overhead costs to cost objectives according to established methodology; and determine unit costs or other amounts for activities, products, and services billable to other entities		

Business Function	Functional Process	Functional Sub Process	Definition	Anticipated in Roadmap?	Comments
	Maintain Cost Allocation Plan		Identify activities, products, and services (cost objectives) for which costs need to be measured and determine the method for accumulating costs incurred	Yes	
	Manage Fully Loaded Costing (ABC)		Record, accumulate, and distribute indirect, and overhead costs to cost objectives according to the established methodology Manage staff, contractor and other costs directly charged to cost objectives (projects and programs) using purchasing, time entry, project management, and other systems	Yes	
	Manage Billable Services		Establish unit costs (prices, rates or fees) for department delivered goods and services, price goods and services delivered by customer, and prepare customer billings	Yes	
	Manage Grants		Apply for, receive, distribute, manage, and report on the use of funds from other entities in support of agency capital and other programs	Yes	
		Locate, Apply for, and Obtain Grants	Identify potential financial assistance (grant or loan) in support of strategic goals, provide information to grant makers and lenders in applications for funds, negotiate and execute contract or other agreement with grant maker or lender and receive and allocate funding to programs, projects, and organizations	Yes	

Business Function	Functional Process	Functional Sub Process	Definition	Anticipated in Roadmap?	Comments
		Manage Grants	<p>Track grant and loan monies received as well as spending using monies, ensuring compliance with grant and loan terms</p> <p>Prepare requests for draws or bills against grants and loans based on expenses planned and incurred in meeting stated goals</p> <p>Periodically report on activities supported by grants and loans to funders, demonstrating progress against goals</p>	Yes	
		Close Out Grants	<p>Prepare payments or other credits returning unspent funds to grant makers and lenders</p> <p>Prepare final report summarizing the use of grant and loan funds and the outcome of activities as compared to stated goals</p>	Yes	
	Manage Sub-grants		<p>Define, describe, solicit applicants for, review applications received, award, monitor, and report on agency capital and other program funds distributed to other entities</p>		
		Establish and Manage Grant Programs	<p>Plan for and create programs, projects, or organizations to distribute funding to other individuals or entities to complete activities in support of department strategic goals, allocating revenue from internal and/or external sources</p>	Yes	

Business Function	Functional Process	Functional Sub Process	Definition	Anticipated in Roadmap?	Comments
		Solicit Grant Recipients	Identify potential individuals or entities qualified to complete activities in support of grant and loan programs, projects, or organizations, advertising opportunity, identifying and documenting application requirements	Yes	
		Evaluate Applications and Award Grant/Loan	Review applications from individuals and entities qualified to complete grant and loan program activities, evaluate applications against pre-established criteria, and select awardee(s), allocating available funds, as appropriate Create and execute contract or other agreement with grantee or borrower	Yes	Includes confirming funding source and establishing loan terms
		Manage Grant	Track grant and loan monies disbursed, as well as reported spending using monies, ensuring compliance with grant and loan terms Respond to requests for draws or bills against grants and loans based on expenses planned or incurred in meeting stated goals Periodically review reports of activities performed by grant and loan recipients, assessing progress against goals	Yes	

Business Function	Functional Process	Functional Sub Process	Definition	Anticipated in Roadmap?	Comments
		Close Out Grant	<p>Prepare bills for return of unspent funds</p> <p>Receive and review final report summarizing the use of grant or loan funds and the outcome of activities as compared to stated goals</p> <p>Close contract or other agreement with grant or loan recipient</p>	Yes	
Reporting and General Ledger			Prepare and present agency financial results and associated clarifying information according to Generally Accepted Accounting Principles, recording financial activity in conformance with established accounting policies and utilizing a system of internal controls	Yes	Includes core financial policies and processes
	Manage Chart of Accounts		Define, create, and update the financial information components and values required in various types of business transactions to ensure the accuracy of financial information and internal control over operations	Yes	
	General Ledger Accounting		Prepare, review, and record financial transactions to the appropriate fiscal period, fund, program, and account, for example, reconciling general and subsidiary ledger account information	Yes	
	Fund Management		Project, control, monitor, and report resources available, earned, and used within funds	Yes	

Business Function	Functional Process	Functional Sub Process	Definition	Anticipated in Roadmap?	Comments
	Financial Reporting		Collect, analyze, and present financial information to accurately reflect the results of operations, addressing internal and external managerial, compliance, and performance reporting needs	Yes	Includes: <ul style="list-style-type: none"> • Agency and statewide financial statements • Management reporting • Federal reporting • Bond reporting

Appendix B – Partial List of WSDOT Systems That May Be Candidates for Decommissioning As Result of the Critical Applications Replacement Program

Exhibit B-1 provides a partial list of existing WSDOT systems that may be able to be decommissioned based on the implementation of an ERP and the other components of the Critical Applications Replacement Program. This list is not intended to be a complete list of systems to be decommissioned. This list is a compilation of systems identified by the study team through its work. There are likely other systems, potentially a number of which are maintained in business units, that should also be on this list. Likewise, additional analysis of each system will be required as part of implementation planning and enterprise design activities to confirm the system can be decommissioned and to ensure that the business functions performed by these systems are supported by the ERP or one of the other Critical Application Replacement Program components.

Exhibit B-1: Partial List of WSDOT Systems That May Be Candidates for Decommissioning As Result of the Critical Applications Replacement Program

System Acronym	System Title	System Function	Potential Solution
130-010	Task Order Tracking	Manages/tracks status of engineering consultant task orders	Replace with ERP Contracts Management functionality
Accounting Data Mart	Accounting Data Mart	Data Mart of TRAINS data	Replace with Business Warehouse
ArmCalc	ArmCalc	Convert state route milepost to ARM and ARM to state route milepost. Also validates SRMP to ARM and ARM to SRMP. Common module for PC systems. Also includes web services.	New Location Referencing System
ASA	Aggregate Source Approval	Identifies historical aggregate sources and whether they are approved for use	ERP Materials Management
Automated Fuel Tracking	Automated Fuel Tracking	Interface between vendor supported system and TRAINS	Interface vendor system with ERP
BATS	Basic Accounting Transaction System,	Transmits Materials Lab Billing to TRAINS	Integrate existing MATS system with ERP Projects
Bridge Engineering Information System	Bridge Information Engineering System	Provides access to inventory data, plans, rating reports, inspection reports, photographs, and related files for bridge structures in the WSDOT inventory	Potential to replace with Transportation Asset Management application
CAFM	Computer Aided Facilities Mgmt	Provides data and functionality for facility management functions including real property and lease, building operations, space management, and strategic planning	ERP Facilities Management and/or Property Management
CAPS	Construction Administration and Payments System	Manages Contractor Pay Vouchers	Construction Management. ERP Procurement/Contracts Management/Payables
CARS	Condition Acquisition and Reporting System	Supports input and sharing of information about traffic, incidents, construction, closures, and other activity on the roadway	Transportation Asset Management solution
CARSQA	CarsQA	Process collision reports for upload and processing by Mainframe	Transportation Asset Management Solution + Crash Analysis tools
CATS	Construction Audit Tracking System	Supports communication to resolve non-compliance issues found during construction inspections	Construction Management + ERP Contracts Management

System Acronym	System Title	System Function	Potential Solution
CATS	WSF Contract Agreement Tracking System	Tracks consultant agreements, task, and supplemental budget allocations and management reserve fund allocations for WSF	ERP Contracts Management
CCIS	Construction Contracts Information System	Tracks construction contract details, for example, start dates, end dates, percent complete, fair hiring practices, fair wage rates, and percent of work sublet	Construction Management
CCIS Word Macros	Construction Contracts Information System Word Macros	Regional Project Offices use to add or modify change order text	CCIS, CAPS replacement
CCSV	Credit Card Services	Single interface for processing credit-card transactions. Interfaces to another middle ware product, CyberSource, externally	ERP
Clarity	Clarity	IT Portfolio management information and accounting	ERP Asset Mgmt
Collision Data Mart	Collision Data Mart	Transportation Data Office collision information	Transportation Asset Management
Construction Data Mart	Construction Data Mart		Construction Management and Business Warehouse
Consumable Inventory Data Mart	Consumable Inventory Data Mart		Business Warehouse
Consumable Inventory System	Consumable Inventory System	Tracks consumable inventory for MVF, WSF, and maintenance. Handles orders, receipts, issues, physical inventory, and adjustments to inventory.	ERP
COPIS	CADD and Ortho Photo Information System	Tracking catalog for CADD and Ortho-Photo Management images and diagrams for highway projects	Transportation Asset Management
CPMS	Capital Program Management System	Supports development, monitoring, managing and delivering WSDOT's highway capital construction program	ERP
CPMS Data Mart	CPMS Data Mart		Business Warehouse
CTS	Commitment Tracking System	Enter and track environmental commitments.	Transportation Asset Management
Culvert Database		Tracks condition history and maintenance on culverts	Transportation Asset Management
Dev Srvcs	Developer Services System	Supports considering environmental impact of proposed developments	ERP

System Acronym	System Title	System Function	Potential Solution
EBASE	Estimate and Bid Analysis System	Contains engineer's estimates and contract bid history for highway construction projects. Estimates and bid information are uploaded into CAPS	Preconstruction Mgmt
EBIDS	Electronic Bid System	Allows contractors to submit bids for construction projects electronically	Preconstruction Mgmt
Economic Gas Tax Reporting	Economic Gas Tax Reporting	Reports on state gas tax distribution to counties and cities, providing the percentage of allotments	ERP
EHOQS	Expenditure History	Reporting application to answer questions related to highway construction expenditures on a state route	ERP
Employee Master File/Personnel Information System	Employee Master File/Personnel Information System	Load employee data from HRISD to maintain employee data	Time, Leave, and Labor Distribution
Facilities Data Mart	Facilities Data Mart		Business Warehouse
FATS	Federal Aid Tracking System	Supports the preparation, review and processing of federal funding authorization agreements and modifications to the federal Fiscal Management Information System	ERP
FEMS	Fleet Equipment Management System	Fleet management	ERP
FIRS	Financial Information Retrieval System	Provides summarized accounting, spending plan, and work order information from TRAINS and TRACS	ERP
Fleet Equipment Management Interface	Fleet Equipment Management Interface	System interface between Fleet Management System and TRAINS	ERP
Force Account	Force Account	Provides and tracks construction project information	Construction Management
FRS	Federal Reporting System	Supports detailed reporting to FHWA on highway construction, maintenance and administration expenditures. Used to prepare the Transportation Revenue Generator Report that details revenues generated as compared to revenues expended by county for transportation purposes.	ERP
H&LP Conference / Workshop Tracking System	H&LP Conference / Workshop Tracking System	Track registrants and finances for conferences	ERP

System Acronym	System Title	System Function	Potential Solution
HES Risk	HES Risk	On-line grant applications for Federal Aid related to Hazard Elimination Safety projects to mitigate the risk of collision at high risk locations	ERP Grants Management
HES Safety	HES Safety	On-line grant applications for Federal Aid related to Hazard Elimination Safety projects for hazardous locations	ERP Grants Management
HPMS	Highway Performance Monitoring System Web Application	Annual data collection for reporting to FHWA	Transportation Asset Management
Illegal Sign Inventory	Illegal Sign Inventory	TDO application used to track advertising signs that have not been permitted or that do not meet IAW RCW standards	Transportation Asset Management
IRIS	Integrated Real Estate Information System	Managing right of way acquisition for projects	ERP Real Estate and Case Management
Internet Standard Item Table Unit Bid Applications	Internet Standard Item Table Unit Bid Applications	Inquiry to standard item table	Preconstruction Mgmt
IP Addresses	IP Addresses	Tracks IP addresses and associated owners/devices	ERP Asset Mgmt
IT Account Master	IT Account Master	Used to validate logon accounts and billing accounts	ERP
IT Administrative Support	IT Administrative Support	Monitor overtime pay and IT core expenditures	ERP
IT Contracts	IT Contracts	Active contracts and subscriptions and amendments	ERP Contracts Management
Labor	Labor Collection / Payroll Expenditure Reporting	Collect and process data for employee hours worked, leave taken, and financial details associated with labor hours	Time, Leave, and Labor Distribution
Labor Data Mart	Labor Data Mart		Business Warehouse
Legislative Maps	Legislative Maps	Maps on highway construction projects by legislative district	ERP
Lessons Learned	Lessons Learned	Tracks and shares construction lessons encountered in the course of a project.	Construction Mgmt
LIMS	Laboratory Information Management System	Provides access to materials testing and other laboratory data	Construction Mgmt
Locator Log	Locator Log	Provides means for inventorying roadway items.	Transportation Asset Management

System Acronym	System Title	System Function	Potential Solution
MainWim, VolCheck, Dirsel	TDO Traffic	A collection of applications for collecting, tracking, and maintaining traffic count data	Transportation Asset Mgmt/Traffic Analysis
MATS	Materials Accreditation and Testing System	Standardizes test information reporting and provides central repository	Construction Management potentially or remains as is
McDonald Mailing List Database	McDonald Mailing List Database	Tracks contacts and contract information	ERP
MDL	Master Deliverables List	Comprehensive listing of project elements that serves as starting point for project work breakdown structures	PMRS
MinorCap	Minor Capital Inventory	Tracks equipment location and depreciates equipment for reporting to Statewide Asset Reporting System. Records physical inventory results	ERP
Module Counts	Module Counts	Reformats outputs from GK serial data ports for upload and processing	Transportation Asset Management/Traffic Analysis
Monthly Construction Reporting	Monthly Construction Reporting	Provides high-level construction contract information and specific project information for the public and internal users	ERP, PMRS, Construction Management
MTP	Materials Tracking Program	Provides ability to record and assign construction documents and material information to agency project offices	PMRS, ERP, Construction Management
MWBE Data Mart	MWBE Data Mart		Construction Management, ERP, Business Warehouse
NW REGION CHECKER		This program is used to check NW Region loop data plus reformat to report missing data + run a macro	Transportation Asset Management
NP	New Products	Review new products for use by WSDOT	ERP Materials Management or Construction Management
OMWBE Reporting	OMWBE Reporting	Extracts expenditure data for reporting to OMWBE	ERP
Outdoor Advertising Inventory and Permitting System	Outdoor Advertising Inventory and Permitting System	Inventory, track, and issue outdoor advertising sign permits for use along state routes.	Transportation Asset Management (potential)
PATS	Priority Array Tracking System	Collects, maintains, and tracks WSDOT's capital highway program deficiencies to support development of the capital highway construction program	ERP
Payroll System Reporting	Payroll System Reporting	Payroll expenditure reporting	Time, Leave, and Labor Distribution

System Acronym	System Title	System Function	Potential Solution
PCRS	Project Control and Reporting System		ERP
PDIS	Project Delivery Information System	Project scheduling system for capital highway construction projects	PMRS
Personnel Archive Database	Personnel Archive Database	Supports web based input to Personnel Archive Database. Allows users to retrieve, edit, update, and add past employees of WSDOT to the database	Time, Leave, and Labor Distribution
PMP	Performance Management Program		ERP
PMTS	Professional Membership Tracking System	Tracks agency-paid memberships along with funds expended. Used to approve rack, and monitor all agency paid memberships	ERP
POS	Purchase and Order System	Five forms and applications for purchase orders	ERP
Pre-Qual	Contractor Pre-Qualification System	Contract pre-qualification, pre-contract administration, and district contractor inquiry. Assists in determining if contractor qualified to perform specific types of work	Preconstruction Mgmt and ERP
Project Estimating and Scheduling	Project Estimating and Scheduling	Retains data and calculations on facility design and construction projects	ERP Facilities Management
Project Summary	Project Summary	Collects capital project information during initial project scoping – documents the department’s commitment for scope of work and documents design, programming and environmental decisions	ERP + program extensions
Public Disclosure of Collision Reports	Public Disclosure of Collision Reports	Tracks monies received from public for copies of collision reports	ERP
QPL	Qualified Products List	List of products pre-qualified to use on WSDOT construction projects	Preconstruction Mgmt, Construction Mgmt, ERP
QTABS	Quality Tabulation Structure Notes	Project bid item tracking	Preconstruction Management, Construction Mgmt
Quality Assurance Specification	Quality Assurance Specification	Stores test data related to paving/asphalt. Calculates bonus or penalty due contractor based on test data	Construction Mgmt
Railroad Crossing Elimination Program	Railroad Crossing Elimination Program	On-line grant applications for Federal Aid for elimination of hazardous RR crossings	ERP Grants Management

System Acronym	System Title	System Function	Potential Solution
RAMPS	Road Access Management Permit System	Manage access to state highway system not in centrally incorporated area	Transportation Asset Management
RegTech	Region Technical System	Captures materials test results from regional testing centers for asphalt, grout, ignition furnace calibration, blends, aggregate, cylinders, gauge correlation, multi-grading, and generates reports	Construction Management, ERP
REIS	Real Estate Information System	Estimating, tracking, and management of projects	ERP
Remedy	Remedy Action Request System	Tracks system problems for management and resolution	ERP (potential)
Remedy	Remedy Equipment Inventory System, Asset Management System	Asset management for OIT equipment inventory. Also includes IT purchasing	ERP
Remedy	Remedy Materials Lab Equipment Tracking	Inventory system for materials lab equipment. Also tracks scheduled testing and calibrations of equipment	ERP
Report Generator	Report Generator	Generates and distributes reports of test results from LIMS database	Construction Management (potential)
RES-ER	Real Estate Services - Electronic Review	Electronic workflow for disposal of WSDOT properties. Collect recommendations on surplus of lease of processes and approvals for process to proceed	ERP Property Management
RFIP	Roadway Features Inventory Program	Gather roadside features - GPS based	Transportation Asset Management
Roadway Data Mart	Roadway Data Mart		Transportation Asset Management, Business Warehouse
ROM	Record of Materials	List of major construction items used on a contract. Used as a base for tracking material items on a contract	Preconstruction Management, Construction Mgmt
RTIS	Radio Towers Information System	Secure inventory of government radio tower infrastructure with GIS interface	Transportation Asset Management
SAAB	Northwest Region Scoping Analysis and Budgeting System	Provides direct database link to SMARTS	ERP + program extensions

System Acronym	System Title	System Function	Potential Solution
Safety Management	Safety Management	Tracks safety incidents	Transportation Asset Management
SAM	Statistical Analysis of Materials	Provides test result analysis and calculates quality assurance pay incentive to resolve non-compliance issues found during construction inspections	Construction Management
School Bus Stop Inventory	School Bus Stop Inventory	TDO application used to track school bus stop zones on roads and highways maintained by WSDOT	Transportation Asset Management
SGDB	Specialty Group Database	Collects comments from special group and loads into database supporting PDIS	PMRS, ERP
Short Count	Manual Counts	Process traffic counts collected by individuals for upload and processing	Transportation Asset Management/Traffic Analysis
SignSpec	Sign Specification and Cost Estimation	Documents sign removal, installation, and relocation information for highway construction projects that are included in the set of standard plans	Transportation Asset Management, Construction Management
SIMMS	Signal Maintenance Management System	Supports management of work and inventory by Signal Maintenance department. Used to enter work reports, print timesheets, and maintain location control records for signals inventory.	Transportation Asset Management (potential with work order module)
SMARTS	Safety Management Accident Review Tracking System	Supports review of high accident locations, high accident corridors, and pedestrian accident locations by NW Safety Management Group	Transportation Asset Management/Crash Analysis
SRView	State Route Viewer	Used for viewing roadway perspective images of state routes	Transportation Asset Management
SSOS	Sign Shop Order System	Used to order highway signs for the sign shop	ERP, Transportation Asset Management
STIP	Statewide Transportation Improvement Program	Lists planned projects for federal funding	ERP + custom program extensions
Survey	Survey Monument Database	Tracks the location, status, and history of survey monuments for state highways	Transportation Asset Management
SWD	Stormwater Inventory System	Used to meet federal, state, and local regulations related to controlling contaminated storm water runoff and reducing storm water flows	Transportation Asset Management

System Acronym	System Title	System Function	Potential Solution
TAAS	WSF Transportation Allocation and Allotment System	Management tool for budget process	ERP
TARIS	Traffic Accident and Roadway Information System	Database of traffic, roadway, and collision data	Transportation Asset Management
TARTS	Transportation Asset Reporting and Tracking System	Reports on depreciation of department assets. Compiles value and depreciation for reporting to SARS	ERP, Transportation Asset Management
TEIS	Transportation Executive Information System	Provides budget preparation and executive summary information about a variety of activities	ERP + custom program extensions
TRACTS	Traffic Action Tracking System	Stores critical traffic project data	Transportation Asset Management/Traffic Analysis
Traffic Accidents	Traffic Accidents	Process and track accident information	Transportation Asset Management/Crash Analysis
Traffic Data Mart	Traffic Data Mart		Transportation Asset Management, Business Warehouse
TRAINS	Transportation Reporting and Accounting Information System	Accounts for all WSDOT revenues, expenditures, receipts, disbursements, resources and obligations. This system is a highly customized version of an American Management Systems (AMS) software package. (It includes the budget subsystem – TRACS)	ERP
TRAINS Web Service	TRAINS Web Service	Web service for accessing certain TRAINS functions	ERP
Transmittal System	Transmittal System	Creates electronic transmittal for samples of materials to be tested by materials labs	Construction Management (potential)
TRIPS	Transportation Information Planning and Support System	Maintains and processes current and historical data about the WSDOT roadway network, traffic volumes and classifications, collisions and collision severity	Transportation Asset Management
TSMS	Traffic Sign Management System	Inventories all signs installed by WSDOT on various state and inter-state routes	Transportation Asset Management
UFP	Utility Franchise Permits	Allows entry, edit, and view of utilities, franchise, and permit information	Transportation Asset Management

System Acronym	System Title	System Function	Potential Solution
USMS	Unstable Slopes Management System	Allows entry and storage of slope information, ratings, and cost estimates	Transportation Asset Management
WOA	Work Order Authorization	Provides for funding approval of preliminary engineering, right of way and construction expenditures for all projects in the highway construction program	ERP
Work Order Grabber	Work Order Grabber	Transfers work order information from FIRS and CCIS to the Laboratory Management Information System	ERP, Construction Management
Workforce Management	Workforce Management	Historical workforce expenditures for forecasting future workforce needs	ERP, Time, Leave, and Labor Distribution
WSBIS	Washington State Bridge Inventory System	Integrated bridge inventory system	Transportation Asset Management
WSF Accounts Receivable Interface	WSF Accounts Receivable Interface	Provides interface between WSF point of sale (POS) and WSF Automated Revenue Control System, bank, and TRAINS	ERP
WSF ARCS Operational Staff Reports	WSF ARCS Operational Staff Reports	Used to reconcile POS revenue data and ticket inventory stock and to provide management information on transaction volumes and seller workload	ERP
WSF Claims Management System	WSF Claims Management System	Tracks and analyzes customer incident reports and public claims and dollar costs	ERP
WSF Consumable Inventory	WSF Consumable Inventory	Tracks WSF consumable inventory	ERP
WSF Contracts Administration	WSF Contracts Administration	Present the general public with contract information	ERP
WSF Credit Card Refunds	WSF Credit Card Refunds	Processes refunds to WSF credit card sales	ERP
WSF Customer Inquiry System Interface	WSF Customer Inquiry System Interface		ERP
WSF Labor System	WSF Labor	Supports labor, payroll, HR, budgeting, accounting, time sheet preparation and provides labor cost data to TRAINS	Time, Leave, and Labor Distribution
WSF Lost and Found	WSF Lost and Found	Track items lost or found at the WSF ferries and terminals	ERP

System Acronym	System Title	System Function	Potential Solution
WSF Marine Expenditure System	WSF Marine Expenditure System	Extracts monthly WSF general ledger expenditures and feeds to RT-BEARS. Generates expenditure reports for accounting.	ERP
WSF NSF Tracking	WSF NSF Tracking	Tracks and monitors NSF checks and support collections	ERP
WSF RCS Ticket Inventory System	WSF RCS Ticket Inventory System	Tracks ticket inventory in the central stock warehouse and at various POS terminals	ERP
WSF Revenue Control System	WSF Revenue Control System	Used to perform revenue accounting functions associated with POS revenues	ERP
WSF Terminal Engineering Materials Tracking	WSF Terminal Engineering Materials Tracking	Provides ability to track, monitor, and report on items contained in WSF Terminal Engineering contracts	ERP
WSF Terminal Records Resource System	WSF Terminal Records Resource System	Identifies the physical location of WSF terminal contract records	ERP
WSF Traffic Statistics System		Collects and stores ticket sales information and categorizes sales counts by type of fare	ERP
WSF General Ledger			ERP

Critical Applications
Implementation Feasibility Study

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