COORDINATED WATER MEASUREMENT

FEASIBILITY STUDY REPORT

STATE WATER RESOURCES CONTROL BOARD

CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

May 2009

CALIFORNIA
Water Boards
STATE WATER RESOURCES CONTROL BOARD
REGIONAL WATER QUALITY CONTROL BOARDS

Document Revision History

Date	Version	Description	Author
12/01/2008	0.1	Initial Draft	Pacific Project Management, Inc.
12/17/2008	0.2	Final Draft	Pacific Project Management, Inc.
12/29/2008	1.0	FINAL	Pacific Project Management, Inc.
12/31/2008	1.1	Submitted FINAL	Pacific Project Management, Inc.
5/19/2009	1.2	Revised FINAL	Division of Water Rights

Table of Contents

Table of Figures

Table of Tables

…this page is intentionally left blank…

1.0 Project Approval Transmittal

Information Technology Project Request

Feasibility Study Report
Executive Approval Transmittal

Department Name		
State Water Resources Control Board		
Project Title (maximum of 75 characters)		
Water Institute for Statewide Data Management		
Project Acronym	**Department Priority**	**Agency Priority**
WISDM	**High**	**High**
APPROVAL SIGNATURES		

…this page is intentionally left blank…

2.0 IT Project Summary Package

This section contains the following information:

- Section A: Executive Summary
- Section B: Project Contacts
- Section C: Project Relevance to State and/or Department/Agency Plans
- Section D: Budget Information
- Section E: Vendor Project Budget
- Section F: Risk Assessment Information

INFORMATION TECHNOLOGY PROJECT SUMMARY PACKAGE
SECTION A: EXECUTIVE SUMMARY

1.	**Submittal Date**	

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

			Estimated Project Dates	
			Start	**End**
3.	**Project Title**	Water Institute for Statewide Data Management		
	Project Acronym	WISDM	7/1/2010	2/28/2013

4.	**Submitting Department**	State Water Resource Control Board
5.	**Reporting Agency**	N/A

6.	Project Objectives

This FSR is for a new Information Technology (IT) system to implement Water Code Section 531.5, added by Assembly Bill 1404 (Stats. 2007, ch. 675, § 2), to establish a centralized statewide Water Measurement Database where the source data is collected using standardized forms. The intent of the statute is to determine the feasibility, estimated costs, and potential means of financing a database that would provide coordinated water measurement reporting, and would also support water management planning and decision making. The author's office stated that: "AB1404 will fill critical agricultural water use data gaps and require State Agencies to develop a coordinated water use database. This bill would enable more effective water management planning and investment decisions at the state and regional level." Sections of the Bill specify:

I. **AB 1404 Section 1(a) states**:" As growth and development continue to make California's water resources increasingly scarce, diverse stakeholder groups have recognized the importance of accurate water measurement. Appropriate measurement of water use facilitates better water management by making critical information available to Local, State, and Federal water managers and planners. A greater understanding of water use will support better decisions related to water planning, water allocations, water transfers, and water use efficiency."

II. **AB 1404 Section 1(d) requires that**:" The Department of Water Resources, the State Water Resources Control Board, the State Department of Public Health, and the California Bay-Delta Authority[1] should cooperate and coordinate their efforts in collecting, managing, and utilizing water use measurement information to ensure that the information is put to optimal use in water resource planning and decision making, to increase efficiency, and to reduce redundancy of effort, administrative costs, and duplicative reporting burdens on persons required to report measurement information."

[1] This organization is now referred to within the State as "CALFED Bay-Delta Program"

7.	Proposed Solution

8.	Major Milestones	Estimated Completion Date
	RFP Development	01/31/2011
	Vendor Selection and Contract Negotiation	06/30/2011
	Project Initiation and Planning	08/31/2011
	Requirements Definition and System Design	03/31/2012
	Development and Testing	08/31/2012
	Implementation	12/31/2012
	Pilot Phase Assessment	02/28/2013
	Key Deliverables	**Estimated Delivery Date**
	RFP	01/31/2011
	Vendor Proposals Received	04/30/2011
	Vendor Contract	06/30/2011
	Project Plan and Schedule	08/31/2011
	Requirements Definition Document	01/31/2012
	System Design Document	03/31/2012
	System Test Plan	03/31/2012
	Implementation Plan	10/31/2012
	System Documentation	09/30/2012
	System Acceptance Document	10/31/2012
	Pilot Phase Assessment Document	02/28/2013

INFORMATION TECHNOLOGY PROJECT SUMMARY PACKAGE
SECTION B: PROJECT CONTACTS

Project #	
Doc. Type	FSR

Executive Contacts								
	First Name	**Last Name**	**Area Code**	**Phone #**	**Ext.**	**Area Code**	**Fax #**	**E-mail**
State Water Resources Control Board								
Board Chair	Charles	Hoppin	916	341-5611	N/A			choppin@waterboards.ca.gov
Executive Director	Dorothy	Rice	916	341-5615	N/A			drice@waterboards.ca.gov
ISO	Geesun	Jung	916	341-5126	N/A			gjung@waterboards.ca.gov
CIO	Gary	Arnstein-Kerslake	916		N/A			
Budget Officer	Bill	Damian	916	341-5144	N/A			bdamian@waterboards.ca.gov
Department of Public Health								
Agency Secretary	S. Kimberly	Belshé	916	654-3454	N/A	916	654-3343	kbelshe@chhs.ca.gov
Director	Mark	Horton, MD, MSPH	916	558-1700	N/A			mark.horton@cdph.ca.gov
ISO	Yasser	Lahham	916	440-7038	N/A			Yasser.Lahham@cdph.ca.gov
CIO	Bob	Ferguson	916	445-8057	N/A			Bob.Ferguson@cdph.ca.gov
Budget Officer	Debbie	Shepherd-Juch	916	657-3178	N/A			Debbie.Shepherd-Juch@cdph.ca.gov

INFORMATION TECHNOLOGY PROJECT SUMMARY PACKAGE
SECTION B: PROJECT CONTACTS

Department of Water Resources								
Agency Secretary	Mike	Chrisman	916	653-5656	N/A			mike.chrisman@resources.ca.gov
Director	Lester	Snow	916	653-7007	N/A			
ISO	Anthony	Lourick	916	653-2137	N/A			
CIO	Tim	Garza	916	653-8364	N/A			
Budget Officer	Kathie	Kishaba	916	653-6071	N/A			

Direct Contacts								
	First Name	**Last Name**	**Area Code**	**Phone #**	**Ext.**	**Area Code**	**Fax #**	**E-mail**
Doc. prepared by	Chris	Maneely	916	251-6647	N/A	916	652-4570	seniorpm@pacpm.com
Second contact	Steve	Langridge	916	251-6647	N/A	916	652-4570	stevelangridge@pacpm.com
Project Manager	Victoria	Whitney	916	341-5302	N/A	916		SNyman@waterboards.ca.gov

INFORMATION TECHNOLOGY PROJECT SUMMARY
SECTION C: PROJECT RELEVANCE TO STATE AND/OR DEPARTMENTAL PLANS

1.	**What is the date of your current Operational Recovery Plan (ORP)?**	**Date**	
2.	**What is the date of your current Agency Information Management Strategy (AIMS)?**	**Date**	March 2008
3.	**For the proposed project, provide the page reference in your current AIMS and/or strategic business plan.**	**Doc.**	AIMS
		Page #	1 through 3

Project #	
Doc. Type	FSR

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

INFORMATION TECHNOLOGY PROJECT SUMMARY PACKAGE
SECTION D: BUDGET INFORMATION

Project #	
Doc. Type	FSR

Budget Augmentation Required?		
	No	
	Yes	✓

If YES, indicate fiscal year(s) and associated amount:

FY 2010-11	FY 2011-12	FY 2012-13	FY 2013-14	FY 2014-15	FY 2015-16
$761,573	$4,384,459	$4,553,976	$2,157,442		

PROJECT COSTS

1.	Fiscal Year	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	TOTAL
2.	One-Time Cost	$761,573	$4,384,459	$4,553,976	$0	$0	$0	**$9,700,008**
3.	Continuing Costs	$0	$0	$0	$2,157,442	$0	$0	$2,157,442
4.	**TOTAL PROJECT BUDGET**	$761,573	$4,384,459	$4,553,976	$2,157,442	**$ 0**	**$ 0**	**$11,857,450**

SOURCES OF FUNDING

5.	**General Fund**	$761,573	$4,384,459	$4,553,976	$2,157,442	$0	$0	**$11,857,450**
6.	**Redirection**	$0	$0	$0	$0	$0	$0	**$ 0**
7.	**Reimbursements**	$0	$0	$0	$0	$0	$0	**$ 0**
8.	**Federal Funds**	$0	$0	$0	$0	$0	$0	**$ 0**
9.	**Special Funds**	$0	$0	$0	$0	$0	$0	**$ 0**
10.	**Grant Funds**	$0	$0	$0	$0	$0	$0	**$ 0**
11.	**Other Funds**	$0	$0	$0	$0	$0	$0	**$ 0**
12.	**PROJECT BUDGET**	**$761,573**	**$4,384,459**	**$4,553,976**	**$2,157,442**	**$ 0**	**$ 0**	**$11,857,450**

PROJECT FINANCIAL BENEFITS

13.	**Cost Savings/Avoidances**							
14.	**Revenue Increase**							

Note: The totals in Item 4 and Item 12 must have the same cost estimate

INFORMATION TECHNOLOGY PROJECT SUMMARY PACKAGE
SECTION E: VENDOR PROJECT BUDGET

Project #	
Doc. Type	FSR

Vendor Cost for FSR Development (if applicable)	
Vendor Name	Pacific Project Management, Inc.

VENDOR PROJECT BUDGET

1.	**Fiscal Year**	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16**	**TOTAL**
2.	**Software Customization**	$0	$2, 302,255	$2, 302,255	$506,496	$0	$0	**$5,111,005**
3.	**Project Management**	$0	$300,000	$300,000	$0	$0	$0	**$600,000**
4.	**Project Oversight**	$0	$115,113	$115,113	$0	$0	$0	**$230,225**
5.	**IV&V Services**	$0	$115,113	$115,113	$0	$0	$0	**$230,225**
6.	**QA/QC**	$0	$0	$0	$0	$0	$0	**$ 0**
7.	**TOTAL VENDOR BUDGET**	**$ 0**	**$2.832,480**	**$2,832,481**	**$506,496**	**$ 0**	**$ 0**	**$6,171,456**

----------(Applies to SPR only)----------

PRIMARY VENDOR HISTORY SPECIFIC TO THIS PROJECT

7.	**Primary Vendor**	
8.	**Contract Start Date**	
9.	**Contract End Date (projected)**	
10.	**Amount**	**$**

PRIMARY VENDOR CONTACTS

	Vendor	First Name	Last Name	Area Code	Phone #	Ext.	Area Code	Fax #	E-mail

Project #	
Doc. Type	FSR

RISK ASSESSMENT

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

General Comment(s)
Risk management is a standard and rigorous process that will be followed during this multi-department Information Technology project. Many of the major components of this system will take advantage of technologies already in place at the Department of Public Health, the Department of Water Resources and the State Water Resources Control Board. Please refer to Section 7 of this FSR (Risk Management Plan) for information on Project Risk and how it will be addressed during the WISDM Project.

3.0 BUSINESS CASE

This section of the FSR supports that the State Water Board, in collaboration with the Department of Water Resources (DWR), the Department of Public Health (DPH), and the California Bay-Delta Authority[2] (CALFED):

- Is specifically named in legislation to evaluate a central database of water use and diversion data,
- Has water use and diversion expertise,
- Understands the demand (or need) for a central database of this consolidated water use and diversion data, and
- Is the right group to implement and manage the central database because of the group members' broad water use and diversion experience and responsibilities.

3.1 Business Program Background

The main reason for this feasibility study is the mandate of Assembly Bill 1404 (AB 1404) enacted as Water Code section 531.5 (Stats. 2007, ch. 675, § 2). However, the need to provide coordinated and reliable statewide water use and water diversion information has also been recognized by the State Water Board, DWR, DPH and CALFED and expressed in the organizations' business Strategic Plans. This section describes the legislative and business goals to document the business program background, and also provides background information on each organization's main responsibilities.

3.1.1 Legislative Program Directives

The growing concerns about limited water availability in the State of California[3], the lack of coordinated statewide knowledge regarding available water resources, water measurement, and the potentially negative effects of global warming climate changes are significant factors that led to the introduction and enrollment of AB 1404. Water Code section 531.5 directs the State Water Board, DWR, DPH and CALFED to: (1) conduct a study to determine the feasibility of establishing a Coordinated Water Measurement Database where the source measurement data is collected and reported using standardized forms shared by the agencies; (2) provide the estimated costs to develop and implement the database; (3) identify potential funding sources, (4) consider how the database can be used to provide information to address impacts related to climate change mitigation and adaptation, and (5) consider coordinating the collection and sharing of data through the use of technologies used by the National Environmental Information Exchange Network and existing data exchange infrastructure of the involved agencies.

[2] The organization is now referred to in the State as "CALFED Bay-Delta Program".

[3] Reference the following Press Release containing Governor Arnold Schwarzenegger's directive for a 20% per capita reduction in water usage as outlined in his February 28, 2008 letter regarding ***"Comprehensive Actions Needed to Fix Ailing Delta":*** http://gov.ca.gov/press-release/8911/ .

> **AB 1404 Section 1(a) states**: "As growth and development continue to make California's water resources increasingly scarce, diverse stakeholder groups have recognized the importance of accurate water measurement. Appropriate measurement of water use facilitates better water management by making critical information available to Local, State, and Federal water managers and planners. A greater understanding of water use will support better decisions related to water planning, water allocations, water transfers, and water use efficiency."
>
> **AB 1404 Section 1(d) requires that**: "The Department of Water Resources, the State Water Resources Control Board, the State Department of Public Health, and the California Bay-Delta Authority should cooperate and coordinate their efforts in collecting, managing, and utilizing water use measurement information to ensure that the information is put to optimal use in water resource planning and decision making, to increase efficiency, and to reduce redundancy of effort, administrative costs, and duplicative reporting burdens on persons required to report measurement information."

The establishment of the Centralized Water Measurement Database governed by a Water Institute for Statewide Data Management would provide coordinated water measurement reporting, and also support water management planning and decision making. The bill's author office stated that: "AB1404 will fill critical agricultural water use data gaps and require State Agencies to develop a coordinated water use database. This bill would enable more effective water management planning and investment decisions at the state and regional level."

The Water Institute for Statewide Data Management (WISDM) would be a new program. There is no existing business process in place, either manual or automated, to create and administer the WISDM Program.

3.1.2 Strategic Planning Alignment

Water Code Section 531.5 has provided the impetus for the State Water Board, DWR, DPH and CALFED to work together collaboratively, initially on this FSR and subsequently on the governance, operation and enhancement of the WISDM Program. Each of the organizations also has an internal strategic planning process, the decisions of which are documented in a strategic plan. These strategic plans also state the need for improving the collection and reporting of statewide water measurement data as components of a comprehensive view of State water resources to support both strategic and operational planning of this critical resource.

The following are extracts from each organization's strategic plan to illustrate that the requirements of Water Code section 531.5 and the organizations' business goals and objectives are in alignment.

The State Water Board Strategic Planning

The State Water Board has updated the organization's Strategic Plan for 2008-2012[4]. The main trends identified in the Strategic Plan that the State Water Board has to manage include:

- ***Climate Change***.

  It is widely recognized that changes in temperature and precipitation patterns will impact water availability and quality. Higher air temperatures lead to increases in water demand and changes in hydrologic conditions, resulting in drought and greater threats of wildfires, and reduced snow pack, earlier snowmelt, and a rise in sea level that may cause more seawater intrusion.

- ***Demographic Changes.***

  California continues to experience significant population growth, particularly in the Inland Empire and Central Valley. This growth places greater demands on groundwater supplies, impacts groundwater quality, and creates challenges for dealing with new or increased wastewater discharges, often to environments having limited assimilative capacity. Population growth also drives the need for new infrastructure or the updating of existing infrastructure. This need is particularly critical for small communities with very limited resources.

- ***Decentralized Regulatory Framework.***

  Protecting water resources has traditionally been addressed through separate programs and agencies. Many of the responsibilities involved, however, can only be met by examining the entire watershed, including the way that lands are managed and how they affect receiving waters. The absence of a shared watershed approach to decision-making can result in actions, within and among agencies that do not address priority problems and their causes.

Demand and competition for California's limited water supplies will increase as our population continues to grow and climate change impacts occur. Over the past 50 years, California has met much of its increasing water needs primarily through a network of water storage and conveyance facilities, groundwater development, and more recently, by emphasizing the gains to be achieved through water use efficiency. Efficiently managing our water is the critical purpose of an integrated watershed management approach that leverages actions among and between water supply and water quality, flood protection and storm water management, wastewater and recycled water, and watershed management and habitat protection and restoration interests.

The process established by Senate Bill 1070 (Stats. 2006, ch. 750), which establishes a California Water Quality Monitoring Council, is an excellent approach to resolving problems associated with surface water data availability and use over the long term.

[4] California Water Boards Strategic Plan Update 2008-2012; adopted September 2, 2008.

Establishing the same governance model for statewide water measurement problem resolution and long term planning is recommended.

It is apparent that in order to successfully manage and mitigate the risks of these trends and organizational impacts it is essential that statewide coordinated water measurement data is available to support research, planning, and operational control of California's water resources. The WISDM will be a critical source of that data.

The DWR Strategic Planning

The DWR's current document is the 2005 Strategic Plan[5]. The main business goals documented in the Strategic Business Plan include:

- ***Develop and assess strategies for managing the State's water resources, including development of the California Water Plan Update.***

  Management of water resources and development of adequate, reliable, and sustainable water are essential for the State's success, quality of life, and environmental health. The DWR protects and manages California's water resources. As a manager of the State's water resources, the DWR develops strategies and tools that the public, local, and regional agencies can use to increase reliability and maintain sustainability of water supplies.

  Objective 1.2 identifies the need to develop the tools for data collection, management, and analysis in support of DWR programs including integrated regional water management, preparation of the California Water Plan Update 2010, local assistance, water quality, groundwater management, and water use efficiency. Also Objective 1.5 identifies the need to analyze and report on the delivery capability of the State Water Project using the best available tools and in close coordination with efforts of the California Water Plan. The WISDM will fulfill these objectives for water use and water diversion data collection, management, and analysis.

- ***Protect and improve the water resources and dependent ecosystems of statewide significance, including the Sacramento-San Joaquin Bay-Delta Estuary.***

  DWR is working in many areas to improve water supply reliability, improve water quality, and restore ecosystems affected by water supply projects throughout the State. These efforts support water supply and water system reliability by reducing impacts to threatened and endangered species. DWR's efforts incorporate targeted scientific studies, water quality monitoring, and support of CALFED. Through these efforts, DWR expects increased understanding of the ecosystem environment, reduced pressures on threatened and endangered species, and improved water supply reliability from the Delta.

[5] The Department of Water Resources 2005 Strategic Business Plan – April 2005.

Objective 3.1 identifies the need to develop the tools to support long-range planning and operations of the SWP while maintaining healthy ecological systems and water quality in the Sacramento-San Joaquin Delta. Objective 3.4 identifies the need to develop strategic assessment and long-term State policy for Delta and Suisun Marsh levees. The WISDM central reporting database will support these objectives by providing timely access to current and past water use and water diversion data.

- ***Support local planning and integrated regional water management through technical and financial assistance.***

  The DWR has a long history of providing engineering, environmental, and other planning support to local agencies to help improve water management, including addressing regional challenges. This information is provided either directly or by distribution of comprehensive reports such as local water supply evaluation reports or groundwater investigations. To further assist local actions, the DWR provides financial assistance through various grants and loans to help advance water supply reliability. Integrated regional water management has been mandated by the Legislature and water managers around the State are learning that they can optimize their water supply reliability by developing integrated resource management actions at the local and regional level. The DWR has the expertise and the resources available to support these kinds of efforts and help local water decision-makers meet the new criteria and challenges.

  Objective 6.1 states the need to develop the necessary tools to help local and regional agencies be successful with integrated regional water management. Objective 6.3 identifies the intent to assist in negotiated collaborative water resource decision-making to engage multiple interests to achieve common solutions to existing problems. The WISDM central reporting database will support these objectives by providing timely access to current and past water use and water diversion data.

The DPH Strategic Planning

The DPH's current strategic planning document is the 2008 CDPH Strategic Plan[6]. This is the final approved version of the document. Some of the main business goals included in the CDPH Strategic Plan are:

- ***Improve Quality and Availability of Data to Inform Public Health Decision – Making.***

  The DPH Data Resources Inventory (DRI) is an interactive electronic catalog of data sets and other data resources that have been created by and are maintained within DPH's various programs. The DRI includes data about data (metadata) for more than 100 data sets maintained within DPH programs, including information about the purpose for the data, what program created and

[6] The CDPH Strategic Plan 2008-2010 – July 9, 2008.

maintains the data set, what data items are included in the data set, how and under what circumstances DPH staff and partners may access and use the data, etc. The WISDM environment will add consolidated water use and water diversion data to the DRI.

- ***Performance-based organizations rely on data to make decisions.***

  Now that the DPH has defined goals and objectives, the DPH must collect baseline data for each of the objectives against which it will measure its progress. The DPH is establishing a data collection methodology along with an analysis and reporting mechanism to collect data, examine progress, and report results to the Department and its stakeholders. The WISDM will be one of the components to support these objectives.

The CALFED Strategic Planning

The CALFED Program continues to be guided by the CALFED Record of Decision (ROD) signed in 2000. The ROD outlined the need for "appropriate measurement of water deliveries" and called for a public process to define "appropriate measurement" to be followed by legislation requiring appropriate measurement of water uses. As a first step towards that goal, the ROD directed that a panel of independent experts be convened to help define appropriate agricultural water use measurement. Their work culminated in a report Independent Panel on Appropriate Measurement of Agricultural Water Use dated September, 2003. In addition, a proposal on Appropriate Agricultural and Urban Water Use Measurement was submitted to the California Bay Delta Authority in April, 2004. These efforts served, in part, as the genesis for AB 1404 and, ultimately, Water Code section 531.5.

Two major efforts now underway are setting the future direction for the CALFED Program. The Delta Vision Strategic Plan outlines seven goals for the Delta:

- Legally acknowledge the co-equal goals of restoring the Delta ecosystem and creating a more reliable water supply for California;
- Recognize and enhance the unique cultural, recreational, and agricultural values of the California Delta as an evolving place, an action critical to achieving the co-equal goals;
- Restore the Delta ecosystem as the heart of a healthy estuary;
- Promote statewide water conservation, efficiency, and sustainable use. An action associated with this goal states *"Request agencies to ensure that accurate and timely information is collected and reported on all surface water and groundwater diversions in California by 2012"*;
- Build facilities to improve the existing water conveyance system and expand statewide storage, and operate both to achieve the co-equal goals;
- Reduce risks to people, property, and state interests in the Delta by effective emergency preparedness, appropriate land uses, and strategic levee investments; and

- Establish a new governance structure with the authority, responsibility, accountability, science support, and secure funding to achieve these goals.

The Delta Vision Committee has reviewed the Strategic Plan and developed recommendations for its implementation.

State and federal agencies, along with stakeholders, are developing a conservation plan for the Delta. The goals of the Bay-Delta Conservation Plan are to:

- Identify and implement conservation strategies to improve the overall ecological health of the Delta;
- Identify and implement ecologically friendly ways to move fresh water through and/or around the Delta;
- Address toxic pollutants, invasive species, and impairments to water quality; and
- Provide a framework and funding to implement the plan over time.

The final Bay Delta Conservation Plan is expected to be completed in mid-2010. *Clear and complete reporting on water diversion and use will be of paramount value in understanding resultant consequences to affected species as well as actual deliveries of water.*

The WISDM central reporting database will also aid in achieving these goals by providing timely access to current and past water use and water diversion data, both regionally and statewide.

3.1.3 Governance Direction

Currently, the State Water Board believes that, rather than create separate governance models for different aspects of the state-level water resources management, it is more desirable to create an overarching governance model such as a Statewide Water Data Institute that would direct and manage statewide water related programs such as those mandated by SB1070 and AB 1404. The project team members from the DWR, DPH and CALFED also agree that a statewide overarching governance model is needed to ensure the fulfillment of separate program mandates, and to ensure the critical coordination of program efforts and the establishment and assurance of a common vision and goals.

One of the key points in the State Water Board Agency Information Strategy document states: “The Water Board’s commitment to a five-year plan for significantly improving the collection, storage, management and reporting capabilities for information and data regarding waters of the state, and for collaborating with other public and private organizations to establish a comprehensive Statewide Water Data Institute to house and provide public access and analysis tools.”[7]

[7] State Water Board Agency Information Management Strategy Update, March 2008.

3.1.4 The Water Boards Organization

The State Water Board has broad authority and responsibility to protect water quality, allocate water supplies, and balance the competing demands on water resources in accordance with the law. The State Water Board provides for the orderly and efficient administration of the water resources of the state through its exercise of the California's adjudicatory and regulatory functions in the field of water resources. The State Water Boards and the nine Regional Water Quality Control Boards (Collectively called in this document Water Boards) are responsible for protecting all of the waters of the state for the use and enjoyment of the people of California.

The major functions of the State Water Board support its mission: “To preserve, enhance and restore the quality of California’s water resources, and ensure their proper allocation and efficient use for the benefit of present and future generations”.

Water Rights: The Water Board's primary authority over water supply issues is regulatory in nature. The State Water Board serves as the State's administrative adjudicatory body over water allocation issues, sharing authority over water rights enforcement with the State courts. Anyone who wants to divert and use water from a natural stream course who does not already have an existing water right must first apply for and be issued a water right permit by the State Water Board. The State Water Board issues permits for water rights specifying amounts, time of year when water can be diverted, water supply project development schedules, and other conditions. The State Water Board also administers and exercises continuing authority over all water rights permits and licenses it has previously issued, enforces against illegal water diversion and use, regulates all water rights to ensure that the constitutional mandate against waste or unreasonable use of water or unreasonable method of diversion is enforced, and assists the courts in determining rights that were acquired prior to the creation of an administrative water rights program.

Water Quality: The Water Boards have primary authority over issues affecting water quality in California, and act to protect the health, safely, and welfare of Californians and the health of the environment by regulating activities that may affect water quality in order to attain the highest water quality that is reasonable, considering all demands being made on those waters. Operating under both state law and, as the entity delegated with water quality authority under federal law, the Water Boards are responsible for water quality planning, permitting, enforcement, and local assistance. Recognizing the geographic, climatic, and demographic variability between different areas of the State, the Regional Water Boards have primary authority within their regional boundaries. The State Water Board provides technical assistance to the Regional Water Boards, ensures coordination and consistency between the various regions, and is responsible for water quality issues of statewide concern. In addition, the State Water Board provides oversight of certain Regional Water Board actions by acting as the first level of appeal of Regional Water Board permits and decisions.

In carrying out their missions, the Water Boards are responsible for ensuring that the waters of the State are used beneficially and reasonably, and that water is not wasted.

3.1.5

3.1.5 The DWR Organization

The DWR is responsible for promoting California's general welfare by ensuring beneficial water use and development statewide. To guide development and management of the State's water resources, the DWR is responsible for preparing the California Water Plan Update. The Plan is updated every five years to address challenges currently facing California, such as satisfying the needs of the State's growing population (projected to reach about 53 million by 2030), quantifying water demands and supplies and identifying management strategies.

The DWR is authorized to conduct other water supply planning functions, including those related to urban and agricultural water use, fish and wildlife, recreation, groundwater, agricultural drainage, and water quality. It also investigates and identifies water management strategies, such as conservation, water recycling, water transfers, conjunctive management, and structural measures.

The DWR operates California's State Water Project (SWP), the largest State-built multipurpose water supply project in the United States. The SWP spans more than 600 miles from Northern California to Southern California and includes 32 storage facilities, 17 pumping plants, 3 pumping-generating plants, 5 hydroelectric power plants, and approximately 693 miles of canals and pipelines.

The ability of the DWR to meet many of its goals hinges on achieving and maintaining a healthy ecosystem in the Bay-Delta Estuary. Maintaining such an ecosystem requires understanding, collaboration, and reasonable agreement among many partners to resolve Bay-Delta issues. The DWR is collaborating and coordinating with the CALFED agencies to carry out its responsibilities of controlling salinity, providing water for use in the Delta, planning long-term solutions for environmental and water use problems, and administering Delta levee maintenance reimbursements and special flood control projects.

The DWR represents the State on interstate water policy issues and is designated as the State administrator of interstate water-related compacts. It is responsible for the supervision of the safely of dams and reservoirs, and exercises that responsibility through regulatory authorities. The DWR provides water master services in California to enforce water right decrees and agreements. Lastly, the DWR provides technical expertise on flood control issues, and, if no other agency is specified, provides for flood control protection related to the San Francisco Bay-Delta Estuary.

3.1.6 The DPH Organization

The California Department Public Health's Division of Drinking Water and Environmental Management (DDWEM) promotes and maintains a physical, chemical, and biological environment that contributes positively to health, prevents illness, and assures protection of the public.

DDWEM's major components are: (1) Drinking Water Program, (2) Environmental Management Branch, (3) Sanitation & Radiation Laboratory, and (4) Environmental Laboratory Accreditation Program

Drinking Water Program: The Drinking Water Program regulates public water systems; oversees water recycling projects; permits water treatment devices; certifies drinking water treatment and distribution operators; supports and promotes water system security; provides support for small water systems and for improving technical, managerial, and financial (TMF) capacity; oversees the Drinking Water Treatment and Research Fund for methyl tertiary-butyl ether (MTBE) and other oxygenates; and provides funding opportunities for water system improvements, including funding under Proposition 84, Proposition 50 and the Safe Drinking Water State Revolving Fund.

Environmental Management Branch (EMB): The EMB regulates medical waste generators, shellfish production and harvesting operations, and recreational health (swimming pools and ocean beaches); provides sanitary surveillance of State institutions; oversees radiological surveillance around federal facilities, the State's radon program, and low level radioactive waste disposal; and houses DPH's Nuclear Emergency Response Program.

Sanitation & Radiation Laboratory (SRL): The SRL provides analytical support to the DDWEM's programs and DPH's Radiological Health Branch, and, through interagency agreements, to other State agencies.

Environmental Laboratory Accreditation Program (ELAP): The ELAP provides evaluation and accreditation of environmental testing laboratories to ensure the quality of analytical data used for regulatory purposes to meet the requirements of the State's food, drinking water, wastewater, shellfish, and hazardous waste programs.

3.1.7 The CALFED Organization

The CALFED Bay-Delta Program is a unique collaboration among 25 State and Federal Agencies that was formed with a mission: to improve California's water supply and the ecological health of the San Francisco Bay/Sacramento-San Joaquin River Delta.

CALFED was created because of the importance of the Delta to California. The majority of the State's water runs through the Delta and into aqueducts and pipelines that distribute it to 25 million Californians throughout the state, making it the state's single largest and most important source of water for drinking, irrigation and industry.

As an ecosystem, the Delta is unique as the largest estuary on the Pacific Coast and home to more than 750 species of flora and fauna. Additionally, the Delta is home to more than 500,000 people, a major recreation destination and a crossroads for Northern California infrastructure. Finally, the importance of the Delta has made it a politically-charged battleground that has compounded the issue of finding solutions to its problems as an aging and increasingly fragile system susceptible to the forces of land subsidence, seasonal flooding, a future of climate change and sea level rise, the potential of earthquake and the collapse of its ecosystem.

It was the Delta's importance to the economic stability of California and the nation that led to the drafting in 2000 of a 30-year plan for its management and restoration. Implementation of the plan was ultimately pledged by 25 State and Federal Agencies with expertise to manage the complex program. This plan, set forth in a programmatic Record of Decision, laid out a science-based planning process through which the participating agencies were able to make and implement better, more informed decisions and actions on future projects and programs. Two years later, the California Bay-Delta Authority was created to oversee the program's implementation and Congress adopted the plan in 2004.

The CALFED's major programs are: (1) water quality, (2) water supply reliability, (3) levees, and (4) ecosystem restoration.

Water Quality. The CALFED Water Quality and Ecosystem Restoration programs aim to improve Delta water quality for all uses: in-Delta, Delta-related, drinking water, environmental and agricultural uses. The Water Quality Program focuses on the use of the Delta water for drinking and, to some degree, for agricultural use. The Ecosystem Restoration Program focuses on the water quality needs of Delta species. Through regulatory programs and implementation grants, these programs seek to improve water quality in the Delta by reducing sources of contaminants, improving flows and conveyance, and demonstrating drinking water treatment technologies.

Water Supply Reliability. The CALFED's Water Supply Reliability Program is achieved through five program elements: Conveyance, Storage, Environmental Water Account, Water Use Efficiency and Water Transfers. Together, they comprise the CALFED's Water Supply Reliability Program objective. Through partnerships with local and regional agencies, these programs seek to increase water supplies, ensure efficient use of water resources and add flexibility to California's water system.

Levees. The CALFED's Levee System Integrity Program provides long-term protection for vast resources in the Delta by maintaining and improving the integrity of the estuary's extensive levee system. These resources include not only the quality of the Delta's water and the health of its ecosystem, but the 500,000 people who call the Delta home, the many towns and villages in the Delta, infrastructure such as utilities and transportation corridors, and economic assets of thriving agriculture and recreational industries.

Ecosystem Restoration. The CALFED's Ecosystem Restoration Program (ERP) is implemented through the ERP and Watershed Program Elements and works to improve the ecological health of the Bay-Delta watershed through restoring and protecting habitats, ecosystem functions and native species. The Watershed Program Element specifically works in tandem with the Ecosystem Restoration Program Element to ensure that ecological health of the Delta is restored and that water management is improved by working with communities at the watershed level.

3.1.8 Business Expertise Summary

As described in the aforementioned organization descriptions, the State Water Board, DWR and DPH, as data collectors/managers, have critical responsibilities and existing expertise in all aspects of the water use, water diversion, and water quality environments. As a major user of this data, CALFED has an interest in the definition of the data that is to be collected and managed by WISDM. These attributes will enable the four organizations to collaborate to successfully design, develop and administer the Centralized Water Measurement Database of the WISDM Program.

3.1.9 The Water Institute for Statewide Data Management Vision

Once completely established the WISDM will have coordinated access to a statewide repository of comprehensive water use and water diversion information. It will fulfill the goals of Water Code section 531.5 and will provide online access to the data repository for use by external entities such as: the data source stakeholders; Legislature; researchers; federal/State/local government agencies; and other approved organizations.

3.2 Business Problem/Opportunity

The WISDM will eventually make available the current and relevant water use and diversion data into one information repository. The WISDM will contain comprehensive water resource data that will provide the water use and diversion status for policy makers, researchers and stakeholders in the State. Once it is available, key staff will be able to go to a single authoritative source for water use and diversion information, giving them the best opportunity to investigate recent trends and develop appropriate policy. The WISDM will offer the best available information about the link between two of the most critical policy areas in the State: Water Use and Water Diversion.

The WISDM will:

- ✓ Reduce cost of ownership of data through more accurate data,
- ✓ Result in less human intervention required for data input and management, and
- ✓ Improve sharing of information between Departments which will reduce the amount of maintenance and administration of the data.

3.2.1 Business Analysis Methodology

The analysis of the business problems and opportunities, business objectives and related business functional and technical requirements was achieved primarily using a workshop approach. The State Water Board, DWR, DPH, and CALFED participated in a series of workshops designed to elicit a common overarching WISDM Project scope and approach and to reach a consensus on the business problems and opportunities and related business objectives and requirements. The following are overviews of each workshop conducted and a list of attendees for each workshop is included as Attachment 1 in the FSR.

1. **Initial Combined Workshop**

   This included State Water Board, DWR, DPH and CALFED project team members. The purpose of the workshop was to set the agreed project scope in the major process areas. This workshop covered the discussion points below.

   - Define the current processes and information flows for each stakeholder group, including inter-departmental information sharing and data categories, at a high level.
   - Create a context/domain diagram – with the new central database as the hub; inputs and outputs; roles and responsibilities.
   - Define the required information group categories and subcategories and high level information required, to establish the outline of the new form(s) content.

2. Stakeholder Group Workshops for State Water Board, DWR, and DPH

Pacific Project Management, Inc. (PacPM) and the three State stakeholder groups conducted a needs assessment as part of the Business Case definition for the FSR. This was done to establish:

- The current business environments, and the associated problems being experienced, and to determine other business opportunities that can be realized as part of the Multi-Departmental Water Usage Database solution;
- The business objectives that will correct the identified problems, and fulfill the business opportunities; and,
- The functional and technical requirements that support the fulfillment of the business objectives

PacPM conducted two workshops with each stakeholder group to gather the information for the needs assessment.

- **Current Systems and WISDM – Problems, Opportunities and Objectives**

This workshop included the stakeholder group project team members and invited subject matter experts (SMEs). The purpose of the workshop was to discover the current business problems and opportunities, and the business goals/objectives that need to be fulfilled to solve the problems and realize the opportunities.

This workshop was supported by a guide to explain the objectives of the workshop and included questions to prompt discussion to define the problems/opportunities and related objectives. The guide was emailed to the attendees several business days before the meeting so the attendees could prepare.

- **Current Systems and WISDM – Objectives, Functional and Technical Requirements**

This workshop included the stakeholder group project team members and invited SMEs. The purpose of the workshop was to discuss the objectives identified in the first workshop, and to define the high level functional and technical requirements that will fulfill them.

This workshop was supported by a guide to explain the objectives of the workshop. The guide was emailed to the attendees several business days before the meeting so the attendees could prepare.

3. **CALFED Interview - Current Systems and WISDM**

   The CALFED does not publish, distribute or process standard forms for water users to complete. The project team decided that because of this it was not necessary that the CALFED be part of the stakeholder groups workshops process, and that an interview to discuss the current processes and the WISDM was sufficient.

4. **Consensus and Requirements Validation Workshop**

   This included State Water Board, DWR, and DPH project team members. The purpose of the workshop was to gain consensus on any differences of vision between the organizations discovered during the workshops and for all the organizations to validate the high level functional and technical requirements.

3.2.2 Business Problems

Creating and maintaining a WISDM that contains consolidated statewide water use and diversion information is critical to support the strategic planning and operational effectiveness of the management of California's water resources.

A consolidated statewide water use and diversion database does not currently exist, either through manual policies and procedures, or with the support of an automated system. The lack of correlated information poses three main problems that limit the understanding of California's statewide water resource availability and use.

Problem: There is no comprehensive understanding of California's statewide water resource availability and use due to lack of available consolidated data accessible by a centralized reporting toolset. Therefore it is not possible to obtain a clear state-level picture of California's available water supply, water diversions and use, and the potential effects of climate change on water resources.

Problem: There are instances of Water Data Providers[8] (WDP) having to enter source data multiple times because of the reporting requirements of the State Agencies. The reporting requirements for some WDPs use critical time and resources, and impact the WDP's operational management. Where there is no regulatory requirement to submit the data it has led to WDPs non-reporting, resulting in incomplete data.

Problem: There is no single source of water diversion and use data that exists in the State and no centralized method of consolidating different data sources and reporting on them to inform and support strategic planning and policy decisions.

[8] The term Water Data Providers, or WDP, encompasses the State Water Board, DWR and DPH sources of information which include: Water Rights Permitees and Licensees, Public Water Agencies, Public Water Systems, Public Water Suppliers.

3.3 Business Objectives

The following business objectives address the key problem statements defined above. They are organized into four main categories to indicate the business approaches required to fulfill the Water Code section 531.5 requirements.

1. **WISDM Program and Project Governance**

Formal established governance for both the WISDM Program and the Project is critical to its success. The State Water Board, DWR and DPH are all major stakeholders in the Program and the Project, and as such should be represented in the governance structure and take part in managing the planning and progress of both. While CALFED does not publish, distribute or process standard forms for water users to complete, it should take part in the development of the governance and managing structure for the WISDM.

Establish a governance structure to formally document how the participating departments will govern the multi-department WISDM Program.

This will significantly reduce project risk and help to ensure that on-going operations will be successful. Program governance must be determined.

As stated in Section 3.1.3 Governance Direction previously, it is the project team's consensus agreement that a statewide governance model, such as an independent Water Data Institute, should be created to coordinate the efforts of legislated programs such as SB1070 and AB 1404, to preserve a statewide "global" view and dissemination of water related information, and to prevent duplication of effort and the propagation of "stove piped" narrowly focused systems.

Based on the WISDM Project schedule documented in Section 6, the governance structure for this project should be in place prior to the project start date of 7/1/2010.

Program Governance should establish a change management process that will formally manage changes to the form sets' questions repository used by the WISDM for data collection.

This will significantly reduce project risk and help to ensure that on-going operations will be successful. Form questions from different departments requesting similar information may overlap and cause jurisdictional issues. Some of the forms are governed by statutory requirements and cannot be changed at will. A formal change management process will ensure that all aspects of a proposed form change are discussed and approved by a multi-department change management board before being executed.

As an integral part of the overall Project Management Plan documented in Section 6, a Change Management Plan and process should be put in place

during the Project Planning phase to manage potential changes to the form content of the WISDM System.

Each stakeholder department should assign staff with the required knowledge and expertise to support the WISDM Program and Project.

This will significantly reduce project risk and help to ensure that on-going operations will be successful. The stakeholder departments have worked collaboratively on all aspects of the feasibility study, and it is critical that this level of collaboration continues through all project phases and in all aspects of the program management. This will result in the need for enhanced staffing levels – see Section 5 Proposed Solution for more detail. If the Legislature intends to move forward with this project, it is critical that it provide the resources to do so.

The core staff necessary to ensure the WISDM Program success is identified in Section 5. However, in addition to the core team, each participating agency should assign staff as SMEs and to provide agency support to participate in all phases of the project. SMEs are generally the more experienced staff at the various agencies. As such, their redirection to special projects, such as this one, have adverse effects on other program efforts, even if additional resources are provided.

The WISDM Program management must determine acceptable methods of measurement and recording of water flow for use by water diverters to monitor their diversions.

This is critical to fulfilling the centralized database requirement. Improved measurement of water diversion and use is necessary to support data accuracy for planning and operational use. This may require additional tasks to identify funding to create incentives for participation with devices to provide 'methods of measurement' (e.g. meters, Parshall Flumes, river stage recorders, etc.).

The WISDM Program management should establish a focus group to determine standard specific methods of measurement and recording, during the Project Planning phase of the project.

Provide financial incentives to WDPs to provide water use data to the State.

This is critical to fulfilling the centralized database requirement. Currently only about 50 percent of the water diversion and use data is submitted by the WDPs. To support the submittal of a targeted 90 percent or more of the water diversion and use data, the program management will determine what financial incentives can be provided to ensure that WDPs submit the data.

The WISDM Program management should establish a focus group to determine potential financial incentives, and the potential legislative and regulatory effects of the incentives, that could be provided to WDPs, prior to the end of FY 09/10.

Provide regulatory incentives to WDPs to provide water use data to the State.

This is also critical to fulfilling the centralized database requirement. Currently the state has no authority to require all water diverters to report their diversion and little authority to require those who do report to report accurate data. Further, current water right laws encourage the misreporting of data, because those who do not use water under their water rights are subject to forfeiture of all or part of their water right. This tends to encourage the over-reporting of water diversion and use. Similarly, because a large number of water users do not report their use at all, overall, water use in the State is likely under-reported.

The Delta Vision Committee has made recommendations on the need for additional regulatory authority related to water diversion and use monitoring. Depending on the outcome of those recommendations, the WISDM Program management should establish a focus group to determine best practices regarding water diversion and use monitoring.

Engage appropriate stakeholders across all departments and selected end users in the design, development and implementation of the WISDM.

This will significantly reduce project risk and help to ensure that on-going operations will be successful. It is critical that the WISDM Project team and on-going support team be composed of the appropriate participants from the stakeholder departments, the WDPs and external user communities.

The WISDM Project and Maintenance and Operations support teams should be composed of both dedicated and SME participants as described in Section 5, during all phases of the project.

Provide a mechanism for hardcopy forms data to be input into the system without having to contract with a vendor each year to do it.

The WISDM Program management will determine the best method to be used for forms data input, without using vendor resources. This will save money by not using vendor services or State staff resources to input data. This effort should also include participation by the WDPs that currently submit data in their own format for input by the State.

During the Project Planning phase, the WISDM Program management team will determine the most appropriate process for hardcopy forms data to be input into the WISDM system without the use of contracted or State resources.

2. Improving WDP Participation and Volume of Data Submitted

Only about 50 percent of the total water diversion and use data is submitted when requested. The WDP's participation in collecting and submitting the data to the State agencies is mainly voluntary, and even when it is required (for instance as a water right permit term), a lot of the data required for statewide strategic and operational planning is not being submitted. Measures must be taken to improve the volume of submittals of the required water diversion and use data.

Provide more current and accurate information for strategic and operational planning and control.

This is critical to fulfilling the goals of a centralized database requirement. Currently only about 50 percent of the water diversion and use data is submitted by the WDPs. Also, some of the reporting periods are multiple years, so that the data provided is several years old and may not relate to current water availability issues. The current level of available data is not a sufficient base of data to support the statewide planning and modeling requirements.

The WISDM Program management should establish a focus group to review the current data reporting requirements of the stakeholder agencies to improve the currency, efficiency, and accuracy of the data collected, prior to the end of FY 09/10.

The WISDM must enable data to be captured on-line in real-time, and permit the WDP to enter information in multiple on-line sessions if required. The WISDM will allow WDPs to see what they submitted in previous periods, and what needs to be submitted.

This promotes an increase in the level of data submitted. If the WISDM makes it easier for the WDPs to submit, correct and view data then increased participation will result.

The WISDM System should include this functionality. This is part of the proposed solution scope described in Section 5, which will be analyzed in detail during the Requirements Analysis and System Design phases of the WISDM Project.

The WISDM will include the ability for State staff to enter information for a WDP.

This promotes an increase in the level of data submitted. When State field agents are at the WDP site(s), particularly the smaller ones, they will have the ability to use the WISDM to input water diversion and use data for the WDP. State office based staff will also have the ability to use the WISDM to input water diversion and use data for a WDP.

This is part of the proposed solution scope described in Section 5, which will be analyzed in detail during the Requirements Analysis and System Design phases of the WISDM Project. The WISDM System will include this functionality.

Make the on-line form appear the same as the existing hardcopy form.

This promotes an increase in the level of data submitted. The WISDM on-line form will look the same as the hardcopy form which the WDPs are already familiar with, and will make the transition to on-line submittal of information easier for the WDPs.

The WISDM System should include this functionality. This is part of the proposed solution scope described in Section 5, which will be analyzed in detail during the Requirements Analysis and System Design phases of the WISDM Project.

Facilitate uniform (full and complete) participation of WDPs statewide to reduce the amount of effort that is required for collection of water use and diversion information.

This promotes an increase in the level of data submitted. The WISDM on-line data input process will prompt for all required form fields when scheduled, and will not confirm successful submittal of data until the required data is complete.

The WISDM Project should include selected WDPs as SMEs in appropriate phases of the project. The WISDM Program Team will use the processes documented in the Communications and Outreach Plan to ensure that the WDP Community will be kept informed of program and project features, training, milestones and status.

3. **Data Quality Assurance and Quality Control**

It is critical that measures are taken to improve the quality and integrity of the data submitted. A reliable consolidated base of data is essential to provide accurate reporting and analysis to support statewide strategic and operational planning.

Analyze and document the stakeholder departments' water use and diversion information to enable centralized data management to maintain common definitions and combined sharing.

This will significantly reduce project risk and help to ensure that on-going operations will be successful. It is critical that there is an accurate understanding of each stakeholder department's data, including where there is duplication, and that a central data dictionary, or metadata repository, is created to document the characteristics of each data item. The WISDM will then be able to route the data input correctly and fulfill reporting and data extract requests accurately.

As part of the WISDM Project Requirements phase, a comprehensive data analysis will be performed by the Design, Development and Implementation (DD&I) vendor in conjunction with the State project team. This will include data normalization (to mitigate duplication of data), data mapping, data item characteristics and standard description, metadata creation, and a data catalog for end user reporting.

The State Water Board, DWR and DPH must collect and maintain *electronic* data on water use and diversion information.

This is critical to fulfilling the centralized database requirement. There are currently no stakeholder department automated systems that collect and maintain data input by WDPs. Automated systems must be implemented as part of the WISDM Project to provide a centralized database view for scheduling of data input, validation and storage of data input, and to provide a consolidated data repository for reporting and analysis.

The scope of the WISDM Project is to create rudimentary database stores for each department (State Water Board, DPH, and DWR), for the water use and water diversion data that the WISDM central forms input process will be forwarding to the appropriate department in the form of XML-based messaging. This will preserve the pre-validated data so that each department can review and amend the data as required to ensure it becomes valid business information, and to incorporate it as desired in the department's enterprise data stores for other specific business use.

The WISDM Project Team should create rudimentary database stores for each participating agency as part of the project requirements to capture the agency data as it is received from the WISDM System. This is part of the proposed solution scope described in Section 5, which will be analyzed in detail during the Requirements Analysis and System Design phases of the WISDM Project.

The WISDM will enable the WDPs to report the requested information by selecting from a standard list of valid units, as specified by the State.

This is critical to support the validity and integrity of the data input to the WISDM. The stakeholder departments will determine those data items that are subject to specific standard values, such as units of measure, and will prompt the WDP to select from a list of standard values rather than permitting free-form non-standard values to be input.

During the Requirements Analysis phase, the WISDM Project Team and DD&I vendor should determine the standard values for appropriate data items. These will be incorporated in the design of the WISDM System as drop-down data field lists.

The WISDM will capture the appropriate detail level of data and data inter-relationships (e.g. mother-daughter relationships).

This is also critical to support the validity and integrity of the data input to the WISDM. Some of the data elements that the stakeholder departments currently manage have inter-dependencies and inter-relationships that must be defined and managed to ensure data integrity and reporting accuracy.

As part of the WISDM Project Requirements phase, a comprehensive data analysis should be performed by the DD&I vendor in conjunction with the State project team. This will ensure that the data inter-dependencies and inter-relationships are incorporated in the database and system design.

The WISDM must preserve an audit trail of the changes made to the data, which will specify at a minimum the user who made the change and when the change was made.

This is critical to support the validity and integrity of the data input to the WISDM. The WISDM staff will be able to print audit reports to verify changes.

During the Project Requirements phase, the WISDM Program management should determine the appropriate level of audit trail that must be incorporated into the WISDM System. This may be an integral feature of the selected relational database management system (RDMS).

4. **Centralized and Consolidated Data Access**

Water Code section 531.5 requires that a centralized reporting data base be created to support effective State and regional water management and decision making, and also to provide information to address the impacts related to climate change mitigation and adaptation. It is critical that the WISDM provides not just a historical reporting capability, but also tools that support trend analysis, projections and data sharing.

The WISDM should provide the ability to produce both standard and ad hoc consolidated data reports by enabling standardized calls to State databases.

This is critical to fulfilling the centralized reporting database requirement. It is imperative that the WISDM technical infrastructure and software tools are based on open industry standards and comply with the Office of the Chief Information Officer (OCIO) enterprise architecture standards.

The WISDM Project Team and selected SMEs should define the required abilities of the business intelligence toolset component of the WISDM System, as documented in Section 5. This will be done as part of the RFP detailed requirements analysis process, and these detailed requirements will be validated during the Requirements Analysis phase of the WISDM Project.

The WISDM must provide the stakeholder departments the capability to interface to their own department applications.

This is critical to fulfilling the centralized database requirement. The WISDM must have the ability to route the validated data input by the WDPs to the appropriate stakeholder department for department specific storage and management.

Create rudimentary database stores for each participating agency as part of the project requirements. Each agency will incorporate the data into the existing agency applications databases as they deem appropriate, after further validating and transforming the data to fit the agencies business needs. The data will still be available to the business intelligence toolset for reporting and analysis, as it will be part of the data source mapping and data catalog of the toolset.

5. **Climate Change**

The State is ill-equipped to estimate water supply impacts related to climate change, except in a gross manner. Water supply impacts are the result of changes in precipitation, streamflow, water storage (for instance in groundwater basins) and changes in demand. Although individual local water managers may have sufficient data on their own water supplies and water use to estimate localized impacts that could result from climate change, there is insufficient information available at a statewide level to determine water use trends. If the WISDM project is implemented, data entered into the data base on both water diversion and use would be available to water resource managers and could form the basis for better water supply planning.

Water use allocations are currently made consistent with water rights law and contractual arrangements. To address climate change under the current water rights system, the State will have to determine: (1) when to curtail water diversions if there is less water available than was available historically; (2) when new water rights can be granted for proposed water supply projects because more water is available than was available historically,; (3) when and where there are opportunities for conservation and water reuse practices; and (4) when voluntary water transfers can be made from those with a water allocation to those without an allocation without adverse environmental or third party impacts. All of these decisions require knowledge of how and where water is being used. Ultimately, it was determined that a coordinated statewide water measurement database, given the required data elements were collected, would not only provide much of the information necessary to address impacts related to climate change mitigation and adaptation, but that based on current state of knowledge regarding water use within California, it is paramount that it be done.

In collaboration, the participating agencies concluded that at the present time, there is no comprehensive understanding of California's statewide water resource availability and use, due to lack of available consolidated data accessible through a centralized reporting toolset. Because of this, it is not possible to obtain a clear state-level picture of California's available water supply, water diversions and use, and the potential effects of climate change on water resources.

The project team determined that while the specific data elements necessary to provide this picture would require detailed analysis by subject matter experts for the participating agencies, it was apparent that this coordinated statewide water measurement database must provide not only a historical reporting capability, but also tools that support trend analysis, projections and data sharing on both a statewide and multi-departmental basis. However, even if the database is available, significant effort will have to be expended to populate the database with historic diversion and use data to use the database in the near future for water supply planning. If resources are not available to populate the database with existing historical data, several years will elapse before there is sufficient information in the data base to conduct a trend analysis.

3.4 Business Functional and Technical Requirements

This section presents the high level business functional and technical requirements needed to achieve the business objectives defined in Section 3.3 Business Objectives. As part of this FSR, the project team performed an initial review of the data and data types currently being collected and managed by the collaborating departments. The team determined that a more-detailed analysis would take much longer than the time allowed to complete this FSR, would require dedicated subject matter experts (SMEs) to formulate a complete picture of the data relationships, and was too detailed for an FSR. The team did, however, perform a sufficient review to determine the resource requirements necessary to fully complete the necessary data analysis during system design, development and implementation phase should the Legislature provide direction and funding for the project to go forward. These resources and associated costs are detailed in Section 8 – Economic Analysis Worksheets of this FSR.

Data Redundancies and Deficiencies - It is imperative to understand that the collaborating agencies cannot simply assemble and report in electronic form on the data that they are currently collecting if decision-makers want to use the information to make informed decisions based on how and where California diverts and uses its water. Water from the northern-most areas of the state flows to the southern-most areas through a complicated series of engineering projects and legal water exchange agreements. If diverters and users were simply to report to a single database, some of the data would be "double counted" unless the relationships between the water diverters and the water users was clearly understood and accounted for in interpreting the database outputs. This is an important point from a policy perspective, in that a failure to recognize this critical point might lead to an uninformed decision built on incomplete or inaccurate information that could have catastrophic consequences for the health of the population, our environment and our already faltering economy.

The following matrix is a compilation of requirements that satisfy one or more of the project objectives and may be modified and refined during the procurement document development phase.

Table 3-1: Objectives to Requirements Cross Reference

Objective Description	Requirement Number	Requirement Description
Analyze and document the stakeholder departments' water use and diversion information to enable centralized data management to maintain common definitions and combined sharing.	1	Conduct a comprehensive data analysis of the stakeholder departments' water use and diversion information.

Objective Description	Requirement Number	Requirement Description
	2	Determine the water use and diversion information that is common (collected or reported) to all the stakeholder departments for use in the WISDM.
	3	The stakeholder departments will define what information will be shared, the method of sharing, and the frequency.
	4	The stakeholder departments will define a common WDP identification (id) indexing methodology for the WISDM.
	5	The stakeholder departments will identify the water use and diversion information they each need, and agree on the common definitions (where feasible) and quality of the data.
	6	The stakeholder departments will define the quality assurance and quality control capabilities of the WISDM to ensure the completeness and accuracy of information collected on statewide water use and diversion.
	7	All stakeholder departments must determine the dedicated resources in the FSR to input manually collected information into the WISDM.
The State Water Board, DWR and DPH must collect and maintain *electronic* data on water use and diversion information.	8	Leverage any electronic forms projects to provide shareable electronic water use and diversion data to the WISDM environment. *Also, the scope of the WISDM Project is to create rudimentary database stores for each department (State Water Board, DPH, and DWR), for the water use and water diversion data that the WIDM central forms input process will be forwarding to the appropriate department in the form of XML-based messaging.*

Objective Description	Requirement Number	Requirement Description
Each stakeholder department will determine the staff with the required knowledge and expertise to support the WISDM Program and Project (Design, Development and Implementation [DD&I] *and* Maintenance and Operations [M&O] phases).	9	Determine the governance of the WISDM Project and the key program and project team members.
	10	Determine the roles and responsibilities of the key program and project team members.
	11	Provide for WISDM user training at system rollout.
Provide more current and accurate information for strategic and operational planning and control.	12	Manage the relationships with the WDPs to obtain timely response to data requests and accurate data.
	13	Provide incentives to WDPs to provide more frequent and accurate water use and diversion data.
The WISDM Program management must determine acceptable methods of measurement and recording of water flow for use by water diverters to monitor their diversions.	14	Research the available water diversion measurement methods, including metering, and related costs.
	15	The WISDM governance team to decide on the appropriate measurement method(s) to be used for monitoring water diversions.
	16	Provide outreach to the selected water diverter community to explain the new measurement methods to be employed, and any cost sharing incentives that apply.
	17	Define and communicate cost sharing incentives for the measurement methods.

Objective Description	Requirement Number	Requirement Description
	18	Ensure that a WDP's information can only be updated by that WDP.
	19	Provide a secure interface for input and reporting.
The WISDM will enable the WDPs to report the requested information by selecting from a standard list of valid units, as specified by the State.	20	The WISDM must provide a list of valid units that the WDP can select when entering their water use information, to support the accuracy of the data stored.
	21	The WISDM enable State staff to enter and maintain the lists of valid units for data fields.
	22	The WISDM will be able to convert the WDP's water use information from what was entered to a State specified standard in the database.
Provide financial incentives to WDPs to provide water use data to the State.	23	Research, analyze, and select the best methods to provide financial incentives to WDPs to provide water use data to the State.
The WISDM will capture the appropriate detail level of data and data inter-relationships (e.g. mother-daughter relationships).	24	Production information entered into the WISDM must have sufficient metadata to enable evaluation of wholesale and retail relationships.
	25	The WISDM will capture how much water each WDP's sources produce, how much each WDP purchased from other WDPs, and how much each WDP sold to other WDPs.
	26	The WISDM must have the ability to capture the water use from each source, and then aggregate the data into the Database.

Objective Description	Requirement Number	Requirement Description
	27	The WISDM must be able to capture the number of water users for each WDP.
	28	The WISDM will provide rules-based reasonability edits when data is entered.
The WISDM must enable data to be captured on-line in real-time, and permit the end user to enter information in multiple on-line sessions if required. The WISDM will allow users to see what they submitted in previous periods, and what needs to be submitted.	*19* *Also supports this objective*	*Provide a secure interface for input and reporting.*
	29	The WISDM must provide a standardized data structure for exchange of information.
	30	The WISDM will provide a web-based real-time interface for data entry and data inquiries.
	31	The WISDM will allow each approved user to capture and hold entered data until it is submitted. This will allow information to be entered throughout the reporting period and then be submitted once when complete. The WISDM will support extended business hours and weekend availability.
	32	Provide the ability for on-line users to print the on-line form in the same format as the current hardcopy form, including the completion instructions.
	33	Provide the ability for on-line users to download the current Excel file version of the form.
	34	Provide the ability for on-line users to upload the completed Excel file version of the form.

Objective Description	Requirement Number	Requirement Description
	35	Provide the ability for on-line users to upload form attachments. This will include the ability to upload spatial information (like shape files and digital maps) or image files and route to the appropriate department.
	36	Provide a standard option list for WDPs to select a reason for not responding to a question, but always prompt for the complete set of questions.
	37	The WISDM web forms processor will inform the user upon login of the schedule of form submissions.
	38	The WISDM web forms processor will initiate emails to users if their information has not been submitted by the scheduled date for submission.
	39	The WISDM web forms processor will provide the ability for users to correct previously submitted information.
Provide a mechanism for hardcopy forms to be input into the system without having to contract with a vendor each year to do it. *Note:* this will also include the WDPs that submit data in their own format for input by the State.	40	The WISDM will enable the uploading of data that has been collected outside the system in approved formats.
The WISDM will include the ability for State staff to enter information for a WDP.	41	The WISDM will provide access to State staff to enter information for a WDP as appropriate.
	42	The WISDM will provide an hierarchical, role-based user and data access functionality.
	43	The WISDM will have the functionality to generate a selected form (containing the list of questions) for selected WDPs that the State will send to them for

Objective Description	Requirement Number	Requirement Description
		completion and return to the State for entry.
The WISDM must preserve an audit trail of the changes made to the data, which will specify at a minimum the user who made the change and when the change was made.	44	The WISDM must provide an audit trail for all additions and changes made to data in the database, which will include who made the change, when it was made, why the change was made.
	45	The WISDM must provide the State with the ability to report on selected audit information.
Make the on-line form appear the same as the existing hardcopy form.	46	The on-line form display shall be in the same format as the current hardcopy form.
Establish a change management process that will formally manage changes to the form sets' questions repository used by the WISDM for data collection.	47	The WISDM will allow the participating State departments to manage the form sets' questions repository.
The FSR will identify and document possible funding sources to support the WISDM DD&I and M&O.	48	The Project Team will ensure that possible funding sources are identified and documented in the FSR.
Establish a governance structure that formally documents how the participating departments will govern the multi-department WISDM Program.	49	The Project Team will ensure that a governance structure is identified and documented in the FSR.
Facilitate uniform (full and complete) participation of WDPs statewide to reduce the amount of	50	The WISDM will prompt the WDP user for complete data on water use information.

Objective Description	Requirement Number	Requirement Description
effort that is required for collection of water use and diversion information.		
	51	The WISDM will track each individual time-phased data element and prompt for it when it is due.
	52	After the WDP user submits the data, the WISDM will display a data summary report to indicate whether the submission is complete or if there are data fields that need to be entered before the submission can be accepted.
The WISDM will provide the ability to produce both standard and ad hoc consolidated data reports.	53	The WISDM must provide a standard and ad hoc reporting toolset capability via a browser-based interface.
	54	The WISDM must provide the capability to allow standardized calls to retrieve data from multiple State databases.
	55	Enable data export for modeling systems.
	56	Provide the availability for consolidating data for planning and analysis, including trending analysis.
	57	Provide the ability to export data from the WISDM for use in data modeling systems.
The WISDM must provide the participating departments the capability to interface between department applications.	58	The WISDM will create and download data files for transfer in a standard format.

Objective Description	Requirement Number	Requirement Description
Engage appropriate stakeholders and end users across all departments in the design, development and implementation of the WISDM.	59	Ensure that the Project Plan includes all stakeholders' participation, including WDPs, in the design and testing phases of the project.

Global Technical Requirements

These are high level general technical requirements that apply to all SDLC phases of the WISDM project.

Table 3-2: Global Technical Requirements

Requirement Reference	Requirement Statement
GT1	The Water Institute for Statewide Data Management DD&I phases must comply with the State Data Management standards and policies.
GT2	The Water Institute for Statewide Data Management DD&I phases must comply with the State IT standards for SDLC and hardware and software.
GT3	The Water Institute for Statewide Data Management production environment must not negatively affect the stakeholder departments' current end user accessibility and response levels.
GT4	The Water Institute for Statewide Data Management must meet State security and confidentiality requirements for data.
GT5	There must be comprehensive documentation for all phases of the SDLC.
GT6	The WISDM will provide a user interface that will be user friendly, easy to use and scalable for the data suppliers and for data inquiry.

…this page is intentionally left blank…

4.0 BASELINE ANALYSIS

The majority of water use and diversion data referenced by Water Code section 531.5 is currently being collected and managed separately by the State Water Board, DWR and DPH for their own business requirements and using their own business processes and systems. The CALFED requests project-based information from the State Water Board, DWR and DPH, as well as 22 other agencies for their own audit and reporting requirements. As this is the case, this section describes the State Water Board, DWR, DPH and CALFED current methods individually to document an overall description of the current water use and water diversion information flows and processing within the project stakeholder departments and divisions.

4.1 State Water Board Current Method

California's appropriative water right system has been administered by the State Water Board and its predecessors since the early part of the 20th century. Persons or entities intending to appropriate water must file an application for a water right permit or in the case of certain small uses, a registration form. The State Water Board maintains records of all active appropriative water rights that it has issued. Existing law also requires any person or entity diverting surface water under claims of riparian or pre-1914 appropriative right to file a Statement of Water Diversion and Use with the State Water Board.

Overall, the State Water Board currently maintains the records of approximately 35,000 post-1914 appropriative water right holders, 10,500 water users diverting under claims of riparian or pre-1914 appropriative right, and 1,400 diverters/extractors of ground water.

The State Water Board maintains basic information on each water right in its electronic Water Rights Information Management System (eWRIMS). Data in eWRIMS is either entered by hand or was migrated from the State Water Board's prior databases. All recent data entries into eWRIMS are routed to the Division's Data Management Unit for quality assurance and control. Any documentation or correspondence associated with processing and maintenance of these records are also received or generated in hardcopy format and subsequently placed in physical files maintained by the Records Unit.

The State Water Board collects data on water diversion amount and water use amounts from the following entities: (1) those who hold water right permits, licenses, and registrations for surface water or groundwater associated with subterranean streams; (2) those who divert surface water under a claim of pre-1914 or riparian water right unless those users divert from a spring that does not flow off of their property, are in the Delta lowlands, or have an adjudicated right that is regulated by a DWR watermaster or the use under which is included in annual reports filed with the Water Board or a court; and (3) those who divert groundwater in an amount in excess of 25 acre-feet per year from lands in four southern California counties. The State Water Board collects information from water diverters only, not from the end-user unless the end user is also

the diverter. The State Water Board does not collect water use information from end users in situations where the water right holder contracts for water delivery to other users. For instance, the State Water Board collects diversion information from the DWR, which holds water right permits issued by the State Water Board, but does not collect use information from DWR's contractors or subcontractors. The State Water Board allows parties to estimate their diversion and use, if those amounts are not measured.

The State Water Board collects information by water right, not by entity. Those who hold more than one right must report on each right separately. Appropriative water rights are limited by the amount put to actual use and can be lost if they are not exercised. The State Water Board uses its monitoring reports and other information as a means of determining how much water has been put to beneficial use under each permit it has issued. When it issues a water right license to a water right permit holder, it reduces the amount of water authorized for diversion under the license to the maximum amount of water that was actually diverted and used under the permit. When there is not enough water to satisfy all demands, water rights holders are entitled to divert water based on their water right priority. More senior water right holders must have their demand satisfied consistent with their water rights before junior water right holders can divert and use water. For appropriative water right holders, such as water right permit and license holders, the priority is generally based on the data that the water right application is filed. An entity who holds more than one water right could, in times of insufficient supply, be restricted from diverting and using water under a junior water right, but be allowed to continue diversions and use under his or her higher priority right. Monitoring reports are also used to confirm continuing use, since non-use for five or more years can result in the revocation of the water right.

In most cases, users are required as either a condition of their water right permit or license or by statute to provide monthly diversion and use information. However, many water rights were issued decades ago and water measurement was not required. As a result, the State Water Board has allowed water right holders to estimate water use and has, in the past, allowed them to simply report that they diverted and used water without specifying the quantities. Often diversion rates and use are calculated based on land use data or is estimated by the user. Reporting frequencies vary, but most data is reported on a three year basis, making the data less than useful for determining trends or making real-time decisions. Even though the Water Board has the authority to require the submission of data, it has little or no authority to enforce against reporting and monitoring violations. As a result, only about 67 percent of permit and license holders actually report. Fewer than 35 percent of other water right claimants who are required to do so report their use.

Although the record is long, dating back to the date each water right was issued, data quality is poor. Additionally, water diversion and use information has not been converted into electronic form or entered into a database. Instead, it is submitted on paper forms in handwritten format. Each form is filed with the appropriate water right. The State of Kansas collects similar data from about half as many water right holders

and expends about four staff years of effort each year to enter data into a database. The State Water Board is currently in the process of improving the functionality of its eWRIMS database to allow reporters to report their diversion and use online. That functionality is anticipated to be available in December of 2009. When completed, State Water Board staff, water right holders, and the public will be able to view submitted reports online.

Each water right permit and license holder is required to pay an annual fee. The annual fee is based on the amount of water that is authorized for diversion by their water right. The State Water Board uses the data in its eWRIMS database to calculate the annual water right fees, and electronically provides information on water right ownership and fee amounts to the State Board of Equalization (BOE). BOE issues annual water right fee invoices on behalf of the State Water Board and enforces against those who owe a fee but do not pay their fees.

The diagram below documents the current information flow:

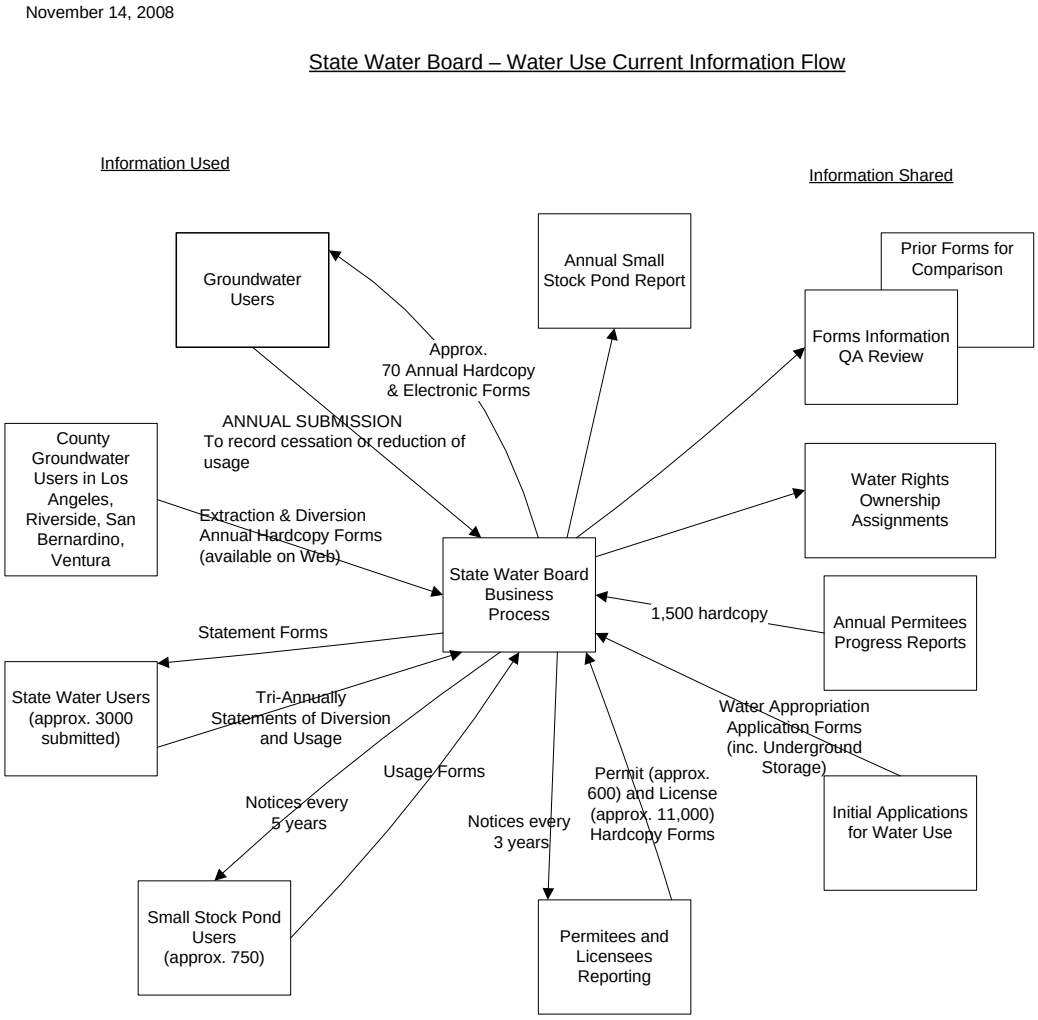


Figure 4-1: Current Information Flow—State Water Board

4.1.1 Objectives of Current System

The State Water Board's electronic Water Rights Information Management System (eWRIMS) supports the following key business objectives:

- Store and maintain water rights information,
- Process water right applications and issue water right permits, licenses, and registrations,
- Process petitions for change to applications, permits, and licenses,
- Process petitions for temporary change and long term transfers,
- Process annual reports of groundwater extraction,
- Monitor and enforce compliance of water rights regulations by conducting inspections, responding to complaints and performing investigations,
- Provide functionality to facilitate the due process of water rights (e.g. administrative actions, conferences and hearings),
- Manage water rights business programs, and
- Effectively calculate and record the annual fees assessed and collected by the State Board of Equalization (BOE).

4.1.2 Abilities of Current System

Deployed in October of 2007, the Division's electronic Water Rights Information Management System (eWRIMS) stores, tracks and provides public access to information on water rights in California. The eWRIMS consists of both a tabular database and an integrated geographic information system (GIS). Data stored in the eWRIMS, can be searched by water right owner's name, watershed, stream system, or county; scanned images of permits and licenses can be accessed and downloaded; and points of diversion can be plotted and viewed in the GIS.

As stated, although no on-line reporting capability currently exists, work has commenced on an On-Line Reporting System scheduled for implementation in December 2009. The On-Line Reporting System will: (1) automate the Division's existing manual data collection processes, (2) expand the Division's use of the Internet to conduct business; (3) reduce the reporting burden on its stakeholders; and (4) provide higher quality information.

The major outputs from the State Water Board water rights and water use business processes are:

- Water Right Permits and Licenses,
- Environmental Documents, such as Environmental Impact Reports and Negative Declarations prepared pursuant to the California Environmental Quality Act,
- State Water Board Decisions and Orders following adjudicatory administrative hearings conducted by the Water Board,
- Enforcement Actions,
- Court decrees issued at the conclusion of water right stream system adjudications of water right claims,
- Water Rights Information Management System (eWRIMS) system reports,
- Water Availability Analyses,
- Public Notices,
- Water Right Ownership Assignments and Changes,
- Quarterly and Annual Small Domestic and Livestock Stock Pond Reports,
- Compliance and Licensing Inspection Reports,
- Complaint Investigation Reports,
- Water Right Annual Fee Invoices issued by the Board of Equalization, and
- Public Records and Ad Hoc Report Requests.

4.1.3 Level of User and Technical Staff Satisfaction

The manual processing and management of hardcopy-based information is inefficient and time consuming. Implementation of the On-Line Reporting System in December of 2009 should result in fewer demands on staff time. However, because many water right holders and claimants (more than 50 percent) are users of small amounts of water, and are located in remote areas, these users may not report their use electronically once the functionality is available.

4.1.4 Data Input

The majority of data is received in hardcopy format and routed to Division staff for review and processing. Some of the data is input and stored in automated systems. The majority of the data is manually filed and maintained in hardcopy format using physical storage methods.

4.1.5 Data Characteristics

Currently there are no penalties for failure to report water usage to the State.

In FY 2007-08, approximately 67 percent of the reports and forms mailed to the WDPs were completed and returned to the Division. Additionally, there is no available method by which the State can verify the accuracy of the data received from the WDPs. For these reasons, data submittals are oftentimes incomplete and/or inaccurate.

4.1.6 Provisions for Security, Privacy and Confidentiality

The current provisions are mainly physical facility security and general network access security.

4.1.7 Equipment Requirements

The current equipment requirements are the standard workstation configuration and network infrastructure.

4.1.8 Software Characteristics

The technical platform includes browser-based Java code running on an Oracle database and application servers with ArcIMS GIS elements supported by MS Windows 2003 systems. The environment complies with established State IT technical standards, including Oracle application and database standards. The operating system software includes Microsoft Windows Server 2003, Unix/Sun, and Oracle 10g, and Oracle 10g IAS as outlined in OIT's technology standards. Other software used is Excel and Microsoft Office.

4.1.9 Internal and External Interfaces

The Division's eWRIMS is integrated with the State Water Board's California Integrated Water Quality System (CIWQS).

The State Water Board and the Board of Equalization (BOE) exchange data via an FTP site maintained at Teale Data Center. The State Water Board and BOE have developed automated processes for uploading the exchanged data into their respective systems.

4.1.10 Personnel Requirements

A total of 14.7 personnel years (PYs) are required to administer and maintain the Division's eWRIMS system and compliance reporting and data recordation activities.

Six of the PYs are information technology personnel assigned to support the eWRIMS systems and infrastructure in the following roles:

- Data Entry: 2 PY
- Database Admin (Oracle): 1 PY

- Programmer 1 PY
- GIS-Administration (GIS): 1 PY
- Data Modules: 0.5 PY
- Network Admin: 0.5 PY

The remaining PYs are program staff responsible for collecting and recording data and/or performing administrative functions that support the eWRIMS in the following roles:

- Data Quality Control and Quality Assurance: 1.4 PYs
- Collecting/Maintaining Data (Statements, Notices, Compliance Reports): 2.3 PYs
- Ownership and Annual Fee Changes and Updates: 1.0 PY

Additional resources would be required for entry of existing data annually into an electronic data base.

4.1.11 System Documentation

The system documentation is adequate.

4.1.12 Current System Missing Features

Due to budget constraints and limited staff resources, requisite functions/features for peripheral programs have not been fully addressed by the eWRIMS. Specifically, there is more information that is collected by the State Water Board that is not stored and processed by eWRIMS.

Other functions/features that have not yet been deployed due to their complexity and expense include access to real-time information and the capability to spatially display ‘place of use’ data in eWRIMS GIS system.

4.2 DWR Current Method

To support its organizational goals, including water supply planning, local assistance, and water supply investigations, the DWR processes water use information and surveys WDPs (such as Public Water Authorities) annually. The DWR sent out approximately 1,000 documents for the last survey and had a 50 percent response rate. The survey is sent in both letter and Excel file form. If the DWR is not satisfied with the survey response then selected WDPs are contacted to get them to respond. Participation in the survey is voluntary. The follow up contacts for the last survey resulted in an increase in the response rate to approximately 70 percent.

The DWR periodically conducts industrial water use surveys. The DWR purchases an industry list, and selects about 5,000 companies of the required size and in the targeted areas within the state. The DWR sends a survey cover letter to the selected companies, which directs the companies to the website where the survey form can be downloaded. The survey requests water use by month and workforce levels by month.

Four DWR district offices contact, via telephone, some of the larger WDPs to collect water diversion and delivery information.

The DWR publishes WDP information as the Bulletin 166 annual survey. There are currently many quality control issues with verifying and validating the data, which is used in the 5-year Water Plan update.

The diagram below documents the current DWR information flow:

June 30, 2008

Department of Water Resources (DWR) – Water Use and Quality
Current Information Flow

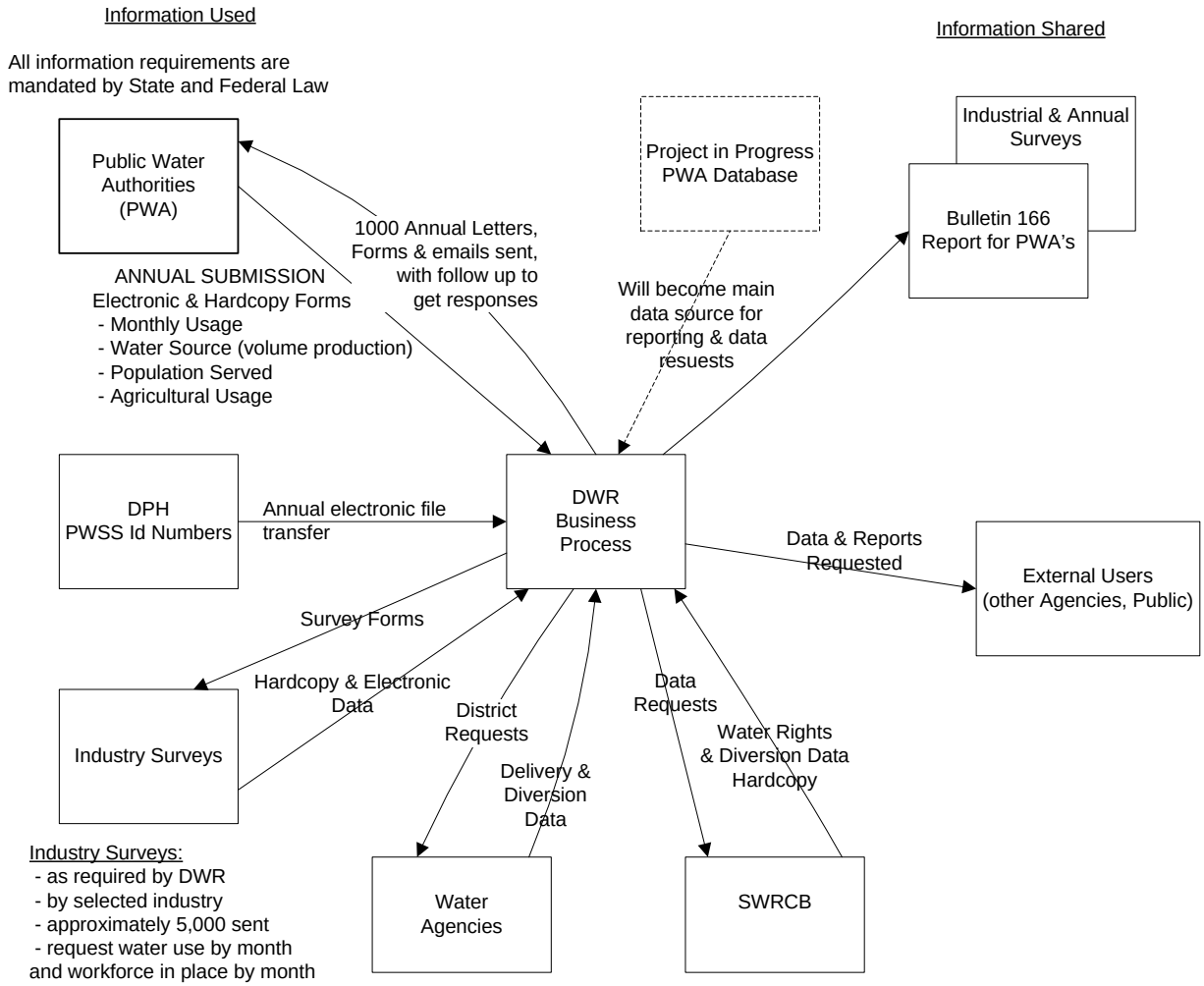


Figure 4-2: Current Information Flow—DWR

4.2.1 Objectives of Current System

The DWR builds and maintains relationships with the WDPs to obtain voluntarily provided water production and delivery data from them. The WDPs are familiar with and accustomed to reporting their historical information to the DWR. The survey reporting form was designed to be relatively simple to complete, but there are many questions that require responses so the survey form set takes some time for the WDPs to complete and requires access to external information.

The DWR is not a regulatory organization so there is the potential that some information that is requested may not be supplied, resulting in incomplete data availability.

4.2.2 Abilities of Current System

About half of the WDPs are submitting their responses in hardcopy and that information is then input and validated by external contractors. The validated data is input into DWR applications (spreadsheet programs and the Urban Water Model). Keying in hardcopy data has a direct cost of about $10/report, but does not include the staff cost of preparing contracts for keying data.

Voluntary reporting means that there may not be any data received from specific geographic areas, and means that there could be “holes” in the data as in some years a WDP may not report its data, thus making it difficult and less accurate to estimate water use in those areas.

Quality control and the editing of incorrect data are performed at the DWR District offices, and the corrected data is not sent back to a central database. Also, the public requires access to the corrected data, which is not easy to provide.

4.2.3 Level of User and Technical Staff Satisfaction

If the system is not improved then costs will not decrease, data accuracy will not increase, and the DWR District offices’ corrected data will not be available to the public for their use and analyses.

The DWR Office of Water Use Efficiency would like to have access to the corrected WDP data, but they only have access to the original uncorrected data.

4.2.4 Data Input

The DWR staff includes the prior year’s contact information into the forms sent to the WDPs. They also receive monthly production and delivery data and sector information, which are input into existing separate spreadsheets in the DWR District offices for analysis, and later input into the Urban Water Use Model.

The DWR receives an annual updated list of WDP agencies, numbers, contacts, and other demographic data from the DPH. This data is used to update the list of WDP agencies, such as adding agencies or removing non-operating agencies.

The DWR obtains from the State Water Board the existing water diversions and place of use data in hardcopy every other year. The State Water Board data is used in the annual process of developing water uses and supplies.

4.2.5 Data Characteristics

The State Water Board data is hardcopy, and difficult to obtain and use as often as the DWR would prefer.

The DWR would like to get WDP data from more WDPs on an annual basis. Also, the ability to reference the WDP water service area boundaries in digital spatial format is not currently available.

It is not possible to compare the data being input against previous submissions from the same WDP for trend analysis, so that the DWR would have the option to discuss the submission with the WDP and work with them to correct the information. The ability to do trend, comparative, and other analyses would help to support the business functions.

4.2.6 Provisions for Security, Privacy and Confidentiality

The current provisions are mainly physical facility security and general network access security.

4.2.7 Equipment Requirements

The current equipment requirements are the standard workstation configuration and network infrastructure.

4.2.8 Software Characteristics

The main software used is Excel and Microsoft Office.

4.2.9 Internal and External Interfaces

There are no automated internal and external interfaces.

4.2.10 Personnel Requirements

The Public Water Supplier (PWS) survey is handled by one Associate Land and Water Use Scientist.

4.2.11 System Documentation

Since the existing system is very rudimentary, there is no documentation.

4.2.12 Current System Missing Features

The current system is not part of a centralized environment for the CALFED, the DPH, the DWR, and the State Water Board to gather information without having to send out the hardcopy forms and reminders.

The current system does not permit printing of the form set, and also bookmarking of the on-line form set so that respondents can complete all the requested information over time.

The current system does not automatically perform quality control and assurance, or have the ability to electronically retrieve data collected by other agencies that could be used for both regional and statewide planning efforts.

The current system also does not have the following:

- Spatial data related to water service area boundaries,
- The ability to QA/QC the data being input (e.g. trending, comparative edits),
- Sector-based reports, including graphical representations, indicating trends based on the information collected in a. and b. above,
- The ability to export information for input into other data modeling tools, and
- The ability for Ad Hoc reporting.

4.3 DPH Current Method

The California Department Public Health's Division of Drinking Water and Environmental Management (DDWEM) promotes and maintains a physical, chemical, and biological environment that contributes positively to health, prevents illness, and assures protection of the public. The DDWEM processes water use and water quality data. All of this information is required by Federal, State and/or Local law.

The Drinking Water Program regulates public water systems; oversees water recycling projects; permits water treatment devices; certifies drinking water treatment and distribution operators; supports and promotes water system security; provides support for small water systems and for improving technical, managerial, and financial (TMF) capacity; oversees the Drinking Water Treatment and Research Fund for MTBE and other oxygenates; and provides funding opportunities for water system improvements, including funding under Proposition 84, Proposition 50 and the Safe Drinking Water State Revolving Fund.

The WDPs submit Annual Reports using electronic forms. The data requested varies by WDP size, which is the number of connections, and type, such as community. This determines which questions are asked. A variety of information is requested on these forms, including engineering related questions. Electronic Inventory data is submitted by the WDPs via the counties to the DDWEM and is provided continuously.

Water quality analysis is received in electronic batches from environmental health laboratories. This data is continuously provided, and results in millions of records annually.

There is an on-line library that contains water inventory and water quality information that can be queried by DPH staff. There are also internal and external reports produced for the Federal Government and the State, as well as ad hoc reporting capabilities. These reporting systems are also available on-line to the public. Standard reports are sent back to the data sources. There are also “validation of information” reports that are sent to the environmental health laboratories.

The State Water Board is the largest external user of the information that is collected by the DPH. Some also goes to the DWR and a limited amount is sent to the CALFED. The information is supplied as electronic data files, which are sent monthly to the State Water Board, as needed to the DWR and annually to the CALFED. The DPH also exchanges electronic files with Universities, some regularly scheduled (University of California System) and others as requested.

The diagram on the following page documents the current information flow:

June 30, 2008

Department of Public Health (DPH) – Water Use and Quality
Current Information Flow

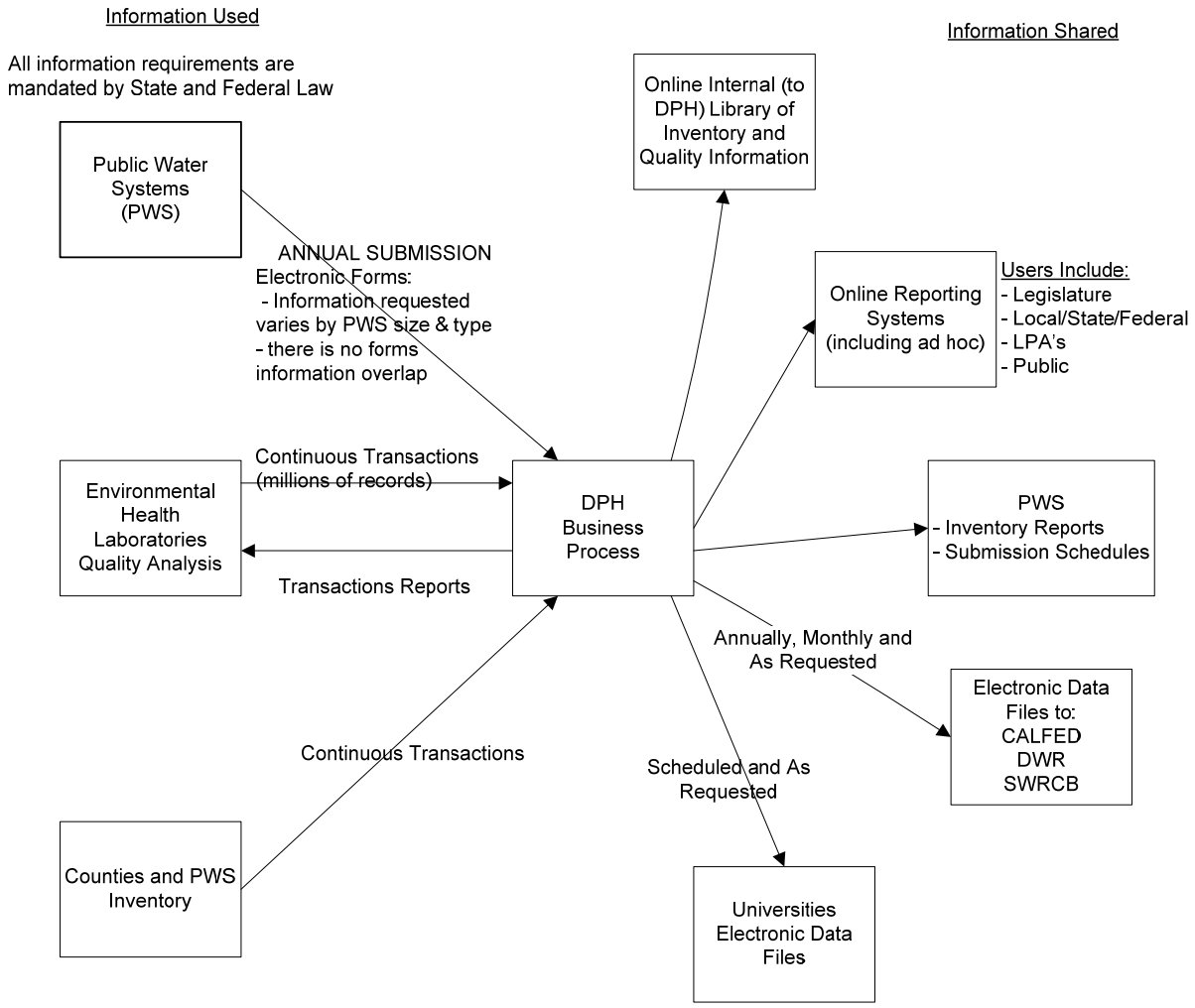


Figure 4-3: Current Information Flow—DPH

4.3.1 Objectives of Current System

The Safe Drinking Water Systems Program (SDWS) within the DDWEM provides direct oversight including the permitting, inspection, and enforcement of approximately 2,500 small water systems (those with less than 200 service connections) in 23 counties and delegates responsibility to local environmental health jurisdictions (also known as Local Primacy Agencies) for oversight of the small water systems in the remaining 35 counties. These water systems are billed annually and fees are collected by the program. The Drinking Water Program (DWP) is also allowed by statute to bill up to $1,000 of time spent on enforcement activities against the water system. This is currently invoiced manually. A billing and fee collection system to carry out these functions would enable the program to be more responsive to the water utilities and direct staff to other essential activities.

Major Processes:

- ***Permit Water Treatment facilities***: This process involves the receipt and processing of paper-based permit applications from water systems facilities; reviewing inspection results and issuing permits.

- ***Perform Water Systems facilities Inspection:*** As part of the permit process, water systems facilities undergo initial permit inspections, as well as periodic inspections thereafter. This process describes the steps associated with a facilities inspection.

- ***Issue Water Systems Billing Notices:*** SDWS sends billing notices to both Large Water Systems (LWS) and Small Water Systems (SWS). This process describes the steps associated with issuing billing notices for all drinking water systems.

- ***Perform Cashiering:*** This process involves receiving approximately 4,677 annual payments from SDWS customers, recording payments into the respective system, and addressing overpayments, underpayments, and dishonored checks.

- ***Reconcile Deposits:*** This process involves reconciling SDWS prepared cash deposits to the State's accounting system.

4.3.2 Abilities of Current Systems

Today, the common functions are supported by a mixture of technological platforms. Many of these platforms have become outdated and are difficult to maintain, supported by only a small number of staff, or reliant on dwindling skill sets due to retirements and obsolescence of technology. In fact, some systems now have no skilled staff remaining to support the system. In addition, numerous stand-alone MS Access and MS Excel systems are created as work-around quick-fix solutions.

The above steps combine to create a processing method that unnecessarily delays the issuance of permits to public water systems, for no reason other than the state's lack of an adequate processing system. In more than half of all instances, the state is not making a 30-day timeframe which is desired. These delays only further compound the backlog.

The Permits Inspections Compliance Monitoring & Enforcement (PICME) system was created in 1993 to meet the California drinking water reporting requirements of the United States Environmental Protection Agency (EPA). It is an IBM mainframe database residing at the Department of Technology Services (DTS) datacenter. PICME contains permits (conditions), inspections (codes, high level history), compliance (violation history) enforcement (violations, provisions), contacts (addresses, phone numbers, email, titles), and facilities sources (water treatment sources, facilities specifications and flows) data by public water system entity, by district. PICME ‘contacts’ data (name, billing address, etc.) is sent to a Focus database residing on the SDWS Local Area Network (LAN) for billing purposes. Some of this contact data is also loaded into a FileMaker database on the LAN for Permits tracking.

The Permit Tracker is a FileMaker client/server database application that resides on the SDWS LAN. It is used by only one employee in a SDWS district to manage/track water systems permits for that district.

In addition to the core systems, the SDWS Program uses a variety of stand-alone, single-user MS Excel spreadsheets, MS Access and Filemaker databases developed by program staff to track miscellaneous data and perform calculations.

4.3.3 Level of User and Technical Staff Satisfaction

The state currently has a backlog of over 2,000 inspections (two years' worth) and approximately 500 Public Water Systems are waiting for renewals (nearly 8 months' worth). Notwithstanding the DPH’s current practice of redirecting staff to prioritize highest risk systems for renewal/inspection to minimize public health impact, the backlogs continue to grow. This means that the safety of drinking water is placed at additional unacceptable risk. Public Water Systems that are not currently permitted may not be fully complying with water system safety requirements, thereby resulting in potential health risk to consumers.

The primary systems used by California drinking water regulators are based on an antiquated technology (Focus) supported by a single technical resource (person) with no backup. This is a high-risk situation, made even worse because there is little technical documentation in place and few technical experts in the industry available to hire to replace the current technical resource should he suddenly become unavailable. When system issues occur, they cannot be addressed if the technical resource is out or unavailable, which impacts SDWS staff’s ability to fulfill their regulatory mission; they either have to cease certain business process activities altogether or spend extra time and effort on workarounds until the system issue is resolved. This situation puts the SDWS Program at significant risk for loss of data or worse system failure, and adds to the backlogs of inspections and renewals mentioned above, diminishing Californians’ access to safe drinking water.

4.3.4 Data Input

Paper-based processes have resulted in extensive manual processing steps and the inability to process all submittals received within the designated target timeframes (generally 30 days in statute) due to:

- The multitude of related to receiving, opening, sorting, and distributing mail.
- Submitted forms are incomplete or not completed correctly and require SDWS to either contact the customer or return the submittal. This can go back and forth several times.
- SDWS staff must access multiple systems to review and validate the data included in the submittal.
- Back-and-forth contacts with customers to resolve questions or inaccuracies in the paper application and/or payment amount.
- Handoff of the submittals between units because different units are required to review specific subsections of the submittal (e.g., review of water system permit applications).
- New errors in re-submitted documents, requiring additional follow-up contacts with customers.
- Delays due to the back-and-forth contacts, especially when the customer or State staff is out due to illness, vacation, etc.
- Misplaced and lost submittals and related documents.

4.3.5 Data Characteristics

The SDWS lacks a single data source used by all systems. By using multiple data sources, it is difficult to achieve data consistency. All of the systems have limited data edits and logic checks, resulting in incomplete and inaccurate data to be maintained in the databases. Furthermore, the systems have inadequate calculation features or calculate fees incorrectly. As a result, SDWS staff is required to calculate fees due, penalties, etc. using a separate spreadsheet or calculator, and then entering the total amounts into the systems. The manual calculation and transfer of totals leads to data entry errors and miscalculation of fees due. On occasion, the SDWS Billing System miscalculates fees due that are not identified until after billing notices have been distributed. This results in manual updates to the Billing System.

4.3.6 Provisions for Security, Privacy and Confidentiality

Security, privacy and confidentiality of data are not a significant issue currently within SDWS' systems.

4.3.7 Equipment Requirements

The end users have workstations or laptops for network and system access. These are networked to the DPH server farm and the DTS mainframe, the latter for access to the PICME system. The server farm houses the billing related systems, the permits tracking system, and other miscellaneous applications.

4.3.8 Software Characteristics

The core SDWS systems reside on an antiquated platform of Mainframe Focus. Focus is a programming language that is over 30 years old and the systems are performing complex functions and reaching integration/interface levels beyond their intended capability. Since the Focus databases are large and complex, even minor modifications are extremely challenging because changes have a rippling impact to other lines of code in the system. Also, the database structure cannot be easily expanded to accommodate legislative or policy changes.

4.3.9 Internal and External Interfaces

None of the SDWS' systems are integrated, requiring the SDWS to operate its functional areas in silos. The SDWS has developed a variety of multi-user and stand-alone MS Excel spreadsheets to assist in tracking data. Because the systems are not integrated, SDWS staff must perform duplicate data entry into multiple systems, resulting in extra processing time, reliance on paper forms to multiple individuals to key data into various systems, data redundancy, and greater probability of data error.

4.3.10 Personnel Requirements

Approximately 6.0 FTE are utilized by SDWA operations as follows:

- 0.3 Management
- 1.0 Database Administrator
- 1.7 Programming
- 3.0 Quality Assurance / Quality Control

The DDWEM has a Division Chief and an Information Systems Manager. Field Support is provided by two Sanitary Engineering Associates, two Field Engineers, eight Field Technicians, and administrative support is provided by an Office Technician. There is also part time assistance from the Small Water Systems unit to assist with data from the LPAs.

Information Technology support is provided by staff in the Application Support, Operations Support, and Desktop and Server Support units. The staff in these units provides part time support for the DDWEM systems documented above, which varies by need.

4.3.11 System Documentation

The mainframe systems documentation is adequate. However, the other related systems documentation does not meet organizational requirements. PICME, WQI3 and WQM have system manuals. SDWIS State has installation, operation and user manuals.

4.3.12 Current System Missing Features

Since permits are not issued until the appropriate fees are paid, any delay in the payment process necessarily delays Californians' access to drinking water. However, the SDWS requires all payments to be in check or money order form, limiting customers' options, due solely to the State's own processing limitations. Reasonable customer expectations – based on the prevalence of modern payment methods in virtually every aspect of today's society – are not fulfilled.

This is a compound problem that increases the state's workload and delays public health outcomes even while it limits customers' options and fails to meet even basic modern expectations. As a result of the system limitation, a significant manual cash management process exists whereby payments are received; associated to the proper program's applicant or licensee; and manually logged, batched, and sent to DPH Accounting for deposit. Standard accounts-receivable functionality does not exist, so that when checks are received for an incorrect amount (for which the check is returned) or are dishonored due to non-sufficient funds, this results in additional work steps to resolve and obtain proper payment, requiring program staff to conduct multiple contacts to clarify data with the applicant.

To summarize:

- Fees billed are often not correct due to various system limitations,
- Payments received are often not correct,
- Delays and back-and-forth contacts are created,
- Reasonable customer expectations (which could easily be met) are left unmet, and
- Californians' access to safe drinking water is diminished accordingly.

An estimated $11.2 million per year is processed this way, collected by the SDWS via checks and money orders, and handled by manual processes.

One of the most significant shortcomings of the existing systems is that they do not provide the SDWS' customers online capability to submit applications, amendment requests, changes, or payments via the web. As a result, customers must submit all information to SDWS via paper-based forms which are cumbersome and often incomplete or incorrect. Furthermore, SDWS is only able to accept checks and money orders and cannot accept electronic payments of any type. As the number of water systems increases, this efficiency problem puts more of a burden on SDWS staff, causing a diversion of effort away from regulatory activities.

4.4 CALFED Current Method

The CALFED Bay-Delta Program is an unprecedented effort to build a framework for managing California's most precious natural resource: water. This is the most complex and extensive ecosystem restoration project ever proposed. It is also one of the most intensive water conservation efforts ever attempted. It is the most far-reaching effort to improve the drinking water quality of millions of Californians as well as an unprecedented commitment to watershed restoration and levee system integrity. It is also the most significant investment in storage and conveyance in decades.

The CALFED does not publish, distribute or process standard forms for water users to complete. However, the CALFED Program Performance and Tracking Unit (PP&T) tracks all CALFED funded projects. The State Water Project is one of many funding sources. There are 4 main CALFED Objectives and 13 program elements which are documented in detail in the CALFED Programmatic Record of Decision (2000).

The PP&T sends out required project information packets to be completed by the Implementing Agency contacts. The PP&T requests this information from numerous State and Federal agencies of which the State Water Board, DWR, and DPH are part. The results are compiled and used to develop the "Cross-Cut Budget " which is submitted to the California Legislative Analyst's Office (LAO) in January and used to analyze the CALFED portion of the Governor's proposed Budget. Any updates are included after the May Revise and documented in the Supplemental Cross-Cut Budget Report. The "Cross-Cut Budget" is the official view for all CALFED funding and includes information on both Federal and State funding.

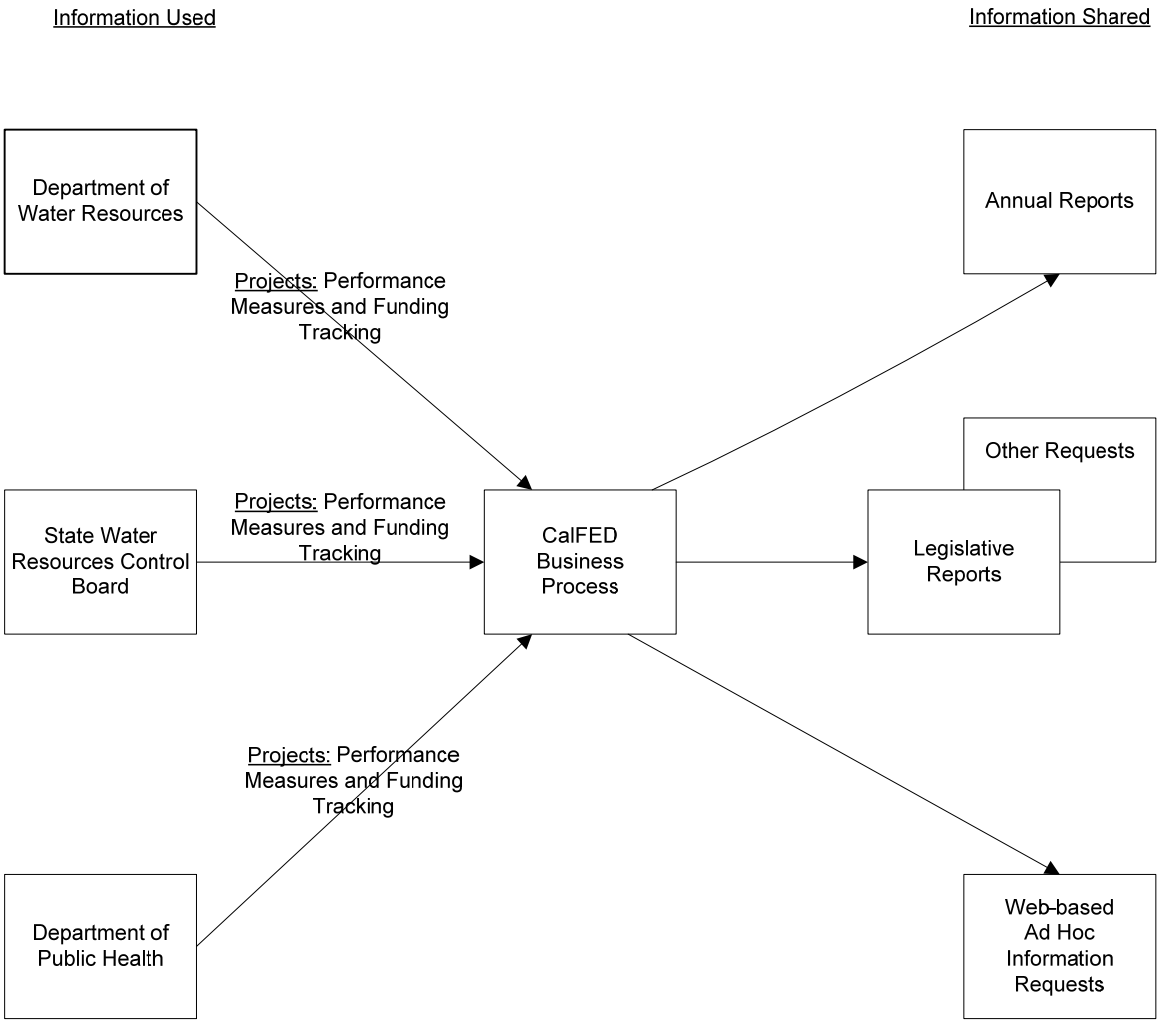
There is a new Project Performance Information System (PPIS) being developed which will include more comprehensive project data. This will require the project groups to provide more detailed information. The PPIS will eventually support outcomes measurement and lessons learned studies.

The DWR Bond Accountability System will be in production soon, and CALFED is looking into interfacing with it.

The diagram on the following page documents the current information flow:

June 30, 2008

CALFED – Water Use and Quality
Current Information Flow



Project Types:
> Improve Water Supply Reliability
- Use
- Quality
- Conveyance
> Ecosystem Restoration
> Levee Improvement and Maintenance

Figure 4-4: Current Information Flow—CALFED

4.4.1 Level of User and Technical Staff Satisfaction

The response from the three departments to CALFED data requests is generally good, and the data requests content is complete. If the information is not provided in time for inclusion in the January Cross-Cut Budget it could result in the Legislature not having enough information to make accurate funding decisions regarding CALFED projects.

4.5 Technical Environment

4.5.1 Expected Life of Proposed Solution

No fixed end date exists at which the proposed solution will be discontinued. The proposed solution will have to be flexible enough to accommodate unforeseen future changes, including changes in program structure, the addition of new programs and/or changes in the technology environment. Because of this the WISDM Solution will be designed to allow for future expandability to prolong the life of the system.

4.5.2 Interfaces to Other Systems

The interfaces to other systems are addressed in Section 5.0 of the FSR. At a minimum, the WISDM Project approach to interfaces to other systems will be in support of the Service-Oriented Architecture (SOA) and Federated Identity Management Technical Vision (FIMTV) for California, and the National Environmental Information Exchange Network (NEIEN). The SOA and FIMTV support will be as expressed in the document[9] released by the Office of the State CIO California in support of the Enterprise Architecture Program, dated January 7, 2008.

4.5.3 State-Level Information Processing Policies

The WISDM Solution will be designed to adhere to all state-level policies for information processing. A requirement of the WISDM Solution will be that it will leverage existing IT infrastructure and tools where possible.

The WISDM Solution will have integrated components for Data Collection and Validation, Data Transfer to existing systems at DPH, DWR and State Water Board, as well as a Web-based Reporting environment. The Data Collection and Validation component will be modeled after existing proven applications already in existence in the State. The web-based ad hoc reporting and data extraction environment will extract information directly from the existing data systems to support and control user requests.

The WISDM Solution will reside within the existing Department of Technology Services (DTS) technical infrastructure for network management, server management, communications, data security and Internet connectivity.

[9] The California *Service-Oriented Architecture (SOA) and Federated Identity Management Technical Vision* document by the State OCIO dated, January 7, 2008.

4.5.4 Financial Constraints

As with all State of California IT systems, the WISDM Program must operate within the annually allotted budget during design, development and implementation as well as during the operating life cycle of the WISDM Solution.

4.5.5 Legal and Public Policy Constraints

If the Legislature determines to go forward with a centralized database as envisioned by Water Code section 531.5, it may adopt additional database requirements intended to enhance or augment the WISDM Program. In that circumstance, the WISDM Project Governance will work within all legal and public policy constraints as prescribed by law and enhanced by regulations. At this time, there is no legal impact or constraint caused by this project.

4.5.6 Agency Information Management Policies and Procedures

All California Environmental Protection Agency and Health and Human Services Agency Information Management policies and procedures, as well as those established by the WISDM Program, should be adhered to in the design, development, implementation as well as operations and maintenance of the WISDM Solution.

4.5.7 Changes in Hardware and Software

All changes to hardware and software in the WISDM Solution should be be managed through those mature processes developed and in place within the Information Systems Section at the DPH. Specifically, these changes will be recommended, analyzed, reviewed, improved if rejected and if approved implemented via the change management process in place.

4.5.8 Staffing Availability

All staffing, either WISDM ‘Program’ staff or Information Technology ‘support’ staff will be defined and budgeted for in the Budget Change Proposal (BCP) process. The final requirements for level of staffing are described in the Proposed Solution in Section 5.

4.6 Existing Infrastructure

The WISDM Solution should be housed at the DTS State Data Center and available for access for the participating agencies via their existing network browsers and supported by their existing network infrastructure. The proposed solution specifies that the water use and diversion data will be processed by the department responsible for collecting and maintaining it. This will require that the State Water Board, DWR and DPH have automated systems capable of accepting, storing, and managing the data routed to them by the web forms processor.

In addition, the proposed solution requires a reporting toolset to create and maintain standard reports as well as ad hoc requests and data extracts. This “central database”

view of the data is made possible by enabling the consolidation of water use and water diversion data from the State Water Board, DWR and DPH databases together with the central demographic data, based on the reporting, data extraction, and analysis requests. This consolidation ability will be flexible so that other data sources can be included in the future, such as water quality and water availability data.

These features of the proposed solution require that the WISDM Solution have the capability to interface and work within the existing IT infrastructures of DPH, DWR and State Water Board

.

4.7 Technical Requirements

The following tables detail technical standards as defined by the WISDM Project Team. These standards represent technical requirements and/or constraints within which any proposed solution should operate. While exceptions may be possible, preference would be afforded to solutions that can fully comply with these standards/requirements. The tables provide the following information:

- System Size and Performance
- Operating Environment
- Data and Security
- Interface
- Infrastructure

Table 4-1: Size and Performance Requirements

Standard Area	*Consensus Minimum Technical Requirement*	*Current State Water Board Standard*	*Current DWR Standard*	*Current DPH Standard*
Workstations	HP Compaq Business Desktop dc5700; Intel Pentium Dual Core E2160—1.8 GHz; 2 GB (2 x 1GB) RAM—DDR II - 667 MHz/PC2-5300; HP DVD RW (+R DL) drive—Serial ATA; 80GB 7200RPM SATA 3.0 GB/s DISK (or equivalent workstation as listed in the State approved hardware list).	Pentium IV CPU with 2.8 ghz, 512M RAM, 30G hard disk, 1024x768 video card and10/100 or 10/100/1000 Mbit NIC.	Based on "Consensus" considerations.	HP/Compaq DC7700 CMT; Intel® Pentium® D 3.0 GHz; 10/100/1000 Ethernet; 80 GB Hard Drive and 1.44 FDD; 1 GB RAM; CD-RW/DVD-ROM Drive (or equivalent Gateway E4500D)
Concurrent Users	There is NO current IT Standard for ***Concurrent Users***. This will be defined by business requirements (functional) during the requirements definition phase of the Project.	Based on "Consensus" considerations.	Based on "Consensus" considerations.	Based on "Consensus" considerations. Volume would be managed by DTS hardware, and can accommodate thousands of concurrent users.

Standard Area	*Consensus Minimum Technical Requirement*	*Current State Water Board Standard*	*Current DWR Standard*	*Current DPH Standard*
Transaction Rate	There is NO current IT Standard for ***Transaction Rate***. This will be defined by business requirements (functional) during the requirements definition phase of the Project.	The current eWRIMS system supports a peak average rate of 100 transactions per second.	Based on "Consensus" considerations.	Based on "Consensus" considerations. Volume would be managed by DTS hardware, and can accommodate thousands of concurrent users.
Required Up Time	System must be available 24 x 7, but allows for periodic system backups and maintenance. The system is supported during State normal business hours, 8am to 5pm, Monday through Friday, excluding all State holidays. ***Required Up Time*** may be re-defined by business requirements (functional) during the requirements definition phase of the Project.	The current eWRIMS system is available 5 days a week/6am-6pm.	Based on "Consensus" considerations.	Based on "Consensus" considerations.
Required Response Time	There is NO current IT Standard for ***Required Response Time***. This will be defined by business requirements (functional) during the requirements definition phase of the Project.	For the current eWRIMS system 90% of the system transactions: - Require no more than 10 seconds to provide initial logon to the application. - Require no more than 5 seconds to provide responses to simple database queries, complete on-line updates to the database, or navigate from screen to screen.	Based on "Consensus" considerations.	Based on "Consensus" considerations.

Table 4-2: Operating Environment Requirements

Standard Area	*Consensus Minimum Technical Requirement*	*Current State Water Board Standard*	*Current DWR Standard*	*Current DPH Standard*
Client Operating System	Microsoft Windows XP, service pack 3 (sp3)	Windows 2003 Professional or better, Internet Explorer 6.0+.	Based on "Consensus" considerations.	Microsoft (MS) Windows XP Professional SP2
Network Operating System	Novell NCP (Netware Core Protocol) with Novell Client 4.91 sp3 for Windows 2.2	Novell Netware 6.	Based on "Consensus" considerations.	Based on "Consensus" considerations.
Web Servers (Physical)	DELL 6850 Server; Two (2), Quad-Core Intel processors (3.0GHz), 2GB RAM and 60GB disk (or current standard at the DTS).	Microsoft IIS and Oracle 10g IAS.	Based on "Consensus" considerations.	Dell PowerEdge 29xx series with rack mount conversion kit; Two Intel Xeon Dual Core processors at 2.8 GHz or higher; 2 GB RAM or higher; A minimum of four SCSI 72GB or bigger drives. Standard configuration is Raid 5 plus one hot spare
Web Servers (Virtual)	DELL R900; 2GB RAM and 18GB disk (or current standard at the DTS).	(same)	Based on "Consensus" considerations.	Based on "Consensus" considerations.
Application Servers (Physical)	DELL 6850 Server; Two (2), Quad-Core Intel processors (3.0GHz), 4GB RAM and 60GB disk (or current standard at the DTS).	Microsoft IIS and Oracle 10g IAS.	Based on "Consensus" considerations.	*Same as Web Servers*
Application Servers (Virtual)	DELL R900; 4GB RAM and 18GB disk (or current standard at the DTS).	(same)	Based on "Consensus" considerations.	Based on "Consensus" considerations.
Database Servers (Physical ONLY)	DELL 6850 Server; Two (2), Quad-Core Intel processors (3.0GHz), 8GB RAM and 60GB disk (or current standard at the DTS).	Microsoft IIS and Oracle 10g IAS.	Based on "Consensus" considerations.	*Small to Medium databases same as Web Servers*

Standard Area	*Consensus Minimum Technical Requirement*	*Current State Water Board Standard*	*Current DWR Standard*	*Current DPH Standard*
Server Operating System	Microsoft Windows Server 2008	Windows 2003 or Advanced Server.	Based on "Consensus" considerations.	Microsoft Windows Server 2003 SP1. Enterprise Edition, x64, and R2 versions are permitted when required by an application
Application Language	Visual Basic .Net; C# .Net; ASP .Net; Java script (or other .Net application language as proposed by the DD&I vendor and supported by the DTS).	Candidates include ASP, Visual Basic, JSP, Java.	Based on "Consensus" considerations.	MS Visual Studio 2005
Data Base Management System (DBMS)	Oracle 11g; SQL 2008 (or DB2 if proposed by the DD&I vendor and supported by the DTS).	Oracle 10g	Based on "Consensus" considerations.	Microsoft SQL 2005 SP1
Database platform	Server-based, Microsoft Windows 2008	Sun/Solaris for the eWRIMS system, but will agree with "Consensus considerations" for WISDM	Based on "Consensus" considerations.	Microsoft Windows Server 2003 SP1. Enterprise Edition, x64, and R2 versions are permitted when required by an application
Data Communications	ADO .Net	The present LAN/WAN supports network services for the Water Board and Regional Boards. Regional Board locations have adequate bandwidth to support the integrated system. This includes redundant DS3 circuits to access the Internet. T1 ATM Circuits homerun to Water Board site.	Based on "Consensus" considerations.	RIP, EIGRP; IP, SNA, DLSW
LAN Topology	Star Topology on an Ethernet 100-baseT	Ethernet	Based on "Consensus" considerations.	Based on "Consensus" considerations.

Standard Area	*Consensus Minimum Technical Requirement*	*Current State Water Board Standard*	*Current DWR Standard*	*Current DPH Standard*
Transport Protocols	TCP/IP	TCP/IP	Based on "Consensus" considerations.	TCP/IP
Network Management	Microsoft System Center and Cisco NimBUS for Network Monitoring (or other network management software as supported by the DTS).	Cisco Works Monitoring tool.	Based on "Consensus" considerations.	HP OpenView Network Node Manager 7.5 or higher; CiscoWorks 2000 LAN Management System 2.5 and Virtual Management System 2.3 or higher; nGenius Performance Manager 3.01 or higher; Cisco TACACS Windows v3.3
Other (e.g. GIS Tools)	• Microsoft SharePoint 2007 • (other software as proposed by the DD&I vendor and supported by the DTS.)	eWRIMS uses ESRI ArcIMS, ArcGIS, and ArcSDE, Terminal Server Software, Windows Terminal Server and Citrix.	Based on "Consensus" considerations.	MS Office 2003 Professional SP2; Adobe Acrobat 8; SAS; ArcGIS, ArcView, ArcInfo 9.x; Crystal Reports XI

Standard Area	*Consensus Minimum Technical Requirement*	*Current State Water Board Standard*	*Current DWR Standard*	*Current DPH Standard*
Desktop Application Software	• Microsoft Office 2007 • Microsoft Project 2007 Professional (limited number) • Microsoft Visio 2007 Professional (limited number) • Microsoft Groove 2007 (limited number) • TechSmith SnagIT 9 (limited number) • (other software as proposed by the DD&I vendor and supported by the DTS.)	Based on "Consensus" considerations.	Based on "Consensus" considerations.	MS Project 2003; MS Office 2003 Professional SP2; MS Visual Studio 2005;

Table 4-3: Data and Security Requirements

Data Area	*Consensus Minimum Technical Requirement*	*Current State Water Board Standard*	*Current DWR Standard*	*Current DPH Standard*
Data Structure	There is NO current IT Standard for ***Data Structure***. This will be defined by business requirements (functional) during the requirements definition phase of the Project.	For eWRIMS two data types (traditional and spatial/imaging) are employed, both of which are stored, retrieved, updated and maintained through Oracle's 10g RDMS. The traditional data types are stored in tables with defined relationships, attributes, and keys while the spatial and image data types are stored as "objects". Spatial data requires third party software to retrieve and format for data for use.	Based on "Consensus" considerations, however, DWR would like to be involved in the eventual develop, including development and review of a functional diagram of the application communication.	Based on industry standard RDMS such as Microsoft SQL 2005 SP1
Data Integrity	There is NO current IT Standard for ***Data Integrity***. This will be defined by business requirements (functional) during the requirements definition phase of the Project.	Transaction log of changes made to high priority data fields.	Based on "Consensus" considerations, however, DWR would like to be involved in the eventual develop, including development and review of a functional diagram of the application communication.	Standard server disk configuration is RAID 5 plus one hot spare. Idera SQLSuite, Ent. Ed.;

Data Area	*Consensus Minimum Technical Requirement*	*Current State Water Board Standard*	*Current DWR Standard*	*Current DPH Standard*
Data Conversion	There is NO current IT Standard for ***Data Conversion***. This will be defined by business requirements (functional) during the requirements definition phase of the Project.	For eWRIMS new tables were created and fields re-mapped to be consistent with the Water Boards Enterprise Data Model.	Based on "Consensus" considerations, however, DWR would like to be involved in the eventual develop, including development and review of a functional diagram of the application communication.	At a minimum, the Data Cleansing and Conversion Plan must address the following: • Identify opportunities for automated data conversion (i.e., script). • Identify where manual data conversion is necessary and the participants. • Define data clean-up tasks that must occur to enable data migration. • Define a validation approach to confirm data accuracy prior to migration.
Integration Issues	There is NO current IT Standard for ***Integration Issues***. This will be defined by business requirements (functional) during the requirements definition phase of the Project.	The Water Board will comply with Oracle 10g DBMS standards so that data integration will be manageable.	Based on "Consensus" considerations, however, DWR would like to be involved in the eventual develop, including development and review of a functional diagram of the application communication.	The Systems Integration vendor is responsible for conducting the data migration and integration effort.

Data Area	***Consensus Minimum Technical Requirement***	***Current State Water Board Standard***	***Current DWR Standard***	***Current DPH Standard***
Security Level	There is NO current IT Standard for ***Security Level***. This will be defined by business requirements (functional) during the requirements definition phase of the Project. However, the general tendency is that adequate data access layers (user access levels) **must** be designed into the application.	Read, write, update and delete privileges defined by user logon, workstation and/or position. Recommend record-level security.	Based on "Consensus" considerations, however, DWR would like to be involved in the eventual develop, including development and review of a functional diagram of the application communication.	The many levels and areas of security level requirements are documented in the DPH Information Systems Security Requirements for Projects (ISO/SR1)
Field Level Security	There is NO current IT Standard for ***Field Level Security***. This will be defined by business requirements (functional) during the requirements definition phase of the Project. However, the general tendency is that through user access levels (role-based security) field level security **must** be built into the application.	For eWRIMS spatial and attribute data require different access levels.	Based on "Consensus" considerations, however, DWR would like to be involved in the eventual develop, including development and review of a functional diagram of the application communication.	Provide an audit trail for all data entry and data changes, including date, time, and user identification

Table 4-4: Interface Requirements

Interface Area	*Consensus Minimum Technical Requirement*	*Current State Water Board Standard*	*Current DWR Standard*	*Current DPH Standard*
User Interface	Application-based (client-server) or web browser-based (Microsoft Internet Explorer 7).	Web browser-based, IE6.	Web browser-based, IE6.	Based on "Consensus" considerations.
System Interfaces	Similar to that used at DTS and industry best practices, external user access to application (i.e., System Interface) is achieved via a web server placed external to the firewall in the DMZ.. At a minimum, this should conform to the NEIEN standards based XML environment.	Based on "Consensus" considerations.	(Additional input from DWR anticipated here…)	Based on "Consensus" considerations.

Table 4-5: Infrastructure Requirements

Infrastructure	*Consensus Minimum Technical Requirement*	*Current State Water Board Standard*	*Current DWR Standard*	*Current DPH Standard*
Bandwidth	There is NO current IT Standard for ***Bandwidth***. This will be defined by business requirements (functional) during the requirements definition phase of the Project.	Single client connection should have minimum one connection of 1.5Mb from internal and external. A minimum of 1Mb bandwidth for a single connection to all major Tier 1 providers.	Based on "Consensus" considerations.	Based on "Consensus" considerations.

Infrastructure	*Consensus Minimum Technical Requirement*	*Current State Water Board Standard*	*Current DWR Standard*	*Current DPH Standard*
Backup system	The current IT Standard for ***Backup System(s)*** is Veritas Backup Exec and HP Data Protector (or current standard at the DTS).	Recommends Veritas nightly data and application backups.	DWR will define its own.	Embedded RAID – PERC5. Minimum of 256 MB Battery Backup Write and Read Cache (BBWC) Veritas Backup Exec 11.D
Firewall	The current IT Standard for ***Firewall*** is Cisco PIX/ASA (allowances for different firewalls must be provided when dealing with various participating agencies and the DTS).	Cisco PIX 525 v. 6.3(1).	DWR will define its own.	The Presentation, Application/Business Logic, and Data Access Logic layer must be separated physically by a firewall regardless of physical implementation. Use DTS standards.
Intrusion detection system	The current IT Standard for ***Intrusion Detection*** is Cisco IPS (allowances for different intrusion detection software must be provided when dealing with various participating agencies and the DTS).	Cisco IDS.	Based on “Consensus” considerations.	Cisco Security Agent for servers. Cisco IDS/CiscoWorks VMS for network

Infrastructure	*Consensus Minimum Technical Requirement*	*Current State Water Board Standard*	*Current DWR Standard*	*Current DPH Standard*
Security practice	This project will be governed by the controls established under one or more of the following Information Security and IT Infrastructure Policies by the participating agencies and the DTS: • Security Patches and Security Upgrade Policy, • Server Configuration Policy, • Firewall Configuration Policy, • Server Hardening Policy and/or • Use of Computing Facilities Policy. As part of a 'Best Practices' On-Going Security Accreditation and Certification process, this project will undergo periodic security compliance reviews and as may be necessary, additional appropriate security policies may be drafted that are applicable to identified needs.	Nightly check of applicable patches and security updates.	Based on "Consensus" considerations.	The many levels and areas of security level requirements are documented in the DPH Information Systems Security Requirements for Projects (ISO/SR1)

Infrastructure	*Consensus Minimum Technical Requirement*	*Current State Water Board Standard*	*Current DWR Standard*	*Current DPH Standard*
Operational recovery	In addition to the ***Operational Recovery*** plan in place at the DTS, each participating agency will need to have a written plan and procedure to recover the WISDM System and/or application for their own agency.	RAID 5 drives for increased reliability and system redundancy, and clustering at the application server level.	Based on "Consensus" considerations.	Recovery procedures shall be developed using Appendix "J" Template from the Department's ORP. Quest Recovery Manager
Load balancing system	The ***Load Balancing System*** to be used for the WISDM Solution is to utilize the feature for load balancing built into the Microsoft Windows Server 2008. Additional load balancing may be achieved by employing an external 'appliance' such as Radware's Web Server Director (WSD).	Load balancing application and provide redundancy protection.	Based on "Consensus" considerations.	Based on "Consensus" considerations.
Redundant connection to ISP	The current IT Standard for ***Redundant Connection to ISP*** is to have multiple T1 or DS3 connections, at both the participating agencies as well as the DTS. In this manner, should one connection fail there is always a second connection available.	Two redundant DS3 ATM Internet circuits with one T1 backup circuit.	Based on "Consensus" considerations.	Based on "Consensus" considerations.
UPS system	The current IT Standard for ***Uninterruptable Power Supply (UPS) Systems*** only applies to the DTS standard currently in place and not at the participating agencies.	Enterprise Liebert UPS system in Cal/EPA computer room with individual standalone UPS units connected to some servers. If system is housed at DTS, then UPS is automatically provided with system configuration.	Based on "Consensus" considerations.	HP Smart UPS standard, 1500 watt – 110 volt plug versions only. One 1500 watt UPS may only serve a maximum of two servers. All power supplies in a given server should be plugged into a common UPS.

4.7.1 Application Development Methodology

This section discusses the Application Development Methodology (ADM) that will be followed during the DD&I phase of the WISDM Project. After careful review of the ADMs in place within the participating agencies, the ADM being used at the DPH was selected as the ADM that will be followed for the WISDM Project. This ADM is a mature process and follows industry best practices.

4.7.2 Project Management Methodology

This section discusses the Project Management Methodology (PMM) that will be followed during the WISDM Project. While firmly rooted in the Project Management Body of Knowledge (PMBOK), the PMM is detailed in Section 6.0 of the FSR.

…this page is intentionally left blank…

5.0 PROPOSED SOLUTION

The process used to determine the proposed solution included the assessment of several different alternatives for meeting the Water Code section 531.5 legislative requirements for the establishment of a coordinated water measurement database. The alternatives assessed were:

- A Central Single Database Solution;
- A Low Functionality Solution; and
- The WISDM Phase I Solution.

After researching and analyzing these alternatives, it was determined by the project team that the WISDM Phase I Solution best meets the goals of Water Code section 531.5 and the State Water Board, DWR, CALFED and DPH business requirements. Analysis of the defined functional requirements against features provided by the other alternatives determined that the proposed solution meets 100 percent of the defined requirements.

The sections below provide the detail of the proposed solution to implement the WISDM solution and the other alternatives that were analyzed.

5.1 Solution Description

The proposed solution consists of a web forms processor with a central database of common (to all departments) “enterprise” customer information. The web forms processor would also be used to manage a repository of “form questions” and associated data validation rules which can be assembled into a collective “form” questionnaire dependent on what the WDP needs to report. It would also enable the maintenance of the enterprise customer information, fulfill report requests for enterprise customer information, and enable the maintenance of the “form questions” repository.

When a WDP has completed the data input, the water use and diversion data will be forwarded to the appropriate department(s) for processing by the existing applications. Each department will be responsible for managing its own enterprise customer information, via the web forms processor, and for informing the other departments of any additions and changes so that the departmental cross referencing can be maintained. It will be critical to ensure that duplicate enterprise customer information is not created, and that the departmental cross referencing is accurately maintained.

The main features of this alternative are:

- A central single web site for WDPs to use to input information. Access will be by a WISDM Program supplied user-id and password (user maintained).
- On-line forms compiled by the web forms processor based on the WDP type(s) associated with the user-id. The web forms processor will include data validation and interdependency rules to control the data input process, and will permit the user to supply data in several on-line sessions.

- When the WDP indicates completion of the requested data, and the data has passed the web forms processor validation rules checks, the data is processed. Any changes to demographic data will be stored in the central database. The water use and diversion data will be routed by the web forms processor using XML-based messaging services to the appropriate department(s) – State Water Board, DWR or DPH – based on the form(s) completed.
- The demographic (e.g. name, address, contacts) and cross reference (e.g. unique WDP id; State Water Board cross reference WDP id; DWR cross reference WDP id; DPH cross reference WDP id) data will be stored and managed in the central database.
- Where possible, any demographic changes, including the cross reference WDP id, a department makes in-house to the WDP data will be routed to the web forms processor database management process to synchronize the corresponding central database data, using XML-based messaging services created by the legacy application(s). If the department uses manual processes then the changes to the central database will be made using the web forms processor input process.
- The water use and diversion data will be processed by the department responsible for collecting and maintaining it. This will require that the State Water Board, DWR and DPH have automated systems capable of accepting, storing, and managing the data routed to them by the web forms processor.

  The WISDM Project scope includes the creation of simple “data pooling” databases for each department. These will process and store the XML-based data messages from the web forms processor for further data validation, transformation, and business use by the departments. Water use, water diversion, and changes to WDP demographic data will processed and stored.
- A business intelligence toolset will be available to create and maintain standard reports as well as fulfill ad hoc requests and data extracts. This will also provide a “central database” view of the data by enabling the consolidation of water use and water diversion data from the State Water Board, DWR and DPH databases together with the central demographic data, based on the reporting, data extraction, and analysis requests. This consolidation ability will be flexible so that other data sources can be included in the future, such as water quality and water availability data.

The following diagram documents the agreed project approach and scope for WISDM, while Attachment 2 contains a sample flowchart of how process flow could be handled within the WISDM System:

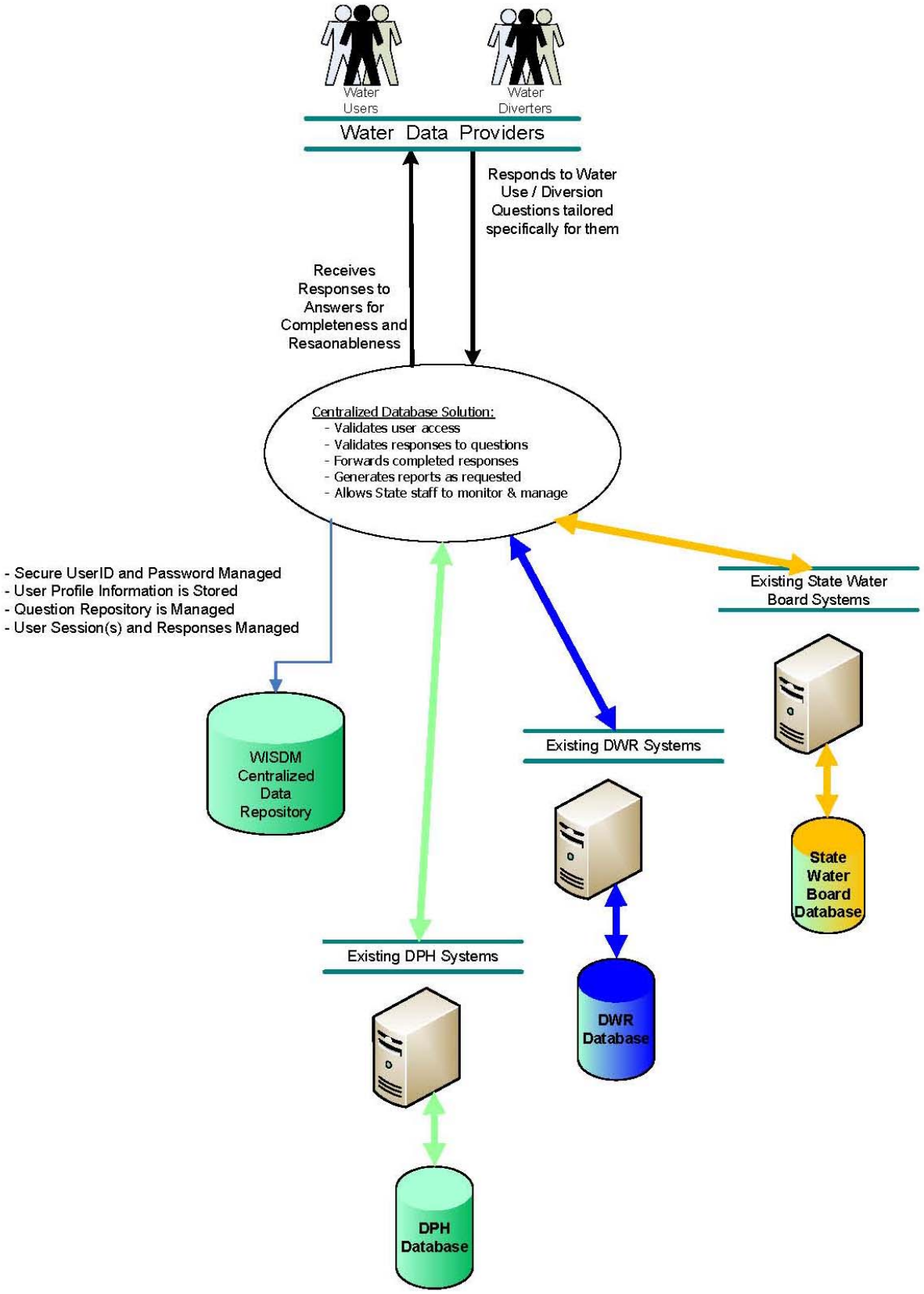


Figure 5-1: WISDM Solution

5.1.1 Hardware

All hardware used in the development and implementation of this proposed solution will adhere to the DTS hardware standards currently in place, as well as those defined by the WISDM Project Team. Specifically, the following hardware standards will be followed for servers and workstations:

Servers

Table 5-1: Servers

Standard Area	*Minimum Technical Requirement*
Web Servers (Physical)	DELL 6850 Server; Two (2), Quad-Core Intel processors (3.0GHz), 2GB RAM and 60GB disk (or current standard at the DTS).
Web Servers (Virtual)	DELL R900; 2GB RAM and 18GB disk (or current standard at the DTS).
Application Servers (Physical)	DELL 6850 Server; Two (2), Quad-Core Intel processors (3.0GHz), 4GB RAM and 60GB disk (or current standard at the DTS).
Application Servers (Virtual)	DELL R900; 4GB RAM and 18GB disk (or current standard at the DTS).
Database Servers (Physical ONLY)	DELL 6850 Server; Two (2), Quad-Core Intel processors (3.0GHz), 8GB RAM and 60GB disk (or current standard at the DTS).

Workstations

Table 5-2: Workstations

Standard Area	*Minimum Technical Requirement*
Workstations	HP Compaq Business Desktop dc5700; Intel Pentium Dual Core E2160—1.8 GHz; 2 GB (2 x 1GB) RAM—DDR II - 667 MHz/PC2-5300; HP DVD RW (+R DL) drive—Serial ATA; 80GB 7200RPM SATA 3.0 GB/s DISK (or equivalent workstation as listed in the State approved hardware list).

5.1.2 Software

All software used in the development and implementation of this proposed solution will adhere to the DTS software standards currently in place, as well as those defined by the WISDM Project Team. Specifically, the following software standards will be followed:

Servers Software

Table 5-3: Servers Operating System

Standard Area	*Minimum Technical Requirement*
Server Operating System (ALL Servers)	Microsoft Windows Server 2008
Other Server Software	Microsoft SharePoint 2007

Workstations Software

Table 5-4: Workstations Operating System

Standard Area	*Minimum Technical Requirement*
Workstation Operating System	Microsoft Windows XP, service pack 3 (sp3)
Desktop Application Software	• Microsoft Office 2007 • Microsoft Project 2007 Professional (limited number) • Microsoft Visio 2007 Professional (limited number) • Microsoft Groove 2007 (limited number) • TechSmith SnagIT 9 (limited number) • (other software as proposed by the DD&I vendor and supported by the DTS.)

5.1.3 Technical Platform

The WISDM Solution will be based on the n-tier technical platform environment in use at the DTS and participating agencies today.

As defined by IBM[10]:

> *"N-tier architecture abstracts out the layers of the application, separating presentation logic from business logic, allowing reuse of existing legacy applications, and providing universal client support via Web browsers."*

The traditional two-tier, client/server model requires clustering and disaster recovery to ensure reliability. While the use of fewer nodes simplifies manageability, change management is difficult because it requires servers to be taken offline for repair, upgrades, and new application deployments. In addition, the deployment of new applications and enhancements is complex and time consuming in user workstation based fat-client environments, resulting in increased risk and reduced availability. Only average resource utilization rates are possible, and the ability to reactively scale resources to meet peak time and seasonal demand is virtually impossible.

The inherent shortcomings of the two-tier model gave rise to n-tier architectures. To mitigate the limitations of traditional client/server environments, the n-tier architecture was designed to enable applications to be distributed as needs dictate. The n-tier application architecture is characterized by the functional decomposition of applications, service components, and their distributed deployment, providing improved scalability, availability, manageability, and resource utilization (Figure 5-2). An n-tier is a functionally separated hardware and software component that performs a specific function.

In the WISDM technical configuration approach:

- Tier-1 is the presentation layer handled by the web server, the Internet and each user's web browser. This web server sits in front of the firewall to isolate the server from the rest of the servers—which also meets the DTS and participating agencies ISO security requirements.
- Tier-2 is managed by the application server(s). These servers process information that has been passed from the web servers once security authentication has taken place. In this configuration, validation and reporting of submitted data will take place.
- Tier-3 is managed by the database server. In this configuration, data that has passed validation will be temporarily stored until forwarded to the various systems in place at the participating agencies.

[10] As described on the IBM website under **Frequently Asked Questions** in response to ***"What does n-tier architecture mean?"*** Complete reference can be found at the following link:
http://www-304.ibm.com/jct09002c/isv/tech/faq/individual.jsp?oid=1:22731

- Tier-n is the layer of existing data systems at the participating agencies. In this configuration, this includes existing systems at the DPH, the DWR and the State Water Board.

The following diagram depicts how this technical platform is proposed in terms of actual servers and network configuration for the WISDM Solution.

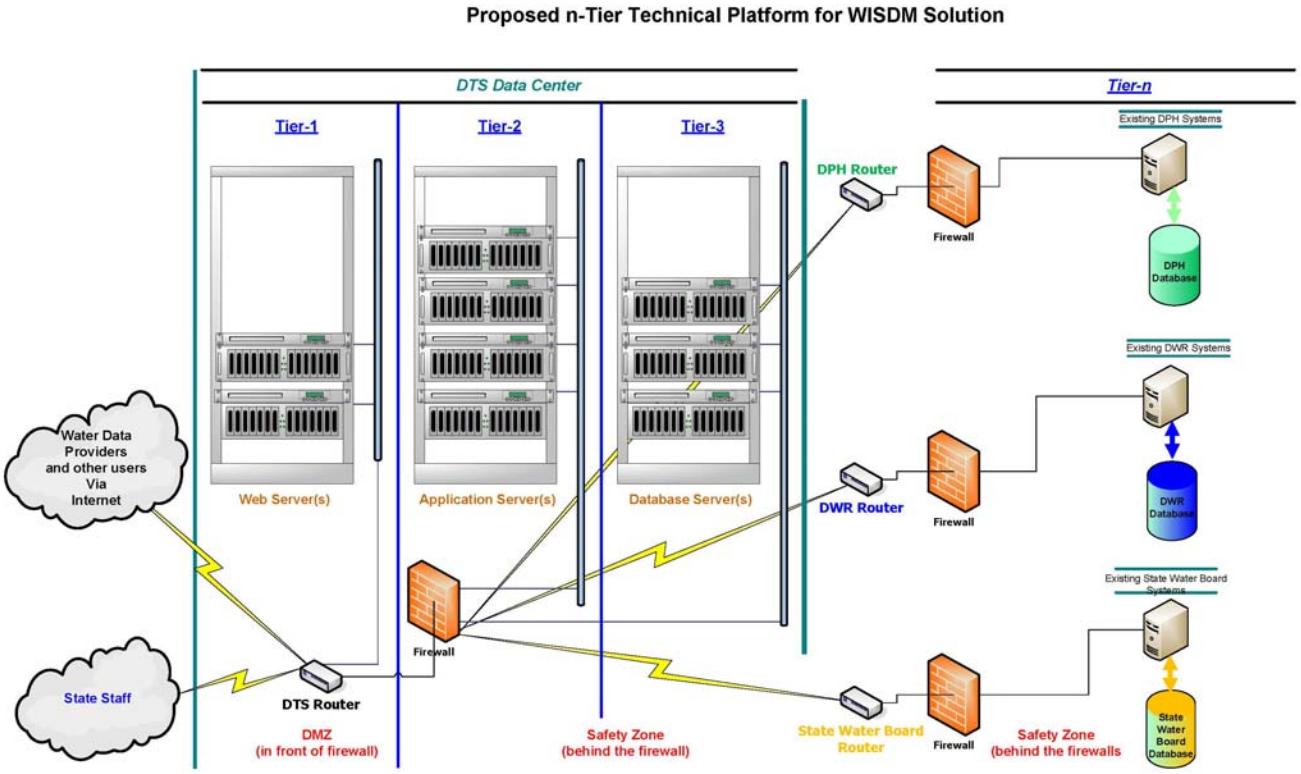


Figure 5-2: WISDM Solution Using the n-Tier Technical Platform Approach

Because each tier can be managed or scaled independently, flexibility is increased in the IT infrastructure that employs it. Communication between tiers is accomplished through standard protocols such as HTTP, RMI, and XML. All functional components, such as persistent storage, management of clients, and the retrieval of data from many stores, are separated. This componentization is critical, with each component ascribed to a tier, providing an abstraction for application architecture, manageability, and flexibility. As a result, individual components can scale and be made highly available with ease. Typically, n-tier architectural platforms place each service or group of like services on a separate server, enabling systems to be divided into easily scalable components. As a result, applications can exploit this modular software architecture approach to increase scalability and availability.

5.1.4 Development Approach

The following describes the development approach proposed for each of the WISDM Solution information technology components.

Web-based Forms Processor

The WISDM Project will select a vendor who will be responsible for the design, development, testing, training and implementation (DD&I) phases of the WISDM Solution. The DD&I vendor staff will be onsite at the WISDM Project facilities. The development approach will also include the contracted services of both an Independent Project Oversight Contractor (IPOC) and Independent Verification and Validation (IV&V) vendor. The oversight responsibilities are required to ensure that the solution is technically sound and meets the business and technical requirements of the WISDM Solution. This oversight will work with the WISDM Project ISO, to also oversee the security aspects of the system implementation such that the topology ensures data integrity, that only authorized users can access data and that no data resides on the Web (all data will be behind the firewall). The DD&I vendor and State staff assigned to the project will be directly involved in all phases of development as described below:

- The DD&I vendor will be directly responsible for the development of the WISDM Solution throughout the SDLC. The vendor will have the responsibility to develop requirements specifications, design specifications and conduct implementation of the solution in the State's information systems infrastructure.
- The WISDM Program staff will also be directly involved with the DD&I vendor and program technical staff throughout the SDLC. The program staff responsibilities will include definition of the business and data rules, review of system specifications and requirements, participation in system design, testing, preparation of training materials, and user documentation and implementation planning.
- The DD&I vendor and program technical staff will be required to follow the prescribed Application Development Methodology during the design, development and implementation of the WISDM Solution.
- The DD&I vendor is responsible for developing the WISDM Solution Architecture Plan.
- The program technical staff will ensure the proposed WISDM Solution is in compliance with the WISDM Solution Architecture Plan.
- The DTS is responsible for assumption of system operation and operational support of the WISDM System upon turnover from the DD&I vendor.
- WISDM Program technical staff will be responsible for assumption of application operation and maintenance of the WISDM Solution upon turnover from the DD&I vendor.

- The DD&I vendor is responsible for updating the WISDM Solution Architecture Plan to an 'As Built' WISDM Architecture version upon turnover of the WISDM System to the DTS.
- A WISDM Project Manager supported by the IV&V Vendor will provide overall project management during all project phases.
- The WISDM Project ISO will be involved in planning and testing for the security and operational recovery of the WISDM System during all phases of the project.

Following a standard modular approach will help to mitigate risk and provide a structured method of configuration, development and deployment[11]. The Project Manager will be responsible for development of a detailed Work Breakdown Structure (WBS) at the beginning of the project and will be required to maintain it throughout the project lifecycle.

The figure below graphically depicts the WISDM Solution process flow for the Web-based Forms process:

[11] A detailed Risk Management Plan is provided as Section 7.0 of this FSR.

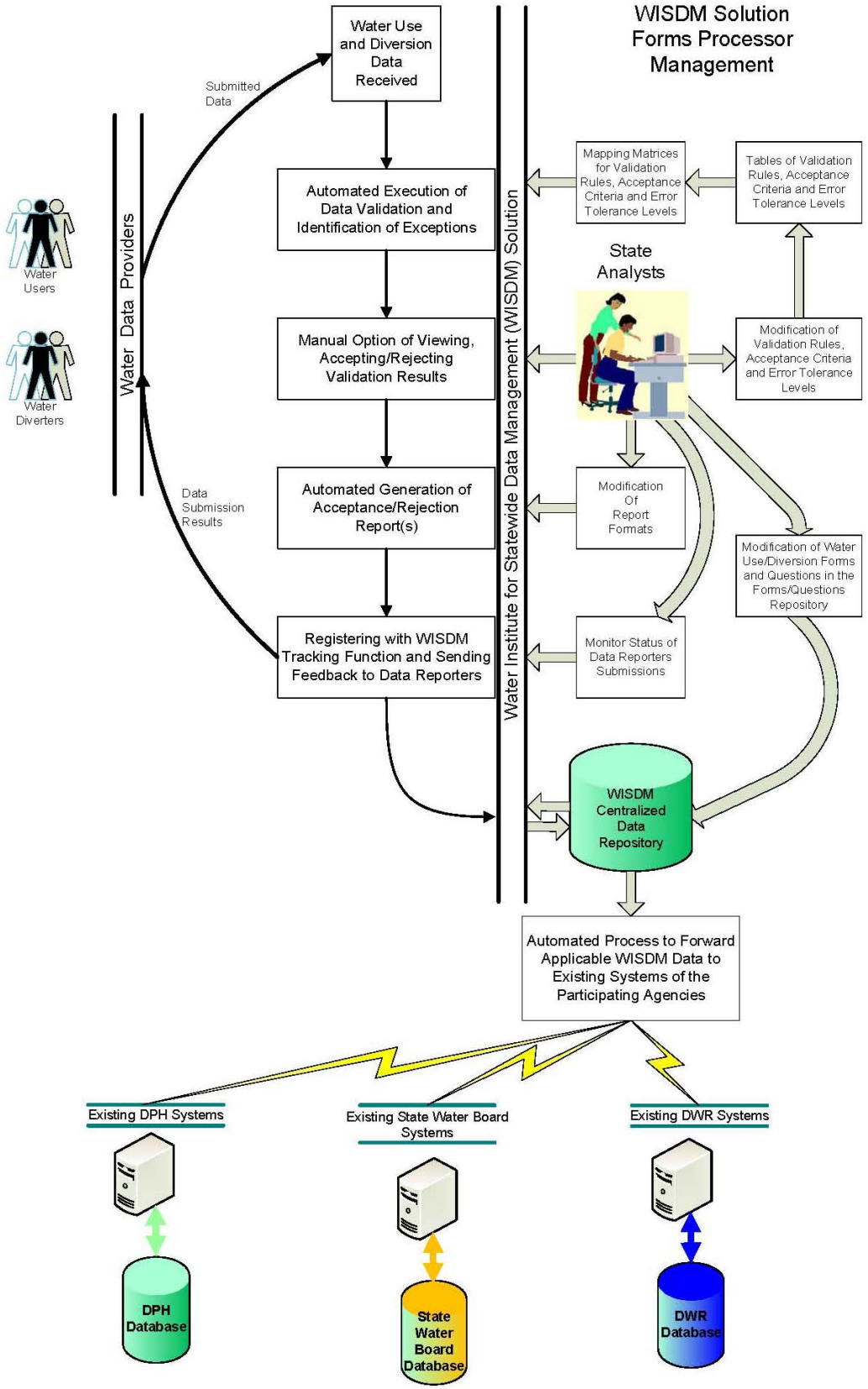


Figure 5-2: WISDM Forms Processor

Centralized Database View

The WISDM Solution utilizes a virtual centralized database methodology. That means that while the data is actually stored in various existing systems' databases within the participating agencies, from the WISDM user perspective access to the data will appear to be from a single database. This is accomplished via the business intelligence toolset across those existing databases. This approach is outlined in the figure below:

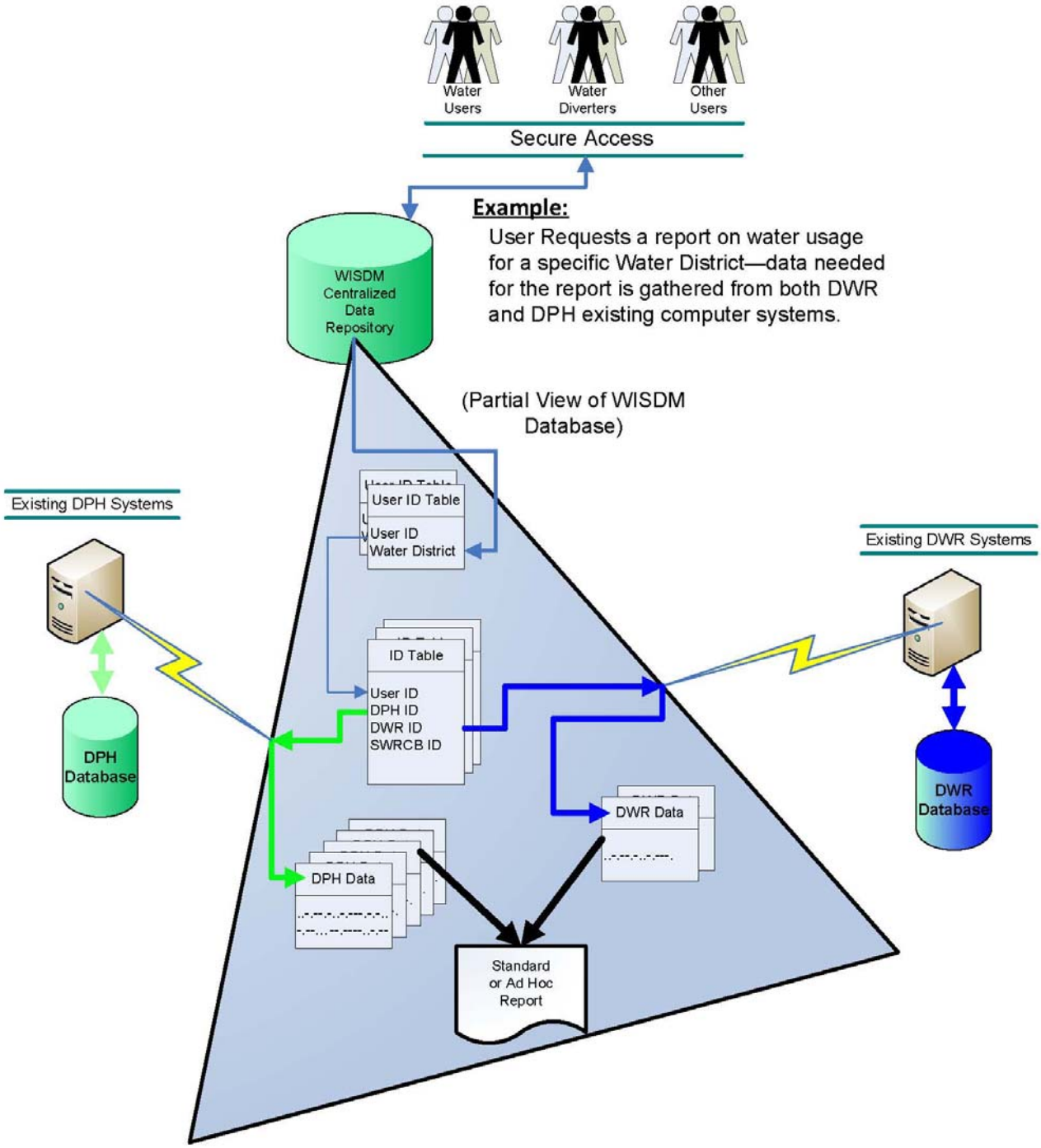


Figure 5-3: WISDM Centralized Database View

Data Reporting and Analysis

The centralized database view provided by the WISDM Solution supports internal and external web-based data reporting and analysis environments using the selected business intelligence toolset. The WISDM technical staff, supported by the DTS technical staff, will provide technical expertise and support to the internal and external user communities. Access to the centralized database for data reporting, analysis, and extraction is depicted in the figure below:

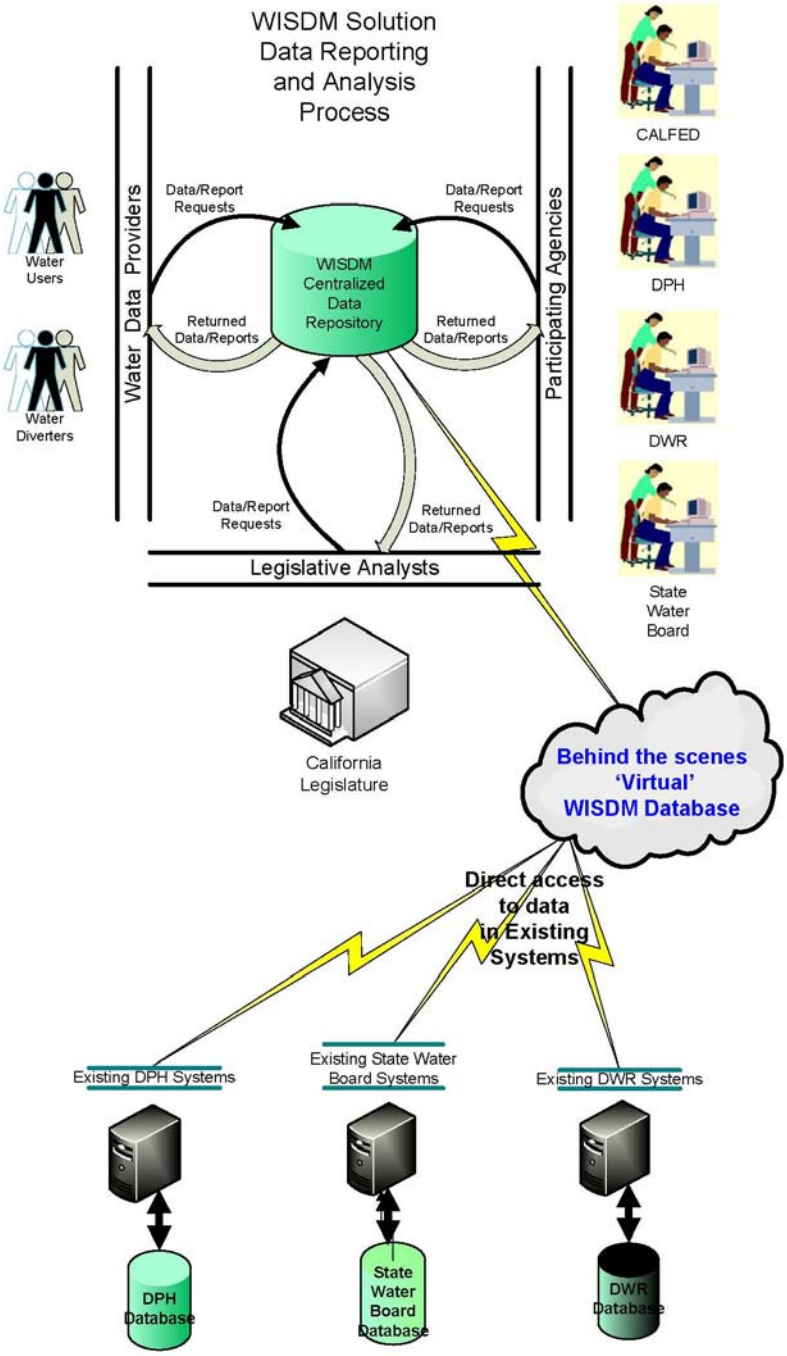


Figure 5-4: WISDM Data Reporting and Analysis

5.1.5 Integration Issues

Integration between the WISDM Solution and the existing systems at the participating agencies is critical to the success of the WISDM Solution. Two things are paramount to support this integration:

- First, the WISDM Solution will forward the collected and verified water use and diversion data from the Web Forms Processor using XML-based messaging services. The definition of the data being exchanged via the XML-based messages will be formally specified using the National Environmental Information Exchange Network (NEIEN) standards as a guide. This will enable the WISDM Solution to use a single, standardized format for data exchange which simplifies the data processing. The water use and water diversion data will be processed by the participating agency(ies) responsible for collecting and maintaining it. This will require that the State Water Board, DWR and DPH have automated systems capable of accepting, storing, and managing the data routed to them by the Web Forms Processor.
- Second, the WISDM Solution will adhere to the guidelines for security and data exchange as identified in the “Service-Oriented Architecture (SOA) and Federated Identity Management Technical Vision (FIMTV) for California” document.

5.1.6 Project Phases

The WISDM Solution will eventually process and manage multiple data sources which will contain different categories of water data. Water Code section 531.5 defines the scope and high level requirements of WISDM Phase I: that is, the efficient WDP-friendly capture, management, and coordinated reporting of water use and water diversion data.

An important part of Phase I will be a Pilot Project, which will include all the required data collection, storage, and reporting functionality of the WISDM Solution, but it will focus on a limited number of WDPs. A representative number and type(s) of WDPs will be determined by the WISDM Solution governance team to provide input to the Pilot Project, and to use, prove, and provide feedback on the WISDM functionality. When the Pilot Project has been completed and the functionality has been successfully implemented with user acceptance, the WISDM Project team will review the Pilot Project and use this experience to implement the rest of Phase I and subsequent phases.

The results of the Pilot Project review will include “lessons learned”, the WDP’s pro/con feedback and identification of the Project Management and DD&I methodologies that worked as well as those that did not. The results of this review will be used by Program and Project Management to refine the project approach and methodologies for the completion of Phase I and the next phase of the project. This will reduce project risk and help to ensure that subsequent project phases progress smoothly and are successful.

After the initial implementation, the WISDM functionality will be expanded to process agricultural water use and water diversion data consistent with the goals of AB 1404. . The available data sources mapped to the virtual central database will be expanded to enable reporting on the agricultural water use and water diversion data.

To expand the WISDM Program to include other critical sources of statewide water data, such as water availability and climatic change impact, so that a “complete picture” of the state’s water status can be extracted and reported on will require further program phases. Phase II and further program phases, will require additional legislation and funding. A figure of how this might appear is shown in the Figure below:

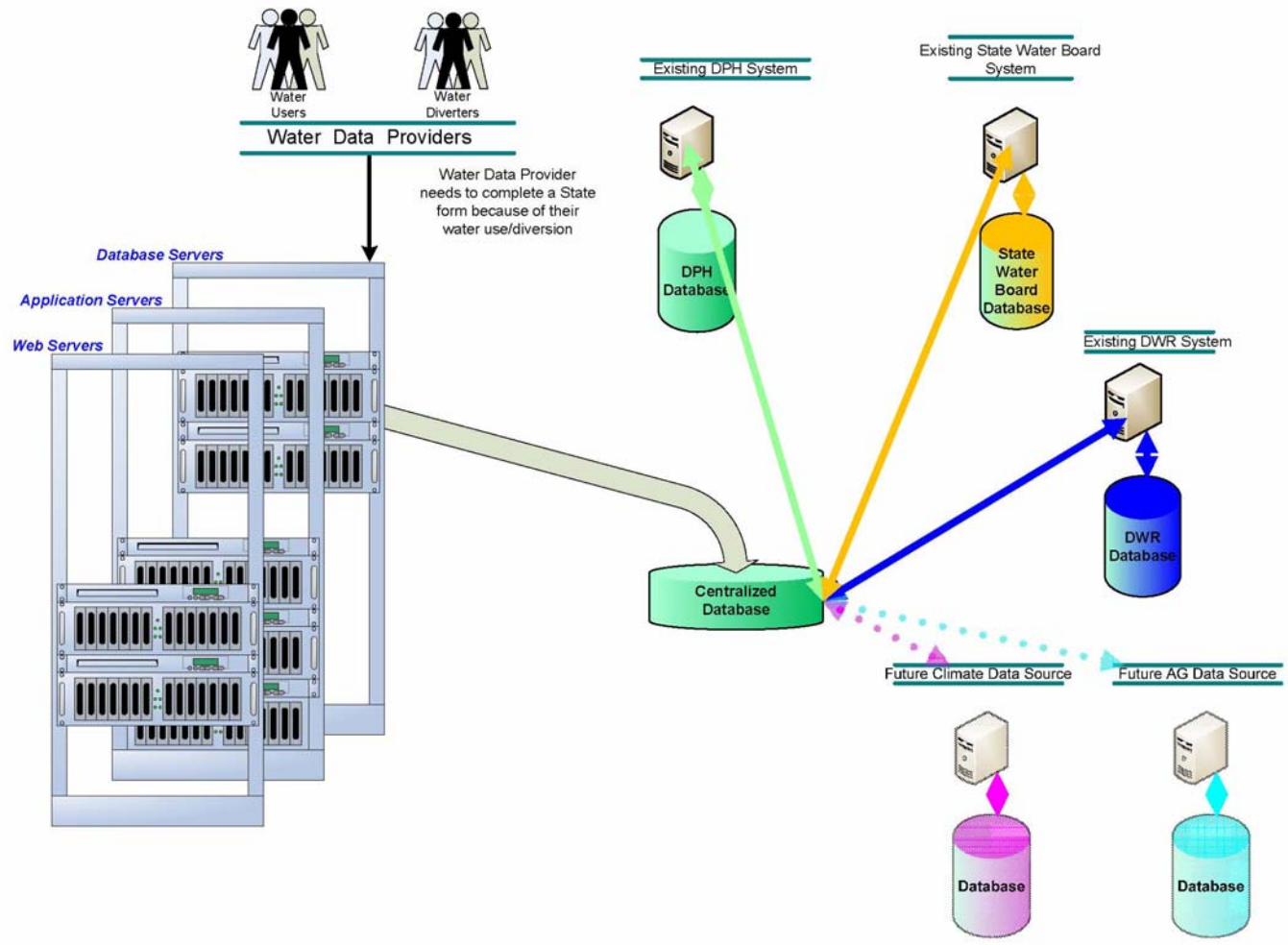


Figure 5-5: WISDM Project Phases

5.1.7 Procurement Approach

The procurement approach will be documented in complete detail in a separate deliverable called an Information Technology Procurement Plan (ITPP). The ITPP is prepared for the Department of General Services' review and approval, where it is to be submitted along with an OCIO approved FSR.

With an approved FSR and ITPP, the project will continue with the creation of a Request For Proposal (RFP). The RFP is used to solicit competitive bidding on the Proposed Solution for the WISDM System Design, Development and Implementation (DD&I). This solicitation will result in the selection of a DD&I vendor.

Additional procurements will include California Multiple Award Schedules (CMAS) RFO procurements for the PM, IV&V and IPOC vendor services.

5.1.8 Technical Interfaces

There will be XML message-based interfaces between the WISDM Solution and the systems to be provided by the State Water Board, DWR, and DPH to manage the water use and water diversion data.

There will also be XML message-based interfaces between the systems to be provided by the State Water Board, DWR, and DPH to manage the water use and water diversion data and the WISDM Solution to synchronize in-department changes to the WDP demographic data with the WISDM Solution central database.

These interfaces will not be complex in functionality, and will use the NEIEN technical design standards as a guide.

5.1.9 Testing Plan

The stakeholder departments have a well-defined testing methodology which will be used by all business and technical staff (both in-house and contracted staff). In addition, existing technical and program subject-matter experts will be involved and responsible for review of the project deliverables and acceptance testing. Testing procedures will include unit, system, integration and user acceptance testing.

A formal software version control process will be in place to control the baseline of the system software as testing progresses and the system becomes production-ready.

5.1.9.1 Unit Testing Phase

Formal unit test scripts will be used to execute tests and record the test results. Any problems encountered will also be forwarded through the system problem correction process, so that problems, their solutions and subsequent re-testing will be tracked.

5.1.9.2 System Testing Phase

The system testing phase will be subject to a formal System Test Plan, which will control all phases of the system test such as end user testing for small, medium and

large data submissions and reporting/data requests and load testing to reflect the expected number of end users. All test results will be formally documented and any problems will be documented and forwarded through the system problem correction process. After problems are corrected and successfully unit tested, system regression testing will be done to ensure the problem has been corrected in the system context.

5.1.9.3 Integration Testing Phase

This phase will be supported by a formal Integration Test Plan. This testing will be executed to ensure that all the components of the solution work together as required. All test results will be formally documented and any problems will be documented and forwarded through the system problem correction process. After problems are corrected and successfully unit tested, integration testing will be done to ensure the problem has been corrected in the application environment context.

5.1.9.4 User Acceptance Testing Phase

This is the final phase of testing. There will be a formal User Acceptance Test Plan which will describe the scope, test scripts and processes and expected results of the acceptance testing. All test results will be formally documented in a User Acceptance Test Report. This will be used as the user “sign off” document to indicate that the system is production ready.

The same processes used for system test problems will be used for user acceptance test problems. As problems are encountered and when they are corrected, the new software version(s) will be subject to unit test and system and integration regression testing.

5.1.10 Resource Requirements

The resource requirements have been defined as necessary to support the Proposed Solution. The costs for positions and in what fiscal year they are incurred are detailed in Section 8.0 of the FSR and include:

Table 5-5: WISDM Program Staff

Position Title	***General Description***
Staff Services Manager III (Program Director)	Functions as a full supervisor with responsibility for a moderate to large size program and technical staff in a highly specialized and complex operation. The incumbent will be responsible for a highly complex Staff Services function with multi-departmental or service-wide impact.
Research Analyst I	Provides entry level, basic technical research and statistical work.
Research Analyst II	Functions at the full journey level. Under general direction, employees at this level perform a variety of tasks including the more independent, responsible, varied and complex technical research and statistical work in a variety of fields; they may provide consultative advice to various governmental entities and agencies, and may act as a lead person. Work at this level is often characterized by independent development and employment of research methodology and techniques; and the designing and implementation of research projects.
Associate Governmental Program Analyst	Performs the more responsible, varied, and complex technical analytical staff services work and continually provides consultative services to management or others. Assists with the development of regulations for the WISDM Program. Works in a team environment to interpret law, develop regulations necessary to comply with the applicable sections of the Water Code. Reviews procedural requirements for developing and submitting regulations. Reviews other statutes, regulations, and internal policies that relate to the WISDM statutes. Provides documentation to support the need for and authority for the regulations.
Office Technician	Processes personnel action requests, coordinates training, fulfills facilities requirements (e.g. office supplies, furniture and equipment), follows up with accounting on the payment of invoices for goods and services, performs receptionist and general clerical duties.

Table 5-6: WISDM IT Staff

Position Title	***General Description***
Data Processing Manager III	Provides management guidance and leadership in planning and directing the research factors to produce complete and quality data. Directs, coordinates, and evaluates programs technical development and contract staff for the implementation and maintenance of the WISDM environment. Recommends and implements WISDM data policies concerning responsibility and accountability for data accuracy, consistency, timeliness, integrity, availability, security, and retention. Assesses the impact of laws and regulations on WISDM Program data policies. Evaluates, recommends, and implements a distributed databases network or similar technologies to provide research and analysis functions for the WISDM.
Senior Information Systems Analyst (Technical Lead)	Serves as the technical lead to provide knowledge and expertise in the SDLC and Operations of the WISDM. Conducts team meetings regularly to review status, coordinate team efforts, delegate and assign work to technical staff, review the work and progress of individual IT staff, and discusses and resolves problems and issues related to systems design, development, implementation, operations, and maintenance of systems. Performs and oversees the planning, development, implementation and maintenance of the WISDM system architectures and application. Provides consultation to management, project team members and IT specialists on the most complex application and application problems, technologies and methodologies.
Senior Information Systems Analyst (Network Specialist)	Performs complex systems research, systems analysis and planning to define and design network architecture, infrastructure, and interfaces to meet the WISDM System business and security requirements. Prepares specifications for the architecture components. Lead, oversee and coordinate the complex installation, configuration, testing, and systems upgrades and patching of the network infrastructure components (hardware and software) to support the WISDM System (routers, hubs, switches, security and firewall components).

Staff Programmer Analyst (DBA)	Serves as the Data Base Administrator for the WISDM project. Plans and implements software system upgrades and conversions. Supports, and troubleshoots production databases / applications issues. Develops and maintains the database architecture, configuration, operations, monitoring, performance tuning, security, account management, upgrades, and backup and recovery. Develops and maintains the BI toolset architecture, configuration, operations, monitoring, performance tuning, security, account management, upgrades, and backup and recovery. Serves as the technical data coordinator to provide knowledge and expertise in the SDLC and Operations for the data in the WISDM. Performs and oversees the planning, development, implementation, and maintenance of the Database Systems Architecture. Independently performs the most complex analysis, design and programming tasks involving the development and maintenance of Database Systems. Performs and oversees System Administration of Database Systems. Performs and oversees the implementation of security measures and controls of these Systems.
Staff Information Systems Analyst (Specialist)	Under general direction, act as project leader on complex information technology systems and research associated problems. Configures, installs, and monitors physical and virtual desktop functions including operating systems and files. Oversee creation of standard workstation image. Configures, installs, and maintains network printers on print servers. Works with other technical specialists to diagnose and resolve complex workstation and printer problems. Provide leadership and guidance to other technical specialists engaged in workstation systems operations and support. Review work for completeness, accuracy, and fulfillment of requirements. Ensure adherence to standards.
Staff Programmer Analyst	Programs the complex application development, support and enhancements tasks. Plans, develops and administers database management systems. Ensures database system quality, integrity, resolves data access problems, ensures that data systems are consistent with user's business requirements, and ensures data security.
Office Technician	Under direction from the Project Manager, prepares documents, tracks invoices, orders supplies, maintains document library and generally supports project staff.

The project work plans for these positions are included in Attachment 3. The staffing costs for these positions, by Fiscal Year, are provided in the EAW costs tables included in section 8.0 of the FSR.

5.1.11 Training Plan

User training will be done using a "train-the-trainers" approach and also by the development of web-based training (WBT) modules. The latter will be created for the

WDPs and also the end users of the WISDM data for reporting and data extraction. Supporting documentation will be produced by the DD&I vendor, in the form of user manuals, technical support manuals, technical architecture documentation and training materials for the Web Forms Processor, the Central Demographic Database and the Reporting Facility.

5.1.12 Ongoing Maintenance

On-going maintenance for the WISDM Solution will be the responsibility of the DTS for operational support and the WISDM Program Staff, both business and technical, for application support. This is both in terms of systems support and program support. The associated costs of support for the WISDM Solution are detailed in Section 8 of this FSR.

5.1.12.1 System Support

System support includes support and maintenance of the hardware, software and network infrastructure necessary to support the WISDM Solution. This includes the cost of hardware and software as well as the personnel costs to perform these support tasks.

5.1.12.2 Program Support

Program support includes support and maintenance of the WISDM Solution in terms of application enhancements and ‘bug fixes’. This translates to the personnel costs to perform these tasks.

5.1.13 Information Security

The WISDM environment will provide security through *authentication* and *authorization*. Authentication ensures that users are who they claim to be. After a user's identity has been authenticated, that user is authorized to use network resources. Authorization is made possible by access control which uses permissions on any resource such as file systems and screens.

Besides *authentication* and *authorization*, the following security measures will be part of the WISDM environment:

- Physical Security,
- Personnel Security,
- Administrative Security and
- Security of Data Transmission between WDPs and the WISDM.

Authentication via Usernames and Passwords

Access to secure parts of the WISDM will require a username and password. Each user must have a unique username and password in order to log into the WISDM. Sharing of usernames and passwords will be prohibited. Users who will need secure access to the WISDM environment include:

- Individuals who submit data on behalf of a WDP.
- Individuals who need to see status of data submissions on behalf of a WDP.

Authorization and Access Control

Access control into the WISDM provides a multi-level access control to the major functions, including:

- User access to Forms Data Collection and Validation
- User access to the WISDM database.

User Roles

Users will have designated roles within the WISDM environment, which will be assigned by the appropriate Program staff. Roles will be used to specify individual read, write and view access to specific screens within the WISDM system. Users created for a specific WDP will be restricted to update information for only that WDP.

Secure Socket Layer

The web interface for the WISDM environment will use industry-standard 128-bit secure socket layer (SSL) certificates for encryption. The Program Management will require the use of a 128-bit encryption browser when using the WISDM environment. As such, the WISDM environment will only support the use of Microsoft Internet Explorer version 5.0 or higher. Using 128-bit encryption offers a high degree of confidentiality and security when transmitting data over the Internet.

5.1.14 Confidentiality

Some WISDM data contains individual identifiers (such as name and address), which are considered confidential. Access to WISDM data will be restricted to the Program staff, the WDPs, and approved Data Users.

To assure data confidentiality, the Program Management must implement guidelines governing the dissemination of information. There are two distinct categories of data: confidential and public. Confidential data, which contains individual identifiers, is released only upon appropriate justification and access approval. Public information is “de-identified”, i.e. individual identifiers are removed or masked. The WISDM will support the implementation of existing confidentiality rules by implementing confidential and public database views. Based on roles (as defined above) the Program Management will control the data elements to which a user or process has access.

5.1.15 Impact on End Users

The Water Data Providers

There will be significant impact on the WDPs, as the WISDM Solution will be a new electronic forms environment. The impact will be mitigated by ensuring that the WDPs are included in all phases of the project and that sufficient outreach and training is provided.

External End Users

The WISDM end user community will have Web access to standard water use and diversion reports and also the ability to submit ad hoc report and data extraction requests. The Communication Plan, developed in collaboration with the Public Information Office (PIO) from each participating agency, will include outreach and availability tasks to inform the end users of the centralized database status, available content and the methods to be used for accessing, reporting and downloading the data.

Program Staff

The WISDM Program staff will be managing the new WISDM Program and will be tasked with managing the legislation language, the WDP relationships and participation, the Data Collection and Validation process, the business and data rules and the reporting process. This will have an impact on staff levels and will require the creation and management of the appropriate policies and procedures.

Program IT Support Staff

The IT Support staff will have to support the Web Forms Processor system processing and enhancements, the centralized database processing and enhancements, and end user business intelligence processing and enhancements. The WISDM Program is new, which will have an impact on staff levels and will require the creation and management of the appropriate IT policies and procedures.

5.1.16 Impact on Existing System

The WISDM is a new program legislated by Chapter 675/2007, consequently there is no existing system.

5.1.17 Consistency with Overall Strategies

The WISDM Solution fulfills the Chapter 675/2007 requirements, and also supports the Strategic Plan business goals and objectives of the State Water Board, DWR, DPH, and CALFED organizations, as documented in Section 3 Business Case.

The WISDM Solution also conforms to the guidelines for enterprise architecture as documented by the California Information Technology Council.[12]

5.1.18 Impact on Current Infrastructure

The WISDM Solution will be housed at the DTS and accessed by the State Water Board, DWR, and DPH users as well as the WDPs. This will create an impact on the current departmental infrastructure in terms of:

- Added network traffic,
- Additional network storage required for the WISDM Solution,

[12] California Information Technology Council, Enterprise Architecture and Standards Committee: California Enterprise Architecture Framework, July 15, 2005 – Release 1.0 Final

- Additional backups required for the WISDM Solution (as well as added procedures for operational recovery).

The costs of these items are documented in either the 'One-Time' or 'On-Going' Costs areas of the EAWs which are included in Section 8.0 of the FSR.

5.1.19 Impact on Data Center(s)

The current WISDM Governance members and DTS representatives do not anticipate any significant impact to the State Data Centers. The Proposed Solution n-tier architecture, hardware and software are all supported by the DTS.

5.1.20 Data Center Consolidation

The implementation of the WISDM will not be affected by the on-going and future efforts by the California State Department of Technology Services (DTS) to consolidate the State Data Centers. In anticipation of the "Cannery Campus" closure, the WISDM Proposed Solution will be housed and supported by DTS at the "Gold Campus" facility.

5.1.21 Backup and Operational Recovery

The WISDM environment implemented by DTS will adhere to all DTS backup and operational recovery strategies. Backup and operational recovery functions for the water use and diversion databases housed at the State Water Board, DWR, and DPH will be performed by those departments' IT divisions in accordance with their specific ITSS standards, policies and practices.

5.1.22 Public Access

The general public will have web-based access to the standard WISDM reports, such as the annual water use and diversion analyses. The reports will be available for online reading and also for downloading in a Portable Data File (PDF) format.

Approved external users, such as the Legislature and researchers, will be assigned a user id and password for access to the WISDM business intelligence reporting and data extraction tools.

5.1.23 Costs and Benefits

5.1.23.1 Costs

The proposed solution, which is a pilot program, has an estimated One-Time cost of approximately $**9.7M**, and estimated continuing costs of $2.1M. All One-Time and On-Going costs for the proposed solution are detailed in Section 8 – Economic Analysis Worksheets. These costs do not include opportunity costs associated with redirection of program staff who will act as SMEs during the development phase of this project. The experience of the State Water Board during its development of the eWRIMS database is that this time commitment is significant. In addition, because SMEs must

necessarily have expertise in program areas, the staff who are redirected to develop data systems are generally staff managers who have other program responsibilities. In the case of eWRIMS development, the Water Rights permitting manager and the water rights enforcement manager both dedicated about half of the their work time for a period of about a year to the development of the program.

5.1.23.2 Benefits

The proposed solution resolves the business problems and fulfills the business opportunities outlined in Section 3 Business Case of this FSR. In addition, there are the following benefits:

- The proposed solution provides for full compliance with the requirements of Water Code section 531.5. It initially provides for all the statutory functionality and allows for system expansion to accommodate future data and functionality requirements with limited additional application software development.
- The proposed solution will save staff and stakeholder time for ad hoc query and reporting, as it will be a single source to access California water use and water diversion data and will not require staff or stakeholders to do multiple queries and extracts using different tools to build a query solution.
- The proposed solution will enable the State Water Board, DPH, CALFED, and DWR and their stakeholders to quantify and identify water use and water diversion problems in a timely manner. This will provide an increased level of community protection.
- The proposed solution will become a widely available library of standard queries and reports.
- External stakeholders will be able to independently query the WISDM Solution centralized database as required, to retrieve water use and water diversion information for specific locations, WDPs, and regions.
- The proposed solution will improve statewide information sharing across government and private industry by providing access to comprehensive water use and water diversion data in the WISDM Solution databases network.
- The proposed solution is based on existing proven technologies and methodologies. The proposed system architecture provides for a structured or layered approach to the initial development and subsequent expansion of the WISDM Solution. This approach allows for controlled development and testing processes minimizing the risk of failure of one component impacting another component.
- The overall cost of developing, installing and operating the proposed solution is lower than other alternatives evaluated.

5.1.24 Sources of Funding

The Chapter 675/2007 author's office stated that: "AB1404 will fill critical agricultural water use data gaps and require State Agencies to develop a coordinated water use database. This bill would enable more effective water management planning and investment decisions at the state and regional level." Several sections of the bill also state the need for state level information, and a central reporting database to support planning.

As the legislation is mandating the creation of a system to support statewide water use and water diversion management and strategic planning, it is appropriate that this new program should be funded with either fees assessed to water diverters and users or with General Funds.

California needs to better manage its use of water, and that can only be done through a clear and accurate understanding of how much water is available and where it is being used throughout the State. This understanding can only be accomplished if comprehensive coordinated information about water is collected, managed and made available to the key decision makers of our State—the Legislature. Without this program, the complete picture about water use and diversion is not available.

The suggested use of General Funds or user fees at this point, however, does not limit the possibility of defining other sources of funding for this program in the future. Nor does it limit the possibility of requesting grants for either initial start-up costs or on-going costs associated with the program in the future.

In summary, as the Legislature needs this information to better manage such a vital resource to the State, then ideally an independent funding source and/or fees should be established. However, if that is not possible, then the use of General Funds will be necessary.

5.2 Rationale for the Selection

The project team decided that this approach best meets the Chapter 675/2007 requirements. It would provide efficient forms data consolidation, enable continued use of current applications with the minimum of change, create an enterprise level library of statewide water users and forms information, and provide a flexible architecture for future enhancements.

Table 5.5 following Section 5.3 compares how each alternative meets the defined business objectives for the WISDM Solution.

Table 5-5: Rationale for Selection of Alternative Solutions

Objectives	***Proposed Solution***	***Alter. #1***	***Alter. #2***
1. Analyze and document the stakeholder departments' water use and diversion information to enable centralized data management to maintain common definitions and combined sharing.	✓	✓	*No*
2. The State Water Board, DWR and DPH must collect and maintain *electronic* data on water use and diversion information.	✓	*In a Single Database*	*No*
3. Each stakeholder department will determine the staff with the required knowledge and expertise to support the WISDM Program and Project (Design, Development and Implementation [DD&I] *and* Maintenance and Operations [M&O] phases).	✓	✓	✓
4. Provide more current and accurate information for strategic and operational planning and control.	✓	*In a Single Database*	*No*
5. The WISDM Program management must determine acceptable methods of measurement and recording of water flow for use by water diverters to monitor their diversions.	✓	✓	*No*
6. The WISDM will enable the WDPs to report the requested information by selecting from a standard list of valid units, as specified by the State.	✓	✓	*No*
7. Provide financial incentives to WDPs to provide water use data to the State.	✓	✓	✓
8. The WISDM will capture the appropriate detail level of data and data inter-relationships (e.g. mother-daughter relationships).	✓	*In a Single Database*	*No*

Objectives	***Proposed Solution***	***Alter. #1***	***Alter. #2***
9. The WISDM must enable data to be captured on-line in real-time, and permit the end user to enter information in multiple on-line sessions if required. The WISDM will allow users to see what they submitted in previous periods, and what needs to be submitted.	✓	✓	*No*
10. Provide a mechanism for hardcopy forms to be input into the system without having to contract with a vendor each year to do it. *Note:* this will also include the WDPs that submit data in their own format for input by the State.	✓	✓	✓
11. The WISDM will include the ability for State staff to enter information for a WDP.	✓	✓	*No*
12. The WISDM must preserve an audit trail of the changes made to the data, which will specify at a minimum the user who made the change and when the change was made.	✓	✓	*No*
13. Make the on-line form appear the same as the existing hardcopy form.	✓	✓	*No*
14. Establish a change management process that will formally manage changes to the form sets' questions repository used by the WISDM for data collection	✓	✓	*No*
15. The FSR will identify and document possible funding sources to support the WISDM DD&I and M&O.	✓	✓	✓
16. Establish a governance structure that formally documents how the participating departments will govern the multi-department WISDM Program.	✓	✓	*No*

Objectives	***Proposed Solution***	***Alter. #1***	***Alter. #2***
17. Facilitate uniform (full and complete) participation of WDPs statewide to reduce the amount of effort that is required for collection of water use and diversion information.	✓	✓	*No*
18. The WISDM will provide the ability to produce both standard and ad hoc consolidated data reports.	✓	*From a Single Database*	*No*
19. The WISDM must provide the participating departments the capability to interface between department applications.	✓	*No*	*No*
20. Engage appropriate stakeholders and end users across all departments in the design, development and implementation of the WISDM.	✓	✓	✓

The term "… *a Single Database*" has been indicated for Alternative #1 because it is a critical technical architecture choice. Having a single central database that contains all the water use and water diversion data would be inefficient and duplicative, and if the database becomes unavailable the State Water Board, DWR, DPH, and the WDPs cannot conduct business, that is, all organizations would be "out of business" until the database was recovered. Also, in the future if water quality, water availability, and climatic change data are to be included in the WISDM environment a single database would become unwieldy and unresponsive. Finally, the data would not be discreet to each department, so that if one department's business processes and data requirements change it would be difficult to reflect the changes in a single database without potential negative effects on the other departments; this would add time and risk to the maintenance and enhancement of the database.

5.3 Other Alternatives Considered

Below are the other two viable alternatives that were considered by the State Water Board, DWR and DPH for a central reporting database.

5.3.1 Alternative 1: A Central Stand-Alone Database Solution

This alternative would create a sophisticated consolidated forms and central single stand-alone database solution that would web enable the consolidated forms and store and maintain all the water use and water diversion data collected in a single stand-alone central database.

Description

Each department would use the stand-alone central database as its data repository and data source. Consolidated water use and water diversion reports would be possible directly from the stand-alone central database.

The main features of this alternative are:

- A central single web site for WDPs to use to input information. Access would be by a State supplied user id and password.
- On-line forms compiled by a web forms processor based on the user type(s) associated with the user id and password. The web forms processor would include data validation and interdependency rules to control the data input process, and would permit the user to supply data in several on-line sessions.
- The water use and water diversion data would be stored and managed in a single central database containing all the State Water Board, DWR and DPH data.
- A business intelligence toolset would be available to create and maintain standard reports as well as ad hoc requests and data extracts.

The project team felt that a single stand-alone central database is not technically or operationally desirable.

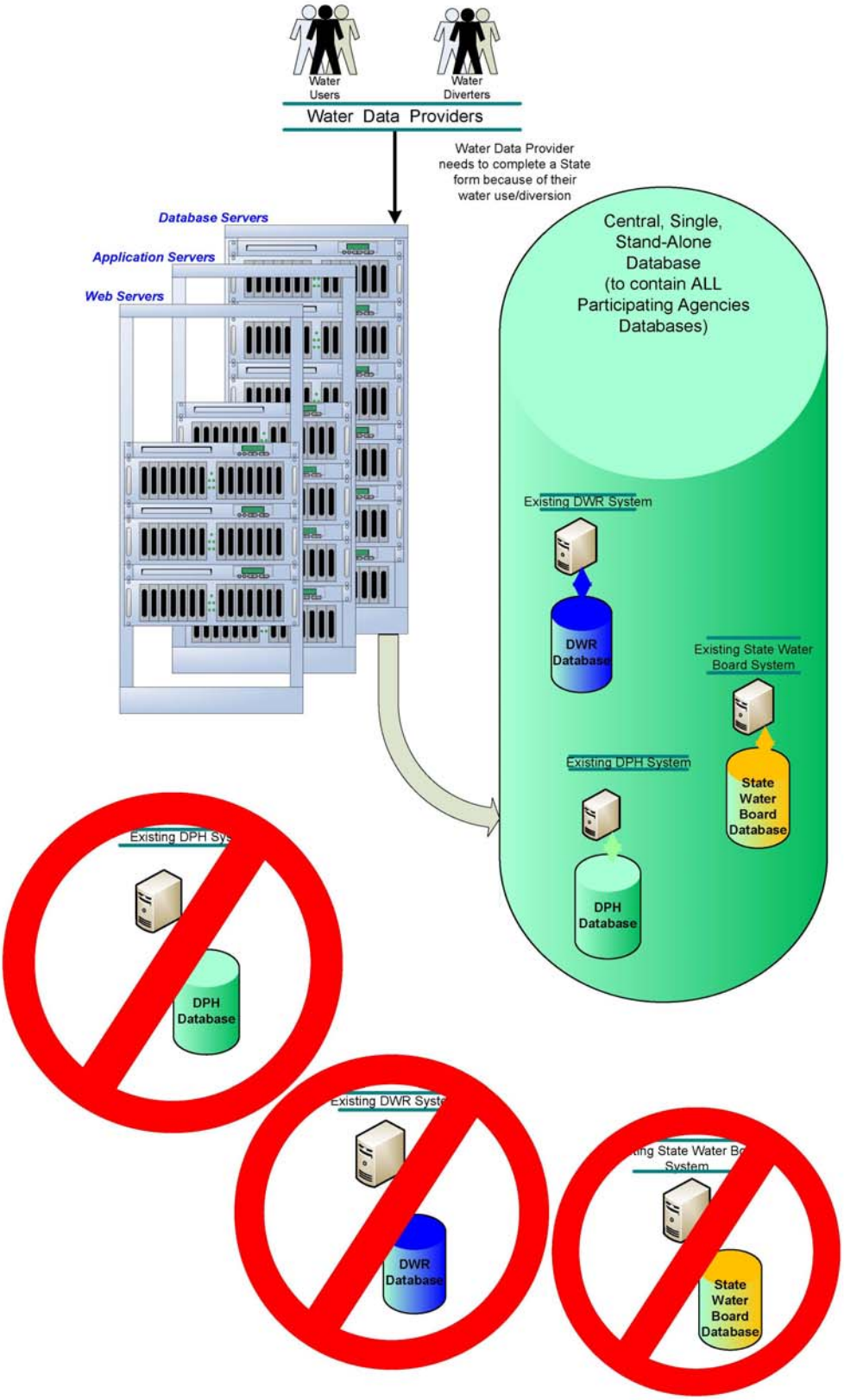


Figure 5-6: Alternative 1: A Central, Single, Stand-Alone Database Solution

Costs

The estimated One-Time cost of this alternative solution #1 is approximately **$11.1M**, and estimated continuing costs of $3.2M. All One-Time and On-Going costs for the alternative solution #1 are detailed in Section 8 – Economic Analysis Worksheets

Benefits

The benefits of this alternative are:

- Alternative Solution #1 provides for full compliance with the requirements of Chapter 675/2007.

Advantages of Alternative 1

The advantages of this alternative are:

- It would meet all of the business objectives documented in Section 3.
- It would meet all of the functional and technical requirements documented in Section 3.
- It complies with DTS, OCIO Enterprise, and stakeholder departments' technology standards.

Disadvantages of Alternative 1

The disadvantages of this alternative are:

- This alternative has the highest costs of all the alternatives considered.
- This alternative has the highest risk of all the alternatives considered.
- This alternative does not encourage the stakeholder departments to coordinate, streamline and standardize internal and external stakeholder group business processes using industry best practices.
- A single stand-alone central database is not technically or operationally desirable because it would contain data that multiple departments have the responsibility for managing and keeping secure. It would become unwieldy over time, and it would be slow to incorporate any changes to content as multiple departments would be involved in change decisions. Also, if the single stand-alone central database goes down for any reason, then multiple departments and groups of WDPs will not be able to conduct business until it is back up. This would cause the system to become a 'mission critical' system, which significantly increases the cost of this alternative.
- This alternative will require a greater amount of stakeholder department staff time to provide governance and coordinate policies and procedures for the single central database operations and management.

- This alternative has the longest implementation time of the alternatives considered.
- This alternative limits scalability for use by other state and external organizations, and to enable future legislation, because the single central database would become unwieldy and inefficient as more categories of water information were added.
- This alternative doesn't help the stakeholder departments to accomplish their AIMS goals or strategic goals.

5.3.2 Alternative 2: A Low Functionality Solution

This alternative is to create a central web site/page to provide WDPs a single entry point to start submittal of water use and water diversion data.

Description

The web application would prompt the WDP for identifying information to enable the web application to navigate the customer to the appropriate department's form(s) to be completed.

The main features of this alternative are:

- A central single web site for WDPs to access the State Water Board, DWR and DPH forms. This would be a navigation function only, and would prompt the user for information to establish which department's web site to route the user to.
- Each department has a web site that permits the user to download or print the hardcopy forms.
- If the user has to input data for multiple forms, and perhaps for multiple departments, the web application will transport the identifying data (e.g. name, address, contact) from the initial input session to the next one(s).
- Each department would need to be able to process the electronic forms data.

The project team felt that this approach did not provide sufficient functionality, data validation, or forms consolidation and does not provide a centralized reporting database.

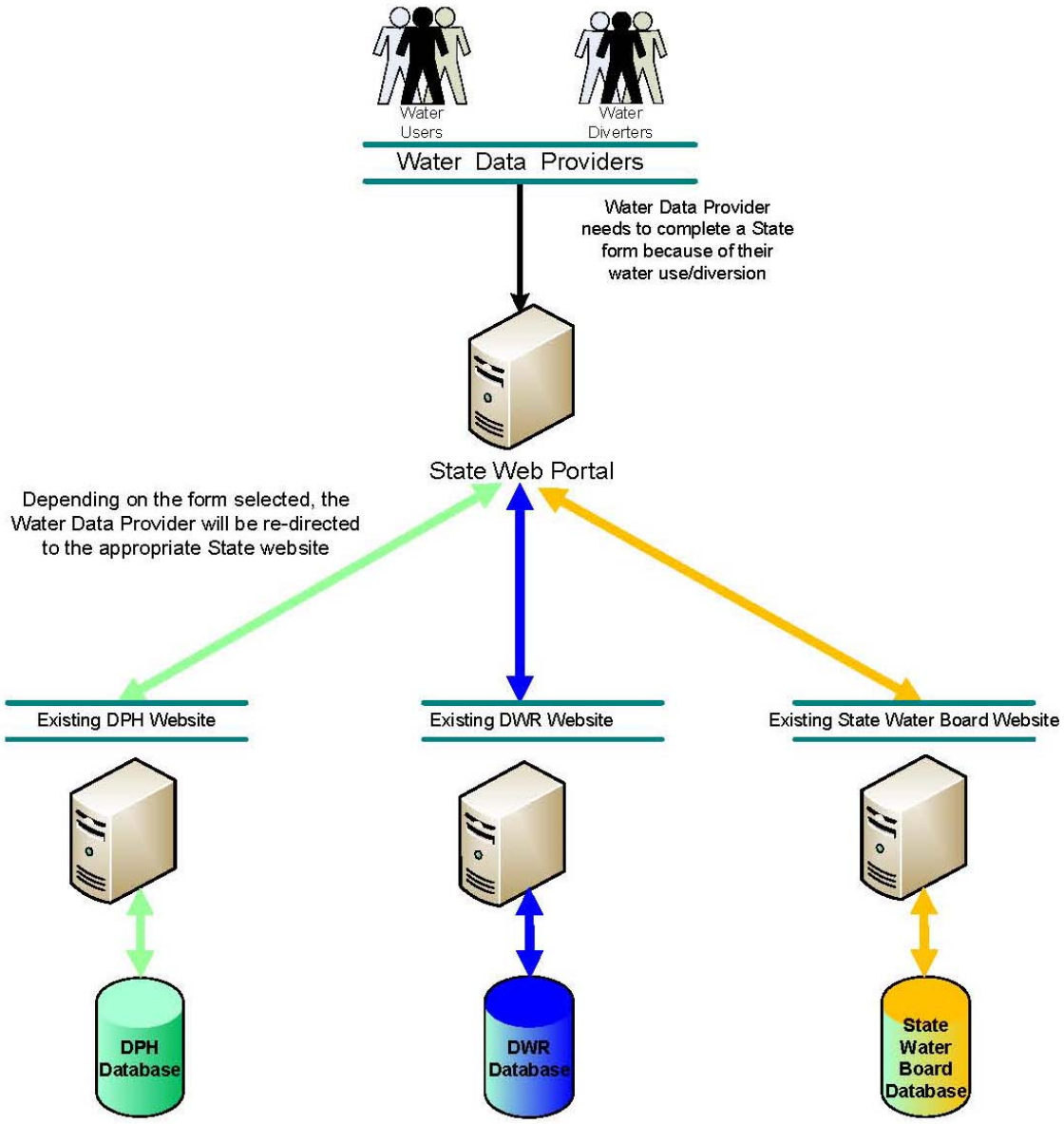


Figure 5-7: Alternative 2: A Low Functionality Solution

Costs

The estimated One-Time cost of this alternative solution #2 is approximately **$1.1M**, and estimated continuing costs of nearly $400K. All One-Time and On-Going costs for the alternative solution #2 are detailed in Section 8 – Economic Analysis Worksheets.

Benefits

The benefits of this alternative are:

- The current departmental environments would be changed minimally.
- Fewer additional costs associated with this alternative.
- No re-training required for WDP or State staff end users.
- No re-training required for technical support staff.

Advantages of Alternative 2

The advantages of this alternative are:

- This alternative has the lowest costs of all the alternatives considered.
- This alternative would meet some of the business objectives documented in Section 3.
- This alternative would meet some of the functional and technical requirements documented in Section 3.
- This alternative means ‘business as usual’ with few additional costs incurred.
- This alternative means minor changes for end users.
- This alternative means minor changes for technical support staff.
- This alternative would be an extension of the current environment, not a replacement.
- This alternative has the shortest implementation time of the alternatives considered.
- This alternative has the lowest risk of all the alternatives considered.

Disadvantages of Alternative 2

The disadvantages of this alternative are:

- Alternative Solution #2 does not provide for full compliance with the requirements of Chapter 675/2007.
- This alternative does not improve the current departmental forms processing environments, and so does not promote increased WDP participation.

…this page is intentionally left blank…

6.0 PROJECT MANAGEMENT PLAN

Project Management is a key factor in ensuring the successful accomplishment of a defined project. Project Management is the discipline of planning, organizing and managing resources to bring about the successful completion of specific project goals and objectives.

This Project Management Plan (PMP) provides the approach to effectively manage the Water Institute for Statewide Data Management (WISDM) Project[13]. The framework for project management on the WISDM Project includes:

- Project Initiation
- Project Planning
- Project Execution (including a Pilot Project)
- Project Control, and
- Project Closeout.

The Figure below provides the Project Management (PM) Framework that will be followed on the WISDM Project:

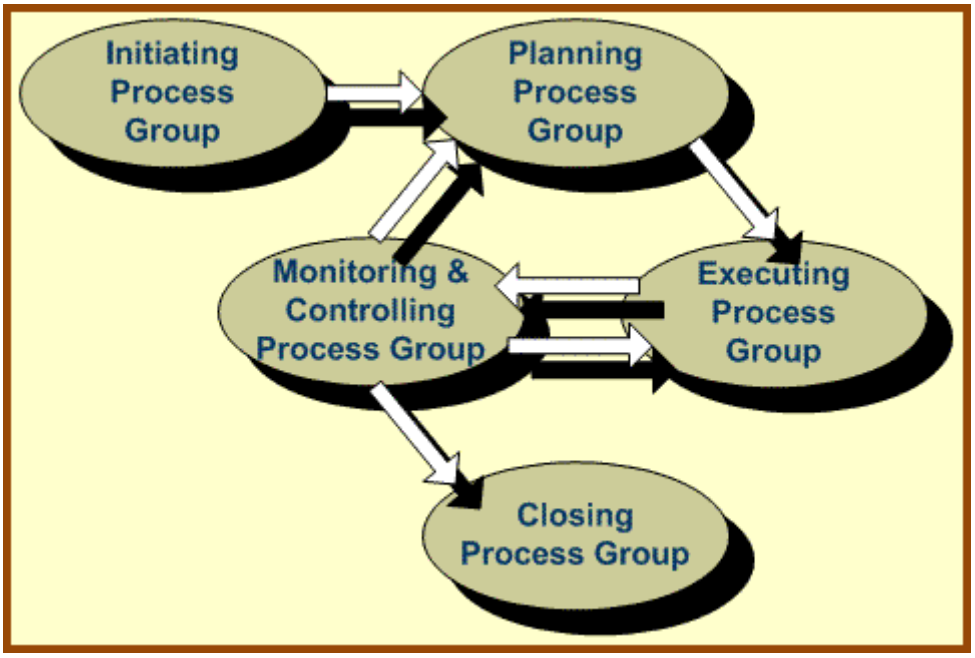


Figure 6-1: The WISDM Project Framework

The ***Process Groups*** identified in the Figure above are described below:

[13] The California Office of Chief Information Officer (OCIO) is currently developing a Project Management Methodology that is projected to be in place by the time the WISDM Project starts. This section may need to be revised based on that methodology.

Initiating Process Group—The Initiating Processes include the work of formally defining and authorizing a new project or project phase. The process group links the project to the performing organization's strategy and on-going work.

Planning Process Group—The Planning Processes include the work of defining and refining project objectives, and planning the specific course of action required to attain the objectives and scope that the project was undertaken to address.

Monitoring & Controlling Process Group—The Monitoring and Controlling Processes include the work of regularly measuring and monitoring progress to identify variances from the project management plan so that corrective action can be taken when necessary to meet project objectives.

Executing Process Group—The Executing Processes include the work of integrating the management people and utilization of other resources to carry out the project management plan.

Closing Process Group—The Closing Processes include the work of formalizing the acceptance of the project's product, service, or result and bringing the project or a project phase to an orderly end.

6.1 Project Management Methodology

The WISDM Project Management Methodology is based on the guidelines in the Statewide Information Management Manual (SIMM) Section 200 and the Project Management Body of Knowledge (PMBOK), maintained by the Project Management Institute. The project management methodology also includes the recommended project management and risk management practices of the State's Office of Chief Information Officer (OCIO) Information Technology Project Framework. Additionally included are industry best practices and lessons learned from prior State projects. The WISDM Project management approach incorporates the principles of these methodologies and includes the following activities:

- Maintenance of a detailed integrated project schedule and identification of the critical path of activities for the phases, timeframes, responsible parties, dependencies, milestones and deliverables.
- Monitoring of planned versus actual performance, schedule and budget.
- Utilization of industry standard issue and change management processes.
- Development of a risk management plan and performance of frequent project risk assessments (as defined in Section 7.0 of this FSR).
- Definition of a structured approach for reviewing and approving deliverables.
- Adherence to the State CIO reporting requirements.

6.2 Project Organization

The WISDM Project will use a project management approach for management of the WISDM Project that consists of a single Project Manager responsible for the WISDM Project Core Team. The Project Manager will report to the WISDM Project Directors, which are representatives from the State Water Board, the DPH, and the DWR..

The WISDM Project Directors will receive direction from an Executive Steering Committee which consists of selected executives from the State Water Board, the DPH, and the DWR. The Project Directors will also receive input related to security matters from a WISDM Project Information Security Office (ISO) Team, consisting of ISOs from the State Water Board, the DPH, and the DWR. Department of Public Health, the Department of Water Resources, and the State Water Resources Control Board. The WISDM Project Directors will in turn, refer direction to the WISDM Project Manager.

This approach to the WISDM Project management will also facilitate improved communication between the WISDM Project Team and management from the participating organizations. To assist in this area, a project communications plan will be developed to address how all entities will coordinate with each other and external stakeholders throughout the course of the project.

A description of each participant's responsibilities during the WISDM Project is included in Section 6.3 Roles and Responsibilities. The Figure below provides a view of the project organization as described above.

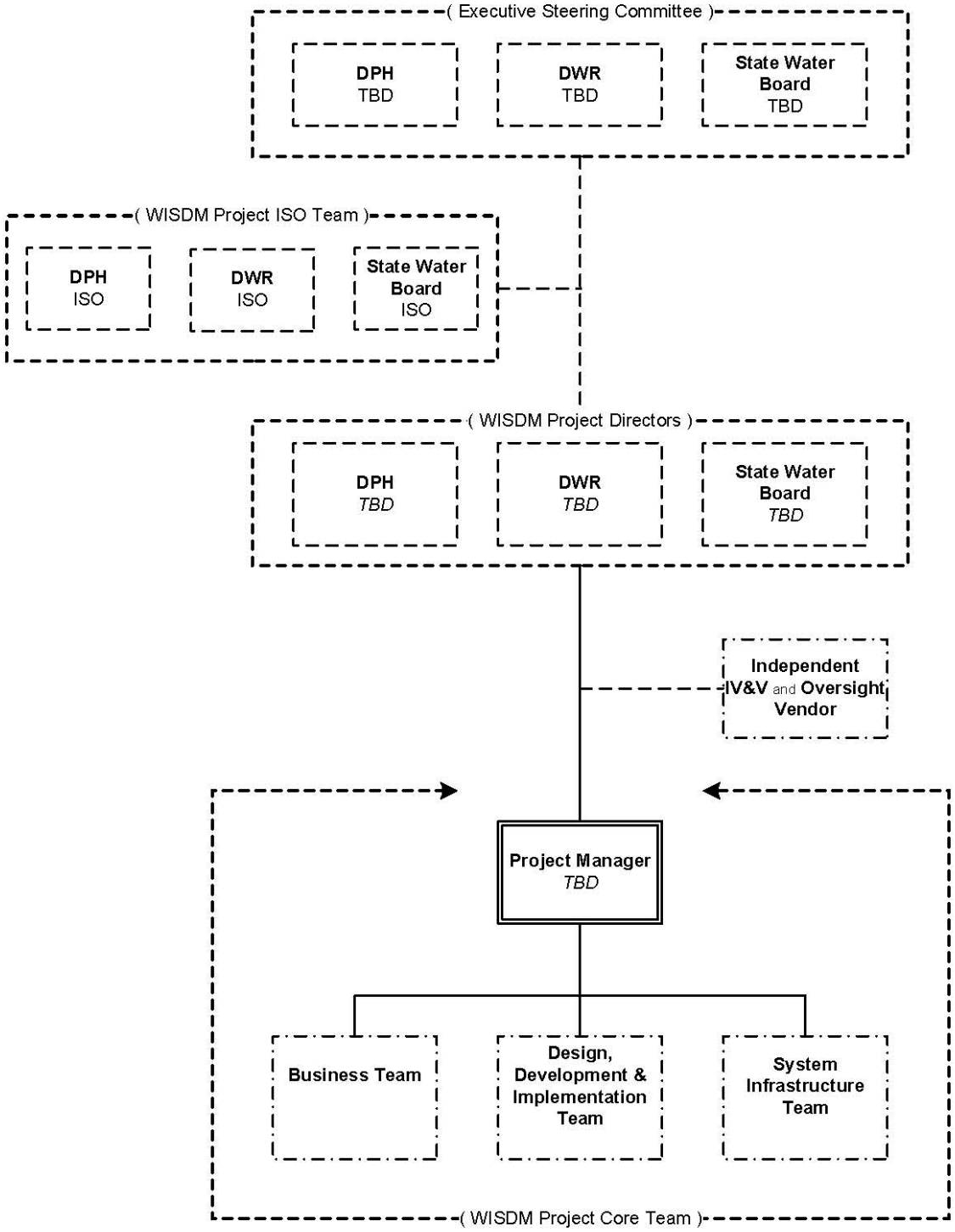


Figure 6-2: WISDM Project Organization

6.3 Roles and Responsibilities

In order to provide all project participants with a clear understanding of the authority and responsibilities for successful accomplishment of the WISDM Project, this FSR defines the roles and responsibilities of key participants in the WISDM Project team. Table 6-1 below identifies each key participant and their responsibilities on this project:

Table 6-1: WISDM Project Team Roles and Responsibilities

Role	Responsibilities
Executive Steering Committee	✓ Project advocates. ✓ Oversees organization funding. ✓ Provides policy direction to the project. ✓ Provides direction to the Project Directors. ✓ Composed of key business decision-makers of participating departments and programs.
WISDM Project Information Security Officer (ISO) Team	✓ Ensures WISDM System meets Security and Data Confidentiality requirements for all participating departments. ✓ Advises Project on security matters.
WISDM Project Directors	✓ Project advocates. ✓ Oversees Project funding. ✓ Provides policy direction to the Project. ✓ Key business decision-makers of the Project. ✓ Facilitates communication between Executive Steering Committee and Project Manager and Project Team. ✓ Resolves significant issues identified by the Project Manager. ✓ Approves the final scope of the Project and Risk Management Plans. ✓ Provides Project resources. ✓ Reviews and approves escalated Project changes. ✓ Facilitates coordination and cooperation of different department programs and Project. ✓ Coordinates policy for uses of data in WISDM.

Role	Responsibilities
WISDM Project Manager	✓ Provides leadership for the Project. ✓ Performs day-to-day Project coordination. ✓ Coordinates Project direction with the Project Directors. ✓ Facilitates communication about the Project to the Project Directors and Project Team. ✓ Implements policy direction as defined by the Project Directors. ✓ Provides support to the Key business decision-makers of the Project. ✓ Resolves issues identified by the Project Team—escalates issues to be resolved by Project Directors when needed. ✓ Contributes to the Risk Management Plan. ✓ Manages Project resources. ✓ Reviews, approves and escalates Project changes. ✓ Performs prioritization and decision making on the Project. ✓ Develops monitors and updates the Project Management Plan. ✓ Oversees, tracks, monitors and reports on Project status including schedule, scope, budget and risk. ✓ Enforces Corrective Action Plans, if appropriate. ✓ Reports Project metrics to the Project Directors. ✓ Manages requirements traceability throughout the system development life-cycle. ✓ Coordinates Project work efforts of the Project Team. ✓ Facilitates the change management process. ✓ Facilitates the risk and issue management process. ✓ Resolves Project issues. ✓ Reviews and approves Project work plan and deliverables. ✓ Oversees the Post Implementation Evaluation Review (PIER).
Independent Oversight Consultant (IPOC)	✓ Evaluates the Project to ensure that it is following a structured and defined approach. ✓ Prepares periodic project assessments and develops monthly OCIO progress reports in coordination with the Project Manager. ✓ Performs risk assessment and provides findings (if any) to OCIO.
Independent Verification and Validation (IV&V) Vendor(s)	✓ Serves as an independent expert that provides technical assistance in all Project activities. ✓ Reviews deliverables to ensure that they are aligned with defined standards and contractual requirements. ✓ Oversees security aspects of the system implementation. ✓ Performs requirements traceability. ✓ Performs risk assessment and provides findings (if any) to the Project Manager.

Role	Responsibilities
Business Team	✓ Defines business rules. ✓ Develops business documentation. ✓ Works with the DD&I team to communicate business policy, processes and functional needs. ✓ Assists the DD&I team to define data elements, relationships and definitions. ✓ Participates in system design and development walkthrough sessions. ✓ Develops test scenarios and acceptance criteria for User Acceptance Testing (UAT). ✓ Participates in UAT. ✓ Works with the DD&I team as they develop user manuals, address user questions and issues (e.g., help desk), develop training manuals and conduct training sessions.
Design, Development and Implementation (DD&I) Team	✓ Leads the joint application design and working sessions with the Project team. ✓ Defines data elements, relationships and definitions. ✓ Conducts data model walkthrough sessions. ✓ Conducts system design and development walkthrough sessions. ✓ Conducts prototyping sessions with internal and external stakeholders. ✓ Designs and develops the WISDM environment, as defined by the functional requirements and business needs. ✓ Conducts unit and system integration tests. ✓ Works with Business Team in the development of UAT test scripts. ✓ Facilitates UAT. ✓ Works with the Business Team to develop user manuals, address user questions and issues (e.g., help desk), develop training manuals and conduct training sessions. ✓ Confirms data conversion approach (if applicable). ✓ Develops data conversion tools (if applicable). ✓ Coordinates data cleanup (if applicable). ✓ Implements the final WISDM Solution.

Role	Responsibilities
System Infrastructure Team	✓ Oversees maintenance and updates to the security components of the application and system. ✓ Participates in testing security components. ✓ Develops and validates security requirements. ✓ Determines technology architecture required for system interfaces. ✓ Designs, tests and documents system interfaces. ✓ Coordinates and oversees the establishment and operation of the Project's technological environment including servers, workstations, network connectivity, and development software and database environments. ✓ Coordinates the implementation of the WISDM Solution technical architecture.

6.4 Project Management Qualifications

Project Management qualifications for the WISDM Project Manager include:

- Experience of successfully managing other State of California projects,
- Experience in the development and operation of other State of California projects and providing staff with administrative and technical advice,
- Experience with receiving direction and support from Project Directors, developing strategies relating to other State of California projects development and implementation, annual budget preparation, monitoring resource allocation and expenditures, management planning, work plan development, position reduction commitments and the selection process for other State of California projects team members,
- Experience monitoring staffing and assisting with personnel outreach, recruitment and retention activities,
- Prior responsibility for the management and supervision of other State of California projects employees to ensure performance objectives/standards are met, and
- Experience in enforcing mandates concerning Equal Employment Opportunity (EEO), Americans with Disabilities Act (ADA and other personnel practices as defined by regulatory agencies and established guidelines and policies).

6.5 Project Priorities

All projects have three core components that must be managed:

- Schedule,
- Scope, and
- Resources.

Each of these is interrelated. That is, a change in any one component will almost certainly impact the others. Prior to beginning the WISDM Project, it is important to determine the relative importance and flexibility of each. For the WISDM Project, this is documented in the Table below:

Table 6-2: WISDM Project Tradeoff Matrix

Schedule	Scope	Resources
Improved (*Can be adjusted)*	**Accepted** (*Is somewhat flexible)*	**Improved** *(Can be adjusted)*

6.6 Project Plan

Project planning defines the project activities to be performed, products to be delivered and how the activities will be accomplished. Project planning helps define each major task, estimate the time and resources required and provide a framework for management review and control. The project planning activities and goals include defining:

- Scope of the effort,
- Project assumptions and constraints,
- Project approach (e.g., phasing, initial pilot project),
- Project team roles and responsibilities, and
- Project schedule.

This section provides an overview of each of these areas.

6.6.1 Project Scope

The WISDM Project seeks to implement a centralized, on-line system to manage:

- Profiles of WDPs,
- A set of on-line reporting forms for the participating departments,
- The collection and validation of data that is submitted via the on-line reporting forms,
- The routing of validated data to the participating departments for processing by existing systems,
- Tracking the status of data submissions,
- The creation and on-line availability of ad hoc reporting capabilities of water use information in the State of California across all participating departments,
- The creation and distribution of standardized reports of water use information in the State of California across all participating departments, and
- The ability to download selected data of water use information in the State of California across all participating departments.

In short, the WISDM Solution will provide the functionality required to manage data collection forms for the participating departments, the collection of this data from WDPs, including edit checks to assist in improving the data quality. In addition, the WISDM Solution will track the status of the data collection/validation process. The WISDM Solution will also provide the ability to easily deliver the consolidated information from participating departments for multiple users.

6.6.2 Project Assumptions

The major project assumptions include:

- The project will be funded in part from the California General Fund.
- New funding will be required.
- The State Water Resources Control Board will be responsible for establishing and chairing the coordinated governance for the WISDM Project. This will be the WISDM Project Directors, which includes one member from each of the participating departments.
- The Project Directors will provide continuing guidance to the WISDM Project Manager during the life of the WISDM Project.
- The Project Directors will provide input for continued funding of the WISDM Project.
- The participating departments will continue to solidify partnerships with WDPs statewide.
- If additional legislation is required to *encourage* WDPs to participate in the WISDM Project, the WISDM Project Executive Steering Committee will take on the responsibility for this effort.
- The participating departments' program and technical staff will contribute towards the requirements definition, design, testing, implementation and maintenance of the WISDM System.
- All additional State resources required to support this project, both one-time and on-going, will be identified and requested via the BCP process.
- The participating departments' PMO's will provide project management guidance and support to the Project Manager.
- Technology to be used will conform to industry and the State of California standards.
- Technology to be used will support the National Environmental Information Exchange Network standards[14].
- The proposed solution will leverage the existing IT infrastructure of the participating departments where possible.
- Problems and issues will be addressed on a timely basis.
- Effective risk management processes will be utilized to mitigate risks and ensure a successful project.
- Vendor procurements and contracts will be accomplished within planned timelines.
- Security provisions will be integrated into the solution.

[14] Full NEIEN standards compliance will need to be addressed in later phases of the SWIM Project.

6.6.3 Project Content

In order to reduce project risk and stay within resource constraints, the WISDM Project will be implemented using a phased approach. The Project Directors in consultation with the Project Manager will determine the data to be included in the first phase of the WISDM Solution—also known as the 'Pilot Project'. This phase will help the project develop repeatable processes which can be employed as the WISDM Project expands. This phase will include water diversion and use data that:

- Is easily implemented via electronic data submission forms across the participating departments and WDP community,
- Meets the intent of the legislation, and
- Provides insight into the data collection, validation, tracking, data exchange with existing systems, and providing access to reports across participating departments' existing systems.

This initial phase will include:

- DD&I Vendor Procurement,
- Project Initiation & Planning,
- Requirements Definition,
- System Design,
- System Development & Testing,
- Implementation Preparation (internal preparation and outreach),
- System Documentation,
- Training & Outreach,
- User Acceptance Testing (UAT),
- System Implementation and Transition to Maintenance & Operation, as well as
- Pilot Assessment (to assess the Pilot Project and support the implementation of future phases).

6.6.4 Project Schedule Dates

The proposed WISDM Project Schedule is outlined in the Table below. The WISDM Project Directors in consultation with the WISDM Executive Steering Committee will need to consider the impact of any changes in dates in order to minimize disruption to current business processes in the participating departments.

Table 6-3: WISDM Project Phases, Schedule and Deliverables

Task Name	*Start*	*Finish*	*Deliverables/Milestone*
DD&I Vendor Procurement			
RFP Development	7/1/2010	1/31/2011	✓ RFP
Vendor Solicitation	2/1/2011	4/30/2011	✓ Vendor Proposals ✓ Vendor Selected
Vendor Selection & Contract Negotiation	5/1/2011	6/30/2011	✓ Contract for DD&I Services
Project Initiation & Planning	7/1/2011	8/31/2011	✓ Project Schedule ✓ Project Management Plan ✓ Risk Management Plan ✓ Communications Plan ✓ Change Management Plan
Requirements Definition	9/1/2011	1/31/2012	✓ Requirements Definition Document ✓ File Format Specifications ✓ Electronic Form Templates
System Design	12/1/2011	3/31/2012	✓ System Design Document

Task Name	*Start*	*Finish*	*Deliverables/Milestone*
System Development & Testing	3/1/2012	8/31/2012	✓ System Prototype ✓ System Test Plan ✓ System Test Results
Implementation Preparation	7/1/2012	9/30/2012	✓ System Implementation (Rollout) Plan ✓ Training Plan (internal & external) ✓ UAT Plan & Criteria
System Documentation	8/1/2012	9/30/2012	✓ System Documentation
Training & Outreach *(Outreach is a continuing task throughout the project) (Training is a focused task at a specific time)*	7/1/2010 7/1/2012	7/1/2012 10/31/2012	✓ Update Data Format & Content Guide ✓ Finalized Training Materials ✓ User Guides ✓ FAQs ✓ User Documentation
User Acceptance Testing (UAT)	9/1/2012	10/31/2012	✓ UAT Test Results ✓ System Acceptance
System Implementation and Transition to Maintenance & Operation	10/1/2012	12/31/2012	✓ System Implementation ✓ Maintenance & Operation Plan ✓ Service Level Agreements ✓ Data Management Plan

Task Name	*Start*	*Finish*	*Deliverables/Milestone*
Pilot Assessment	1/1/2013	2/29/2013	✓ Pilot Project Record Archive Plan ✓ Review of Pilot Project and Assessment ✓ Pilot Project Lessons Learned ✓ Assessment and Planning of Future Phases

The information contained in the Table above is shown in graphical format in the Figure on the next page.

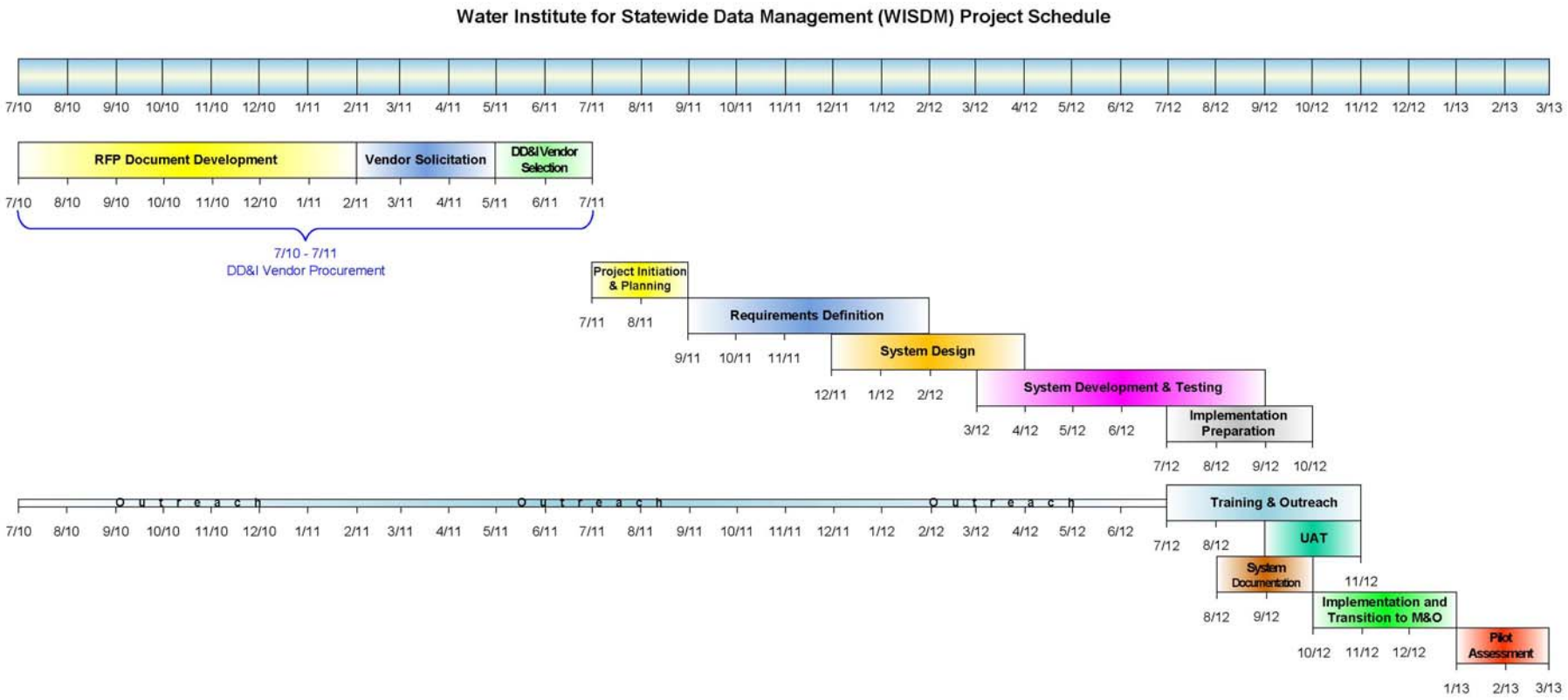


Figure 6-3: The WISDM Project Schedule

6.7 Project Monitoring

The WISDM Project Manager will continually monitor project progress during the life of the project and keep the Project Directors informed of project status and issues. Key components of this monitoring will include:

- **Weekly Project Team Meetings**. These weekly meetings are designed to enhance project communications between the core project team members and will include discussions regarding the project schedule, deliverable status, upcoming meetings, risks and issues.
- **IV&V Project Participation**. This Project will include IV&V consulting services which are designed to assist the Project Manager in a number of areas on the project. Specifically related to Project Monitoring, the IV&V consultant will continually perform risk assessment and provide findings (if any) to the Project Manager throughout the life of the Project.
- **IPOC Project Participation**. The WISDM Project will include IPOC services which are designed to monitor the project for the State CIO. The IPO consultant will continually perform risk assessment and provide findings (if any) to the OCIO.
- **Weekly Project Status Reports**. These will be distributed to the core project team members. They will report on project activities from the previous week, activities planned for the next week, current project schedule and deliverable status, open issues and risks.
- **Monthly Project Management Meetings**. These meetings are designed to keep the management of the participating departments informed about the project and will include discussions regarding the project schedule, deliverable status, upcoming meetings, issues and risks.
- **Monthly Project Status Reports**. These will be distributed to the Project Directors. They will report on project activities performed by the core project team members including: accomplishments during the month, activities in progress, upcoming activities for next month, issues, risks, schedule and status of deliverables.
- **Monthly Independent Project Oversight Report**. These reports will be produced by the independent oversight consultant and will report on the project from an IPOC perspective as well as list oversight activities that took place during the month and will be submitted to the State CIO.
- **Monthly IV&V Status Report**. These reports will be produced by the Independent Verification and Validation consultant and will report on the project status from an independent perspective as well as list IV&V activities that took place during the month and will be submitted to the WISDM Project Manager.

6.8 Project Quality

Quality is defined as the delivery of a work product or deliverable that satisfies the requirements and objectives of the project and that is correct and complete. In order to ensure that the product delivered by the WISDM Solution DD&I team meets specified business and technical objectives and requirements, the WISDM Project will use the following approach to minimize the risk of receiving a work product or deliverable of poor quality:

- The Project Manager, in collaboration with the Business Team and with the support of the System Infrastructure Team, will work with the DD&I team to ensure that the expectations for each deliverable are well-defined in advance.
- The WISDM Project Team will review all major milestone deliverables produced by the DD&I team to ensure that defined standards and methodologies are met.
- The oversight consultant will play a major role in assuring the quality of the new system. Oversight responsibilities will include:
    - Quality Assurance reviews of the DD&I team's plans and deliverables, including: schedules, requirements specifications, systems architecture and design specifications, test plans, test results, training plans, etc.,
    - Validation of requirements at various levels, including user, system software, hardware and security,
    - Requirements traceability at various stages of the project,
    - Independent design analysis on critical issues,
    - Independent testing of software as needed, and
    - Development of project metrics to monitor project quality.

6.9 Change Management

Change is an inevitable occurrence during any project and responsible project management plans for change. A change is defined as any alteration to the scope of the project including requirements, hardware, software, application, network, operations or environment which adds to, deletes from, or in any way modifies the scope of work. In order to effectively manage change for the WISDM Project, the Project Manager will use a Change Management Plan to define the process, procedures and outputs for all change-related project activities. The plan will also identify the parties responsible for identifying, resolving, supporting and making project changes. The major goal of this change management strategy is to ensure changes are made using standardized methods and procedures which minimize negative impacts and maximize positive impacts to the requirements, design, development, implementation and maintenance of the system. The Change Management process provides the capability to identify, document, manage and resolve all project related changes. The plan is designed to:

- Minimize project risk,
- Provide documentation for all changes,
- Minimize disruption to the project due to rework,
- Measure project volatility,
- Provide open disclosure of changes,
- Communicate changes to stakeholders,
- Maximize system/application value, and
- Minimize unanticipated impacts to schedule and/or budget.

The implementation of a change management plan ensures that all changes are evaluated for potential scope, cost and schedule impacts. The process allows decision-makers the opportunity to evaluate changes in a systematic manner which becomes a component of the overall project risk management strategy. Without a method for evaluating, prioritizing and implementing changes, schedule delays, poorly defined requirements and/or cost overruns are potential results for any system development effort. Alternatively, a well-defined and properly utilized Change Management process reduces risk and increases the likelihood of project success.

The Change Control Process to be followed on the WISDM Project will provide a mechanism for the review and approval of changes or additions to the scope, requirements and design of the system. This process will allow the project management team to jointly discuss, review, prioritize and approve changes to requirements and design through all phases of the project from initiation through testing, implementation and maintenance.

The Change Control Process will track and handle all proposed changes to the system software and hardware. All requested changes will be presented to a Change Control Board (CCB) for approval. This process ensures that changes are documented and

applied in a controlled manner with participation from relevant project personnel from initiation through closure. The CCB will be comprised of members from both the Business Team and the System Infrastructure Team and be a representative cross section of the participating departments.

7.0 RISK MANAGEMENT PLAN

Project risks are factors that can jeopardize the successful accomplishment of project goals. Risk management is the systematic process of identifying, analyzing, tracking, mitigating and responding to project risks.

The WISDM Project risk management processes will comply with the California Office of the State Chief Information Officer's (CIO's) *Information Technology Project Management Methodology*[15]. The State Water Board's approach is based on best practices for early detection, thorough analysis, appropriate and swift response, as well as continuous project lifecycle monitoring.

The WISDM Project will also comply with the OCIO's IT Project Framework as detailed in the Statewide Information Management Manual (SIMM 45)[16]. This framework details how project oversight will be managed on State of California IT projects.

This Risk Management Plan will minimize the risks associated with the WISDM Project. The participating department's approach to risk management on the WISDM Project will include:

- Development of a risk management plan that adheres to the *Project Management Framework* outlined in Section 6.0 of this FSR,
- Identification of project issues and risks by the WISDM Core Project team, vendor(s) and WISDM Project Directors,
- Development of preventative risk mitigation (or avoidance) strategies and contingency measures to avoid or minimize the impact of these issues and risks; and
- Continuous monitoring of identified issues and risks through on-going communications and reporting mechanisms throughout the life of the project.

This chapter discusses the:

- ✓ Risk Management Team,
- ✓ Risk Management Approach, and
- ✓ Current Known Risks to the WISDM Project.

[15] There are two references used here: a) http://www.cio.ca.gov/Government/IT_Policy/pdf/PM0.0_Project_Management_Methodology_Cover.pdf#search=Project%20Management%20Methodology&view=FitH&pagemode=none, and b) http://www.cio.ca.gov/Government/IT_Policy/pdf/PM1.2_Overview_Concept.pdf#search=Project%20Management%20Methodology&view=FitH&pagemode=none.

[16] The Information Technology Project Oversight Framework is detailed in the following document: http://www.cio.ca.gov/Government/IT_Policy/pdf/IT_OvrsghtFrmwrkR2-25-04s.pdf.

7.1 Risk Management Team

The WISDM Project Manager will have overall responsibility for risk management on the project and will be supported in this responsibility by a Risk Management Team (RMT) as outlined below. The WISDM Risk Management Team will include the following key individuals[17]:

- **WISDM Project Manager**—Has overall responsibility for the WISDM Project. The Project Manager will: help identify project risks; review, approve and maintain the Risk Management Plan; regularly review the Project Issues Log; meet regularly with the WISDM Project Directors. The Project Manager will have primary responsibility for monitoring and reporting on project risks, developing risk mitigation strategies and contingency plans, as well as ensuring that these are strategies and plans are implemented appropriately.
- **WISDM Executive Steering Committee**—Will receive reports of all high probability risks and may be called upon to assist with mitigation.
- **Participating Agencies**—CALFED, the Department of Public Health (DPH), the Department of Water Resources (DWR) and the State Water Board as participating Agencies in the WISDM Project will support the Risk Management Team as called upon by the WISDM Executive Steering Committee members.
- **WISDM Project Directors**—Will receive reports of all risks and may be called upon to assist with mitigation and contingency planning.
- **WISDM Project Team Members**—Project Team members will be responsible for identifying risks and recommending risk mitigation plans. Team members will have experience with existing participating department programs, knowledge of data collection within participating departments, or other relevant Information Technology experience.
- **Project Oversight**—Will meet with the WISDM Project Manager on a frequent basis to discuss the status of the project, including project risks and risk mitigation strategies. The Oversight Consultant may assist the WISDM Project Manager in identifying project risks and developing risk mitigation strategies and contingency plans.

[17] The specific individuals/resources cannot be identified at this point as the project has not yet been approved and if so will probably not start for approximately 6-12 months.

7.2 Risk Management Approach

The WISDM Project Manager, with support from the RMT, will be responsible for risk assessment on the WISDM Project. This consists of identifying, analyzing, quantifying and prioritizing project risks. Above all, the notion of '*Early Detection and Intervention'* combined with '*Taking Prompt and Corrective Action'* is paramount to a successful risk management approach.

The WISDM Project Manager will determine the probability that specific risks will occur and evaluate their potential impact. This will be an on-going process throughout the lifecycle of the project.

The six steps in Risk Assessment, which are discussed in more detail in the sub-sections below, are:

- **Identify** the risk,
- **Analyze** the risk,
- **Plan** for risk mitigation,
- **Implement** risk mitigation strategy,
- **Track and Control** identified risks, and
- **Communicate and Coordinate** risk management.

7.2.1 Risk Identification

Identification of project risks is the first step in Risk Assessment. It is the responsibility of ***all*** members of the WISDM Project Team and consists of identifying risks as early as possible in a project. Initially, this will be based on an understanding and analysis of project requirements and challenges, in light of previous experience with similar projects. As the project progresses and more specific experience is gained with the people, organizations, technologies and the business environment associated with the WISDM System, additional risks will be identified and the probability estimates of others may be changed. Crucial to risk identification will be the input of project team members and other stakeholders who will be encouraged to recognize and report risks as soon as possible. This will occur through formal means, such as status reports and team meetings, as well as by less formal communications such as telephone calls and e-mails. The WISDM Project Manager will document and evaluate risks identified by the WISDM Project Team Members and stakeholders.

7.2.2 Risk Analysis

Once a project risk is identified, the WISDM Project Manager, in consultation with the RMT, will evaluate the likelihood of the risk event occurring and the probable outcomes associated with the risk event, in order to determine its potential impact on the success of the project. The RMT may recommend assignments of risk impact, timeframe and probability as well as recommended risk mitigation actions. The result of risk analysis is a set of confirmed project risks that have been verified, evaluated (including probability), classified, prioritized and documented.

The five steps in Risk Analysis, which are discussed in more detail in the sub-sections below, are:

- **Determine** the impact of the risk,
- **Determine** the probability of the risk occurring,
- **Determine** the timeframe for responding to the risk,
- **Determine** the exposure to the risk, and
- **Determine** the severity of the risk.

7.2.2.1 Determine Risk Impact

The RMT is responsible for determining the *Risk Impact*, which involves considering the consequences that the risk would have on the project if the risk were to materialize. The Criteria for Risk Impact in the Table below is a guide for this step, expressed in terms of High, Medium, or Low.

Table 7-1: Criteria for Risk Impact

IMPACT	CRITERIA: RISK CONSEQUENCES INCLUDE...
High	Risk consequences include one or more of the following: ✓ Significant **schedule** delay. For example, delay in a critical path activity by more than 2 months or by more than 10% of the overall project schedule. ✓ Significant **cost** increase. For example, project budget increase by more than 10% of the overall project costs. ✓ Significant **resource** change. For example, loss of more than 20% of personnel, or loss of more than 10% of key management personnel assigned to the Project. ✓ Significant **scope** changes. For example, major objectives of the Project are dropped or increased. ✓ Significant political repercussions. For example, non-compliance with current legislation that requires annual reporting. ✓ Significant impact to ability to meet needs of stakeholders. For example, lack of communication or miscommunication with water user (or diverters) respondents results in non-acceptance of the WISDM System and/or adverse perceptions of the participating departments or the State of California. ✓ Significant user dissatisfaction[18] **(quality)**. For example, more than 20% of users are extremely dissatisfied with more than 20% of system functions or performance characteristics.

[18] This information could be gathered by surveying respondents. The same applies for both *Medium* and *Low Impact* in the Table below—the level of user satisfaction with respect to the quality of the system, performance characteristics, etc.

IMPACT	CRITERIA: RISK CONSEQUENCES INCLUDE...
Medium	Risk consequences include one or more of the following, but do not include any consequences previously identified above under "High": ✓ Moderate **schedule** delay. For example, delay in a critical path activity by more than 1 month or by 5 to10% of the overall project schedule. ✓ Moderate **cost** increase. For example, project budget increase by 5 to 10%. ✓ Moderate **resource** change. For example, loss of 10-20% of personnel, or loss of 5-10% of key management personnel assigned to the Project. ✓ Moderate **scope** changes. For example, a number of non-major objectives of the Project are dropped or increased. ✓ Moderate political repercussions. For example, moderate dissatisfaction of political parties or special interest groups. ✓ Moderate impact to ability to meet needs of stakeholders. For example, lack of communication or miscommunication with water user (or diverters) respondents results in non-acceptance of the WISDM System and/or adverse perceptions of the participating departments or the State of California. ✓ Moderate user dissatisfaction **(quality)** with system or program changes. For example, 10-20% of users are extremely dissatisfied with 10-20% of system functions or performance characteristics, or more than 20% of users are moderately dissatisfied with more than 20% of system functions or performance characteristics.
Low	Risk consequences include one or more of the following, but do not include any consequences previously identified above under "High" or "Medium": ✓ Minor **schedule** delay. For example, delay in a critical path activity by less than 2 weeks, or delay in a non-critical path activity by less than 1 month. ✓ Minor **cost** increase. For example, Project budget increase by less than 5%. ✓ Minor **resource** change. For example, loss of less than 10% of personnel, or loss of less than 5% of key management personnel assigned to the Project. ✓ Minor **scope** changes. For example, one or two minor objectives of the Project are dropped or increased. ✓ Minor political repercussions. For example, minor dissatisfaction of political parties or special interest groups. ✓ Slight impact to ability to meet needs of stakeholders. For example, lack of communication or miscommunication with water user (or diverters) respondents results in non-acceptance of the WISDM System and/or adverse perceptions of the participating departments or the State of California. ✓ Minor user dissatisfaction **(quality)**. For example, less than 10% of users are extremely dissatisfied with less than 10% of system functions or performance characteristics.

7.2.2.2 Determine Risk Probability

The RMT is responsible for determining the *Risk Probability*, which involves considering the likelihood of the occurrence of the risk. The Criteria for Risk Probability in the Table below is a guide for this step, expressed in terms of High, Medium, or Low.

Table 7-2: Criteria for Risk Probability

Probability	Criteria: The likelihood of the risk event is …
High	Certain or very likely to occur.
Medium	Equally likely to occur as to not occur (or 50/50 chance).
Low	Not likely, probably will not occur.

7.2.2.3 Determine Risk Timeframe

The RMT is responsible for assigning the *Timeframe* within which action must be taken to successfully mitigate the risk. The criteria in the Table below should be used as an aid for assigning the risk mitigation timeframe, expressed in terms of Long, Medium, or Short.

Table 7-3: Criteria for Risk Mitigation Timeframe

Timeframe	Criteria: Action must be taken within…
Long	Greater than six months.
Medium	Three to six months.
Short	Less than three months.

7.2.2.4 Determine Risk Exposure

The RMT is responsible for determining the *Risk Exposure,* which is derived from the risk attributes *Impact* and *Probability* and is used in conjunction with timeframe to prioritize risks for mitigation and escalation. Risk Exposure is determined for each project risk and is done so by finding the intersection of that risk's impact and probability in the matrix presented in the Table below (the bold lines outline the exposure determinations. For example, a risk with a 'medium' *Impact* and a 'high' *Probability* results in a "High" in terms of *Risk Exposure*.).

Table 7-4: Risk Exposure Matrix

		Probability		
		HIGH	**MEDIUM**	**LOW**
Impact	**HIGH**	**HIGH**	**HIGH**	**MEDIUM**
	MEDIUM	**HIGH**	**MEDIUM**	LOW
	LOW	**MEDIUM**	LOW	LOW

7.2.2.5 Determine Risk Severity

The RMT is responsible for determining the *Risk Severity,* which is a derivative of *Risk Exposure* (from Table 7-4 above) and *Risk Mitigation Timeframe* (from Table 7-3 above). Risk Severity will be used to determine the relative priority of the identified risks in the Planning step below. Determine *Risk Severity* for each risk from the intersection of that risk's exposure and timeframe in the matrix below (the bold lines outline the severity determinations. For example, a risk with a 'short' *Timeframe* and 'low' *Exposure* results in a "Medium" in terms of *Risk Severity*.).

Table 7-5: Risk Severity Matrix

		Exposure		
		HIGH	**MEDIUM**	**LOW**
Timeframe	**SHORT**	**HIGH**	**HIGH**	**MEDIUM**
	MEDIUM	**HIGH**	**MEDIUM**	LOW
	LONG	**MEDIUM**	LOW	LOW

7.2.3 Risk Planning

An integral part of planning for risks on a project is taking ownership of risk mitigation. Risk planning involves prioritizing risks for the WISDM Project Team's attention, assigning risk ownership, developing risk action plans, developing contingency plans, reviewing and approving risk mitigation and contingency plans and recording risk information changes in the Risk Management Log (RML).

The seven steps in Risk Planning, which are discussed in more detail in the sub-sections below, are:

- **Determine** the priority of the risk,
- **Assign** an owner to the risk,
- **Develop** an action plan for the risk,
- **Review and Communicate** the risk status with Team and Management,
- **Approve** an action plan for risk mitigation,
- **Conduct** an independent review of the risk analysis, and
- **Maintain** the Risk Management Log.

7.2.3.1 Determine Risk Priority

The RMT is responsible for determining and assigning the priority of each risk based on the *severity* of the risk as determined earlier in this section of the FSR. Risk Severity involves a determination of the importance of the risk based upon:

- The potential impact of the risk on the project,
- The probability of occurrence, and
- The timeframe for mitigation actions.

Project Risks should be grouped and ranked in risk severity order. That is, risks with 'high' severity should be ranked in relative order of importance to the project, then 'medium' severity risks and finally low severity risks. The Priority (or ranking) allows the WISDM Project Team to focus efforts on those risks that have the greatest potential impact, highest probability and/or shortest timeframe for mitigation first.

7.2.3.2 Assign Risk Owner

The WISDM Project Manager is responsible for identifying an *owner* for each risk. The Risk Owner is a WISDM Project Team Member who will have primary responsibility for developing the risk response strategy and action plan. While a Risk Owner may have several risks that they own, each risk should have only one owner.

7.2.3.3 Develop Risk Action Plan

The Risk Owner, in cooperation with the WISDM Project Manager and other WISDM Project Team Members, is responsible for developing the recommended action plan for a given risk. The Risk Action Plan consists of a Risk Response Strategy, Action Items and Triggers. In most cases, it should also include a contingency plan (should this perceived risk become an actual risk).

Possible strategies for responding to a risk include the following:

- **Observe**—No action is taken at this time. Continue to monitor the identified risk area for changes.
- **Research**—More information is needed to define the risk and develop a risk strategy.
- **Mitigate**—Develop and implement a plan to avoid, reduce or eliminate the impact of the risk or the probability of the risk occurring.
- **Accept**—Accept the consequences if the risk were to actually occur.

The WISDM Project Team will seek to develop responsive actions that are designed to mitigate (avoid, eliminate or reduce) the risk, rather than recommend acceptance of a risk, for at least **high and medium** priority risks. There may be circumstances when it is acceptable to just watch or research medium and low risks.

The Action Items outlined in the Action Plan are activities to be performed **before the risk occurs.** Each action item will be assigned to a member of the WISDM Project Team with a due date.

Trigger Points/Events are also a key part of any Action Plan. A Trigger is an indicator that a risk has occurred or is about to occur (e.g. increased probability or shortened timeframe). Triggers are warning signs or conditions that are defined during the Planning step and tracked throughout the Project so that the appropriate action steps or Contingency Plans are put into action when necessary.

For **high severity** risks (those with major impact to the project's objectives, schedule, or cost), the Risk Action Plan should also include a **Contingency Plan** to be executed in the event mitigation fails or an accepted risk occurs. The Contingency Plan defines actions to be taken when the consequence of the risk is imminent or has occurred.

7.2.3.4 Risk Review with Team and Update Project Directors

The WISDM Project Directors and WISDM Project Manager are responsible for reviewing the risk with the RMT and the Risk Owner to validate all of the risk information identified at the time of the review, including the Risk Impact, Risk Probability, Risk Timeframe and Recommended Action Plan. The result of this step is to validate the risk as a confirmed risk and to confirm or modify the recommended action plan for input to approve risk action plans. The Project

Directors and the WISDM Project Manager are responsible for informing the WISDM Executive Steering Committee of confirmed high risks and their status on an ongoing basis. Extracts from the RML may be used for this purpose.

The primary forum for reviewing risks will be the Weekly Project Team Meeting where the Risk Owner will lead the discussion of project related issues and risks. Additional meetings may be conducted as needed.

7.2.3.5 Approve Risk Action Plans

The WISDM Project Manager and the Risk Owner approve the risk action plans for each defined risk.

7.2.3.6 Independent Reviews

The Project Oversight consultant will provide *independent* reviews of the WISDM Project Team's risk analysis process and decisions as part of its responsibilities for independent project oversight as directed in the Chief Information Officer's Independent Project Oversight Framework. Independent Project Oversight review focuses on consistency with recognized best practices and industry standards for risk management, from which the WISDM Project's approach has been developed. Findings and recommendations are communicated to the WISDM Project Manager.

7.2.3.7 Update Risk Management Log

The WISDM Project Manager is responsible for updating the RML information for confirmed risks based on risk planning results. Perceived risks that are not confirmed as valid project risks during this step will be archived and no longer tracked during the WISDM Project.

7.2.4 Implement Risk Mitigation

The purpose of *Risk Mitigation* implementation is to actively mitigate risks on the WISDM Project. Implementation involves the execution of risk action plans and recording risk information changes in the RML.

7.2.4.1 Execute Action Plans

The Risk Owner is primarily responsible for the execution of the risk action plan according to the timeline (due dates for action items) developed during the Planning step. Ultimately, however, the WISDM Project Manager is responsible for ensuring that this activity is completed and done so within the time period allotted for this activity.

Other WISDM Project Team Members may be responsible for performing some of the action items, doing so in coordination with the Risk Owner and WISDM Project Manager.

7.2.4.2 Update Risk Management Log

The WISDM Project Manager is responsible for updating the status of risk action items in the RML based on information provided by the Risk Owner and/or the WISDM Project Team Member executing the action plan for a specific project risk. During the Track/Control steps, the WISDM Project Team will review these updates to the RML.

For *High Severity* project risks, the Risk Owner must update the RML at least weekly, or preferably as soon as action plan activities are completed, so that the WISDM Project Directors and the Project Manager have up-to-date status information available. Updates to the status of action items for *Medium* and *Low Severity* project risks must be performed prior to scheduled Project Status Meetings. Updates should include the following:

- Status of action items,
- Notes on significant events related to this risk,
- Person executing the action item, and
- Date action item was executed

7.2.5 Risk Tracking and Control

Risk tracking and control ensures that all steps of the Risk Management process are being followed as identified in the Risk Management Plan and, as a result, project risks are being mitigated. Risk tracking and control involves the oversight and tracking of project risk mitigation execution, re-assessment of individual project risks, reporting project risk status and recording project risk information changes in the RML, as risks evolve during the lifecycle of the WISDM Project.

The WISDM Project Manager will track and control project risks using the RML, which includes:

- Unique Number (ID) to track the risk,
- Title to identify the risk,
- Description of the risk (also known as the *Risk Statement*),
- Impact of the risk [High/Medium/Low],
- Probability of the risk occurring [High/Medium/Low],
- Timeframe for responding to the risk [Long/Medium/Short],
- Exposure of the risk [High/Medium/Low],
- Severity of the risk [High/Medium/Low],
- Priority of the risk,
- Origination Date the risk was first identified,
- Contact (person/organization) that initially identified the risk,

- Owner of the assigned risk,
- Assigned Date,
- Risk Trigger Date,
- Risk Response Strategy,
- Risk Mitigation Plan, and
- Current Status of Risk.

The Risk Management Log will be a key tool in tracking, managing and reporting on WISDM Project risks. The current version lists the major risks associated with the WISDM Project that have been identified to date during the FSR development process. It could be modified to group these identified risks into the following categories:

- Resources,
- Schedule,
- Scope,
- Stakeholders,
- System, and
- Organization.

7.2.5.1 Risk Tracking

At the present time, one of the WISDM Project participating departments (the Department of Public Health), has adopted SharePoint 2007 as a project collaboration and communication tool. This new tool also provides a website interface containing a number of tools and templates that can be used to assist the WISDM Project Manager. One specific tool that is in keeping with Risk Tracking and Control as discussed here is the development of a Risk Management Log (RML) that contains all of the information discussed in this section of the Risk Management Plan.

This RML was developed at another State of California department and is in the form of a *list* as defined within SharePoint 2007. This list may be modified to include categories, as previously defined in this FSR. In this manner, the complete list of identified risks can be filtered by a specific category, to list only those identified risks for a specific category.

A sample of the RML used on a prior State of California project is provided in the Figures below:

Risk Log

Risk Management Log (RML)

New ▾ | Actions ▾ | Settings ▾

ID	Title	Risk Description	Impact	Prob	Time Frame	Exposure	Severity	Priority	Orig Dt	Contact	Owner
1	Cost overruns ! NEW	The project could end up costing more than originally planned.	Low	Low	Long	Low	Low		4/11/2008	Mickey Mouse	
2	Loss of funding ! NEW	With current budget and economic situation in CA, funding may get cut.	High	Low	Long	Medium	Low		4/11/2008	Donald Duck	
3	Schedule overrun ! NEW	With short project timeframes, the [illegible] to miss	Medium	Low	Long	Low	Low		4/11/2008	Minnie Mouse	

Figure 7-1: Sample Risk Management Log in SharePoint 2007 (left side)

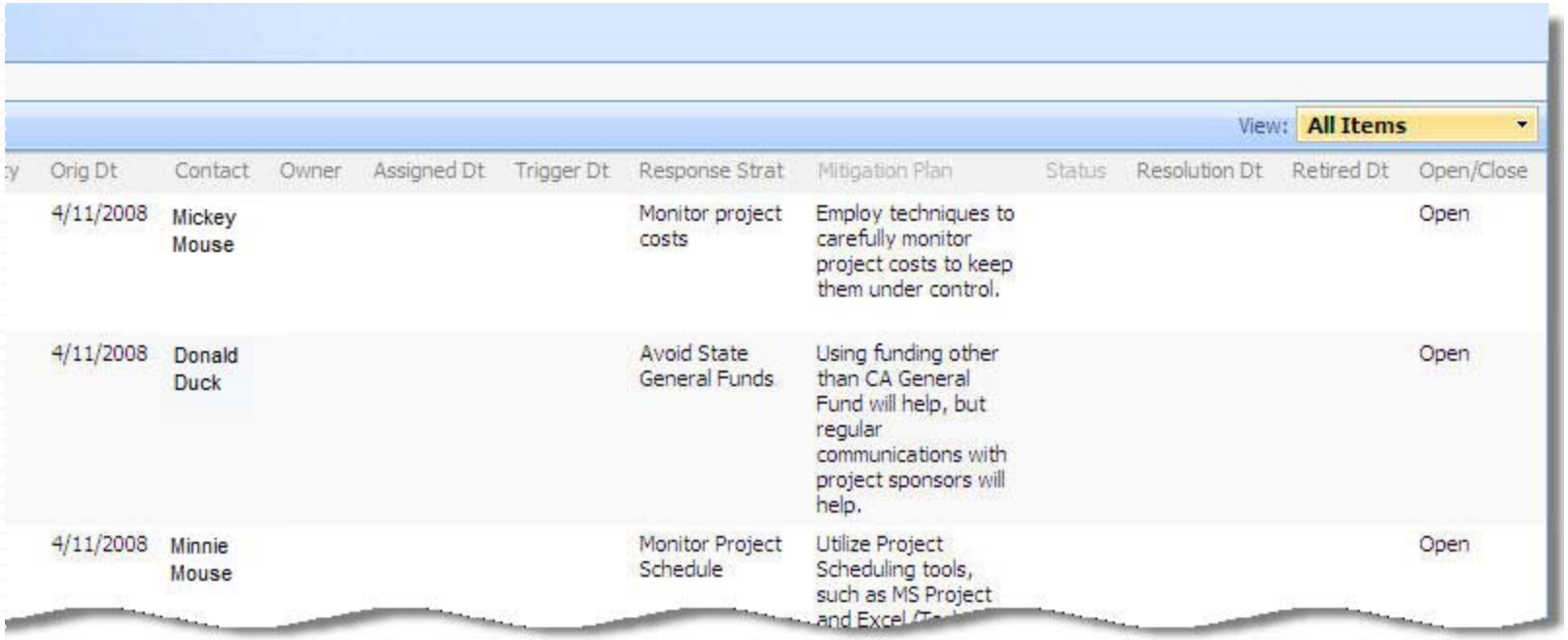


Figure 7-2: Sample Risk Management Log in SharePoint 2007 (right side)

In support of this RML, a built-in feature of SharePoint 2007 was used to create a data entry form used to capture/maintain information about a project risk. In this manner, a standard method for capturing the information is maintained and has been easily adopted by various State of California IT projects where SharePoint 2007 is deployed.

Below is a sample of the data entry form used to record risk items into the RML:

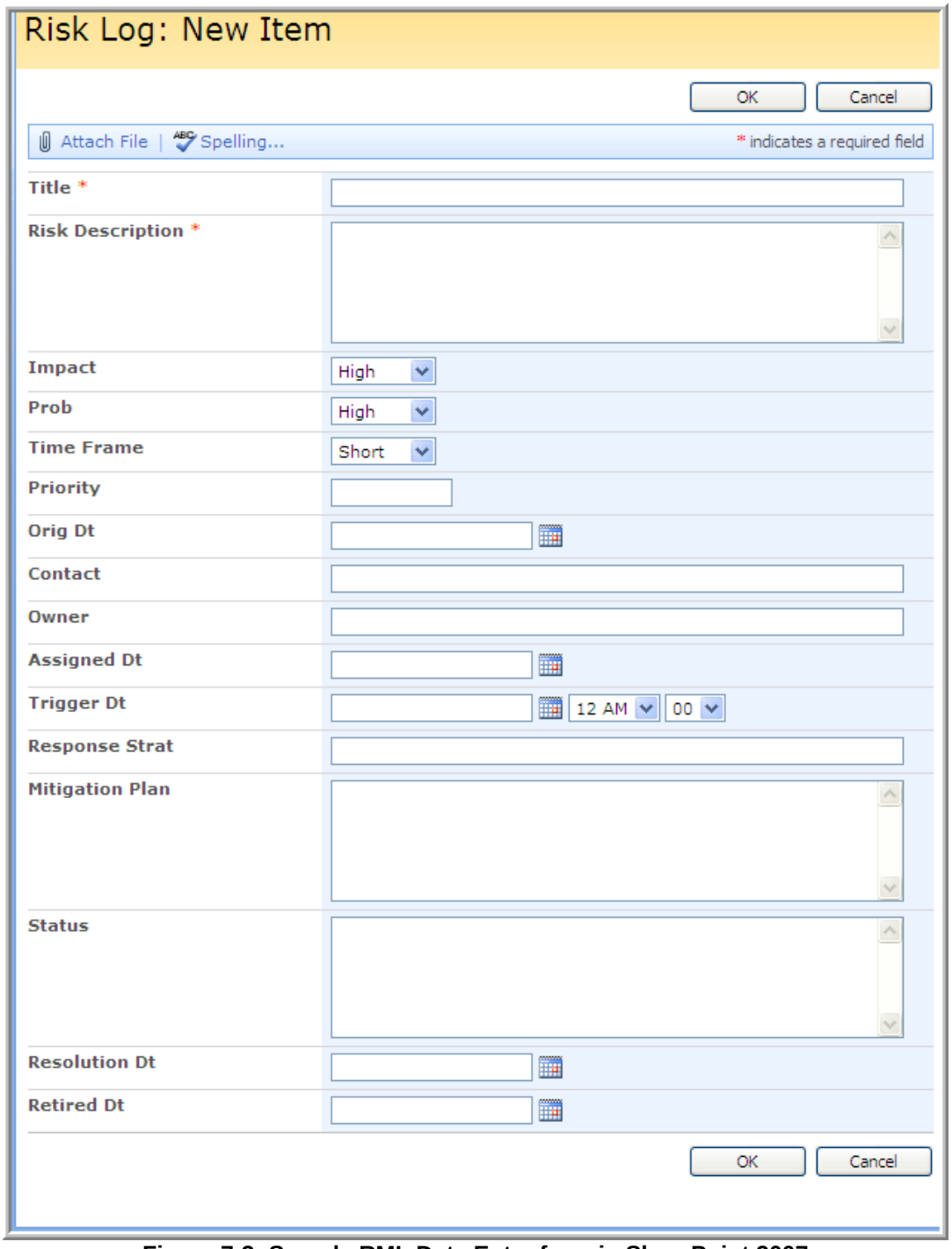


Figure 7-3: Sample RML Data Entry form in SharePoint 2007

7.2.5.2 Reassess Risks

The WISDM Project Manager will re-assess the risk information in the RML to determine if any changes are needed to risk priority or timeframe based upon current project events or changes to other risks. At a minimum, re-assessment of risk information in the RML will be performed on a monthly basis. However, re-assessment may be performed more frequently as needed.

7.2.5.3 Report Risk Status

The WISDM Project Team Members will report project risk status at the recurring project status meetings. Project risk status reporting will focus primarily on *High* and *Medium* priority risks. The Risk Owner may recommend changes in the schedule or assignment of Action Items and risk probability, impact, or timeframe for consideration by the WISDM Project Team. Information presented at the project status meetings will include the status of risk mitigation action plans, changes in risk priority, as well as any new project risks identified.

7.2.5.4 Maintain Risk Management Log

The WISDM Project Manager will maintain the project risk information in the RML, by updating risk impact, probability, timeframe, exposure, severity and priority. The WISDM Project Manager will also update the status of risk action plan tasks. Newly identified project risks will be added to the RML and updated or archived as needed.

7.2.6 Risk Communication and Coordination

WISDM Project Team Members must communicate with each other to coordinate risk management activities within the context of the overall Project Management Plan. The escalation of risks to the WISDM Executive Steering Committee and external oversight agencies is also included in this communication and coordination activity.

7.2.6.1 Risk Reporting and Escalation

Those responsible for project risk reporting include WISDM Project Team Members, WISDM Project Manager and the project oversight consultant. Internal and external reporting and escalation of project risks and risk mitigation status is performed as indicated below:

- All verified high risks are reported to the WISDM Executive Steering Committee,
- All verified IT risks are reported to the Chief Information Officer (CIO) of each of the participating departments, and
- Any verified high or medium risks that include security concerns are reported to the Information Security Officer (ISO) of each of the participating departments.

7.2.6.2 Approve Risk Resolution

When a project risk is no longer a threat to the WISDM Project as a result of successful risk mitigation, avoidance or changes in the project environment, it will be considered *Resolved*. The WISDM Project Directors approve resolution of all *High Severity* project risks and direct the WISDM Project Manager to move them to the Archived Project Risk Log. Resolution of any *Medium* and *Low Severity* project risks is approved by the WISDM Project Manager and they are also moved to the Archived Project Risk Log.

7.2.6.3 Update Project Risk Database

The WISDM Project Manager will update the RML to indicate the status of all project risk Action Items and also indicate when the associated project risk has been resolved.

7.3 Current Known Risks to the WISDM Project

At the time this FSR was being submitted for review by the California Legislature, the Chapter 675/2007 FSR Project Manager, in consultation with representatives from the State Water Resources Control Board, the Department of Public Health, and the Department of Water Resources reviewed the Risk Management Log to finalize all risks that are currently known to the WISDM Project. This RML is being maintained in SharePoint 2007 at the Department of Public Health and is presented in summary form in the table below:

Table 7-6: Known Risks of the WISDM Project

Risk Description	Probability	Severity	Preventive/ Contingency Measures
Departure or limited availability of OIT personnel and program staff with the required subject matter and technical expertise may delay or prevent project implementation.	High	High	• Identify key personnel and potential backups early in the process. • Provide realistic estimates of the time that will be required to implement the project. • Do not schedule implementation of the WISDM to coincide with other major projects or resource demands. • Ensure knowledge is transferred between team members and subject matter experts and documentation is clear.
WDPs not willing to share data.	Medium	Medium	• Inventory WDPs for participation. • Develop strategies for cooperation, such as financial incentives.
Aligning program with legislative intent.	Low	Low	• Create a statewide water resources and management governance body, the Water Data Institute, to coordinate and manage related legislation and projects, such as Chapter 675/2007 and SB1070. • Develop a Stakeholder Advisory Committee to include representative WDPs, Regional Water Board representatives, and data users. • Include challenges and successes in annual report to the Legislature.

Risk Description	Probability	Severity	Preventive/ Contingency Measures
The number and types of WDPs adds a layer of complexity, which could negatively impact the schedule.	Medium	Low	• Begin with a Pilot Project to determine best practices and lessons learned to ensure success of further phasing of the WDPs participation • Stakeholder relationship management.
Some data providers may not have ready access to the Internet for submitting information on line.	Low	Medium	• Ensure adequate performance is provided for reporters using dial-up (56K modem) connections.
Project implementation costs more than expected.	Low	Medium	• Initial and continued project involvement from all associated Program and Departmental units. • Cost monitoring through effective project management. • Develop a Change Management Plan that includes a Change Control Board to control potential scope creep and manage scope changes.
Existing budget constraints and limited funding sources may delay/prevent implementation of the project.	High	High	• Seek alternative funding through grant proposals and contributions from potential collaborators.
Information Technology staff are faced with a highly visible project with statewide implications.	Medium	Medium	• Approach to project management includes a Program Director from program area and Project Manager from information technology area.
Data Provider and State Concerns about Data Privacy, Access and Security	Medium	Medium	• Build strong security measure into system • Clear communication to stakeholders. • Involve WISDM Information Security Officer early in the project

8.0 ECONOMIC ANALYSIS WORKSHEETS SECTION

The purpose of this section is to document the cost and resource analysis that Pacific Project Management, Inc. and the State Water Board, DWR and DPH conducted during the feasibility study process for the WISDM Project. This information provides a record of the research and estimation of the costs of the following:

- The Existing System (there is no current system or process),
- The Proposed Solution, and
- The Other Alternative Solutions.

Information on these follows, as does and comparative economic analysis of the alternatives and a funding plan for the proposed solution.

The scope for estimating State program and IT staff and resource requirements is limited to the requirements for the initial WISDM Project implementation and ongoing WISDM maintenance and operations. It does not include staff or resource requirements to establish and maintain the independent Water Data Institute.

In this section, we have presented the costs for implementing the proposed solution plus one (1) full year beyond implementation in order to reflect estimated on-going maintenance and operations costs. This will then establish the baseline for on-going support and maintenance of the proposed solution.

8.1 Existing System Cost Worksheet

Typically, this worksheet documents the current and projected operations/maintenance costs of the current method of operation to provide a costs baseline and reflects the costs of maintaining that existing system and program processes if the proposed solution is not implemented. In this case, there is no existing system or processes in place, as the Chapter 675/2007 legislation is defining the start of a new program and supporting processes to be put into operation.

8.2 Proposed Solution Cost Worksheet

The cost worksheet for the proposed solution documents the projected One-Time costs (such as development and/or acquisition costs), continuing costs (costs for maintenance and operation), as well as the impact to program costs of the proposed solution.

One-Time and On-Going costs for contracting positions, DTS services and State staff are identified in the table on the next page, and described in more detail in the sub-sections that follow that table.

8.2.1 Specialized Contract Resource Costs

The specialized contract resources described below have specialized/advanced programming skills that State programming staff typically do not have. Because of this, these services will be addressed through separate contracts, and consist of:

- ✓ DD&I Vendor—to design, develop, and implement the components of the WISDM system.
- ✓ Project Oversight and IV&V Services- these vendors will provide project management and project progress and procedures oversight services.
- ✓ Project Management Support—The State Project Manager will be assisted by a Project Management Support consultant who will help in the day to day project management tasks as well as fill in for the project manager when necessary.

Costs for all specialized contract resources were calculated based on estimated costs for specific tasks averaged from recent vendor proposals to State Departments in response to related services identified in RFP's and RFO's.

8.3 Alternative System Cost Worksheets

The alternative system costs worksheets represent the alternative solutions that were considered but not selected to meet the needs of the new program. There is a separate cost sheet for each of the alternative solutions considered. Each of these worksheets document the projected One-Time costs (such as development and/or acquisition costs), continuing costs (costs for maintenance and operation), as well as the impact to program costs of each alternative that satisfactorily met the objectives, functional requirements and cost effectiveness, but to a lesser degree than the proposed solution.

8.4 Economic Analysis Summary

This summary is automatically calculated to compare the estimated costs of the proposed solution to the other considered alternatives (and the existing system when it exists).

8.5 Project Funding Plan

This worksheet documents the estimated resources needed for designing and developing the proposed solution and the necessary budget actions anticipated to support the implementation and on-going support of the proposed solution. Because this is a new program, no re-directed staff has been included for any portion of this project. In addition, the State Water Board, DWR, and DPH were unable to identify any non-General Fund funding sources as the funding source for the costs of designing, developing, implementing and maintenance and operation of the WISDM Solution.

Table 8-1: Existing System Cost Worksheet

EXISTING SYSTEM/BASELINE COST WORKSHEET

Department: State Water Board, DWR & DPH
Project: WISDM-Water Institute Statewide Data Management

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

Date Prepared: 11/21/08

	FY 2010/11		FY 2011/12		FY 2012/13		FY 2013/14		TOTAL	
	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts
Continuing Information Technology Costs										
Staff (salaries & benefits)	0.0	0	0.0	0	0.0	0	0.0	0	**0.0**	**0**
Hardware Lease/Maintenance		0		0		0		0		**0**
Software Maintenance/Licenses		0		0		0		0		**0**
Contract Services		0		0		0		0		**0**
Data Center Services		0		0		0		0		**0**
Agency Facilities		0		0		0		0		**0**
Other		0		0		0		0		**0**
Total IT Costs	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**
Continuing Program Costs:										
Staff	0.0	0	0.0	0	0.0	0	0.0	0	**0.0**	**0**
Other		0		0		0		0		**0**
Total Program Costs	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**
TOTAL EXISTING SYSTEM COSTS	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**

Table 8-2: Proposed Solution Cost Worksheet

PROPOSED ALTERNATIVE: The WISDM Phase One Chapter 675/2007 Solution

Date Prepared: 11/21/08

Department: State Water Board, DWR & DPH

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

Project: WISDM-Water Institute Statewide Data Management

	FY 2010/11		FY 2011/12		FY 2012/13		FY 2013/14		TOTAL	
	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts
One-Time IT Project Costs										
Staff (Salaries & Benefits)	7.8	735,736	13.0	1,232,026	13.0	1,232,026	0.0	0	33.8	3,199,788
Hardware Purchase		21,000		1,000		21,000		0		43,000
Software Purchase/License		4,837		229,103		72,000		0		305,940
Telecommunications		0		37,000		12,000		0		49,000
Contract Services										
Software Customization		0		2,302,255		2,302,255		0		4,604,509
Project Management		0		300,000		300,000		0		600,000
Project Oversight		0		115,113		115,113		0		230,225
IV&V Services		0		115,113		115,113		0		230,225
Other Contract Services		0		0		0		0		0
TOTAL Contract Services		0		2,832,480		2,832,480		0		5,664,960
Data Center Services		0		52,850		331,470		0		384,320
Agency Facilities		0		0		0		0		0
Other		0		0		53,000		0		53,000
Total One-time IT Costs	**7.8**	**761,573**	**13.0**	**4,384,459**	**13.0**	**4,553,976**	**0.0**	**0**	**33.8**	**9,700,008**
Continuing IT Project Costs										
Staff (Salaries & Benefits)	0.0	0	0.0	0	0.0	0	13.0	1,232,026	13.0	1,232,026
Hardware Lease/Maintenance		0		0		0		11,500		11,500
Software Maintenance/Licenses		0		0		0		54,000		54,000
Telecommunications		0		0		0		12,000		12,000
Contract Services		0		0		0		506,496		506,496
Data Center Services		0		0		0		326,420		326,420
Agency Facilities		0		0		0		0		0
Other		0		0		0		15,000		15,000
Total Continuing IT Costs	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**	**13.0**	**2,157,442**	**13.0**	**2,157,442**
Total Project Costs	**7.8**	**761,573**	**13.0**	**4,384,459**	**13.0**	**4,553,976**	**13.0**	**2,157,442**	**46.8**	**11,857,450**
Continuing Existing Costs										

Information Technology Staff	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Other IT Costs		0		0		0		0		0
Total Continuing Existing IT Costs	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**
Program Staff	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Other Program Costs		0		0		0		0		0
Total Continuing Existing Program Costs	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**
Total Continuing Existing Costs	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**
TOTAL ALTERNATIVE COSTS	**7.8**	**761,573**	**13.0**	**4,384,459**	**13.0**	**4,553,976**	**13.0**	**2,157,442**	**46.8**	**11,857,450**
INCREASED REVENUES		0		0		0		0		**0**

Table 8-3: Alternative #1 Cost Worksheet

ALTERNATIVE #1: A Central Single Database Solution

Date Prepared: 11/21/08

Department: State Water Board, DWR & DPH

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

Project: WISDM-Water Institute Statewide Data Management

	FY 2010/11		FY 2011/12		FY 2012/13		FY 2013/14		TOTAL	
	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts
One-Time IT Project Costs										
Staff (Salaries & Benefits)	8.6	796,259	14.0	1,307,680	19.0	1,841,843	0.0	0	41.6	3,945,782
Hardware Purchase		22,000		1,000		27,000		0		50,000
Software Purchase/License		5,196		229,103		72,000		0		306,299
Telecommunications		0		37,000		12,000		0		49,000
Contract Services										
Software Customization		0		2,417,367		2,417,367		0		4,834,735
Project Management		0		300,000		300,000		0		600,000
Project Oversight		0		120,868		120,868		0		241,737
IV&V Services		0		120,868		120,868		0		241,737
Other Contract Services		0		0		0		0		0
TOTAL Contract Services		0		2,959,104		2,959,104		0		5,918,208
Data Center Services		0		64,917		711,533		0		776,450
Agency Facilities		0		0		0		0		0
Other		0		0		53,000		0		53,000
Total One-time IT Costs	**8.6**	**823,455**	**14.0**	**4,598,805**	**19.0**	**5,676,480**	**0.0**	**0**	**41.6**	**11,098,740**
Continuing IT Project Costs										
Staff (Salaries & Benefits)	0.0	0	0.0	0	0.0	0	19.0	1,841,843	19.0	1,841,843
Hardware Lease/Maintenance		0		0		0		14,500		14,500
Software Maintenance/Licenses		0		0		0		54,000		54,000
Telecommunications		0		0		0		12,000		12,000
Contract Services		0		0		0		531,821		531,821
Data Center Services		0		0		0		702,493		702,493
Agency Facilities		0		0		0		0		0
Other		0		0		0		15,000		15,000
Total Continuing IT Costs	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**	**19.0**	**3,171,657**	**19.0**	**3,171,657**
Total Project Costs	**8.6**	**823,455**	**14.0**	**4,598,805**	**19.0**	**5,676,480**	**19.0**	**3,171,657**	**60.6**	**14,270,396**
Continuing Existing Costs										
Information Technology Staff	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0

Other IT Costs		0		0		0		0		0
Total Continuing Existing IT Costs	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**
Program Staff	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Other Program Costs		0		0		0		0		0
Total Continuing Existing Program Costs	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**
Total Continuing Existing Costs	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**
TOTAL ALTERNATIVE COSTS	**8.6**	**823,455**	**14.0**	**4,598,805**	**19.0**	**5,676,480**	**19.0**	**3,171,657**	**60.6**	**14,270,396**
INCREASED REVENUES		0		0		0		0		**0**

Table 8-5: Alternative #2 Cost Worksheet

ALTERNATIVE #2: A Low Functionality Solution

Date Prepared: 11/21/08

Department: State Water Board, DWR & DPH

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

Project: WISDM-Water Institute Statewide Data Management

	FY 2010/11		FY 2011/12		FY 2012/13		TOTAL	
	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts
One-Time IT Project Costs								
Staff (Salaries & Benefits)	2.4	247,003	3.0	310,894	0.0	0	5.4	557,897
Hardware Purchase		11,000		1,000		0		12,000
Software Purchase/License		1,247		2,103		0		3,350
Telecommunications		0		0		0		0
Contract Services								
Software Customization		115,113		115,113		0		230,225
Project Management		75,000		75,000		0		150,000
Project Oversight		5,756		5,756		0		11,511
IV&V Services		5,756		5,756		0		11,511
Other Contract Services		0		0		0		0
TOTAL Contract Services		201,624		201,624		0		403,248
Data Center Services		32,142		30,682		0		62,824
Agency Facilities		0		0		0		0
Other		0		0		0		0
Total One-time IT Costs	**2.4**	**493,016**	**3.0**	**546,303**	**0.0**	**0**	**5.4**	**1,039,319**
Continuing IT Project Costs								
Staff (Salaries & Benefits)	0.0	0	0.0	0	3.0	310,894	3.0	310,894
Hardware Lease/Maintenance		0		0		6,500		6,500
Software Maintenance/Licenses		0		0		0		0
Telecommunications		0		0		0		0
Contract Services		0		0		25,325		25,325
Data Center Services		0		0		30,682		30,682
Agency Facilities		0		0		0		0
Other		0		0		0		0
Total Continuing IT Costs	**0.0**	**0**	**0.0**	**0**	**3.0**	**373,401**	**3.0**	**373,401**
Total Project Costs	**2.4**	**493,016**	**3.0**	**546,303**	**3.0**	**373,401**	**8.4**	**1,412,720**
Continuing Existing Costs								
Information Technology Staff	0.0	0	0.0	0	0.0	0	0.0	0

Other IT Costs		0		0		0		0
Total Continuing Existing IT Costs	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**
Program Staff	0.0	0	0.0	0	0.0	0	0.0	0
Other Program Costs		0		0		0		0
Total Continuing Existing Program Costs	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**
Total Continuing Existing Costs	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**
TOTAL ALTERNATIVE COSTS	**2.4**	**493,016**	**3.0**	**546,303**	**3.0**	**373,401**	**8.4**	**1,412,720**
INCREASED REVENUES		0		0		0		**0**

Table 8-6: Economic Analysis Summary

ECONOMIC ANALYSIS SUMMARY

Date Prepared: 11/21/08

Department: State Water Board, DWR & DPH

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

Project: WISDM-Water Institute Statewide Data Management

	FY 2010/11		FY 2011/12		FY 2012/13		FY 2013/14		TOTAL	
	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts
EXISTING SYSTEM										
Total IT Costs	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Total Program Costs	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Total Existing System Costs	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
PROPOSED ALTERNATIVE	**The WISDM Phase One Chapter 675/2007 Solution**									
Total Project Costs	7.8	761,573	13.0	4,384,459	13.0	4,553,976	13.0	2,157,442	46.8	11,857,450
Total Cont. Exist. Costs	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Total Alternative Costs	7.8	761,573	13.0	4,384,459	13.0	4,553,976	13.0	2,157,442	46.8	11,857,450
COST SAVINGS/AVOIDANCES	(7.8)	(761,573)	(13.0)	(4,384,459)	(13.0)	(4,553,976)	(13.0)	(2,157,442)	(46.8)	(11,857,450)
Increased Revenues		0		0		0		0		0
Net (Cost) or Benefit	(7.8)	(761,573)	(13.0)	(4,384,459)	(13.0)	(4,553,976)	(13.0)	(2,157,442)	(46.8)	(11,857,450)
Cum. Net (Cost) or Benefit	(7.8)	(761,573)	(20.8)	(5,146,032)	(33.8)	(9,700,008)	(46.8)	(11,857,450)		
ALTERNATIVE #1	**A Central Single Database Solution**									
Total Project Costs	8.6	823,455	14.0	4,598,805	19.0	5,676,480	19.0	3,171,657	60.6	14,270,396
Total Cont. Exist. Costs	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Total Alternative Costs	8.6	823,455	14.0	4,598,805	19.0	5,676,480	19.0	3,171,657	60.6	14,270,396
COST SAVINGS/AVOIDANCES	(8.6)	(823,455)	(14.0)	(4,598,805)	(19.0)	(5,676,480)	(19.0)	(3,171,657)	(60.6)	(14,270,396)
Increased Revenues		0		0		0		0		0
Net (Cost) or Benefit	(8.6)	(823,455)	(14.0)	(4,598,805)	(19.0)	(5,676,480)	(19.0)	(3,171,657)	(60.6)	(14,270,396)
Cum. Net (Cost) or Benefit	(8.6)	(823,455)	(22.6)	(5,422,260)	(41.6)	(11,098,740)	(60.6)	(14,270,396)		
ALTERNATIVE #2	**A Low Functionality Solution**									

Total Project Costs	2.4	493,016	3.0	546,303	3.0	373,401	0.0	0	8.4	1,412,720
Total Cont. Exist. Costs	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0
Total Alternative Costs	2.4	493,016	3.0	546,303	3.0	373,401	0.0	0	8.4	1,412,720
COST SAVINGS/AVOIDANCES	(2.4)	(493,016)	(3.0)	(546,303)	(3.0)	(373,401)	0.0	0	(8.4)	(1,412,720)
Increased Revenues		0		0		0		0		0
Net (Cost) or Benefit	(2.4)	(493,016)	(3.0)	(546,303)	(3.0)	(373,401)	0.0	0	(8.4)	(1,412,720)
Cum. Net (Cost) or Benefit	(2.4)	(493,016)	(5.4)	(1,039,319)	(8.4)	(1,412,720)	(8.4)	(1,412,720)		

Table 8-7: Project Funding Plan

PROJECT FUNDING PLAN

Department: State Water Board, DWR & DPH | All Costs to be in whole (unrounded) dollars | Date Prepared: 11/21/08

Project: WISDM-Water Institute Statewide Data Management

	FY 2010/11		FY 2011/12		FY 2012/13		FY 2013/14		TOTALS	
	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts	PYs	Amts
TOTAL PROJECT COSTS	**7.8**	**761,573**	**13.0**	**4,384,459**	**13.0**	**4,553,976**	**13.0**	**2,157,442**	**46.8**	**11,857,450**
RESOURCES TO BE REDIRECTED										
Staff	0.0	0	0.0	0	0.0	0	0.0	0	**0.0**	**0**
Funds:										
Existing System		0		0		0		0		**0**
Other Fund Sources		0		0		0		0		**0**
TOTAL REDIRECTED RESOURCES	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**
ADDITIONAL PROJECT FUNDING NEEDED										
One-Time Project Costs	7.8	761,573	13.0	4384459.0	13.0	4553976.0	0.0	0.0	**33.8**	**9,700,008**
Continuing Project Costs	0.0	0.0	0.0	0.0	0.0	0.0	13.0	2157442.0	**13.0**	**2,157,442**
TOTAL ADDITIONAL PROJECT FUNDS NEEDED BY FISCAL YEAR	**7.8**	**761,573**	**13.0**	**4,384,459**	**13.0**	**4,553,976**	**13.0**	**2,157,442**	**46.8**	**11,857,450**
TOTAL PROJECT FUNDING	**7.8**	**761,573**	**13.0**	**4,384,459**	**13.0**	**4,553,976**	**13.0**	**2,157,442**	**46.8**	**11,857,450**
Difference: Funding - Costs	0.0	0	0.0	0	0.0	0	0.0	0	**0.0**	**0**

Total Estimated Cost Savings	0.0	0	0.0	0	0.0	0	0.0	0	**0.0**	**0**

ATTACHMENTS

…this page is intentionally left blank…

ATTACHMENT 1 – List of Workshops and Attendees

This Attachment contains a list of the Chapter 675/2007 FSR Project Workshops and Attendees.

…this page is intentionally left blank…

List of Workshops and Attendees

1. Initial Workshop

This included all the State Water Board, DWR, DPH and CALFED project team members. The purpose of the workshop was to set the agreed project scope in the major process areas, and also to:

- Define the current processes and information flows for each stakeholder group, including inter-departmental information sharing and data categories, at a high level.
- Create a context/domain diagram – with the new central database as the hub; inputs and outputs; roles and responsibilities.
- Define the required information group categories and subcategories and high level information required, to establish the outline of the new form(s) content, for example:
    i. How to collect graphic information
    ii. Consequences of unavailability of whole/part of required information source
    iii. Standard for location coding
    iv. What about water quality data.

Attendee Name	Organization
Sally Nyman	State Water Board
Kevin Long	State Water Board
Dong Chen	DWR
Scott Hayes	DWR
Eric Sender	DWR
Jean Woods	DWR
Evan Scarisbrick	State Water Board/EcoInteractive
Paul Collins	DPH
Tom Hawkins	DWR
Joran Kreiss	State Water Board
Rick Brietenbach	CalFED

2. State Water Board Workshops

- **WISDM – Problems, Opportunities, and Objectives** this included the State Water Board project team members only. The purpose of the workshop was to discover the perceived business problems and opportunities, and the goals/objectives that need to be fulfilled to solve the problems and realize the opportunities.

Attendee Name	Organization
Joran Kreiss	State Water Board
Kevin Long	State Water Board
Sally Nyman	State Water Board
Cam Williams	State Water Board

- **WISDM – Objectives, Functional and Technical Requirements** this included the State Water Board project team members only. The purpose of the workshop was to discuss the objectives identified in the first workshop, and to define the high level functional and technical requirements that will fulfill them.

Attendee Name	Organization
Joran Kreiss	State Water Board
Kevin Long	State Water Board
Sally Nyman	State Water Board

3. DWR Workshops

- **WISDM – Problems, Opportunities, and Objectives** this included the DWR project team members only. The purpose of the workshop was to discover the perceived business problems and opportunities, and the goals/objectives that need to be fulfilled to solve the problems and realize the opportunities.

Attendee Name	Organization
Scott Hayes	Department of Water Resources
Jean Woods	Department of Water Resources
Eric Senter	Department of Water Resources
Dong Chen	Department of Water Resources
Tom Hawkins	Department of Water Resources

- **WISDM – Objectives, Functional and Technical Requirements** this included the DWR project team members only. The purpose of the workshop was to discuss the objectives identified in the first workshop, and to define the high level functional and technical requirements that will fulfill them.

Attendee Name	Organization
Scott Hayes	Department of Water Resources
Jean Woods	Department of Water Resources
Dong Chen	Department of Water Resources
Tom Hawkins	Department of Water Resources

4. DPH Workshops

- **WISDM – Problems, Opportunities, and Objectives** this included the DPH project team members only. The purpose of the workshop was to discover the perceived business problems and opportunities, and the goals/objectives that need to be fulfilled to solve the problems and realize the opportunities.

Attendee Name	Organization
Paul Collins	DPH/DDWEM
Cindy Forbes	Department of Public Health
Rich Haberman	Department of Public Health
Dmitry Ginzburg	Department of Public Health

- **WISDM – Objectives, Functional and Technical Requirements** this included the DPH project team members only. The purpose of the workshop was to discuss the objectives identified in the first workshop, and to define the high level functional and technical requirements that will fulfill them.

Attendee Name	Organization
Paul Collins	DPH/DDWEM
Cindy Forbes	Department of Public Health
Rich Haberman	Department of Public Health
Dmitry Ginzburg	Department of Public Health

5. CALFED Interview

The CALFED does not publish, distribute or process standard forms for water users to complete. The project team decided that because of this it was not necessary that the CALFED be part of the stakeholder groups workshops process, and that an interview to discuss the current processes and the WISDM was sufficient.

Attendee Name	Organization
Rick Brietenbach	CALFED
John Ryan	CALFED, PP&T Unit

6. Consensus and Requirements Validation Workshop

This included State Water Board, DWR, CALFED and DPH project team members. The purpose of the workshop was to gain consensus on any differences of vision between the stakeholder groups discovered during the group workshops, and for State Water Board, DWR, CALFED and DPH to validate the high level functional and technical requirements.

Attendee Name	Organization
Sally Nyman	State Water Board
Kevin Long	State Water Board
Dong Chen	DWR
Jean Woods	DWR
Evan Scarisbrick	State Water Board/EcoInteractive
Paul Collins	DPH
Tom Hawkins	DWR
Rick Brietenbach	CalFED

…this page is intentionally left blank…

ATTACHMENT 2 – WISDM Process Flow

This Attachment contains a sample flowchart of how process flow *could* be handled within the WISDM System.

…this page is intentionally left blank…

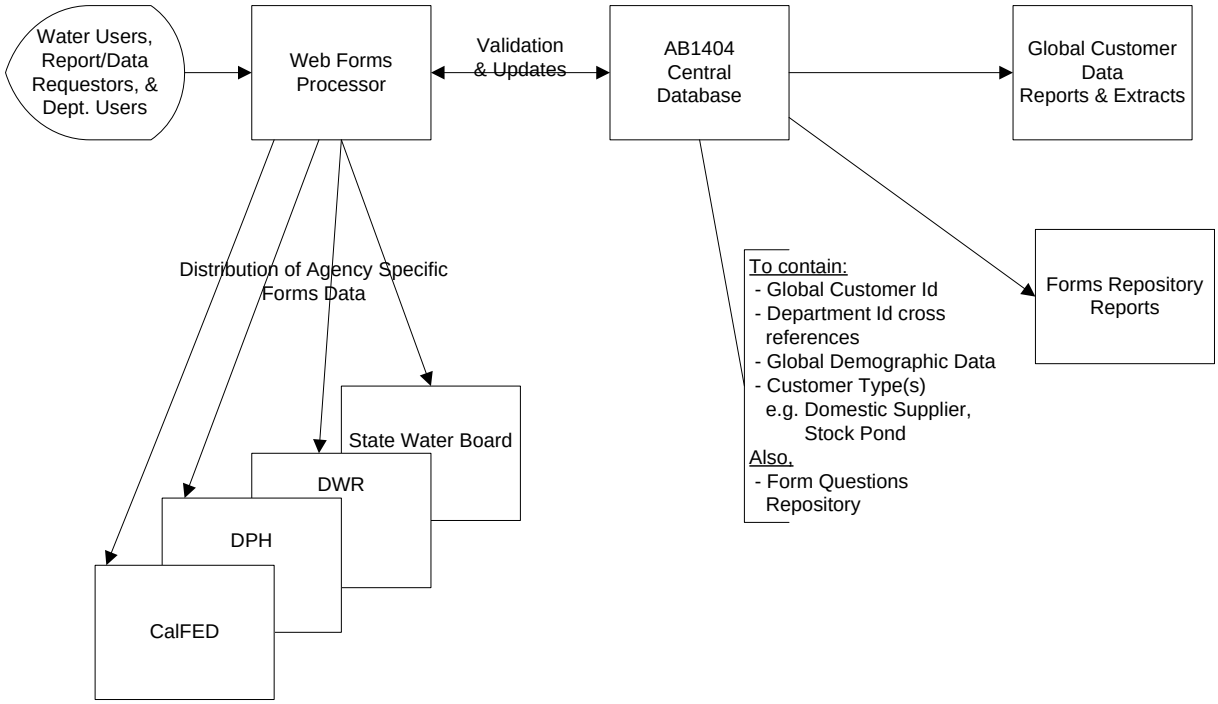
AB1404 Project Team Consensus Approach
Information Flow

Information Sources

Roles & Responsibilities & Features

Information Shared

- Each Department will manage its own Global Customer data
- The IT M&O Support organization has to be determined
- If combined water data is to be delivered for report and data requests, a data consolidation process will have to be developed to access the Departments' application databases.



…this page is intentionally left blank…

ATTACHMENT 3 – Resource Requirements: Definitions and Estimates

This Attachment contains the projects staffing work plans and estimate of hours by task by Fiscal Year for each resource for the WISDM System.

…this page is intentionally left blank…

Position Title: Staff Services Manager III *{Position scheduled to begin 7/1/2010]*

Task Description	FY 10/11 Hours	FY 11/12 Hours	FY 12/13 Hours
• Program Management - Provide management guidance and leadership in planning and directing the program tasks, policies and procedures. Direct, coordinate, and evaluate programs research and reporting, which highlight such elements as data trends, systems delivery, and statewide issues. Plan and coordinate projects, estimate staffing requirements; assign staff to project teams. Assign tasks to teams and directs the work of the project managers.	500	500	500
• Oversee project implementation, enforcing adherence to development standards and assist project manager with the resolution of problems and/or issues affecting implementation. Oversee post-implementation review of tasks and evaluate the quality of systems, services, and appropriateness of standards, methods, and procedures.	200	200	200
• Ensure adherence to the Program's policies and procedures involving EEO, ADA, and other personnel practices. Resolve EEO issues and other conflicts at lowest possible level and ensure that there is no retaliation. Evaluate the performance of employees to ensure acceptable job performance, and work with each employee to develop required skills to meet and exceed job requirements. Assign projects, monitors and evaluates the performance of unit staff, and review and/or prepare unit training plans. Handle all unit administrative matters, including but not limited to personnel, contracts, budgeting, and review and approve unit purchasing requests.	500	500	500
• Program Planning - Oversee, administer and manage the WISDM Program. Develop administrative procedures and policies, program alternatives for the WISDM Program that are consistent with the Program's mission and organization's objectives. Direct the long-term and short-term planning of implementation activities. Develop strategies, policies and procedures associated with the WISDM and other divisional requirements. Monitor program units' adherence to State, departmental, divisional and programmatic polices to ensure efficient operations within authorized budgetary levels. Prepare and maintain a work plan based on Program priorities and criteria outlined by the Chapter 675/2007 Statute. Meet and discuss complex issues with staff regarding program development and resolve issues and problems. Advise and make recommendations to the Deputy Directors, Departments' Directorate on the WISDM Program and workforce development.	200	200	200
• Collaborative Activities - Coordinate with all stakeholders in the development of the WISDM database warehouse and infrastructure. Represent the Program on special task force and at meetings with other governmental stakeholders or agencies, and professional organizations. Prepare programmatic and policy recommendations for submission to executive management. Provide consultation to the WISDM Advisory Committee and other stakeholders as needed regarding the progress of the program development, problems and issues, and research design and methodology. Maintain an awareness of research methods pertaining to the WISDM technical environment.	200	200	200

• Program Management - Provide management guidance and leadership in planning and directing the research factors to produce quality documents. Direct, coordinate, and evaluate staff's research and production of reports, which highlight such elements as data trends, systems delivery, and statewide issues. Prepare and maintain a unit work plan based on Program priorities and criteria outlined in the Chapter 675/2007 Statute. Plans and coordinates projects, estimates staffing requirements; assigns staff to project teams. Assign tasks to teams and direct the work of the project managers. Oversee project implementation, enforcing adherence to research development standards and assist project manager with the resolution of problems and/or issues affecting implementation. Oversee post-implementation review of tasks and evaluate the quality of systems, services, and appropriateness of standards, methods, and procedures.	300	300	300
• Contracts Management – Approve the preparation and administration of contracts required for maintaining program operations. Work with contractor and the WISDM Program contracts/finance personnel to finalize contracts. Monitor timelines and ensure deliverables and scope of work are met. Serve as the point of contact for contractors. Approve final invoices. Update contract budgets and communicate all essential issues to the WISDM Program staff, contract office or the contractors. Review the WISDM needs and program against budget limitations and recommend appropriate action. Comply with the Program fiscal polices by participating in management of the program budget by monitoring, tracking and prioritizing expenditures related to the WISDM Program to ensure fiscal responsibility.	100	100	100
TOTAL REQUIREMENTS	**2,000**	**2,000**	**2,000**
FULL-TIME EQUIVALENT (Total Hours/2,000 Hours Per FTE Year/Period in Years)			

Position Title: Research Analyst II (General) *{Position scheduled to begin 9/1/2010]*

Task Description	FY 10/11 Hours	FY 11/12 Hours	FY 12/13 Hours
• Research, Design and Implementation - Assemble disparate data dealing with water use and diversion, and resources for internal staff and external distribution. Design, implement, and monitor processes for accessing external data sources for the WISDM Program. Conduct research into water use and diversion trends in California focusing on identifying, compiling, analyzing, and describing data. Integrate the data elements obtained from various water use and diversion sources. Work independently to interpret and analyze new data sources to identify emerging trends and to provide WISDM data requirements. Prepare reports as requested.	500	600	600
• Analysis and Evaluation - Research methodology including problem exploration and definition, planning and Designing data collection processes, interpretation of findings, and documentation and reporting of findings in support of WISDM policy areas. Work with WISDM and division staff, WISDM Advisory Committee and other stakeholders to help establish priorities for data acquisition in support of research projects. Conduct general research in support of water use and diversion policy issues. Develop and use business intelligence system (BI) computer desktop tools to analyze and display data. Use other appropriate computer desktop productivity tools (e.g., Excel, Access, etc.) to analyze and display data. Work with staff and specialists from the WISDM, government, and private sectors to identify appropriate sources of information suitable for use in building and maintaining BI data of interest to the OSHPD. Prepare results from analysis (statistical and graphical) of new data sources in support of program activities including written reports, tables/charts and map production.	500	600	600
• Inquiries and Documentation - Respond to complex information requests by retrieving information utilizing computerized models. Identify problem areas and identify data for analysis and comparison. Assist the Research Program Specialist in producing and maintaining metadata (documentation) for the WISDM data sets collection including purpose, and process for collection, classifications used, appropriate applications, responsible units and contact persons, map scale and projections, and other metadata in compliance with Program standards. Respond to WISDM Advisory Committee and other stakeholder inquiries regarding healthcare workforce research information.	500	600	600
• Perform other duties as required.	167	200	200
TOTAL REQUIREMENTS	**1,667**	**2,000**	**2,000**
FULL-TIME EQUIVALENT (Total Hours/2,000 Hours Per FTE Year/Period in Years)			

Position Title: Research Analyst I (General) [number one] *{Position scheduled to begin 8/1/2010]*

Task Description	FY 10/11 Hours	FY 11/12 Hours	FY 12/13 Hours
• Data Collection - Compile, extract, and merge data and provide program data to internal and external researchers. Assist in the collection of workforce data, planning, designing and preparing statistical tables and questionnaires, analyzing healthcare industry trends and relationships and writing text. Respond to Program management, WISDM staff, and external participants' requests for a variety of reporting products including GIS, maps, presentation graphics, data tables and reports. Assist with special studies in a timely and accurate manner.	550	600	600
• Data Quality Assurance - Perform data quality checks to ensure accurate data entry. Provide oral and written data quality reports for the program. Participate, as required, in the analysis and review of statistical data developed or obtained through the survey tools and under the guidance of the supervisor. Apply structured procedures to ensure statistical validity and reliability of estimates for the WISDM Team.	458	500	500
• Regulations and Inquiry - Assist in developing and responding to inquiries from interested parties on issues relating to the WISDM Program regulations.	550	600	600
• Meetings - Attend meetings with staff to discuss the development and progress of the WISDM Program and other relevant issues related to program and policy development.	183	200	200
• Perform other related duties as assigned.	92	100	100
TOTAL REQUIREMENTS	**1,833**	**2,000**	**2,000**
FULL-TIME EQUIVALENT (Total Hours/2,000 Hours Per FTE Year/Period in Years)			

Position Title: Research Analyst I (General) [number two] *{Position scheduled to begin 10/1/2010]*

Task Description	FY 10/11 Hours	FY 11/12 Hours	FY 12/13 Hours
• Data Collection - Compile, extract, and merge data and provide program data to internal and external researchers. Assist in the collection of workforce data, planning, designing and preparing statistical tables and questionnaires, analyzing healthcare industry trends and relationships and writing text. Respond to Program management, WISDM staff, and external participants' requests for a variety of reporting products including GIS, maps, presentation graphics, data tables and reports. Assist with special studies in a timely and accurate manner.	450	600	600
• Data Quality Assurance - Perform data quality checks to ensure accurate data entry. Provide oral and written data quality reports for the program. Participate, as required, in the analysis and review of statistical data developed or obtained through the survey tools and under the guidance of the supervisor. Apply structured procedures to ensure statistical validity and reliability of estimates for the WISDM Team.	375	500	500
• Regulations and Inquiry - Assist in developing and responding to inquiries from interested parties on issues relating to the WISDM Program regulations.	450	600	600
• Meetings - Attend meetings with staff to discuss the development and progress of the WISDM Program and other relevant issues related to program and policy development.	150	200	200
• Perform other related duties as assigned.	75	100	100
TOTAL REQUIREMENTS	**1,500**	**2,000**	**2,000**
FULL-TIME EQUIVALENT (Total Hours/2,000 Hours Per FTE Year/Period in Years)			

Position Title: Associate Governmental Program Analyst *{Position scheduled to begin 7/1/2010]*

Task Description	FY 10/11 Hours	FY 11/12 Hours	FY 12/13 Hours
• Assist with the development of regulations for the WISDM Program. Work in a team environment to interpret law, develop regulations necessary to comply with the applicable sections of the Water Code. Review procedural requirements for developing and submitting regulations. Identify timelines and procedures. Review other statutes, regulations, and internal policies that relate to the WISDM statutes. Gather relevant legal information. Identify all statutes providing the rulemaking authority; provide documentation to support the need for and authority for the regulations. Serve as liaison to other state Departments, the Office of Administrative Law, and the Department of Finance regarding regulations development. Prepare proposed text, draft initial statement of reasons and cost to the state, and draft notice of proposed rulemaking. Prepare publication of notice and mailing to interested parties, internet display for receipt of public comment: establish date, location time for public hearing on proposed text. Conduct the public hearing on the proposed rule. Review comments received in public hearing and incorporate changes in the text; complete rulemaking record with documentation-text, final statement of reasons, and response to the comment. Submit proposed action to Office of Administrative Law. Respond to telephone and correspondence inquiries relative to the WISDM policies and programs.	1,500	1,500	1,500
• Assist the Research staff in verifying proposed data fields conform to the WISDM regulations.	300	300	300
• Perform other duties as required.	200	200	200
TOTAL REQUIREMENTS	**2,000**	**2,000**	**2,000**
FULL-TIME EQUIVALENT (Total Hours/2,000 Hours Per FTE Year/Period in Years)			

Position Title: Office Technician *{Position scheduled to begin 10/1/2010]*

Task Description	FY 10/11 Hours	FY 11/12 Hours	FY 12/13 Hours
• Handles less complex tasks related to the personnel action requests from preparation and submission to Personnel, and tracking requests through completion. Responds to questions and provides additional information to Personnel related to pending actions. Maintains position duty statement, updates project organization chart, emergency notification forms, alternate workweek agreements, etc. Serves as the primary point of contact with Personnel regarding questions related to personnel actions, pay and benefits, and attendance reporting.	300	400	400
• Serves as the Project's training coordinator handling the processing of individual training requests for Project employees. Researches sources of training whether in-service of out-service; negotiates best price with private training vendors; makes special arrangements for group, package or onsite training; resolves service problems with vendors and State providers; maintain contacts with regular training vendors/providers. Screens training requests for proper completion according to program policy; resolves discrepancies with supervisors and employees; submits training requests to the Program's Training Officer for processing; follows up to ensure registration and payment of fees. Works with the Training Officer to ensure that the training records of Project employees are accurate and up-to-date, communicate training activities, and inquire and respond to questions related to Project's training needs.	300	400	400
• Orders and maintains office supplies, furniture and equipment. Researches and secures bids from vendors, prepare required ordering documents; works with business services to track orders from processing through delivery. Initiates purchases of authorized goods and services from CMAS, State-contract suppliers, and other private vendors using online ordering systems or CAL-Card, as permitted. May serve as backup for the ordering and purchasing of computer commodities. Serves as point-of-contact to business services for facilities maintenance problems/repairs/cleaning; initiates telephone line, computer cabling, and electrical repairs, installations, or changes; maintains and initiates orders for repair of general office equipment.	300	400	400
• Follows up with accounting on the payment of invoices for goods and services. Handles pre-payments, travel advances, travel expense claims, etc. Reconciles invoices for payment approvals and resolves errors with vendors/suppliers.	300	400	400
• Perform receptionist and general clerical duties, including but not limited to screening and directing incoming calls, making travel and lodging arrangements for staff, timekeeping, preparing correspondence, and occasional typing/proofreading, filing, and copying. Provides secretarial support to the Program Manager as required.	300	400	400
TOTAL REQUIREMENTS	**1,500**	**2,000**	**2,000**
FULL-TIME EQUIVALENT (Total Hours/2,000 Hours Per FTE Year/Period in Years)			

Position Title: Data Processing Manager III *{Position scheduled to begin 11/1/2010]*

Task Description	FY 10/11 Hours	FY 11/12 Hours	FY 12/13 Hours
• Provide management guidance and leadership in planning and directing the research factors to produce complete and quality data. Direct, coordinate, and evaluate programs technical development and contract staff for the implementation and maintenance of the WISDM environment. Plan and coordinate projects, estimates staffing requirements; assigns staff to project teams. Oversee project management including contract development, contract staff management, work plan approval, risk assessment and coordination with Program Director and Project Sponsor on project development. Oversee post-implementation review of tasks and evaluate the quality of systems, services, and appropriateness of standards, methods, and procedures. Assign projects, monitors and evaluates the performance of unit staff, and review and/or prepare unit training plans. Handle all unit administrative matters, including but not limited to personnel, contracts, budgeting, and review and approve unit purchasing requests.	800	1,200	1,200
• Develops and maintains the WISDM data model (architecture) identifying key data and databases to support internal operational, administrative, and management information needs and water use and diversion data/information dissemination as required by law. Constructs a logical and physical database model to consolidate/synchronize related water use and diversion data. Leads and/or participates in multi-agency stakeholder and multi-divisional efforts to analyze and implement solutions to data management problems related to the WISDM.	67	100	100
• Recommends and implements WISDM data policies concerning responsibility and accountability for data accuracy, consistency, timeliness, integrity, availability, security, and retention. Assesses the impact of laws and regulations on WISDM Program data policies. Implements standards for data elements such as naming conventions, coding, etc. Mediates interdivisional problems regarding ownership, naming, and use of the data.	133	200	200
• Evaluates, recommends, and implements a distributed databases network or similar technologies to provide research and analysis functions for the WISDM. Researches, recommends and directs staff in the implementation of technologies, methods, or applications for electronic data distribution to, or transfer between, external Water Data Providers or users via the Internet and other electronic transfer mediums. Participates in the evaluation and selection of database management system software and access tools for decision support and end user access to ensure compatibility with existing data management technology architecture and standards.	133	200	200
• Provides consultation to business management on ways to improve data collection, integrity, security, integration, synchronization, linkage, distribution and dissemination. Assists business units and IT project teams in the design of applications and products that access or consolidate data from multi-data sources. Educates business management and IT staff on data management policies, standards, and best practices.	200	300	300
TOTAL REQUIREMENTS	**1,333**	**2,000**	**2,000**
FULL-TIME EQUIVALENT (Total Hours/2,000 Hours Per FTE Year/Period in Years)			

Position Title: Senior Information Systems Analyst (Technical Lead) *{Position scheduled to begin 11/1/2010]*

Task Description	FY 10/11 Hours	FY 10/11 Hours	FY 11/12 Hours
• Serves as the technical lead to provide knowledge and expertise in the SDLC and Operations of the WISDM. Conducts team meetings regularly to review status, coordinate team efforts, delegate and assign work to technical staff, review the work and progress of individual IT staff, and discusses and resolves problems and issues related to systems design, development, implementation, operations, and maintenance of systems. This involves planning and coordinating work activities of a virtual teams comprised of in-house technical specialists, WISDM research staff, and external Information Technology (IT) consultants. Provides guidance and mentoring to team members as needed to improve technical proficiency and overall performance; reinforces organizational values in team members; enforces continuous improvement practices and total quality principles in the work and performance of team members; provides feedback to Supervisor on the performance and progress of individual team members and the team, and makes recommendations for further development and enhancements for the Program.	533	800	800
• Performs and oversees the planning, development, implementation and maintenance of the WISDM system architectures and application. Independently performs only the most complex analysis, design, programming and integration tasks involving the development and maintenance of mission critical system architectures and applications and other emerging information technology system architectures and applications. Performs and oversees the administration of system application servers. Performs and oversees the implementation of security measures and controls of applications. Reviews and approves the network administrators and other technical specialist's capacity plans for the program. Reviews and approves the analysis of application, web and database servers' performance requirements for the program. Performs and oversees application client support. Tracks application development problems and change requests. Assesses system client support requirements and works closely with other IT specialists to ensure users have the tools and skills necessary to fully utilize Information systems.	267	400	400
• Assists management and staff in research, analysis, and evaluate new and emerging technologies and methods related to system architectures and application developments. Recommends changes and improvements to program IT guidelines, policies, procedures, standards and requirements. Develops, performs and oversees the IT strategies to migrate applications and systems to newer information technologies and standards.	267	400	400
• Provides consultation to management, project team members and IT specialists on the most complex application and application problems, technologies and methodologies. Acts as program technical representative on multi-departmental task forces, technology forums, advisory committee, etc. that are sponsored by other departments and/or agencies.	266	400	400
TOTAL REQUIREMENTS	**1,333**	**2,000**	**2,000**
FULL-TIME EQUIVALENT (Total Hours/2,000 Hours Per FTE Year/Period in Years)			

Position Title: Staff Information Systems Analyst (Specialist) *{Position scheduled to begin 11/1/2010]*

Task Description	FY 10/11 Hours	FY 10/11 Hours	FY 11/12 Hours
• Configures, installs, and monitors physical and virtual desktop functions including operating systems and files. Oversee creation of standard workstation image.	267	400	400
• Configures, installs, and maintains network printers on print servers. Works with other technical specialists to diagnose and resolve complex workstation and printer problems. Maintain local and domain policies affecting customer workstations. Create and maintain software installation packages for desktop support.	267	400	400
• As higher-level support, diagnose and resolve complex service desk issues related to the network infrastructure. Works with other IT network administrators to monitor network operations at all WISDM locations. Work with support vendors, the Department of Technology Services (DTS) and other technical experts to resolve hardware access, performance, and connectivity issues.	267	400	400
• Provide leadership and guidance to other technical specialists engaged in workstation systems operations and support. Review work for completeness, accuracy, and fulfillment of requirements. Ensure adherence to standards. Identify individual or project problem areas. Prepare project plans and change management requests, provide status reports, and communicates project updates for enterprise technical workstation projects to the Customer Services Center Supervisor.	266	400	400
• With direction from the Enterprise Technical Architect, research new and emerging workstation technologies. Assess the benefit and impact on business operations. Formulate recommendations based on alternative technology solutions.	266	400	400
TOTAL REQUIREMENTS	**1,333**	**2,000**	**2,000**
FULL-TIME EQUIVALENT (Total Hours/2,000 Hours Per FTE Year/Period in Years)			

Position Title: Senior Information Systems Analyst (Network Specialist) *{Position scheduled to begin 6/1/2011]*

Task Description	FY 10/11Hours	FY 11/12 Hours	FY 12/13 Hours
• Perform complex systems research, systems analysis and planning to define and design network architecture, infrastructure, and interfaces to meet the WISDM System business and security requirements. Prepare specifications for the architecture components.	25	300	300
• Participate in requirements and design sessions and review system documentation and technical deliverables... Review and approve all WISDM system requirements and technical design documents.	17	200	200
• Lead, oversee and coordinate the complex installation, configuration, testing, and systems upgrades and patching of the network infrastructure components (hardware and software) to support the WISDM System (routers, hubs, switches, security and firewall components). Research, define requirements, design, configure and install all required hardware and software infrastructure updates or configuration changes required to meet business and security requirements.	25	300	300
• Prepare, review and coordinate activities for the Project Description and Project Plan for the Architecture requirements. Schedule and monitor technical tasks to integrate with overall project plan and prepare Change Control documents.	17	200	200
• Work with the Information Security Officer (ISO) and other ITSS technical subject matter experts to prepare and/or update policies, procedures, diagrams, and other documentation for the network, security and communications architecture.	17	200	200
• Work with network and communications vendor, other third-party vendors, the WISDM ISO, and ITSS and other technical experts to identify hardware and software procurement needs for infrastructure installations and upgrades.	17	200	200
• Research, analyze, design, test, define and coordinate the installation, configuration, testing, and implementation of the wireless remote connectivity components.	17	200	200
• Work with the ISO and other technical specialists to coordinate and design, maintain, support and integrate backup, recovery, security and disaster recovery operations and procedures into the Program's operational recovery plan.	16	200	200
• Research specifications and review industry best practices to prepare the security design of the network infrastructure technology components to adhere to industry and Program's security standards. Ensure compliance to audit, quality, and security standards during design, development & testing. Define security vulnerabilities, assess risk and determine mitigation strategies.	16	200	200
TOTAL REQUIREMENTS	**167**	**2,000**	**2,000**

FULL-TIME EQUIVALENT (Total Hours/2,000 Hours Per FTE Year/Period in Years)			

Position Title: Staff Programmer Analyst (Database Administrator) *{Position scheduled to begin 6/1/2011]*

Task Description	FY 10/11 Hours	FY 11/12 Hours	FY 12/13 Hours
• Serves as the Data Base Administrator for the WISDM project. The incumbent works on the most technically complex software systems and configurations on complex multi-server applications. Plans and implements software system upgrades and conversions. Supports, and troubleshoots production databases / applications issues. Develops and maintains the database architecture, configuration, operations, monitoring, performance tuning, security, account management, upgrades, and backup and recovery. Develops and maintains the BI toolset architecture, configuration, operations, monitoring, performance tuning, security, account management, upgrades, and backup and recovery.	33	400	400
• Serves as the technical data coordinator to provide knowledge and expertise in the SDLC and Operations for the data in the WISDM. Conduct team meetings regularly to review status, coordinate team efforts, delegate and assign work to technical staff, review the work and progress of individual IT staff, and discusses and resolves problems and issues related to systems design, development, implementation, operations, and maintenance of systems. Provides guidance and mentoring to team members as needed to improve technical proficiency and overall performance; reinforces organizational values in team members; enforces continuous improvement practices and total quality principles in the work and performance of individual team members and the team, and makes recommendations for further development and enhancements for the Program.	33	400	400
• Performs and oversees the planning, development, implementation, and maintenance of the Database Systems Architecture. Independently performs the most complex analysis, design and programming tasks involving the development and maintenance of Database Systems. Performs and oversees System Administration of Database Systems. Performs and oversees the implementation of security measures and controls of these Systems. Performs and oversees database support for the clients. Performs, oversees, and reviews capacity planning and disaster recovery for the program. Performs, oversees, and reviews the analysis of application, web and database performance requirements for the program. Tracks database development problems and change requests. Assesses client support requirements and works closely with other IT specialists like trainers and business systems consultants to ensure users have the tools and skills necessary to fully utilize the applications and databases.	33	400	400
• Reviews delivery of data to and status of participating agencies WISDM 'node' Systems. Performs all Database administration, security and performance tuning functions for these 'node' systems.	34	400	400
• Provides consultation to management, project team members and IT specialists on the most complex system software and database problems, technologies and methodologies. Acts as program technical representative on multi-departmental task forces, technology forums, advisory committee, etc. that are sponsored by other departments and/or agencies.	34	400	400
TOTAL REQUIREMENTS	**167**	**2,000**	**2,000**

FULL-TIME EQUIVALENT (Total Hours/2,000 Hours Per FTE Year/Period in Years)			

Position Title: Staff Programmer Analyst *{Position scheduled to begin 6/1/2011]*

Task Description	FY 10/11 Hours	FY 10/11 Hours	FY 11/12 Hours
• Programs the complex application development, support and enhancements tasks. (1) Object-oriented programming using WISDM approved tools; (2) Programming enhancements of application system interfaces including document imaging, and external systems; (3) Programming infrastructure components for rules engine, business objects, workflow management, letter generation, reporting, etc; (4) SQL programming and database schema enhancements; (5) Application report development and enhancements; (6) Maintenance of functional and technical programming specifications; (7) Development of technical documentation using code commenting, diagramming and technical writing as required.	40	475	475
• Plans, develops and administers database management systems. Ensures database system quality, integrity, resolves data access problems, ensures that data systems are consistent with user's business requirements, and ensures data security. Participates with network administrators in capacity planning, and analysis of database server performance and storage requirements. Installs and tests new database management system software releases and patches. Implements security and backup/recovery procedures and performs database server load balancing. Institutes specific processes and procedures to coordinate database systems upgrades. Evaluates database systems for effectiveness and improvements.	40	475	475
• Research new and emerging application development technologies. Formulate technical recommendations based on alternative technology solutions studies. Provide analysis for procurement of network-related software and hardware. Consult with vendors and other technical experts to perform research and analysis.	40	475	475
• Other duties include (1) Preparing correspondence relating to project assignments such as meeting agendas, meeting minutes, memos, and weekly status reports to supervisor; (2) Assisting in the development of system development life cycle standards by researching the Internet, textbooks, lessons learned, best practices, and/or training class materials; (3) Preparing special reports and budget estimates as required; (4) Developing specifications and cost estimates for new PCs, network servers, hardware and software as needed for development services procurement.	40	475	475
• Other duties as assigned.	7	100	100
TOTAL REQUIREMENTS	**167**	**2,0002000**	**2,000**
FULL-TIME EQUIVALENT (Total Hours/2,000 Hours Per FTE Year/Period in Years)			

Position Title: Office Technician *{Position scheduled to begin 6/1/2011]*

Task Description	FY 10/11 Hours	FY 11/12 Hours	FY 12/13 Hours
• Handles less complex tasks related to the personnel action requests from preparation and submission to Personnel, and tracking requests through completion. Responds to questions and provides additional information to Personnel related to pending actions. Maintains position duty statement, updates project organization chart, emergency notification forms, alternate workweek agreements, etc. Serves as the primary point of contact with Personnel regarding questions related to personnel actions, pay and benefits, and attendance reporting.	33	400	400
• Serves as the Project's training coordinator handling the processing of individual training requests for Project employees. Researches sources of training whether in-service of out-service; negotiates best price with private training vendors; makes special arrangements for group, package or onsite training; resolves service problems with vendors and State providers; maintain contacts with regular training vendors/providers. Screens training requests for proper completion according to program policy; resolves discrepancies with supervisors and employees; submits training requests to the Program's Training Officer for processing; follows up to ensure registration and payment of fees. Works with the Training Officer to ensure that the training records of Project employees are accurate and up-to-date, communicate training activities, and inquire and respond to questions related to Project's training needs.	33	400	400
• Orders and maintains office supplies, furniture and equipment. Researches and secures bids from vendors, prepare required ordering documents; works with business services to track orders from processing through delivery. Initiates purchases of authorized goods and services from CMAS, State-contract suppliers, and other private vendors using online ordering systems or CAL-Card, as permitted. May serve as backup for the ordering and purchasing of computer commodities. Serves as point-of-contact to business services for facilities maintenance problems/repairs/cleaning; initiates telephone line, computer cabling, and electrical repairs, installations, or changes; maintains and initiates orders for repair of general office equipment.	33	400	400
• Follows up with accounting on the payment of invoices for goods and services. Handles pre-payments, travel advances, travel expense claims, etc. Reconciles invoices for payment approvals and resolves errors with vendors/suppliers.	34	400	400
• Maintains document library and generally supports project staff. Perform receptionist and general clerical duties, including but not limited to screening and directing incoming calls, making travel and lodging arrangements for staff, timekeeping, preparing correspondence, and occasional typing/proofreading, filing, and copying. Provides secretarial support to the Project Manager as required.	34	400	400
TOTAL REQUIREMENTS	**167**	**2,000**	**2,000**
FULL-TIME EQUIVALENT (Total Hours/2,000 Hours Per FTE Year/Period in Years)			

ATTACHMENT 4 – List of Acronyms

This Attachment contains a list of acronyms and definitions that are used in this FSR.

…this page is intentionally left blank…

Acronym	Acronym Meaning
ADA	Americans with Disabilities Act
ADM	Application Development Methodology
AIMS	Agency Information Management Strategy
BCP	Budget Change Proposal
BOE	Board of Equalization
CALFED	California Bay-Delta Authority and California Bay-Delta Program
CCB	Change Control Board
CIO	Chief Information Officer
CIWQS	California Integrated Water Quality System
CMAS	California Multiple Award Schedules
COTS	Commercial Off The Shelf
CVP	Central Valley Project
DBMS	Database Management System
DD&I	Design, Development and Implementation
DDWEM	Division of Drinking Water and Environmental Management
DPH	California Department of Public Health
DRI	Data Resources Inventory
DTS	California State Department of Technology Services
DWR	California Department of Water Resources
EEO	Equal Employment Opportunity
ELAP	Environmental Laboratory Accreditation Program
EMB	Environmental Management Branch
EPA	Environmental Protection Agency
ERP	Ecosystem Restoration Program
eWRIMS	Electronic Water Rights Information Management System
FAQ	Frequently Asked Question
FIMTV	Federated Identity Management Technical Vision

Acronym	Acronym Meaning
FSR	Feasibility Study Report
FY	Fiscal Year
IPOC	Independent Project Oversight Consultant
ISO	Information Security Office
IT	Information Technology
IV&V	Independent Validation and Verification
LAO	California Legislative Analyst's Office
LWS	Large Water Systems
MDWUD	Multi-Department Water Use Database
M&O	Maintenance and Operations
MTBE	Methyl Tertiary-Butyl Ether
NEIEN	National Environmental Information Exchange Network
OCIO	Office of the Chief Information Officer
O/S	Operating System
PICME	Permits Inspections Compliance Monitoring & Enforcement
PIER	Post Implementation Evaluation Review
PM	Project Management
PMBOK®	Project Management Body of Knowledge
PMI	Project Management Institute
PMM	Project Management Methodology
PMO	Project Management Office
PMP	Project Management Plan
PPIS	Project Performance Information System
PP&T	Program Performance and Tracking Unit
PWA	Public Water Authorities
PWS	Public Water Supplier
RDMS	Relational Database Management System

Acronym	Acronym Meaning
RFP	Request For Proposal
RML	Risk Management Log
RMP	Risk Management Plan
RMT	Risk Management Team
SAM	State Administrative Manual
SDLC	System Development Life Cycle
SDWS	Safe Drinking Water Systems Program
SIMM	Statewide Information Management Manual
SME	Subject Matter Expert
SOA	Service-Oriented Architecture
SRL	Sanitation & Radiation Laboratory
SSL	Secure Socket Layer
SWP	State Water Project
SWS	Small Water Systems
TMF	Technical, Managerial, and Financial
UAT	User Acceptance Testing
WBS	Work Breakdown Structure
WBT	Web-Based Training
WDP	Water Data Provider encompasses the State Water Board, DWR and DPH sources of information which include: Water Rights Permittees and Licensees, Public Water Agencies, Public Water Systems, Public Water Suppliers.

…this page is intentionally left blank…

ATTACHMENT 5 – Reference Documentation List

This Attachment contains a list of documents and other materials that were used in creation of this FSR.

…this page is intentionally left blank…

Reference Documentation List

The following is a list of the reference material that was made available to the Pacific Project Management team, for background information and research purposes.

CALFED References

1. Independent Panel on Appropriate Measurement of Agricultural Water Use, Final Report, September 2003.
2. CALFED Bay-Delta Program, Program Performance System Project, System Design: April 23, 2008.
3. Delta Vision Strategic Plan, June 18 2008.
4. The Natural Resource Projects Inventory, web site.
5. Annual Reports for 2006 and 2007.

DPH References

1. CDPH Strategic Plan, Final July 9 2008.
2. Enterprise-Wide On-Line Licensing System, FSR, January 15 2008.
3. Sample water use reporting forms

DWR References

1. Form DWR38, revised 12/07.
2. California Irrigation Management Information System, FSR, May 2008.
3. DWR Strategic Business Plan, 2005.

State Water Board References

1. AIMS RFO, June 11 2007.
2. Sample Forms.
3. eWRIMS On-line Reporting Project Charter, July 22 2008.
4. Groundwater Recordation Data Format, Excel spreadsheet.
5. eWRIMS Online Reporting- Preliminary Functional Requirements, May 2 2008.
6. Statement and groundwater program information tracked in eWRIMS, Excel spreadsheet.
7. California Water Boards, Strategic Plan Update 2008-2012, May 30 2008.
8. State Water Board Organization Chart, April 1 2008

OCIO References.

1. California Enterprise Architecture Program, Service-Oriented Architecture and Federated Identity Management Technical Vision, January 7 2008.
2. California Enterprise Architecture Framework, July 15 2005.

NEIEN References

1. National Environmental Information Exchange Network, Blueprint for a National Environmental Information Exchange Network, October 30 2000.

Legislation References

1. Assembly Bill No. 1404, Chapter 675, October 14 2007.