Robert Kuo Consulting, LLC with
Lawrence Doyle
Shannon Gaffney Consulting
EPC Consultants, Inc.

Financial Review of Aspects of the Water System Improvement Program

Final Report to the Public Utilities Revenue Bond Oversight Committee

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Table of Contents

EXECUTIVE SUMMARY 1

EXPLANATION OF WSIP PROJECT SCOPE AND BUDGET CHANGES FROM 2002 TO 2005 1
Recommendations on Tracking Future Project Scope and Budget Changes 3
AUDIT OF FINANCIAL DATA IN FAMIS AND PRIMAVERA 4
Recommendations on FAMIS versus P3E Reconciliation 5
Recommendations Regarding Appropriations 5
Recommendations On Invoice Approval Process 6
CHANGES IN PROGRAM CONTROLS 6
Recommendations on Program Controls 7
PROJECTS REMOVED FROM WSIP 7
Recommendations Regarding Project Removed from WSIP 8
LISTING OF FINDINGS AND RECOMMENDATIONS 9

CHAPTER 1: BACKGROUND OF THE REVIEW 15

BRIEF HISTORY OF THE WSIP 16
SOURCES USED IN ANALYSIS 18

CHAPTER 2: OVERVIEW OF 15 WSIP PROJECTS – CHANGES IN SCOPE AND BUDGETS OVER TIME 19

BACKGROUND, FINDINGS AND RECOMMENDATIONS 19
Background and Findings 19
Recommendations 21
PROJECT BUDGETS – COST CATEGORIES AND DEVELOPMENT 21
Projects: Cost Categories 22
Projects: Budget Development 23
ANALYSIS OF 15 WSIP PROJECTS 24
Tie Project Budgets 24
Projects: Overview of Analysis 27
EXPANDED ANALYSES 35
Calaveras Dam Replacement 35
New Crystal Springs Bypass Tunnel 43
Crocker Amazon Pump Station Upgrade 49
CONDENSED PROJECT ANALYSES 56
San Joaquin Pipeline (SJPL) No. 4 56
Tesla Portal Disinfection Facility 59
Calaveras Reservoir Upgrade 62
Irvington Tunnel Alternatives 63
Bay Division Pipelines (BDPLs) Nos. 3 & 4 Cross Connections 66
Bay Division Pipeline (BDPL) Hydraulic Capacity Upgrade 69
SFPUC/EBMUD Intertie 73

Sunset Reservoir -- Seismic Upgrade/Rehabilitation 75
Summit Reservoir Rehabilitation 78
Pump Station Upgrades (Forest Knolls) 81
Pump Station Upgrades (McLaren Park) 84
Tank Rehab and Seismic Upgrade McLaren #1 87

CHAPTER 3: RECONCILIATION AND VOUCHING OF 15 PROJECTS 90

INTRODUCTION 90
RECONCILIATION OF PROJECT BUDGETS & EXPENDITURES BETWEEN PRIMAVERA AND FAMIS 90
CHANGES FROM NOVEMBER 2005 APPROVED PROJECTS BUDGETS TO PROJECT BUDGETS LOADED IN PRIMAVERA IN FEBRUARY 2006 91
Changes to P3E Expenditure Reporting Since 2006 Report 97
Update on FAMIS 97
Reconciliation of Project Expenditure Data between Primavera and FAMIS 97
San Joaquin Pipeline – Corrections Required to Pre-CIP Funding & Erroneous Expenditure Item in P3E 99
Tesla Portal Disinfection Station 99
Calaveras Dam and Calaveras Reservoir Upgrades 100
New Irvington Tunnel 100
Bay Division Pipelines #3 & #4 100
Conclusions on Reconciliation of Expenditure Data 101
Recommendations Regarding Reconciliation of P3E and FAMIS 104
RECONCILIATION OF APPROPRIATIONS IN FAMIS TO BOARD OF SUPERVISORS APPROVED BUDGETS 105
Authorization Procedures 108
Reconciliation 108
Recommendations Regarding Appropriations 109
VOUCHING A SAMPLE OF INVOICES 109
Overhead 113
Recommendations On Invoice Approval Process 114
VERIFY NO PROPOSITION A FUNDS SPENT BEFORE NOVEMBER 2002 115
IDENTIFY ANY MATERIAL DIFFERENCES NOTED AND PROVIDE EXPLANATIONS 115

CHAPTER 4 – REVIEW OF PROGRAM CONTROLS AND INTERNAL CONTROLS 116

INTRODUCTION 116
CHANGE ORDER PROCEDURES AS OF THE RBOC 2006 FINANCIAL REVIEW 116
HIGHLIGHTS OF THE CURRENT CHANGE CONTROL PROCEDURES 117
Approval Path for Project Budget and Schedule Changes 118
Findings on the Current Change Control Procedures 121
Recommendations 121

CHAPTER 5: PROJECTS REMOVED FROM THE WSIP 123

OVERVIEW 123
BACKGROUND: CITY'S CAPITAL PLANNING PROCESS 123
WATER ENTERPRISE CAPITAL PROGRAMS 123

WSIP Overview *126*
Renewal and Replacement Program (R&R) Overview *126*
Water Enterprise Capital Improvement Funding *126*
CHANGED PROJECTS: AN OVERVIEW 127
Finding Regarding Rationale for Decisions to Remove Projects From WSIP . *127*
REMOVED AND REASSIGNED PROJECTS: PROJECT SPECIFIC INFORMATION 130
Removed Projects *130*
Bay Division Pipeline (BDPL) Nos. 1 & 2 Repair of Caisson and Pipe Bridge 130
Mountain Tunnel Lining (Hetch Hetchy) 130
Early Intake Reservoir Resurface Dam (Hetch Hetchy) 130
Early Intake Reservoir – Lower Spillway & Adjustable Weir Project 131
Foothill Tunnel Repairs (Hetch Hetchy) 131
Sunol Quarry Reservoirs 131
Reassigned Projects *132*
BDPL Nos. 3&4 Crossover/Isolation Valve at Hayward Fault 132
Groundwater Project 132
Recycled Water Project 132
FINDINGS AND RECOMMENDATIONS 132
Findings *132*
Recommendations *133*

Table Of Figures

FIGURE 1. COMPOSITION OF TOTAL CONSTRUCTION COSTS 23
FIGURE 2. TIE INITIAL MAY 2002 PROJECT BUDGETS TO AUGUST 2003 CIP TO NOVEMBER 2005 WSIP AND CURRENT WSIP COST ESTIMATE..... 25
FIGURE 3. SUMMARY OF CHANGES IN 15 WSIP PROJECT BUDGETS (PHASE-LEVEL DETAILS) FROM 2002 THROUGH 2005..... 28
FIGURE 4. CALAVERAS DAM REPLACEMENT - MAY 2002 PROJECT BUDGET 36
FIGURE 5. CALAVERAS DAM REPLACEMENT - PROJECT BUDGET CHANGES FROM MAY 2002 TO AUGUST 2003..... 38
FIGURE 6. CALAVERAS DAM REPLACEMENT - PROJECT BUDGET CHANGES FROM AUGUST 2003 TO NOVEMBER 2005 41
FIGURE 7. CALAVERAS DAM REPLACEMENT – SUMMARY OF PROJECT SCOPE AND COST CHANGES FROM MAY 2002 TO AUGUST 2003 TO NOVEMBER 2005 42
FIGURE 8. NEW CRYSTAL SPRINGS BYPASS TUNNEL - MAY 2002 PROJECT BUDGET. 44
FIGURE 9. NEW CRYSTAL SPRINGS BYPASS TUNNEL - PROJECT BUDGET CHANGES .. 45
FIGURE 10. CRYSTAL SPRINGS BYPASS TUNNEL – CONSTRUCTION COST ESTIMATE INCREASES 46
FIGURE 11. NEW CRYSTAL SPRINGS BYPASS TUNNEL - PROJECT BUDGET CHANGES FROM AUGUST 2003 TO NOVEMBER 2005..... 47
FIGURE 12. NEW CRYSTAL SPRINGS BYPASS TUNNEL - SUMMARY OF PROJECT SCOPE AND COST CHANGES FROM MAY 2002 TO AUGUST 2003 TO NOVEMBER 2005 48
FIGURE 13. CROCKER AMAZON PUMP STATION UPGRADE - 50
FIGURE 14. CROCKER AMAZON PUMP STATION UPGRADE - PROJECT BUDGET CHANGES FROM MAY 2002 TO AUGUST 2003 51
FIGURE 15. CROCKER AMAZON PUMP STATION UPGRADE - PROJECT BUDGET IMPACT OF JUNE 2004 CHANGE ORDER 53
FIGURE 16. CROCKER AMAZON PUMP STATION UPGRADE - PROJECT BUDGET CHANGES FROM AUGUST 2003 TO NOVEMBER 2005..... 54
FIGURE 17. CROCKER AMAZON PUMP STATION UPGRADE - SUMMARY OF PROJECT SCOPE CHANGES FROM MAY 2002 TO AUGUST 2003 TO NOVEMBER 2005 55
FIGURE 18. SJPL NO. 4 - MAY 2002 PROJECT BUDGET 57
FIGURE 19. SJPL NO. 4 - PROJECT BUDGET CHANGES..... 57
FIGURE 20. SJPL NO. 4 - PROJECT BUDGET CHANGES..... 58
FIGURE 21. TESLA PORTAL DISINFECTION FACILITY - MAY 2002 PROJECT BUDGET .. 60
FIGURE 22. TESLA PORTAL DISINFECTION FACILITY - PROJECT BUDGET CHANGES.... 60
FIGURE 23. TESLA PORTAL DISINFECTION FACILITY - PROJECT BUDGET CHANGES.... 61
FIGURE 24. CALAVERAS RESERVOIR UPGRADE - NOVEMBER 2005 PROJECT BUDGET. 62
FIGURE 25. IRVINGTON TUNNEL ALTERNATIVES - MAY 2002 PROJECT BUDGET 64
FIGURE 26. IRVINGTON TUNNEL ALTERNATIVES - PROJECT BUDGET CHANGES..... 64
FIGURE 27. IRVINGTON TUNNEL ALTERNATIVES - PROJECT BUDGET CHANGES..... 65
FIGURE 28. BDPL NOS. 3 & 4 CROSS CONNECTIONS -MAY 2002 PROJECT BUDGET... 66
FIGURE 29. BDPL NOS. 3 & 4 CROSS CONNECTIONS - PROJECT BUDGET CHANGES ... 67

FIGURE 30. BDPL NOS. 3 & 4 CROSS CONNECTIONS - PROJECT BUDGET CHANGES ...68
FIGURE 31. BDPL – HYDRAULIC CAPACITY UPGRADE - MAY 2002 PROJECT BUDGET70
FIGURE 32. BDPL – HYDRAULIC CAPACITY UPGRADE - PROJECT BUDGET CHANGES FROM MAY 2002 TO AUGUST 2003 71
FIGURE 33. BDPL – HYDRAULIC CAPACITY UPGRADE - PROJECT BUDGET CHANGES FROM AUGUST 2003 TO NOVEMBER 2005.....72
FIGURE 34. SFPUC/EBMUD INTERTIE - AUGUST 2003 PROJECT BUDGET 74
FIGURE 35. SFPUC/EBMUD INTERTIE - PROJECT BUDGET CHANGES FROM AUGUST 2003 TO NOVEMBER 2005 74
FIGURE 36. SUNSET RESERVOIR – SEISMIC UPGRADE/REHAB MAY 2002 PROJECT BUDGET 75
FIGURE 37. SUNSET RESERVOIR – SEISMIC UPGRADE/REHAB PROJECT BUDGET CHANGES FROM MAY 2002 TO AUGUST 2003 76
FIGURE 38. SUNSET RESERVOIR – SEISMIC UPGRADE/REHAB PROJECT BUDGET CHANGES FROM AUGUST 2003 TO NOVEMBER 2005.....77
FIGURE 39. SUMMIT RESERVOIR REHABILITATION -MAY 2002 PROJECT BUDGET 78
FIGURE 40. SUMMIT RESERVOIR REHABILITATION - PROJECT BUDGET CHANGES.....79
FIGURE 41. SUMMIT RESERVOIR REHABILITATION - PROJECT BUDGET CHANGES.....80
FIGURE 42. PUMP STATION UPGRADES (FOREST KNOLLS) - MAY 2002 PROJECT BUDGET 81
FIGURE 43. PUMP STATION UPGRADES (FOREST KNOLLS) - PROJECT BUDGET CHANGES FROM MAY 2002 TO AUGUST 2003 82
FIGURE 44. PUMP STATION UPGRADES (FOREST KNOLLS) - PROJECT BUDGET CHANGES FROM AUGUST 2003 TO NOVEMBER 2005.....83
FIGURE 45. PUMP STATION UPGRADES (MCLAREN PARK) 85
FIGURE 46. PUMP STATION UPGRADES (MCLAREN PARK) - PROJECT BUDGET CHANGES 85
FIGURE 47. PUMP STATION UPGRADES (MCLAREN PARK) PROJECT BUDGET CHANGES FROM AUGUST 2003 TO NOVEMBER 2005.....86
FIGURE 48. TANK REHAB AND SEISMIC UPGRADE MCLAREN #1 - 87
FIGURE 49. TANK REHAB AND SEISMIC UPGRADE MCLAREN #1 - PROJECT BUDGET CHANGES FROM MAY 2002 TO AUGUST 2003 88
FIGURE 50. TANK REHAB AND SEISMIC UPGRADE MCLAREN #1 - PROJECT BUDGET CHANGES FROM AUGUST 2003 TO NOVEMBER 2005.....89
FIGURE 51. PHASE-LEVEL PROJECT BUDGET CHANGES FROM NOVEMBER 2005 TO MARCH 2006 (AS ENTERED INTO P3E).....93
FIGURE 52. FAMIS/P3E EXPENDITURE RECONCILIATION.....102
FIGURE 53. DEVIATIONS BETWEEN P3E AND FAMIS IF RECONCILIATIONS GO UNCORRECTED 104
FIGURE 54. APPROPRIATIONS RECONCILIATION 106
FIGURE 55. WSIP INVOICE RECAP 111
FIGURE 56. OVERHEAD RATE.....114
FIGURE 57. SUMMARY OF DRAFT VS. FINAL CHANGE ORDER PROCESS: ROLES OF KEY PLAYERS 120
FIGURE 58. PROPOSED PUC FY2007-08 ANNUAL CAPITAL BUDGET FOR R&R AND ENHANCEMENT PROGRAMS 124
FIGURE 59. CHANGES IN THE WSIP PROGRAM: 2002 VERSUS 2005 128

EXECUTIVE SUMMARY

On March 19, 2007, the Revenue Bond Oversight Committee (RBOC) awarded a consultant contract to Robert Kuo Consulting, LLC, and a small team of financial and construction management consultants for the purpose of reviewing certain aspects of the Water System Improvement Program (WSIP). Specifically, the RBOC asked our team to focus on 15 WSIP projects that were selected by the RBOC as a representative sample of the WSIP program. In addition, the team was asked to review changes in program controls and projects removed from the WSIP.

Explanation of WSIP Project Scope and Budget Changes from 2002 to 2005

The original intent of the analysis, as envisioned by the RBOC, was to build upon the Committee's 2006 Financial Review, which included a brief examination of the changes over time in four WSIP project budgets, by including a wider range of 15 projects, coupled with an in-depth examination of, in as much detail as possible, the changes from the initial May 2002 project budget to the current adopted November 2005 WSIP budget. The 15 projects are:

#	Project # CUW	Project Name	Regional or Local
1	37301	San Joaquin Pipeline (SJPL)	R
2	38701	Tesla Portal Disinfection	R
3	37401	Calaveras Dam Replacement	R
4	37402	Calaveras Reservoir Upgrade	R
5	35901	New Irvington Tunnel	R
6	35301	Bay Division Pipeline (BDPL) Nos. 3&4 Crossover Isolation Valves	R
7	36801	BDPL Reliability Upgrades	R
8	38901	East Bay Municipal Utility District (EBMUD) Intertie	R
9	35601	New Crystal Springs Bypass Tunnel	R
10	35801	Sunset Reservoir Upgrades	R
11	30701	Summit Reservoir Rehabilitation	L
12	30601	Crocker Amazon Pump Station Upgrade	L
13	32101	Forrest Knolls Pump Station	L
14	32301	McLaren Park Pump Station	L
15	32801	McLaren Park Tank Rehab Seismic Upgrade	L

The consulting team began its approach to this assignment by examining three "sample" projects: Calaveras Dam Replacement, Crystal Springs Bypass Tunnel, and Crocker Amazon Pump Station Upgrade. This examination led us to identify several overall themes and conclusions:

- There were significant changes in the scope and budgets for several WSIP projects between 2002 and 2005, including many of the 15 projects that

were selected for review by the RBOC, with the vast majority of the changes occurring between 2003 and 2005.

- In addition, the project budget development methodology changed dramatically from 2002 to 2005. Project budget development methodology is often driven by the agency's Program Management consultant team. From 2002 to 2005, the PUC utilized three different Program Management teams. As a result, there were significant changes in budget development methodology. The most significant changes occurred between August 2003 and November 2005, when the cost categories found in earlier project summaries were compressed to four: Project Planning, Environmental Review, Design/Bid & Award, and Construction/Closeout. In 2005 a new methodology for contingencies and escalation was introduced.

- In order to build and maintain its credibility with stakeholders and the public, a public agency that is undertaking a major capital improvement program must have the ability to clearly describe what significant changes have occurred over the life of a capital program, explain the rationale for those changes, and summarize the financial impact of those changes. This information should be readily available to the public. We learned that there are many design and engineering documents available from PUC project managers that address elements of the changes in project scope and cost between 2002 and 2005. However, perhaps due in part to changes in Program Management teams during this period, PUC did not develop its own comprehensive tracking system and summary analysis of all of the changes in WSIP project scopes and project budgets that occurred from 2002 to November 2005.

- Our team attempted to develop its own detailed analysis of the changes that occurred in the three sample projects listed above. We found that it was nearly impossible to make "apples to apples" budget comparisons across the three time frames, given the information that was available.

    - Although PUC staff was helpful and responsive to our requests for information, many current PUC project managers do not have long histories with their projects, and therefore could not provide us this type of historical analysis. Even those project managers with long institutional histories were not able to provide us with enough information to develop full and complete explanations of all budget changes that have occurred.

    - In addition, because the PUC's Program Controls and Support function is relatively new, did not exist when the 2002 and 2003 budgets were developed, and their focus has been on managing project budgets from November 2005 going forward, there was no

PUC central unit that developed this type of information for the 2002 to 2005 period.

- At the phase-level (e.g. design, construction), the WSIP project budgets loaded into Primavera (P3E) in early 2006 are not identical to the phase-level budgets that were developed by Parsons/CH2MHill, and presented to the Commission in November 2005. PUC Program Development staff has indicated that this is because the Commission only adopted "bottom line" budget amounts for each WSIP project in November 2005, and that after the Commission approved those project budgets, PUC staff subsequently identified necessary changes to the phase-level budgets, and the rationale for these changes strikes us as reasonable. More information on this topic can be found in Chapter 3 of this Report.

- The consulting team devoted considerable time and effort to its expanded examination of the three "sample" projects, more effort than was reasonably anticipated, towards that Committee's interest.

After discussing the findings and conclusions from the three "sample" project reviews with the Committee, it was apparent that the current work scope would require significant changes if the Committee wished to pursue an expanded review of the remaining twelve projects, while also achieving the remaining auditing tasks set forth under this engagement. As a result, the RBOC weighed the benefits of devoting more consulting resources toward a further detailed analysis, which was not guaranteed to achieve any measurable difference in results than that already undertaken, against the need to complete the remaining tasks within the scheduled work scope. The RBOC opted not to pursue an expanded analysis of the remaining twelve projects in order to complete the current engagement in a timely manner.

Recommendations on Tracking Future Project Scope and Budget Changes

Several recommendations flow from our findings regarding the analyses of Calaveras Dam, Crystal Springs Bypass Tunnel, and Crocker Amazon Pump Station Upgrade project scope and budget changes from 2002 to 2005:

- Going forward, we recommend that the PUC ensures it always has the ability to track and explain any budget and scope changes made from the November 2005 approved budget, and to provide those explanations in a clear, concise format that is available to the public. This function should be the responsibility of the PUC's Program Controls and Support Bureau. This information should appear in the WSIP Quarterly Report.

- If project budget development methodologies change again in the future, the PUC should ensure that they provide a public document that tracks the impact of the methodology changes on project budgets from November 2005 baseline. Again, this information should be included in the WSIP

Quarterly Report, and the PUC's Program Controls and Support Bureau should have this responsibility.

- Strong communication between Program Controls staff and project managers is essential to ensuring that accurate information is updated, shared, and disseminated. This is a commonsense recommendation geared towards ensuring that Program Controls staff always has the most up-to-date information available from each project manager to incorporate into their analyses of the WSIP program's overall schedule adherence and financial condition. However, it is a recommendation that can be difficult to implement in practice. PUC senior management (e.g. the Deputy General Manager, the Assistant General Manager for Infrastructure) and WSIP Senior Project Managers (who are responsible for all projects within a particular region) must emphasize the ongoing importance of sharing project status information on a regular and timely basis with the Program Controls and Support Bureau.

Audit of Financial Data in FAMIS and Primavera

For the 15 projects, the consulting team also undertook an extensive reconciliation of financial data concerning budgets and expenditures in FAMIS and Primavera (P3E). Our findings are summarized as follows:

- All budgetary data in FAMIS reconciles with the actual appropriations approved to date by the Board of Supervisors.

- The expenditure data in FAMIS and P3E for all 15 projects reconciled to within one percent as of December 31, 2006. We have identified six projects where reconciling entries are required in either FAMIS or P3E. We have discussed these items with PUC staff, and have recommended that they regularly address reconciliation items as they arise, in order to keep the data in FAMIS and P3E "in sync."

- No Proposition A funds were expended prior to November 2002.

- We undertook a review of 93 invoices totaling approximately $15 million, representing 10 percent of the invoices and 27 percent of the non-personal services expenditures associated with the 15 projects under review. All but two expenditures had the proper "encumbrance" documents, and all payments were for the appropriate time period, for the proper amount, to the correct vendor, and for the appropriate goods and services. The two expenditures that lacked encumbrance documents were direct charges by the City's Department of Public Works (DPW). We understand that this issue can be resolved through the issuance of invoices by DPW to PUC.

- During the discussions of our Report findings with the RBOC, the issue of Overhead expenses was raised. We did not undertake a detailed examination of overhead in 2007, but we did review the issue in detail in our 2006 Report. At that time, we determined that the methodology for calculating the overhead rate was appropriate, and has been consistently applied over the last several years. The FY2007 overhead rate of 204% (comprised of a 174% overhead rate and a 30% fringe benefit rate) appears high, but that is because of the small base to which it was applied, rather than any inappropriateness of the costs included. Only the direct labor costs of the Department are used as the denominator in the rate calculation. Our understanding is that the overhead rate is used to recover the costs of: a) "indirect labor," which includes the Office of the Deputy General Manager, and Managers and administrative staff in several PUC bureaus that work on the WSIP, but do not charge to any specific project; b) Rent, travel and materials and supplies for all PUC staff, whether they be "direct" or "indirect"; and c) certain costs from other City Departments, that are not charged directly to projects.

Recommendations on FAMIS versus P3E Reconciliation

- An individual staff person within the PUC Program Controls and Support Bureau should be made responsible and accountable for correcting the reconciling errors as quickly as possible. The longer that reconciling entries languish and accumulate, the harder it becomes to bring two systems back into balance. And eventually that could harm the credibility of the expense data presented in P3E.

- The accrual entries for both labor and contractual services should be reversed at the start of the next month.

- The June 30, 2007, reconciliation should be reviewed to determine if prior year problematic areas have been corrected.

Recommendations Regarding Appropriations

PUC staff should be applauded for combining both "pre-CIP" funds and Proposition A Bond funds into one project appropriation while maintaining the integrity of each source. However, PUC Finance staff and the Controller should consider adopting a simpler method of determining whether someone is viewing appropriations data for entire project at the "01" project in FAMIS, or data for one of several subprojects. An "01" project can be either/or right now, depending on which FAMIS screen is being viewed. We believe using "00" for the total project and then "01", "02", etc… for the subprojects would be better instead of using "01" for both project and subproject.

Recommendations On Invoice Approval Process

- As noted in our 2006 Report, the invoice approval process, with its many required signatures, appears cumbersome. We recommend that PUC Financial Services investigate the use of electronic signature approvals as a means of streamlining and expediting the process.

- There are vacancies in the Accounting unit, which is part of PUC Financial Services. We recommend that these positions be filled as quickly as possible to ensure the quality of the document review and approval process.

- There needs to be more accountability for direct charges from other City Departments, such as the Department of Public Works, at the conclusion of the required work. PUC Project Managers should request invoices from other City Departments for services provided in connection with the WSIP in order to properly document those expenses. PUC Financial Services should follow-up with Project Managers in those cases when invoices are not received in a timely manner.

Changes in Program Controls

WSIP project budgets range from under $5 million to well over $500 million. Because of the wide variation in the budget and contingency amounts involved, it is challenging to develop single set of "Change Order" approval thresholds that can be applied to all WSIP projects.

- PUC has implemented a set of Change Order approval procedures that are triggered when a proposed project budget increase is above a certain percentage of a project's contingency funds. While we are more accustomed to seeing fixed dollar thresholds used in change control approval procedures, we are interested in learning whether the PUC finds the percentage of contingency thresholds to be an effective measure for balancing the needs of oversight versus minimizing the number of small, non-controversial changes that require review.

- As required in the current Change Control procedures, it is prudent to require that the AGM for Infrastructure and the Deputy General Manager be required to approve any change order over $500,000, regardless of whether it can be funded within a project's existing contingencies.

- As required in the current Change Control procedures, requiring the General Manager's approval for any increase in a project's total budget, and any change in phase-level schedules (which often drive budgetary changes) is also a prudent way of ensuring there is adequate senior management scrutiny and oversight over the WSIP's budget and schedule.

- As required in the current Change Control procedures, reporting changes in total budget and phase-level schedules to the Commission is prudent, and adds an element of transparency to the management of the Program.

Recommendations on Program Controls

- The authority of Project Managers and Regional Project Managers to reallocate funds already budgeted at the phase level (e.g. their budgets for planning, design, construction, etc.) should be clearly stated in the Change Control Procedures. We recommend that they have the ability to manage these funds, with appropriate reporting requirements (i.e. at a minimum, reallocations of these funds should be identified and reported in the WSIP Quarterly Project Status Reports).

- Over time, the PUC should review the effectiveness of the "Percentage of Contingency" approval threshold levels for project managers and regional project managers, in order to determine whether senior managers with authority over the WSIP (e.g. Capital Programs Manager, Assistant General Manager, Deputy General Manager) are reviewing all significant project changes before they are implemented, and whether senior managers are becoming overwhelmed by the volume of approval requests that rise to their level.

Projects Removed From WSIP

- Approximately $50 million in projects were removed from the WSIP. After accounting for the elimination of the BDPL #1 & #2 project, the cost of the projects that were moved from the WSIP to another PUC program is approximately $26 million. Of these remaining projects, the largest one, the Sunol Quarry Reservoirs ($12.1 million) was moved to the Enhancement Program, and other projects were either placed into "inspection only" mode, or moved to the R&R program.

- Projects were pulled from the WSIP because they did not meet Level of Service goals, or were deemed to be less critical than other projects that are at risk of failure or could not be taken out of service in order to be repaired because of a lack of redundant systems.

- In recent years, the funding for the R&R program has been in the range of $25 million to $30 million per year. However, fully funding the R&R program would require $60 million to $70 million per year. Thus, moving projects to the R&R program almost certainly delays their implementation.

- Within the capital program, the identification of which projects are included in the WSIP, which projects are included in the R&R program, and which projects are included in the Enhancement program can be confusing. This is exacerbated by the overlap in funding sources utilized by each of these programs.

- Moving a project from the WSIP to either the R&R program or the Enhancement program simply shifts the cost of the improvement from one PUC Water Enterprise program to another.

    - If a project is moved to the R&R program, then its capital cost is paid for directly from annual water system operating revenues, i.e. water rates.

    - If a project is moved to the Enhancement Program, and the project proceeds, then we assume that its capital cost likely would be paid from bond funds, which would result in an increase in annual debt service costs. The net effect on PUC's finances would be the same as issuing additional debt for the WSIP.

Recommendations Regarding Project Removed from WSIP

Given that the Commission approved a dramatic increase in the estimated cost of the WSIP in November 2005, the PUC may be reluctant to increase the total cost of the program in the future, if program's cost estimate rises. This is directly linked to the issue of "affordability" that was identified in the Committee's 2006 Financial Review.

In the 2006 Financial Review Report, we identified a number of reasons why the cost, scope and/or schedule of WSIP projects could change over time, many of which were discussed in detail in the October 2005 Parsons/CH2MHill Report to the Commission on the WSIP. Reasons for scope, schedule and cost changes could include:

- Changes in policy that affect the WSIP's Level of Service Goals;
- Changes in cost estimates determined during the project design process;
- Changes in schedule driven by the environmental review process;
- Changes in schedule and cost driven by right of way acquisition requirements; and
- Changes in schedule, scope and cost driven by weather-related delays and unforeseen conditions.

We noted that early on in the life of the WSIP, proposed budget changes will be funded from on each project's own contingency reserves, leaving the rest of the Program's budget unaffected. Over time, however, increases in a project's budget may be above and beyond a project's own contingency reserves. That raises the question of how such budget changes would be funded, raising the issue of "affordability." As we noted last year:

- PUC may face the choice of whether to scale back the scope of one or more projects, or to increase the overall budget of the WSIP program. And that raises the question of how PUC will determine what level of changes are affordable, and how to set priorities.

If the PUC is intent upon keeping the "bottom line" of the WSIP unchanged, then one way they may seek to manage the WSIP program is to delay certain "less essential" projects, or to shift projects out of the WSIP to another Water Enterprise program. As a result:

- We recommend that the RBOC review the AB1823 Report, and all future reports in order to stay abreast of the changes to the WSIP. The 2006-07 AB1823 Annual Report was recently issued by PUC, and is available on PUC's website.

- We recommend that the RBOC request the PUC to provide an explanation regarding any project that is removed from the WSIP in the future, including why the project was removed, its disposition, and PUC's revised plans for the project. This explanation should be included in the quarterly WSIP report. The request should be made of PUC senior management, and its implementation would involve WSIP and other PUC Capital Programs staff.

- We recommend that the RBOC ask for a presentation from PUC staff on the capital program and how its different components (WSIP, R&R, and Enhancement) relate to each other. This could come from the PUC's Deputy General Manager or others with an understanding of the full range of PUC's capital programs.

Listing of Findings and Recommendations

What follows is a listing of all of the findings and recommendations in the report. They are numbered based upon the chapter in which the finding or recommendation is found, and the order in which they appear within the chapter. For example, R2.2 represents the recommendation from chapter two, item number 2.

F2.1 There were significant changes in the scope and budgets for several WSIP projects between 2002 and 2005, including many of the 15 projects that were selected for review in this engagement, with the vast majority of the changes occurring between 2003 and 2005.

F2.2 In addition, the project budget development methodology changed dramatically from 2002 to 2005. Project budget development methodology is often driven by the agency's Program Management consultant team. From 2002 to 2005, the PUC utilized three different Program Management teams. As a result, there were significant changes

in budget development methodology. The most significant changes occurred between August 2003 and November 2005, when the cost categories found in earlier project summaries were compressed to four: Project Planning, Environmental Review, Design/Bid & Award, and Construction/Closeout. For example, in May 2002, one category is called "Bid." However, by August 2003, that category became "Bid & Award." In 2005 a new methodology for contingencies and escalation was introduced

F2.3 There were many design and engineering documents that were provided to us by PUC project managers that address elements of the changes in project scope and cost between 2002 and 2005. However, perhaps due in part to changes in Program Management teams during this period, PUC did not develop its own comprehensive tracking system and analysis of all of the changes in WSIP project scopes and project budgets that occurred from 2002 to November 2005.

F2.4 Because PUC could not provide an in-house analysis for our review, our team attempted to develop its own detailed analysis of the changes that occurred in the three sample projects listed above. Unfortunately, we found that it was nearly impossible to make "apples to apples" budget comparisons across the three time frames, given the information that was available.

- Although PUC staff did their best to be helpful, many current PUC project managers do not have long histories with their projects, and therefore could not provide us this type of historical analysis. Even those project managers with long institutional histories were not able to provide us with enough information to develop full and complete explanations of all budget changes that have occurred.

- In addition, because the PUC's Program Controls and Support function is relatively new, did not exist when the 2002 and 2003 budgets were developed, and their focus has been on managing project budgets from November 2005 going forward, there was no central unit within the PUC that developed this type of information for the 2002 to 2005 period.

F2.5 At the phase-level (e.g. design, construction), the WSIP project budgets loaded into Primavera (P3E) in early 2006 are not identical to the phase-level budgets that were developed by Parsons/CH2MHill, and presented to the Commission in November 2005. PUC Program Controls and Support staff has indicated that this is because the Commission only adopted "bottom line" budget amounts for each WSIP project in November 2005, and that after the Commission approved those project budgets, PUC staff subsequently identified required changes to the phase-level budgets. More information on this can be found in Chapter 3 of this Report.

R2.1 Going forward, we recommend that the RBOC request that PUC senior management develop and maintain the ability to track and explain any budget and scope changes made from the November 2005 approved budget. The tracking and explanations should be included in each quarterly report, both in the summary materials and within each project description. In order to accomplish this, a new category should be added in the summary write up and in the project descriptions. The PUC Program Controls and Support Bureau should be responsible for this effort.

R2.2 Related to recommendation 2.1, the RBOC should request of PUC management that if project budget development methodologies change again in the future, the PUC provide a public document that tracks the impact of the methodology changes on project budgets from November 2005. Again, this information should be included in the WSIP Quarterly Report, and the responsibility for leading this effort would fall to the PUC Program Controls and Support Bureau.

R2.3 Strong communication between project controls staff and project managers is essential to ensuring that accurate information is updated, shared, and disseminated. This is a common sense recommendation geared towards ensuring that Program Controls staff always has the most up to date information available from each project manager to incorporate into their analyses of the WSIP program's overall schedule adherence and financial condition. However, it is a recommendation that can be difficult to implement in practice. PUC senior management (e.g. Deputy General Manager, Assistant General Manager for Infrastructure) and WSIP Senior Project Managers (who are responsible for all projects within a particular region) must emphasize the ongoing importance of sharing project status information on a regular and timely basis with the Program Controls and Support Bureau.

F3.1 All budgetary data in FAMIS reconciles with the actual appropriations approved to date by the Board of Supervisors.

F3.2 The expenditure data in FAMIS and P3E for all 15 projects reconciled to within one percent as of December 31, 2006. We have identified six projects where reconciling entries are required in either FAMIS or P3E. We have discussed these items with PUC staff, and have recommended that they regularly address reconciliation items as they arise, in order to keep the data in FAMIS and P3E "in sync."

F3.3 No Proposition A funds were expended prior to November 2002.

F3.4 We undertook a review of 93 invoices totaling approximately $15 million, representing 10 percent of the invoices and 27 percent of the non-personal services expenditures associated with the 15 projects under review. All

but two expenditures had the proper "encumbrance" documents, and all payments were for the appropriate time period, for the proper amount, to the correct vendor, and for the appropriate goods and services. The two expenditures that lacked encumbrance documents were direct charges by the City's Department of Public Works (DPW). We understand that this issue can be resolved through the issuance of invoices by DPW to PUC.

F3.5 The FY2007 overhead rate of 204% (comprised of a 174% overhead rate and a 30% fringe benefit rate) appears high, but that is because of the small base to which it was applied, rather than any inappropriateness of the costs included. Only the direct labor costs of the Department are used as the denominator in the rate calculation. Our understanding is that the overhead rate is used to recover the costs of: a) "indirect labor," which includes the Office of the Deputy General Manager, and Managers and administrative staff in several PUC bureaus that work on the WSIP, but do not charge to any specific project; b) Rent, travel and materials and supplies for all PUC staff, whether they be "direct" or "indirect"; and c) certain costs from other City Departments, that are not charged directly to projects.

R3.1 The RBOC should recommend that the Program Controls and Support Bureau designate an individual staff person to be responsible and accountable for correcting the reconciling errors as quickly as possible, in coordination with PUC Accounting staff. These responsibilities should be explicitly included in the staff persons' job duties. The longer that reconciling entries languish and accumulate, the harder it becomes to bring two systems back into balance. And eventually that could harm the credibility of the expense data presented in P3E.

R3.2 The RBOC should recommend that the PUC Program Controls and Support Bureau designate a P3E staff person who would be responsible for reversing the accrual entries for both labor and contractual services at the start of the next month. These responsibilities should be explicitly included in the staff persons' job duties.

R3.3 The RBOC should ensure that the June 30, 2007, reconciliation be reviewed by an audit team to determine if prior year problematic areas have been corrected.

R3.4 PUC staff should be applauded for combining pre-CIP funds and Proposition A bond funds into one project appropriation while maintaining the integrity of each funding source. However, PUC Finance staff and the Controller should consider adopting a simpler system to help determine whether someone who is looking at

appropriations data is reviewing appropriations for the entire project, or looking at one of several subprojects when reviewing the "01" project in FAMIS. An "01" project can be either/or right now, depending on which FAMIS screen is being viewed. We believe using "00" for the total project and then "01", "02", etc… for the subprojects would be better instead of using "01" for both project and subproject. We recommend that PUC's Finance Director, or his designee, discuss the implementation of this recommendation with the Controller's Office.

R3.5 The invoice approval process, with its many required signatures, appears cumbersome. We recommend that PUC Financial Services investigate the utilization of electronic signature approvals as a means of streamlining and expediting the process.

R3.6 There are vacancies in the PUC Accounting unit. These positions should be filled as quickly as possible to ensure the quality of the document review and approval process.

R3.7 There needs to be more accountability for direct charges from other City Departments at the conclusion of the required work. In the case of DPW, which is cited above, invoices should be issued by DPW to PUC to provide the proper audit trail for those expenditures. We recommend that PUC Project Managers request such invoices from other City Departments, and that PUC's Finance Director instruct his Accounting staff to follow-up with Project Managers when invoices are not received on a timely basis.

F4.1 WSIP projects range from under $5 million to well over $500 million. Because of the wide variation in the budget and contingency amounts involved, it is challenging to develop a single set of approval thresholds that can be applied to all WSIP projects, and difficult to determine whether it is better to base those thresholds on fixed dollar amounts or a percentage of each project's budget or contingency amount.

F4.2 While we are more accustomed to seeing fixed dollar thresholds used in change control approval procedures, we would be interested in learning whether the PUC finds the percentage of contingency thresholds to be an effective measure for balancing the needs of oversight vs. minimizing the number of small, non-controversial changes that require review.

F4.3 Larger WSIP projects have multi-million contingency budgets. So it is prudent to require that the AGM for Infrastructure and Deputy General Manager be required to approve any change order over $500,000, regardless of whether it can be funded within a project's existing contingencies.

F4.4 Requiring the General Manager's approval for any increase in a project's total budget, and any change in phase-level schedules (which often drive

budgetary changes) is also a prudent way of ensuring there is adequate senior management scrutiny and oversight over the WSIP's budget and schedule.

F4.5 Reporting changes in total budget and phase-level schedule to the Commission is prudent, and adds an element of transparency to the management of the Program.

R4.1 The authority of Project Managers and Regional Project Managers to reallocate funds already budgeted at the phase level (e.g. their budgets for planning, design, construction, etc.) should be clearly stated in the Change Control Procedures. We recommend that they have the ability to manage these funds, with appropriate reporting requirements (i.e. at a minimum, reallocations of these funds should be identified and reported in the WSIP Quarterly Project Status Reports). This recommendation was reviewed by a representative of the Program Controls Bureau, who indicated that this would represent a significant procedural change that would require overall changes in how allocations are tracked in P3E.

R4.2 Over time, the PUC should review the effectiveness of the "Percentage of Contingency" approval threshold levels for project managers and regional project managers, in order to determine whether senior managers with authority over the WSIP (e.g. Capital Programs Manager, Assistant General Manager, Deputy General Manager) are reviewing all significant project changes before they are implemented, and whether senior managers are becoming overwhelmed by the volume of approval requests that rise to their level.

Chapter 1: Background of the Review

On March 19, 2007, the Revenue Bond Oversight Committee (RBOC) awarded a financial consultant contract to Robert Kuo Consulting, LLC, for the purpose of reviewing certain financial aspects of the Water System Improvement Program (WSIP). The WSIP contains both regional and local capital improvement projects, and is being funded through bond proceeds. Specifically, RBOC asked for the following projects to be examined:

#	Project # CUW	Project Name	Regional or Local
1	37301	San Joaquin Pipeline (SJPL)	R
2	38701	Tesla Portal Disinfection	R
3	37401	Calaveras Dam Replacement	R
4	37402	Calaveras Reservoir Upgrade	R
5	35901	New Irvington Tunnel	R
6	35301	Bay Division Pipeline (BDPL) Nos. 3&4 Crossover Isolation Valves	R
7	36801	BDPL Reliability Upgrades	R
8	38901	East Bay Municipal Utility District (EBMUD) Intertie	R
9	35601	New Crystal Springs Bypass Tunnel	R
10	35801	Sunset Reservoir Upgrades	R
11	30701	Summit Reservoir Rehabilitation	L
12	30601	Crocker Amazon Pump Station Upgrade	L
13	32101	Forrest Knolls Pump Station	L
14	32301	McLaren Park Pump Station	L
15	32801	McLaren Park Tank Rehab Seismic Upgrade	L

The RBOC selected a representative cross-section of projects from the WSIP for this engagement. This list of 15 projects includes projects that:

- Are from both regional and local programs;
- Range in cost from the millions to the hundreds of millions of dollars; and
- Are at various stages of completion.

Robert Kuo assembled a team of consultants, (Larry Doyle, Shannon Gaffney, and Gary Katcher of EPC Consultants, Inc.), to assist in the engagement. The engagement has multiple objectives, detailed below:

- For the 15 projects selected by the RBOC, the team is to tie current project budgets to those of November 2005, August 2003, and May 2002. Changes in project scope and budgets along the way are to be identified and explained, ideally by relying on published documents and discussions with project managers. In addition, project budgets are to be looked at through the lens of specific cost categories, including cost contingency, management reserve, and cost escalation. Finally, other factors, such as

"better cost estimating," should be identified, quantified and incorporated into the budget analyses where significant. (Task 1a through all of Tasks 1b.)

- For the 15 projects, tie project budget and actual expenditures to Primavera, and obtain a reconciliation of budgets and actual expenditures from Primavera to FAMIS. Appropriations are to be tied to FAMIS and to authorizing budgetary documents adopted by the Board of Supervisors. (Tasks 1c through 1f.)

- For the 15 projects, conduct a vouching of sample expenditures to invoices, contracts, and other supporting documentation. Verify that no expenditures from Proposition A funds were incurred prior to November 2002. (Tasks 1g through 1h).

- For tying, reconciliation, and vouching, list any material differences noted and provide explanations. (Task 1i.)

- Identify changes since March 2006 to the PUC's program controls system (Primavera) and internal control procedures for accounting of capital projects. Evaluate reasonableness and effectiveness of such changes. Provide recommendations for areas of improvement. (Task 2.)

- Identify those projects that were originally part of WSIP and subsequently removed. Report on the decision-making process for moving projects out of the WSIP and what the source of funding will be for them in the future. In addition, examine and report on the implications of moving projects out of the WSIP. (Task 3.)

- Prepare a written report that addresses the above items. (Task 4.)

Each chapter in the document represents a major analytical task. This is the consulting team's final report. Earlier drafts have been reviewed, and comments from the RBOC, PUC staff and the public have been incorporated into the document.

Brief History of the WSIP

The current WSIP began in 1995 with a Facility Vulnerability Study, Phase I – Facility Assessment. Phase II of the reliability evaluation program continued throughout the rest of the 1990s, addressing hazards such as earthquakes, landslides, flood, fire, and general wear and tear. During this same period, the PUC initiated a water supply planning effort that resulted in the Water Supply Master Plan (WSMP), issued in April 2000.

These two sets of initiatives led to the preparation of a Long-term Strategic Plan for Capital Improvements, a Long-range Financial Plan, and a Capital Improvement

Plan (CIP), which was adopted by the PUC on May 28, 2002 (Resolution No. 02-0101). The May 2002 CIP identified 37 regional water system projects and 40 local (in-City) projects.

Propositions A and E, regarding the financing for water system improvements and long-term stewardship of the public utilities, were approved by San Francisco voters in November 2002. That year, the state legislature also approved three bills reflecting wholesale customer concerns over risk of failure of the water system in a major earthquake, including Assembly Bill No. 1823, the Wholesale Regional Water System Security and Reliability Act.

In August 2003, the PUC produced the first annual status report and update on the implementation of the Regional Water System CIP, as required by the Wholesale Regional Water System Security and Reliability Act (AB1823), San Francisco Bay Area Regional Water System Financing Authority (SB1870), and Proposition E.

At one of a series of workshops held in 2004 and 2005, the PUC established level of service goals (i.e. performance requirements for different operating scenarios or "LOS") for the program. Based upon the LOS goals, the scope, schedule, and budget of the program were refined. The PUC adopted a revised Water System Improvement Program on November 29, 2005.

Throughout this period, the PUC has experienced a number of changes in senior management, in project managers, and in the Program Management consultants who were used to support the development of the WSIP. Initially, the PUC worked with the San Francisco Water Alliance, which was a joint venture between the PUC and Bechtel, as the lead consultant (along with Sverdrup and the Jefferson Company). This arrangement lasted until 2004, when the Alliance was replaced by the Water Infrastructure Partners, a joint venture in which Jacobs Engineering was the lead consultant. Finally, the team of Parsons and CH2MHill (Parsons/CH2MHill) was brought in for project management and consulting services.

Parsons/CH2MHill produced a document, "Water System Improvement Program Assessment Report," dated October 21, 2005, which is a review of the appropriateness of the assumptions, cost, and schedule of the WSIP's regional projects and the overall WSIP program to meet PUC Level of Service (LOS) goals (the report did not review the local program). As a part of this review, the document examined 20 projects that were identified as major or critical, and 14 that were identified as minor projects. They also developed the raw construction cost estimates for these major projects in the document entitled "Water System Improvement Program Assessment Cost Details," dated November 2005. These documents formed the basis for the "bottom-line" project budgets amounts that were adopted by the Commission in November 2005. These two documents were used extensively by the team in our analysis.

Sources Used in Analysis

In order to complete the analyses in this report, multiple sources were consulted. They are listed below.

- PUC "Capital Improvement Program, Project Summary and Cost Estimate" Project Sheets, dated May 28, 2002
- PUC, "Capital Improvement Program Status Report and Update 2003," Project Data Sheets, dated August 21, 2003.
- "December 2005 WSIP Quarterly Project Status Reports," Project Sheets, dated February 10, 2006.
- "March 2006 WSIP Quarterly Project Status Reports," Project Sheets, dated May 19, 2006.
- "Review of Water System Improvement Program Expenditures Under PUC's Commercial Paper Program," dated July 10, 2006.
- Meetings and discussions with Project Managers, the Manager of Program Controls at the PUC, and the Manager of Projects for the Infrastructure Program Management Bureau.
- "Water System Improvement Program Assessment Report," by Parsons/CH2MHill, dated October 21, 2005.
- "Water System Improvement Program Assessment Cost Details," by Parsons/CH2MHill, dated November 2005.
- "Table D-2 Rev. PUC, WSIP Costs – Program Alternative 1, WSIP Cost Breakdown (by sub-regional project group), Program Management Cost as a Separate Project," December 2005, updated date January 17, 2006.
- "AB1823: Notice of Changes to Water System Improvement Program (Clarifications requested by CSSC)," March 8, 2006, San Francisco Public Utilities Commission, dated January 2006.

Chapter 2: Overview of 15 WSIP Projects – Changes in Scope and Budgets Over Time

This chapter presents an analysis of the scope and budget of the 15 WSIP projects at three different points in time. These "snapshots" are May 2002, August 2003, and November 2005. At each of these points in time, the analysis identifies the scope of work and the associated budget for each project. For the two later dates, the analysis compares the scope and budget to the May 2002 scope and budget.

Background, Findings and Recommendations

Background and Findings

The original intent of the analysis, as envisioned by the RBOC, was to provide detailed information regarding changes in budget and scope over time for all 15 of the projects identified in our scope of work. To that end, the team began its approach to this assignment by examining three "sample" projects: Calaveras Dam Replacement, Crystal Springs Bypass Tunnel, and Crocker Amazon Pump Station Upgrade. These examinations resulted in Deliverable 1, and then in a revision of Deliverable 1. This initial effort was undertaken to determine whether we could obtain the information necessary to explain changes in budget and scope across time in a complete manner, and to provide the RBOC with an opportunity to comment on our initial approach and analysis.

This expanded analysis of the three projects led us to identify some overall themes:

F2.1 There were significant changes in the scope and budgets for several WSIP projects between 2002 and 2005, including many of the 15 projects that were selected for review in this engagement, with the vast majority of the changes occurring between 2003 and 2005.

F2.2 In addition, the project budget development methodology changed dramatically from 2002 to 2005. Project budget development methodology is often driven by an agency's Program Management consultant team. From 2002 to 2005, the PUC utilized three different Program Management teams. As a result, there were significant changes in budget development methodology. The most significant changes occurred between August 2003 and November 2005, when the cost categories found in earlier project summaries were compressed to four: Project Planning, Environmental Review, Design/Bid & Award, and Construction/Closeout. For example, in May 2002, one category is called "Bid." However, by August 2003, that category became "Bid & Award." In 2005 a new methodology for contingencies and escalation was introduced

F2.3 There were many design and engineering documents that were provided to us by PUC project managers that address elements of the changes in project scope and cost between 2002 and 2005. However, perhaps due in part to changes in Program Management teams during this period, PUC did not develop its own comprehensive tracking system and analysis of all of the changes in WSIP project scopes and project budgets that occurred from 2002 to November 2005.

F2.4 Because PUC could not provide an in-house analysis for our review, our team attempted to develop its own detailed analysis of the changes that occurred in the three sample projects listed above. Unfortunately, we found that it was nearly impossible to make "apples to apples" budget comparisons across the three time frames, given the information that was available.

- Although PUC staff did their best to be helpful, many current PUC project managers do not have long histories with their projects, and therefore could not provide us this type of historical analysis. Even those project managers with long institutional histories were not able to provide us with enough information to develop full and complete explanations of all budget changes that have occurred.

- In addition, because the PUC's Program Controls and Support function is relatively new, and did not exist when the 2002 and 2003 budgets were developed, and their focus has been on managing project budgets from November 2005 going forward, there was no central unit within the PUC that developed this type of information for the 2002 to 2005 period.

F2.5 At the phase-level (e.g. design, construction), the WSIP project budgets loaded into Primavera (P3E) in early 2006 are not identical to the phase-level budgets that were developed by Parsons/CH2MHill, and presented to the Commission in November 2005. PUC Program Development staff has indicated that this is because the Commission only adopted "bottom line" budget amounts for each WSIP project in November 2005, and that after the Commission approved those project budgets, PUC staff subsequently identified required changes to the phase-level budgets. More information on this can be found in Chapter 3 of this Report.

Because of the uncertainty that an expanded review of the remaining twelve projects would produce any substantial difference in the overall themes and conclusions already identified, the RBOC opted not to pursue an expanded effort at this time, but instead conduct a condensed examination of the remaining identified projects.

Recommendations

Several recommendations flow from our findings regarding the analyses of Calaveras Dam, Crystal Springs Bypass Tunnel, and Crocker Amazon Pump Station Upgrade project scope and budget changes from 2002 to 2005:

R2.1 Going forward, we recommend that the RBOC request that PUC senior management develop and maintain the ability to track and explain any budget and scope changes made from the November 2005 approved budget. The tracking and explanations should be included in each quarterly report, both in the summary materials and within each project description. In order to accomplish this, a new category should be added in the summary write up and in the project descriptions. The PUC Program Controls and Support Bureau should be responsible for this effort.

R2.2 Related to recommendation 2.1, the RBOC should request of PUC management that if project budget development methodologies change again in the future, the PUC provide a public document that tracks the impact of the methodology changes on project budgets from November 2005. Again, this information should be included in the WSIP Quarterly Report, and the responsibility for leading this effort would fall to the PUC Program Controls and Support Bureau.

R2.3 Strong communication between project controls staff and project managers is essential to ensuring that accurate information is updated, shared, and disseminated. This is a commonsense recommendation geared towards ensuring that Program Controls staff always has the most up-to-date information available from each project manager to incorporate into their analyses of the WSIP program's overall schedule adherence and financial condition. However, it is a recommendation that can be difficult to implement in practice. PUC senior management (e.g. the Deputy General Manager, the Assistant General Manager for Infrastructure) and WSIP Senior Project Managers (who are responsible for all projects within a particular region) must emphasize the ongoing importance of sharing project status information on a regular and timely basis with the Program Controls and Support Bureau.

Project Budgets – Cost Categories and Development

Part of the challenge in creating an "apples to apples" comparison was that the cost categories contained in project budgets contained over time. In part, this reflected a philosophical shift in how project budgets were developed. Both are discussed in greater detail below.

Projects: Cost Categories

An understanding of cost categories is critical to understanding the project discussions. As mentioned earlier, the cost categories used in the development of the WSIP have not been static across time. For 2002 and 2003, the project summaries include the following cost categories:

- Planning
- Environmental
- Design
- Bid/Bid & Award
- Construction
- Construction Management
- Project Management
- Program Management
- Subtotal
- Escalation
- Total

In November 2005 the cost categories found in the project summaries were compressed to four:

- Project Planning
- Environmental Review
- Design, Bid & Award
- Construction/Closeout

    - The "Design" and "Bid & Award" categories were consolidated into a single cost category.

    - The "Construction Management" budget was rolled into "Construction."

    - The "Project Management" budget associated with each project was eliminated as a separate category, and amounts that had been budgeted for this purpose were incorporated into the remaining categories.

    - The "Program Management" budget associated with each project was eliminated, and an overall WSIP Program Management cost category was created.

    - The "Escalation" cost category was eliminated as a stand-alone line item, and the costs were incorporated into other cost categories.

Finally, the November 2005 figures have incorporated pre-CIP (i.e., non-Proposition A) funding to give a more complete picture of the total costs of a project.

The source to use for November 2005 information was also a challenge. The December 2005 WSIP Quarterly Summary project sheets contain little detail, compared to other project summaries. Thus project information has been supplemented with the March 2006 WSIP Quarterly Summary project sheets.

Projects: Budget Development

The October 2005 Parsons/CH2MHill Report indicates that the original budget estimates had varying levels of accuracy, depending on how much investigation had been performed on the project. Historically, cost estimates were developed within the PUC engineering bureau, or in combination with consultants. The estimates were developed using a variety of methods, including a cost database from other major programs and actual project development by the PUC departments and consultants.

Generally, costs can be placed into two groups: construction and program delivery (or soft costs). The estimated cost of construction is the basis from which all other project costs are developed. Due to the fact that the projects are in various stages of development, the construction cost estimates vary in level of detail. The PUC accounts for this uncertainty in costs by multiplying the base construction costs by a multiplier to create an estimate of contingency costs. The multiplier depends on what stage the project is in. For example, for a project in pre-planning stages, the multiplier ranged from 25 to 40 percent, while for a project at mid-point of design, the multiplier ranged from 10 to 20 percent. Parsons/CH2MHill recommended that the high end of the multipliers be used for tunnel, dams, and process/treatment system projects, and the lower end for other projects.

The base and the estimate of contingency costs are added together to create a construction cost estimate, with contingencies. This number is then escalated to reflect costs at the mid-point of construction. This number is added to the other two figures to create a base construction cost. Finally, this base construction cost is multiplied by a number to create a construction contingency cost. This figure is included in the final construction costs, as are costs associated with environmental mitigation and art commission fees. This is detailed in the table below. (The information in this section comes from Chapter 8 of the 2005 Parsons/CH2MHill report and "Table D-2 Rev. PUC WSIP Costs", with WSIP cost breakdowns.)

Figure 1. Composition of Total Construction Costs

Component	Comment
Construction Cost Estimate (A)	Created by PUC staff and consultants
Estimate Contingency Costs (B)	Percentage of construction cost estimate (A times X%)
Construction Cost Estimate with Contingency (C)	Sum of construction cost estimate and estimate contingency costs (A+B)
Construction Escalation Cost (D)	Percentage of Construction Cost Estimate with Contingency (C times

	X%)
Base Construction Cost (E)	Sum of Construction Cost Estimate with Contingency and Construction Escalation Cost (C+D)
Construction Contingency Cost (F)	Percentage of Base Construction Cost (E times X%)
Environmental Mitigation Cost (G)	
Arts Commission Cost (H)	
Total Construction Cost (I)	Sum of Base Construction Cost plus Construction Contingency Cost plus Environmental Mitigation Costs plus Arts Commission Cost (E+F+G+H+I)

In the above table, the Base Construction Cost is the amount that can be compared against the award of a bid for a construction contract.

The other costs associated with projects are considered program delivery costs, as opposed to construction costs. Based on the revised "Program Delivery Cost" factors developed by Parsons/CH2MHill, detailed "soft costs" for the November 2005 cost estimate were estimated as follows:

- Program Management = a percentage of "raw escalated construction cost and construction phase contingency."
- Project Management = a percentage of "raw escalated construction cost and construction phase contingency."
- Pre-design planning = a percentage of "raw escalated construction cost and construction phase contingency."
- Environmental Planning and review = a percentage of "raw escalated construction cost and construction phase contingency."
- Design = a percentage of "raw escalated construction cost and construction phase contingency."
- Construction Management = a percentage of "raw escalated construction cost and construction phase contingency."
- Department and Agency Fees = a percentage of "raw escalated construction cost and construction phase contingency."

ANALYSIS OF 15 WSIP PROJECTS

Tie Project Budgets

For each of 15 projects the Team was asked to tie the initial project budget to the CIP initially adopted by the PUC in May 2002, the budget amended in August 2003 and the budget adopted in November 2005, and the current project budget to the current WSIP.

Figure 2. Tie Initial May 2002 Project Budgets to August 2003 CIP to November 2005 WSIP and Current WSIP Cost Estimate

Project Title	Project Number/ (Control Number)	Project Budget [1]As Of May 2002 (escalated $)	Change From May 2002 To August 2003	Project Budget [2] As Of August 2003 (escalated $)	Change From August 2003 To November 2005	Project Budget [3] As Of Nov 2005 (escalated $)	Change From Nov 2005 to to December 2006	Project Budget [3] As Of Dec 2006 (escalated $)
REGIONAL PROGRAM								
San Joaquin Sub Regional Program								
Tesla Portal Disinfection Station [4]	CUW38701 (202535)	$11,882,668	($102,668)	$11,780,000	$8,951,000	$20,731,000	($19,109,000)	$1,622,000
SJPL System, Alternative A	CUW37301 (202035)	$477,324,266	($4,896,266)	$472,428,000	($119,696,000)	$352,732,000	$0	$352,732,000
Sunol Valley Sub Regional Program								
Calaveras Dam Replacement	CUW37401 (202135)	$170,796,686	($3,017,686)	$167,779,000	$89,057,000	$256,836,000	($324,000)	$256,512,000
Calaveras Reservoir Upgrade	CUW37402	N/A	N/A	N/A	$1,787,000	$1,787,000	($47,000)	$1,740,000
Irvington Tunnel	CUW35901 (9970)	$165,796,083	($1,435,083)	$164,361,000	$50,289,000	$214,650,000	$0	$214,650,000
Bay Division Sub Regional Program								
BDPL Nos. 3 & 4 Crossover/Isolation Valves	CUW35301 (202339)	$13,247,542	($338,542)	$12,909,000	$14,691,000	$27,600,000	$0	$27,600,000
Bay Division Pipeline Reliability	CUW36801 (201441)	$317,398,638	($1,299,638)	$316,099,000	$255,924,000	$572,023,000	$0	$572,023,000
SFPUC/EBMUD Intertie	CUW38901 (23040)	N/A	$9,150,000	$9,150,000	($551,000)	$8,599,000	$0	$8,599,000
Peninsula Sub Regional Program								
New Crystal Springs Bypass Tunnel	CUW35601 (9891)	$57,233,823	$1,904,177	$59,138,000	$24,085,000	$83,223,000	$10,000	$83,233,000
San Francisco Sub Regional Program								
Sunset Reservoir	CUW35801 (9960)	$60,812,929	($11,784,929)	$49,028,000	$12,948,000	$61,976,000	$5,000,000	$66,976,000
SUBTOTAL - REGIONAL PROGRAM						**$3,326,004,000**	($9,999,000)	$3,316,005,000

	Project Number/ (Control Number)	Project Budget [1] As Of May 2002 (escalated $)	Change From From May 2002 To August 2003	Project Budget [2] As Of August 2003 (escalated $)	Change From August 2003 To November 2005	Project Budget [3] As Of Nov 2005 (escalated $)	Change from Nov 2005 to to December 2006	Project Budget [3] As Of Dec 2006 (escalated $)
LOCAL PROGRAM								
Summit Reservoir Rehab	30701 (99059)	$17,521,921	($414,921)	$17,107,000	($2,179,000)	$14,928,000	($2,628,000)	$12,300,000
Crocker Amazon Pump Station Upgrade	30601 (9972)	$3,021,558	($83,558)	$2,938,000	$1,886,000	$4,824,000	$0	$4,824,000
Forrest Knolls Pump Station	32101 (202536)	$2,806,138	($84,138)	$2,722,000	$3,058,000	$5,780,000	$986,000	$6,766,000
Alemany Pump Station (McLaren Park)	32301 (202538)	$6,061,728	($197,728)	$5,864,000	$4,528,000	$10,392,000	$9,483,000	$19,875,000
McLaren Park Tank Rehab & Seismic Upgrade	32801 (202547)	$8,264,828	($87,828)	$8,177,000	($2,822,000)	$5,355,000	$0	$5,355,000
SUBTOTAL – LOCAL PROGRAM						**$383,202,000**	$0	**$383,202,000**
SUBTOTAL - SYSTEMWIDE PROGRAM						**$81,347,000**	$10,000,000	**$91,347,000**
SUBTOTAL FINANCING COSTS						**$633,699,000**	($81,280,000)	**$552,419,000**
GRAND TOTAL						**$4,392,291,000**	($49,318,000)	**$4,342,973,000**

Notes:

[1] From Capital Improvement Program approved by the PUC on May 28, 2002, Appendix CIP-3 (regional) and CIP-5 (local). Costs shown in 2003 dollars exclude a total of $481 Million in cost escalation to year of construction.

[2] From "Annual CIP Report as of June 30, 2003" dated August 21, 2003, Appendix CIP-3 (regional) and Appendix CIP-4 (local) CIP Project Data Sheets.

[3] From December 2006 WSIP Quarterly Report

[4] Tesla project has been combined with the Advanced Disinfection Project (CUW384). The December 2006 WSIP Quarterly Project Status Report states: "Integrating CUW387 (Tesla Portal Disinfection Station) into this project will combine the design, and construction of a new chlorination disinfection facility with the new advanced disinfection facility at the same site which will provide reliable disinfection to the Hetch Hetchy water supply. The remaining budgets for the Environmental, Design, Bid & Award, Construction, Construction Management and Close-out Phases of CUW387 (Tesla Portal Disinfection Station) have been transferred to CUW384 Tesla Treatment Facility (old Advanced Disinfection).

Projects: Overview of Analysis

This section of the Report begins with the detailed analysis of three sample WSIP projects. They are followed by the 12 condensed project analyses. The analysis begins with a summary table, called "Summary of Project Budget Changes." The summary table allows the reader to identify those projects that have experienced significant budget changes, and the cost categories that have been most affected by those changes.

Project analyses follow the summary table; each follows the same format. The analysis includes project background and current status, and then examines the project scope and budget at each of the points in time. The analysis details changes associated with each project in August 2003 and November 2005.

For the three projects which underwent more extensive scrutiny, included is our commentary regarding our current understanding of:

- How project budgets were developed;
- How budgeting may have changed over time;
- The reasons underlying major scope and budget changes; and
- Questions left unanswered in this report. These questions may serve as a guide in any future reports. We believe that the questions can be answered, but doing so would require a significant amount of time and access to the right people and documents.

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Figure 3. Summary of Changes in 15 WSIP Project Budgets (Phase-Level Details) from 2002 through 2005

CUW	PROJECTS	Budget May 2002	Changes Between 2003 and 2002	Budget August 2003	Changes Between 2005 and 2003	Budget Nov 2005
37401	**Calaveras Dam Replacement**					
	Planning	$1,187,000	$0	$1,187,000	$4,338,000	$7,310,000
	Environmental Review	$742,000	($277,000)	$465,000	$4,543,000	$5,008,000
	Design	$13,653,000	$0	$13,653,000	$2,139,000	$20,456,000
	Bid	$1,187,000	$0	$1,187,000	$988,000	$0
	Construction	$118,761,000	$0	$118,761,000	$79,175,000	$223,736,000
	Construction Management	$6,678,000	$0	$6,678,000	$16,083,000	$0
	Project Management	$7,791,000	($845,000)	$6,946,000	$369,000	$0
	Sub-Total Cost	$149,999,000	($1,122,000)	$148,877,000	$107,635,000	$256,512,000
	Escalation	$20,798,000	($1,897,000)	$18,901,000	($18,901,000)	$0
	Total	$170,797,000	($3,019,000)	$167,778,000	$88,734,000	$256,512,000
35601	**New Crystal Springs Bypass Tunnel**					
	Planning	$444,000	$1,215,000	$1,659,000	$1,469,000	$3,445,000
	Environmental Review	$278,000	$594,000	$872,000	$393,000	$1,274,000
	Design	$5,106,000	($1,071,000)	$4,035,000	$1,449,000	$0
	Bid	$444,000	$46,000	$490,000	($342,000)	$0
	Construction	$37,801,000	$0	$37,801,000	$27,805,000	$71,865,000
	Construction Management	$2,498,000	$0	$2,498,000	$2,563,000	$0
	Project Management	$2,914,000	$1,613,000	$4,527,000	($1,996,000)	$0
	Sub-Total Cost	$49,485,000	$2,397,000	$51,882,000	$31,341,000	$83,223,000
	Escalation	$7,749,000	($492,000)	$7,257,000	($7,257,000)	$0
	Total	$57,234,000	$1,905,000	$59,139,000	$24,084,000	$83,223,000

Figure 3, continued

CUW	PROJECTS	Budget May 2002	Changes Between 2003 and 2002	Budget August 2003	Changes Between 2005 and 2003	Budget Nov 2005
30601	**Crocker Amazon Pump Station Upgrade**					
	Planning	$34,000	$0	$34,000	($34,000)	$0
	Environmental Review	$21,000	$0	$21,000	($21,000)	$0
	Design	$395,000	$0	$395,000	$394,000	$789,000
	Bid	$34,000	$0	$34,000	($34,000)	$0
	Construction	$1,926,000	$0	$1,926,000	$665,000	$2,591,000
	Construction Management	$193,000	$0	$193,000	$642,000	$835,000
	Project Management	$225,000	$0	$225,000	$384,000	$609,000
	Sub-Total Cost	$2,828,000	$0	$2,828,000	$1,996,000	$4,824,000
	Escalation	$194,000	($85,000)	$109,000	($109,000)	$0
	Total	$3,022,000	($85,000)	$2,937,000	$1,887,000	$4,824,000
37301	**SJPL**					
	Planning	$2,823,030	$0	$2,823,030	$4,883,970	$7,707,000
	Environmental Review	$1,764,394	$0	$1,764,394	$5,182,606	$6,947,000
	Design	$32,464,846	$0	$32,464,846	($8,800,846)	$23,664,000
	Bid	$2,823,030	$0	$2,823,030	($2,823,030)	$0
	Construction	$317,098,676	$0	$317,098,676	($2,684,676)	$314,414,000
	Construction Management	$15,879,544	$0	$15,879,544	($15,879,544)	$0
	Project Management	$18,526,135	$0	$18,526,135	($18,526,135)	$0
	Sub-Total Cost	$391,379,655	$0	$391,379,655	($38,647,655)	$352,732,000
	Escalation	$85,944,345	($4,896,000)	$81,048,345	($81,048,345)	$0
	Total	$477,324,000	($4,896,000)	$472,428,000	($119,695,955)	$352,732,045

Figure 3, continued

CUW	PROJECTS	Budget May 2002	Changes Between 2003 and 2002	Budget August 2003	Changes Between 2005 and 2003	Budget Nov 2005
	Tesla Portal Disinfection					
	Planning	$111,213	$0	$111,213	$1,446,361	$1,557,574
	Environmental Review	$69,508	$0	$69,508	$1,271,794	$1,341,302
	Design	$1,278,953	$0	$1,278,953	$250,901	$1,529,854
	Bid	$111,213	$0	$111,213	($111,213)	$0
	Construction	$7,587,821	$0	$7,587,821	$8,714,717	$16,302,538
	Construction Management	$625,575	$0	$625,575	($625,575)	$0
	Project Management	$729,838	$0	$729,838	($729,838)	$0
	Sub-Total Cost	$10,514,121	$0	$10,514,121	$10,217,147	$20,731,268
	Escalation	$1,368,879	($103,000)	$1,265,879	($1,265,879)	$0
	Total	$11,883,000	($103,000)	$11,780,000	$8,951,269	$20,731,269
37402	**Calaveras Reservoir Upgrade**					
	Planning	$0	$0	$0	$45,873	$45,873
	Environmental Review	$0	$0	$0	$69	$69
	Design	$0	$0	$0	$259,929	$259,929
	Bid	$0	$0	$0	$0	$0
	Construction	$0	$0	$0	$1,481,129	$1,481,129
	Construction Management	$0	$0	$0	$0	$0
	Project Management	$0	$0	$0	$0	$0
	Sub-Total Cost	$0	$0	$0	$1,787,000	$1,787,000
	Escalation	$0	$0	$0	$0	$0
	Total	$0	$0	$0	$1,787,001	$1,787,001

Figure 3, continued

CUW	PROJECTS	Budget May 2002	Changes Between 2003 and 2002	Budget August 2003	Changes Between 2005 and 2003	Budget 2005
35901	**New Irvington Tunnel**					
	Planning	$1,159,581	$0	$1,159,581	$4,693,309	$5,852,890
	Environmental Review	$724,738	$0	$724,738	$4,940,519	$5,665,257
	Design	$13,335,186	$0	$13,335,186	$2,554,915	$15,890,101
	Bid	$1,159,581	$0	$1,159,581	($1,159,581)	$0
	Construction	$113,417,294	$0	$113,417,294	$73,824,458	$187,241,752
	Construction Management	$6,522,645	$0	$6,522,645	($6,522,645)	$0
	Project Management	$7,609,753	$0	$7,609,753	($7,609,753)	$0
	Sub-Total Cost	$143,928,778	$0	$143,928,778	$70,721,222	$214,650,000
	Escalation	$21,867,222	($1,435,000)	$20,432,222	($20,432,222)	$0
	Total	$165,796,000	($1,435,000)	$164,361,000	$50,289,000	$214,650,000
35301	**BDPL Nos. 3&4 Crossover Isolation Valves**					
	Planning	$116,931	$0	$116,931	$1,180,634	$1,297,565
	Environmental Review	$73,082	$0	$73,082	$155,707	$228,789
	Design	$1,344,708	$0	$1,344,708	$1,368,507	$2,713,215
	Bid	$116,931	$0	$116,931	($116,931)	$0
	Construction	$7,895,110	$0	$7,895,110	$15,465,479	$23,360,589
	Construction Management	$657,737	$0	$657,737	($657,737)	$0
	Project Management	$767,360	$0	$767,360	($767,360)	$0
	Sub-Total Cost	$10,971,859	$0	$10,971,859	$16,628,299	$27,600,158
	Escalation	$2,276,141	($339,000)	$1,937,141	($1,937,141)	$0
	Total	$13,248,000	($339,000)	$12,909,000	$14,691,157	$27,600,157

Figure 3, continued

CUW	PROJECTS	Budget May 2002	Changes Between 2003 and 2002	Budget August 2003	Changes Between 2005 and 2003	Budget Nov 2005
36801	**BDPL Reliability Upgrades**					
	Planning	$1,760,904	$854,000	$2,614,904	$6,756,659	$9,371,563
	Environmental Review	$1,100,565	$1,500,000	$2,600,565	$11,490,318	$14,090,883
	Design	$35,529,146	$0	$35,529,146	$3,891,206	$39,420,352
	Bid	$1,760,904	$0	$1,760,904	($1,760,904)	$0
	Construction	$187,357,273	$0	$187,357,273	$321,782,568	$509,139,841
	Construction Management	$9,905,083	$0	$9,905,083	($9,905,083)	$0
	Project Management	$11,555,930	$0	$11,555,930	($11,555,930)	$0
	Sub-Total Cost	$248,969,805	$2,354,000	$251,323,805	$320,698,834	$572,022,639
	Escalation	$68,429,195	($3,653,001)	$64,776,194	($64,776,194)	$0
	Total	$317,399,000	($1,299,001)	$316,099,999	$255,922,640	$572,022,639
38901	**EBMUD Intertie**					
	Planning	$0	$25,000	$25,000	$272	$25,272
	Environmental Review	$0	$25,000	$25,000	($17,200)	$7,800
	Design	$0	$600,000	$600,000	($556,003)	$43,997
	Bid	$0	$0	$0	$0	$0
	Construction	$0	$8,000,000	$8,000,000	$521,789	$8,521,789
	Construction Management	$0	$500,000	$500,000	($500,000)	$0
	Project Management	$0	$0	$0	$0	$0
	Sub-Total Cost	$0	$9,150,000	$9,150,000	($551,142)	$8,598,858
	Escalation	$0	$0	$0	$0	$0
	Total	$0	$9,150,000	$9,150,000	($551,142)	$8,598,858

Figure 3, continued

CUW	PROJECTS	Budget May 2002	Changes Between 2003 and 2002	Budget August 2003	Changes Between 2005 and 2003	Budget Nov 2005
35801	**Sunset Reservoir Upgrades**					
	Planning	$405,530	$0	$405,530	($96,120)	$309,410
	Environmental Review	$253,456	$0	$253,456	($249,834)	$3,622
	Design	$4,663,592	$0	$4,663,592	($44,575)	$4,619,017
	Bid	$405,530	$0	$405,530	($405,530)	$0
	Construction	$34,182,999	$0	$34,182,999	$22,860,952	$57,043,951
	Construction Management	$2,281,105	$0	$2,281,105	($2,281,105)	$0
	Project Management	$2,661,289	$0	$2,661,289	($2,661,289)	$0
	Sub-Total Cost	$44,853,501	$0	$44,853,501	$17,122,499	$61,976,000
	Escalation	$15,959,499	($11,785,000)	$4,174,499	($4,174,499)	$0
	Total	$60,813,000	($11,785,000)	$49,028,000	$12,948,000	$61,976,000
30701	**Summit Reservoir Rehabilitation**					
	Planning	$163,509	$0	$163,509	($31,800)	$131,709
	Environmental Review	$102,193	$0	$102,193	($102,193)	$0
	Design	$1,880,352	$0	$1,880,352	($661,726)	$1,218,626
	Bid	$163,509	$0	$163,509	($163,509)	$0
	Construction	$11,887,536	$0	$11,887,536	$1,689,988	$13,577,524
	Construction Management	$917,737	$0	$917,737	($917,737)	$0
	Project Management	$1,073,027	$0	$1,073,027	($1,073,027)	$0
	Sub-Total Cost	$16,187,863	$0	$16,187,863	($1,260,004)	$14,927,859
	Escalation	$1,334,137	($415,000)	$919,137	($919,137)	$0
	Total	$17,522,000	($415,000)	$17,107,000	($2,179,141)	$14,927,859

Figure 3, continued

CUW	PROJECTS	Budget May 2002	Changes Between 2003 and 2002	Budget August 2003	Changes Between 2005 and 2003	Budget Nov 2005
32101	**Forest Knolls Pump Station**					
	Planning	$30,373	$0	$30,373	$157,974	$188,347
	Environmental Review	$18,983	$0	$18,983	($14,935)	$4,048
	Design	$349,284	$0	$349,284	$288,702	$637,986
	Bid	$29,139	$0	$29,139	($29,139)	$0
	Construction	$1,668,269	$0	$1,668,269	$3,281,126	$4,949,395
	Construction Management	$170,845	$0	$170,845	($170,845)	$0
	Project Management	$199,320	$0	$199,320	($199,320)	$0
	Sub-Total Cost	$2,466,213	$0	$2,466,213	$3,313,563	$5,779,776
	Escalation	$339,787	($84,000)	$255,787	($255,787)	$0
	Total	$2,806,000	($84,000)	$2,722,000	$3,057,776	$5,779,776
32301	**McLaren Park Pump Station**					
	Planning	$57,596	$0	$57,596	$114,125	$171,721
	Environmental Review	$35,998	$0	$35,998	($22,270)	$13,728
	Design	$662,360	$0	$662,360	$228,058	$890,418
	Bid	$57,596	$0	$57,596	($57,596)	$0
	Construction	$3,522,427	$0	$3,522,427	$5,793,264	$9,315,691
	Construction Management	$323,980	$0	$323,980	($323,980)	$0
	Project Management	$377,977	$0	$377,977	($377,977)	$0
	Sub-Total Cost	$5,037,934	$0	$5,037,934	$5,353,624	$10,391,558
	Escalation	$1,024,066	($198,000)	$826,066	($826,066)	$0
	Total	$6,062,000	($198,000)	$5,864,000	$4,527,557	$10,391,557
32801	**McLaren Park Tank Rehab Seismic Upgrade**					
	Planning	$76,316	$0	$76,316	($12,473)	$63,843
	Environmental Review	$47,698	$0	$47,698	($45,724)	$1,974
	Design	$877,638	$0	$877,638	($129,125)	$748,513
	Bid	$76,316	$0	$76,316	($76,316)	$0
	Construction	$4,891,551	$0	$4,891,551	($351,370)	$4,540,181
	Construction Management	$429,280	$0	$429,280	($429,280)	$0
	Project Management	$500,826	$0	$500,826	($500,826)	$0
	Sub-Total Cost	$6,899,625	$0	$6,899,625	($1,545,114)	$5,354,511
	Escalation	$1,420,375	($88,000)	$1,332,375	($1,332,375)	$0
	Total	$8,320,000	($88,000)	$8,232,000	($2,877,489)	$5,354,511

EXPANDED ANALYSES

Calaveras Dam Replacement
(Now part of Calaveras Dam Projects)

Project Number as of Nov 2005 WSIP: 37401
Prior Project Control Number: 202135

Project Background

The project descriptions outline the project background:

Calaveras Dam collects and stores 97,000 acre feet of local Alameda County watershed supplies for treatment and delivery to PUPPC regional water system customers. The PUC water supply experiences deficiencies in dry years and cannot meet the full water demands of its system customers. The PUC's April 2000 Water Supply Master Plan recommended the PUC increase its available water supply by 71 million gallons per day through water transfers, or 800,000 acre feet additional storage, to meet the future needs of its service area. Additionally, the CalFed process has recommended regional water quality projects in the Bay Area that provide high quality Sierra water supplies for local blending. Calaveras Reservoir presents an opportunity to improve PUC water supply reliability by capturing Tuolumne River wet year water supplies and offers a potential source of high quality water supplies.

Current Status of the Project

The Calaveras Dam Replacement project is now part of a larger project, called Calaveras Dam Projects. This project contains three separate projects:

- Calaveras Dam Replacement (37401)
- Calaveras Reservoir Upgrades (37402), and
- San Antonio Backup Pipeline (37403).

This analysis focuses only on project 37401, Calaveras Dam Replacement.

As of the December 2006 quarterly status report:

- Project planning was 100 percent complete;
- Environmental review was 41 percent complete;
- Design/Bid & Award was 36 percent complete; and
- Construction had not yet begun.

The schedule indicated that construction would begin in mid 2009 and be completed in 2012.

MAY 2002 PROJECT SCOPE AND PROJECT BUDGET:

May 2002 Project Description and Scope Summary

- Calaveras Dam is located in a seismically active fault zone, and the terminus of the northern spur of the Calaveras Fault lies within the existing reservoir. The project proposes to replace Calaveras Dam with a new dam 200 feet higher to increase terminal storage from 97,000 to 670,000 acre feet.

- The goal of the first year of the project is to initiate planning of the project and feasibility analysis that will collect sufficient geological data to evaluate site seismic conditions and the potential structural risk to the proposed dam and reservoir.

- In the second and third years, conceptual design of the replacement dam, outlet facilities, pump stations, pipelines, and power facilities will start, and environmental review work will be initiated.

- Design and construction will commence after receipt of all environmental and other approvals.

Itemization of May 2002 Project Budget:

Figure 4. Calaveras Dam Replacement - May 2002 Project Budget

Cost Categories	**2002 Budget**
Planning	$1,187,000
Environmental	$742,000
Design	$13,653,000
Bid/Bid & Award	$1,187,000
Construction	$118,761,000
Construction Management	$6,678,000
Project Management	$7,791,000
Subtotal	**$149,000,000**
Escalation	$20,798,000
TOTAL	**$170,797,000**

Comments on May 2002 Project Budget Development Methodology:

The May 2002 Calaveras Dam Project Budget was based on an "order of magnitude" construction cost estimate prepared by the PUC's program management consultant at that time, which was the San Francisco Water Alliance. The cost estimate was completed in January 2002. The construction cost estimate was developed in 2002

dollars, without escalation, although project included $20,798,000 in unallocated escalation costs. The cost of site exploration, design engineering, construction management, PUC administrative and legal expenses and right of way were excluded from this estimate. Although the cost estimate assumed that the replacement dam would be located at a site approximately 1,700 feet downstream from the existing dam, site geologic conditions had not been evaluated at the time the estimate was prepared, and the text accompanying the cost estimate indicated that there was the possibility that the chosen site could be unacceptable.

The construction cost estimated was developed by estimating the construction price received via a competitive bidding process, including the construction contractor's "site indirect costs, and allowances for home office costs and profit." The cost estimate estimated number of units of an item or service that would be required, their unit price, and their total cost.

It should be noted that we could not determine what factors caused the $79.4 million order of magnitude construction estimate to increase to a total construction cost estimate of $118.8 million in the May 2002 CIP.

CHANGES FROM MAY 2002 TO AUGUST 2003 PROJECT SCOPE AND PROJECT BUDGET

Changes in Project Scope from May 2002 to August 2003:

The California Department of Dam Safety requires the PUC to operate the reservoir at a maximum level of 31,000 acre feet (rather than 97,000) because it is located in a seismically active fault zone which raises the risk of a dam breach following an earthquake.

In addition, to protect the fish that live in the reservoir, the California Department of Fish and Game requires that PUC operate the reservoir at a minimum level of 22,000 acre feet. These constraints result in a current usable storage capacity of 9,000 acre feet, placing a serious strain on the PUC drinking water system.

The planning phase is completed at this stage, with the collection and rigorous analysis of the geological data to evaluate seismicity and potential structural risk at the dam. Planning will proceed with the initiation of the environmental work and conceptual engineering.

Three different approaches will be considered: repair or replace the dam at the original storage capacity (97,000 acre feet), replace dam for increased reservoir storage (up to 420,000 acre feet), or replace the dam with the same storage but with provision for future enlargement (up to 420,000 acre feet). These three alternatives all represent a smaller dam than was originally envisioned in the 2002 project description.

According to the project description, the cost was reduced by $1,122,000. This was the result of a reduction of $277,000 due to a program EIR being initiated and a reduction of $845,000 in project management costs due to program coordination and the removal of need for extra CEQA compliance steps due to reservoir enlargement being removed from the project. The construction cost estimate did not change compared to the May 2002 CIP.

Possible Questions for Future Reports:

1. Why and when was the larger reservoir removed from the project?
2. When were the storage constraints placed on the system?

Itemization of Project Budget Changes from May 2002 to August 2003:

Figure 5. Calaveras Dam Replacement - Project Budget Changes from May 2002 to August 2003

Cost Categories	May 2002 Budget	Changes Between May 2002 and August 2003	August 2003 Budget
Planning	$1,187,000	$0	$1,187,000
Environmental	$742,000	($277,000)	$465,000
Design	$13,653,000	$0	$13,653,000
Bid/Bid & Award	$1,187,000	$0	$1,187,000
Construction	$118,761,000	$0	$118,761,000
Construction Management	$6,678,000	$0	$6,678,000
Project Management	$7,791,000	($845,000)	$6,946,000
Subtotal	**$149,000,000**	**($1,122,000)**	**$148,877,000**
Escalation	$20,798,000	($1,896,000)	$18,902,000
TOTAL	**$170,797,000**	**($3,018,000)**	**$167,779,000**

Comments on August 2003 Project Budget Development Methodology:

The person who previously served as the Calaveras project manager verified that the construction cost estimate was not changed from 2002 to 2003.

CHANGES FROM AUGUST 2003 TO NOVEMBER 2005 PROJECT SCOPE AND PROJECT BUDGET

Changes in Description of Project Scope from August 2003 to November 2005:

By the November 2005 adoption of the WSIP, the Calaveras Dam Replacement Project had become Calaveras Dam Projects, with separate projects: Calaveras Dam Replacement, Calaveras Reservoir Upgrades, and San Antonio Backup Pipeline. The

overall cost of the Dam replacement project increased by $88,733,000. This includes an additional $79,175,000 in construction costs, as well as additional costs for Planning, Environmental, Design, and Bid & Award.

Changes in the Construction Cost Estimate:

The changes in the construction cost estimate are broken into two categories:

1. Modifications (in 2005 dollars) the original 2002 scope for the dam project; and

2. Changes in budget methodology

Changes in Project Scope:

From 2003 to 2005, the construction cost for the dam replacement project increased from approximately $80 million in 2003 dollars to approximately $100 million in 2005 dollars. Based on information from the previous Calaveras Dam project manager, the $20 million increase was driven by:

- Adding a cofferdam upstream of the existing dam;
- Regrading of the existing dam embankment to provide proper reservoir contours at its crest and to provide room for new construction at its downstream toe;
- Dam foundation work required to facilitate future enlargement of the reservoir; and
- Left abutment grouting of the excessively permeable geology at the new dam site.

We do not have a detailed breakdown of the cost increases associated with each of these items.

In addition, the following significant additions were made to the Calaveras Dam project scope, for which we do have cost estimates:

- Treatment Facilities were added to the project scope - $3 million

- Access Road Upgrade was added to the project scope - $7 million

As a result, $30 million of the increased cost of the Calaveras Dam project is accounted for by these 2005 major scope changes.

In total, the 2005 “base” construction cost estimate for the Calaveras Dam was $110.6 million, excluding all contingencies and escalation.

Changes in Budget Methodology:

The October 2005 Parsons/CH2MHill "Water System Improvement Program Assessment Report" indicated that, at that time, the Calaveras project was at the Conceptual Engineering Report (CER) stage of development, and therefore faced "several unknowns" related to dam "foundation excavation and the amount of drilling and grouting required to achieve seepage cut-off through the foundation." The report noted that foundation excavation is "a significant cost item," and can result in large cost overruns. As a result, the report recommended using construction cost contingency of 30 percent of the raw escalated construction cost estimate.

The 2005 construction cost estimate began with a "raw construction cost" of $110.6 million, but then added the following contingency and escalation factors:

1. "Raw construction cost" (in 2005 dollars)	$110,600,000
2. Construction estimate contingency (= 30% of base)	$33,180,000
3. Construction escalation to midpoint of construction (= 21.9% of base + estimate contingency)	$31,449,000
4. Subtotal - "Base Construction Cost" estimate	$175,229,000
5. Construction Contingency at 10% of "base construction estimate"	$17,522,900
6. Total Construction Cost Estimate - November 2005	$192,751,900

It is important to note that $192,751,900 does not match total construction line in November 2005 budget as loaded in P3E, which is $197,936,000. Although this is likely due to the way in which highly detailed cost categories from the November 2005 project budget were aggregated into the seven cost categories discussed earlier, we do not have the information necessary to develop the cross-walk between two figures. Over $82 million in escalation and contingencies were added to the "raw construction cost" estimate in order to derive the construction cost estimate used in November 2005.

Itemization of Project Budget Changes from August 2003 to November 2005:

As noted previously, following the adoption of the November 2005 WSIP program budget by the Commission, the PUC consolidated certain line items into a smaller number of budget categories, and loaded each project budget into seven cost categories. The change in the Calaveras Dam budget from 2003 to 2005 in these seven categories is shown below.

Figure 6. Calaveras Dam Replacement - Project Budget Changes from August 2003 to November 2005

Cost Categories	August 2003 Budget	Changes Between August 2003 and November 2005	November 2005 Budget (as loaded in P3E)	Actuals (as of March 24, 2007)
Planning	$1,187,000	$4,338,000	$7,310,000	$5,941,000
Environmental	$465,000	$4,543,000	$5,008,000	$2,768,000
Design	$13,653,000	$2,139,000	$20,456,000	$6,880,000
Bid/Bid & Award	$1,187,000	$988,000	$0	$0
Construction	$118,761,000	$79,175,000	$223,738,000	$0
Construction Management	$6,678,000	$16,083,000	$0	$0
Project Management	$6,946,000	$369,000	$0	$2,551,000
Subtotal	**$148,877,000**	**$107,635,000**	**$256,512,000**	**$18,140,000**
Escalation	18,902,000	$(18,902,000)	$0	$0
TOTAL	**$167,779,000**	**$88,733,000**	**$256,512,000**	**$18,140,000**

Comments on November 2005 Project Budget Development Methodology:

The Team has obtained a significant amount of historical information from the previous Calaveras project manager, which is reflected in our analysis of the budget changes.

Our analysis raised questions that could be addressed in future reports. They are:

1. What caused the actual expenditures for planning to exceed the 2005 budget by an additional $416,000?
2. If the environmental review is 47 percent complete, why is it on track to finish over budget?
3. Of the additional costs in 2005, which are due to pre-WSIP costs being added to the project?

Figure 7. Calaveras Dam Replacement – Summary of Project Scope and Cost Changes from May 2002 to August 2003 to November 2005

Changes: May 2002 to August 2003		
Change	**Cost Associated**	**Comment**
Programmatic EIR	($277,000)	
Smaller reservoir than originally planned	($845,000)	
Escalation costs reduced	($1,896,000)	
Changes: August 2003 to November 2005		
Change	**Cost Associated**	**Comment**
Planning	$4,338,000	
Environmental	$4,543,000	
Design	$2,139,000	
Bid/Bid & Award	$988,000	
Construction	$79,175,000	Majority of increase driven by changes in budget methodology changes, but there were also $30 million in scope changes.

New Crystal Springs Bypass Tunnel
(Originally called Crystal Springs Bypass Tunnel)

Project Number as of Nov 2005 WSIP: 35601
Prior Project Control Number: 9891

Project Background

The project descriptions provide the following background:

The existing 96 inch Crystal Springs Bypass Pipeline is the only pipeline carrying water north from the Crystal Springs Balancing Reservoir. This pipeline is made from pre-stressed concrete pipe. It is located below a hillside, which in January 1997 and January 1998 experienced landslides. The first landslide covered a 350 foot section of Polhemus Road. As an emergency measure to stabilize the slide, a 350 foot section of Polhemus Creek at the toe of the slide was filled with cobble stones. Inspection at that time indicated that no appreciable damage was done, but there is concern that future landslides may disrupt water supplies in this area. Since this is the only pipeline, it cannot be shutdown for an extended time to allow for inspections.

Current Status of the Project

The project now calls for a tunnel, rather than a pipeline, ranging in depth from 60 to 200 feet. As of the December 2006 quarterly status report:

- Project Planning is 100 percent complete;
- Environmental Review is 66 percent complete;
- Design/Bid & Award being 80 percent complete; and
- Construction not yet begun.

The Environmental phase has experienced a 16 month delay. The project schedule indicates that construction is scheduled to begin summer of 2007, with construction completed in early 2012. However, based upon interviews with the current Project Manager, the current plan is to go to bid in the summer of 2008.

MAY 2002 PROJECT SCOPE AND PROJECT BUDGET:

<u>May 2002 Project Description and Scope Summary</u>

- Construction of a new 4,200 linear feet, 84-inch diameter Crystal Springs Bypass tunnel, parallel to the existing pipeline, from the existing Crystal Springs Bypass Tunnel in the south to Crystal Springs Road in the north, where it will connect to

the Crystal Springs Pipeline.

- Other improvements will include installation of remote controlled isolation valves, cross connection to the existing pipeline and environmental mitigation work.

Itemization of May 2002 Project Budget:

Figure 8. New Crystal Springs Bypass Tunnel - May 2002 Project Budget

Cost Categories	**2002 Budget**
Planning	$444,000
Environmental	278,000
Design	$5,106,000
Bid/Bid & Award	$444,000
Construction	$37,801,000
Construction Management	$2,498,000
Project Management	$2,914,000
Subtotal	**$49,485,000**
Escalation	$7,749,000
TOTAL	**$57,234,000**

Comments on May 2002 Project Budget Development Methodology:

An email from the original Project Manager indicated that initial conceptual engineering for this project was done by Manna Consultants, with a subsequent "Optioneering" document done by the San Francisco Water Alliance. These documents were used as the basis for the project cost estimate. A preliminary engineering investigation was undertaken later that updated the project cost estimates (he recalls that it was performed by the San Francisco Water Improvement Partners).

CHANGES FROM MAY 2002 TO AUGUST 2003 PROJECT SCOPE AND PROJECT BUDGET

Changes in Project Scope from May 2002 to August 2003:

From May 2002 to August 2003, there were both scope and scheduling changes made to the project. The August 2003 project summary notes that both the restoration of Polhemus Creek to its original condition, and mitigation performed as mandated by permits for the emergency work from the California Department of Fish and Game, Regional Water Quality Board, and the U.S. Army Corps of Engineers, had been added to the project. The project was also scheduled to start one year earlier, although the completion date was not scheduled to change substantially.

This additional work cost $2,397,000, and appeared to be funded within the existing project cost categories, through increases in the Planning, Environmental, Bid &

Award, and Project Management cost categories. The Design category was decreased, as well as the Escalation cost category.

An email from the Manager of Program Controls indicates that the changes between 2002 and 2003 pre-date the CIP Control System, and that the annual reports are the best source for that information. The August 2003 report indicates that the additional cost is to pay for creek restoration, but no detail is given.

Itemization of Project Budget Changes from May 2002 to August 2003:

Figure 9. New Crystal Springs Bypass Tunnel - Project Budget Changes from May 2002 to August 2003

Cost Categories	May 2002 Budget	Changes Between May 2002 and August 2003	August 2003 Budget
Planning	$444,000	$1,215,000	$1,659,000
Environmental	278,000	$594,000	$872,000
Design	$5,106,000	($1,071,000)	$4,035,000
Bid/Bid & Award	$444,000	$46,000	$490,000
Construction	$37,801,000	$0	$37,801,000
Construction Management	$2,498,000	$0	$2,498,000
Project Management	$,2914,000	$1,613,000	$4,527,000
Subtotal	**$49,485,000**	**$2,397,000**	**$51,882,000**
Escalation	$7,749,000	($492,000)	$7,257,000
TOTAL	**$57,234,000**	**$1,905,000**	**$59,139,000**

Comments on August 2003 Project Budget Development Methodology:

Per discussions with the Project Manager, the following information was gathered: The San Francisco Water Improvement Partners program management team revisited the budget and made no adjustments, outside of escalation reduction due to the schedule moving forward.

CHANGES FROM AUGUST 2003 TO NOVEMBER 2005 PROJECT SCOPE AND PROJECT BUDGET

Changes in Description of Project Scope from August 2003 to November 2005:

Between August 2003 and November 2005, the budget for the project increased significantly. Overall, the budget increased by $24,085,000. Specifically, the construction cost increased by $27,805,000, with additional increases for Planning, Environmental, and Design. These were offset by savings in Bid and Project Management.

The increase in construction costs is due to increased escalation and contingencies costs, compared to the August 2003 budget. The information for this comes from the "WSIP Cost Breakdown" sheet, and is summarized in the table below.

Figure 10. Crystal Springs Bypass Tunnel – Construction Cost Estimate Increases from August 2003 to November 2005

	August 2003 Budget	Changes Between August 2003 and November 2005	November 2005 Budget	Cost as Percentage of Construction Costs (as applicable)
Construction Cost Estimate	N/A	$ 38,608,000	$ 38,608,000	
Estimate Contingency Costs	N/A	$ 11,582,000	$ 11,582,000	30%
Construction Escalation Costs	N/A	$ 7,322,000	$ 7,322,000	15%
Construction Contingency Costs	N/A	$ 5,751,000	$ 5,751,000	10%
Environmental Mitigation	N/A	$ 2,343,000	$ 2,343,000	
Construction	$ 37,801,000	$ 27,805,000	$ 65,606,000	
Escalation	$ 7,257,000	$ (7,257,000)	$ -	
Total	$ 45,058,000	$ 20,548,000	$ 65,606,000	

As mentioned earlier, it is important to note that contingency and escalation costs are compounded. For example, the estimated contingency costs are 30 percent of the construction cost estimates, but the construction escalation costs are 15 percent of the total of the construction cost estimate plus the estimate contingency costs. The percentages used for contingency and escalation are at the high end of those discussed in the Parsons/CH2MHill report, but are consistent with the Parsons/CH2MHill's guidance.

Itemization of Project Budget Changes from August 2003 to November 2005:

Figure 11. New Crystal Springs Bypass Tunnel - Project Budget Changes from August 2003 to November 2005

Cost Categories	August 2003 Budget	Changes Between August 2003 & November 2005	November 2005 Budget (as loaded in P3E)	Actuals (as of March 24, 2007)
Planning	$1,695,000	$1,469,000	$3,445,000	$3,136,000
Environmental	$872,000	$393,000	$1,274,000	$773,000
Design	$4,035,000	$1,449,000	$6,639,000	$3,605,000
Bid/Bid & Award	$490,000	($342,000)	$0	$0
Construction	$37,801,000	$27,805,000	$71,865,000	$0
Construction Management	$2,498,000	$2,563,000	$0	$0
Project Management	$4,527,000	($1,996,000)	$0	$1,502,000
Subtotal	**$51,882,000**	**31,342,000**	**$83,223,000**	**$9,016,000**
Escalation	$7,257,000	($7,257,000)	$0	$0
TOTAL	**$59,139,000**	**$24,085,000**	**$83,223,000**	**$9,016,000**

Comments on November 2005 Project Budget Development Methodology:

Information about the New Crystal Springs budget development appears in both the "WSIP Assessment Cost Details Report" and the "WSIP Assessment Report," both by Parsons/CH2MHill. The "WSIP Assessment Cost Details Report" is an analysis of "raw" construction costs for individual projects in the document. Per this document, there were no scope changes made to the New Crystal Springs Bypass Tunnel project, and the original construction cost remained unchanged. The report, "Water System Improvement Program Assessment Report," confirmed no scope changes, and it noted that an additional $203,000 had been added to reflect increased escalation for construction costs and schedule changes. This brought the proposed construction cost to $50,190,000, including contingency. This report also noted that there was some uncertainty associated with the project because it had not been decided yet how environmental review would be handled: as part of the programmatic EIR, as a standalone EIR, or whether a Negative Declaration would be granted.

Our analysis raised questions that could be addressed in future reports. They are:

1. Are the Environmental costs projected to go over budget? Why?
2. Why are Project Management costs going down, if Construction costs are going up?

Figure 12. New Crystal Springs Bypass Tunnel - Summary of Project Scope and Cost Changes from May 2002 to August 2003 to November 2005

Changes: May 2002 to August 2003		
Change	**Cost Associated**	**Comment**
Restoration of Polhemus Creek to original condition and mitigation work	$2,397,000	
Changes: August 2003 to November 2005		
Change	**Cost Associated**	**Comment**
Planning	$1,469,000	
Environmental	$393,000	
Design	$1,449,000	
Bid/Bid & Award	($342,000)	
Construction	$27,805,000	This increase is due to increased costs for escalation and contingency.

Crocker Amazon Pump Station Upgrade

Project Number as of Nov 2005 WSIP: 30601
Prior Project Control Number: 9972

Project Background

Project descriptions outline the background of this project:

The existing pump station, built in 1956, is in need of complete rehabilitation. The building is not up to current codes. In addition, equipment and electrical and mechanical systems have deteriorated. All of this leads to a pump station that is less reliable. In order to ensure reliability, the station needs modernization and upgrading.

Current Status of the Project

As of the December 2006 quarterly status report, this project was substantially complete and was operating. Final closeout is being delayed due to a dispute between the contractor and one of its subcontractors.

MAY 2002 PROJECT SCOPE AND PROJECT BUDGET:

May 2002 Project Description and Scope Summary

- The project scope includes the demolition of the existing building, constructing a new 3,000 square foot building, installing two new pumps (13 horsepower each), sprinkler system, new electrical system, new standby 70 Kva generator, replacement of two hydropneumatic tanks, fencing, landscaping, and other site work. During construction, temporary pumps will be installed to facilitate continued operations.

- The project will also provide the necessary facilities to support the SCADA project by adding automation where needed.

Itemization of May 2002 Project Budget:

Figure 13. Crocker Amazon Pump Station Upgrade - May 2002 Project Budget

Cost Categories	2002 Budget
Planning	$34,000
Environmental	$21,000
Design	$395,000
Bid/Bid & Award	$34,000
Construction	$1,926,000
Construction Management	$193,000
Project Management	$225,000
Subtotal	**$2,828,000**
Escalation	$194,000
TOTAL	**$3,022,000**

Comments on May 2002 Project Budget Development Methodology:

The initial budget for this project was developed by the San Francisco Water Alliance, the Bechtel-led Program Management team. A construction cost estimate was generated using pump horsepower ratings, historical data from similar sized pump station projects, in conjunction with the additional requirements of the developed project scope. Soft costs and other direct costs were calculated as a percentage of the construction cost and added to complete the project budget. The budget at this time reflected only the costs necessary to complete the project from this point forward, and did not include any prior expenditures.

CHANGES FROM MAY 2002 TO AUGUST 2003 PROJECT SCOPE AND PROJECT BUDGET

Changes in Project Scope from May 2002 to August 2003:

According to the 2003 project description, there was no change in scope to the project. However, Escalation was reduced by $85,000.

Itemization of Project Budget Changes from May 2002 to August 2003:

Figure 14. Crocker Amazon Pump Station Upgrade - Project Budget Changes from May 2002 to August 2003

Cost Categories	May 2002 Budget	Changes Between May 2002 and August 2003	August 2003 Budget
Planning	$34,000	$0	$34,000
Environmental	$21,000	$0	$21,000
Design	$395,000	$0	$395,000
Bid/Bid & Award	$34,000	$0	$34,000
Construction	$1,926,000	$0	$1,926,000
Construction Management	$193,000	$0	$193,000
Project Management	$225,000	$0	$225,000
Subtotal	**$2,828,000**	$0	**$2,829,000**
Escalation	$194,000	($85,000)	109,000
TOTAL	**$3,022,000**	**($85,000)**	**$2,937,000**

Comments on August 2003 Project Budget Development Methodology:

The San Francisco Water Improvement Partners program management team revisited the budget and made no adjustments, other than escalation reduction due to the schedule moving forward.

CHANGES FROM AUGUST 2003 TO NOVEMBER 2005 PROJECT SCOPE AND PROJECT BUDGET

Changes in Description of Project Scope from August 2003 to November 2005:

Since August 2003, the overall project cost has increased by $1,887,000. A change order was approved in June 2004 that increased the budget by $1,153,130. Eliminated from the project budget were costs for Planning and Environmental categories.

It is important to note that local projects were not subject to the review by Parsons/CH2MHill, so the same level of detail and information does not necessarily exist, unlike for regional projects.

Changes in the Construction Cost Estimate:

The changes in the construction cost estimate can be broken into three categories:

1. Modifications to the "base" costs for the project.
2. Additions to project scope.
3. Changes in budget methodology.

Changes in "Base" Construction Costs
By 2005, the project was fairly far along. Project funding was increased to reflect actual construction bid estimates and projected construction management costs.

Changes in Project Scope
The original construction cost did not include funds for providing a temporary pump station facility during the reconstruction phase, or increased site security requirements. In 2005, the project scope was expanded to include additional designs to improve site security and design and coordination for a temporary mobile pump station. In addition, funding was added to cover expenses associated with additional coordination meetings and presentations to the Art Commission, as well as miscellaneous construction costs, including support services, shutdowns, and piping connections.

Changes in Methodology
The project was partially funded from pre-CIP funds, which were transferred into the Design Phase of the budget at this time. Finally, according to the Manager of Program Controls, the categories of escalation, contingencies, and management reserve were incorporated into various project line items.

Details of Changes
We have shown the changes that resulted from the June 2004 Change Order in separate columns in the table below:

Figure 15. Crocker Amazon Pump Station Upgrade - Project Budget Impact of June 2004 Change Order

	August 2003 Budget	Changes Between August 2003 and Change Order	Change Order Budget	Changes Between Change Order and November 2005 Budget	November 2005 Budget
Planning	$ 34,000	$ (34,000)	$ -	$ -	$ -
Environmental Review	$ 21,000	$ (21,000)	$ -	$ -	$ -
Design	$ 395,000	$ 235,000	$ 630,000	$ 159,000	$ 789,000
Bid	$ 34,000	$ (34,000)	$ -	$ -	$ -
Construction	$ 1,926,000	$ 530,000	$ 2,456,000	$ 135,000	$ 2,591,000
Construction Management	$ 193,000	$ 527,000	$ 720,000	$ 115,000	$ 835,000
Project Management	$ 225,000	$ (50,000)	$ 175,000	$ 434,000	$ 609,000
Sub-Total Cost	$ 2,828,000	$ 1,153,000	$ 3,981,000	$ 843,000	$ 4,824,000
Escalation	$ 109,000	$ -	$ 109,000	$ (109,000)	$ -
Total	$ 2,937,000	$ 1,153,000	$ 4,090,000	$ 734,000	$ 4,824,000

As can be seen in the above table, $1,153,000 of the changes between August 2003 and November 2005 can be explained by the change order. However, we do not have detailed explanations for the remaining $734,000 in budget increases, and surmise that they are associated with the inclusion of contingencies, escalation and management reserve funds in the project budget.

In May 2002 and August 2003, construction management was 10 percent of the construction cost. After the June 2004 change order, it increased to 29 percent of the construction cost, and in the November 2005 budget, it represented 32 percent of the construction cost. A portion of this increase is attributable to the addition of $180,000 in DPW and DPT expenses and $44,500 in art enrichment fees to the construction management line-item, which occurred as part of the June 2004 change order.

Itemization of Project Budget Changes from August 2003 to November 2005:

Figure 16. Crocker Amazon Pump Station Upgrade - Project Budget Changes from August 2003 to November 2005

Cost Categories	August 2003 Budget	Changes Between August 2003 and November 2005	November 2005 Budget (as loaded in P3E)	Actuals (as of March 24, 2007)
Planning	$34,000	($34,000)	$0	$0
Environmental	$21,000	($21,000)	$0	$0
Design	$395,000	$394,000	$789,000	$789,000
Bid/Bid & Award	$34,000	($34,000)	$0	$0
Construction	$1,926,000	$665,000	$2,591,000	$2,318,000
Construction Management	$193,000	$642,000	$835,000	$795,000
Project Management	$225,000	$384,000	$609,000	$132,000
Subtotal	**$2,828,000**	**$1,996,000**	**$4,824,000**	**$4,034,000**
Escalation	$109,000	($109,000)	$0	$0
TOTAL	**$2,937,000**	**$1,887,000**	**$4,824,000**	**$4,034,000**

Comments on November 2005 Project Budget Development Methodology:

The Team has reviewed the Change Order from June 2004, as well as additional information from the Manager of Program Controls. This information is reflected in our analysis of budget changes.

Our analysis raised questions that could be addressed in future reports. They are:

1. Why are there no actuals associated with Bid & Award, Planning, or Environmental costs?
2. What drove up Construction costs by 35 percent?
3. Why did Construction Management costs as a percentage of construction costs increase so dramatically?
4. Why did Project Management costs as a percentage of construction costs go up significantly?
5. What portion of the increase in costs in 2005 is due to the addition of pre-WSIP costs?

Figure 17. Crocker Amazon Pump Station Upgrade - Summary of Project Scope Changes from May 2002 to August 2003 to November 2005

Changes: May 2002 to August 2003		
Change	**Cost Associated**	**Comment**
Reduction in escalation costs due to accelerated schedule.	($84,000)	
Changes: August 2003 to November 2005		
Change	**Cost Associated**	**Comment**
Planning	($34,000)	
Environmental	($21,000)	
Design	$394,000	
Bid/Bid & Award	($34,000)	
Construction	$665,000	Increased due to a change in scope and receipt of actual bid documents.

CONDENSED PROJECT ANALYSES

San Joaquin Pipeline (SJPL) No. 4
(Now called SJPL Pipeline System)

Project Number as of the November 2005 WSIP: 37301
Prior Project Control Number: 202035

Project Background

The project descriptions outline the project background:

The San Joaquin Pipelines (SJPLs) have become increasingly unreliable in recent years, experiencing sudden ruptures, flooding, leaks and service outages. The PUC relies increasingly on these pipelines for its principal water source, and their vulnerability is a major concern. This project will address the planning, design, and construction of a new SJPL #4, 48 miles long across the Central Valley. The new pipeline will be built in the PUC right of way, parallel to existing pipelines.

Current Status of the Project

This project has since been revised to provide for construction of a 9.7 mile section of new pipeline at Tesla Portal. The revised scope also includes the addition of two new crossover facilities on the existing three pipelines, the replacement of approximately 6 miles of existing prestressed concrete cylinder pipe downstream of the Oakdale portal, and a comprehensive evaluation and subsequent repair and rehabilitation of the existing three San Joaquin Pipelines.

<u>May 2002 Project Description and Scope Summary</u>

- The project is to plan, design, and construct a new SJPL #4. It is to be built in the PUC right of way, parallel to existing pipelines, 48 miles across the Central Valley with a delivery capacity of between 130 and 160 million gallons per day.

- Planning and environmental review are scheduled for 2004 through 2006, with design taking place between 2006 and 2008, and construction commencing in 2009.

- Completion is scheduled for 2011.

Itemization of May 2002 Project Budget

Figure 18. SJPL No. 4 - May 2002 Project Budget

Cost Categories	2002 Budget
Planning	$2,823,030
Environmental	$1,764,394
Design	$32,464,846
Bid/Bid & Award	$2,823,030
Construction	$317,098,676
Construction Management	$15,879,544
Project Management	$18,526,135
Subtotal	**$391,379,655**
Escalation	$85,944,345
TOTAL	**$477,324,000**

CHANGES FROM MAY 2002 TO AUGUST 2003 PROJECT SCOPE AND PROJECT BUDGET

Changes in Project Scope from May 2002 to August 2003:

In August 2003, the project start date was moved two years earlier, but the project completion date remained essentially the same. The only budget change was a reduction of $4,896,000 in escalation, presumably due to the earlier start date.

Figure 19. SJPL No. 4 - Project Budget Changes from May 2002 to August 2003

Cost Categories	May 2002 Budget	Changes Between May 2002 and August 2003	August 2003 Budget
Planning	$2,823,030	$0	$2,823,030
Environmental	$1,764,394	$0	$1,764,394
Design	$32,464,846	$0	$32,464,846
Bid/Bid & Award	$2,823,030	$0	$2,823,030
Construction	$317,098,676	$0	$317,098,676
Construction Management	$15,879,544	$0	$15,879,544
Project Management	$18,526,135	$0	$18,526,135
Subtotal	**$391,379,655**	**$0**	**$391,379,655**
Escalation	$85,944,345	($4,896,000)	$81,048,345
TOTAL	**$477,324,000**	**($4,896,000)**	**$472,428,000**

CHANGES FROM AUGUST 2003 TO NOVEMBER 2005 PROJECT SCOPE AND PROJECT BUDGET

Changes in Description of Project Scope from August 2003 to November 2005:

Between 2003 and 2005, the project scope was dramatically adjusted, as was the project budget. Rather than building a complete new pipeline, the project now provides for construction of a 9.7 mile section of new pipeline at Tesla Portal. The revised scope also includes the addition of two new crossover facilities on the existing three pipelines, the replacement of approximately 6 miles of existing prestressed concrete cylinder pipe downstream of the Oakdale portal, and a comprehensive evaluation and subsequent repair and rehabilitation of the existing three San Joaquin Pipelines.

The project budget was reduced by $119,695,955.

Figure 20. SJPL No. 4 - Project Budget Changes from August 2003 to November 2005

Cost Categories	August 2003 Budget	Changes Between August 2003 and November 2005	November 2005 Budget
Planning	$2,823,030	$4,883,970	$7,707,000
Environmental	$1,764,394	$5,182,606	$6,947,000
Design	$32,464,846	($8,800,846)	$23,664,000
Bid/Bid & Award	$2,823,030	($2,823,030)	$0
Construction	$317,098,676	($2,684,676)	$314,414,000
Construction Management	$15,879,544	($15,879,544)	$0
Project Management	$18,526,135	($18,526,135)	$0
Subtotal	**$391,379,655**	**($38,647,655)**	**$352,732,000**
Escalation	$81,048,345	($81,048,345)	$0
TOTAL	**$472,428,000**	**($119,695,955)**	**$352,732,000**

Tesla Portal Disinfection Facility
(Now called Tesla Portal Disinfection Facility)

Project Number as of the November 2005 WSIP: 38701
Prior Project Control Number: 202535

Project Background

The project descriptions outline the project background:

The Tesla Portal disinfection station helps to provide primary disinfection of the Hetch Hetchy water supply to meet all State and Federal drinking water regulations. Inspections of the Tesla Station have identified various deficiencies, such as the lack of a fire protection system, and seismic concerns. In addition, in order to reliably meet current and future drinking water regulations, major improvements are needed. This project is to support the design and construction of a new disinfection facility.

Current Status of the Project

As of December 2006, the project has been combined with the Advanced Disinfection Project (CUW384). At this point, the budgets for Environmental, Design, Bid & Award, and Construction have been transferred from this project to the Advanced Disinfection Project.

<u>May 2002 Project Description and Scope Summary</u>

- The Tesla Portal, in combination with an emergency back-up chlorination station at Thomas Shaft, provides the primary disinfection of the Hetch Hetchy water supply to meet State and Federal regulations.
- Various deficiencies have been identified, such as a lack of a fire protection system, seismic concerns, and the need to improve the facility to meet current and future needs.
- The project is scheduled for planning and environmental work in 2004 through 2005, with design in 2006, and construction in 2007 and 2008.

Itemization of May 2002 Project Budget

Figure 21. Tesla Portal Disinfection Facility - May 2002 Project Budget

Cost Categories	**2002 Budget**
Planning	$111,213
Environmental	$68,508
Design	$1,278,953
Bid/Bid & Award	$111,213
Construction	$7,587,821
Construction Management	$625,575
Project Management	$729,838
Subtotal	**$10,514,121**
Escalation	$1,368,879
TOTAL	**$11,883,000**

CHANGES FROM MAY 2002 TO AUGUST 2003 PROJECT SCOPE AND PROJECT BUDGET

Changes in Project Scope from May 2002 to August 2003:

In August 2003, the project start date was moved two years earlier, but the project completion date remained essentially the same. The only budget change was a reduction of $103,000 in escalation, presumably due to the earlier start date.

Figure 22.Tesla Portal Disinfection Facility - Project Budget Changes from May 2002 to August 2003

Cost Categories	**May 2002 Budget**	**Changes Between May 2002 and August 2003**	**August 2003 Budget**
Planning	$111,213	$0	$111,213
Environmental	$68,508	$0	$68,508
Design	$1,278,953	$0	$1,278,953
Bid/Bid & Award	$111,213	$0	$111,213
Construction	$7,587,821	$0	$7,587,821
Construction Management	$625,575	$0	$625,575
Project Management	$729,838	$0	$729,838
Subtotal	**$10,514,121**	**$0**	**$10,514,121**
Escalation	$1,368,879	($103,000)	$1,265,879
TOTAL	**$11,883,000**	**($103,000)**	**$11,780,000**

CHANGES FROM AUGUST 2003 TO NOVEMBER 2005 PROJECT SCOPE AND PROJECT BUDGET

Changes in Description of Project Scope from August 2003 to November 2005:

The scope in 2005 notes that, concurrent with this project, is an investigation into a Hetch Hetchy Advanced Disinfection Facility (CUW384) and an Integrated Disinfection Strategy, addressing various chemical and other disinfection processes for the Hetch Hetchy Aqueduct. Depending on the technology and site chosen for Advanced Disinfection, the scope of the Tesla Facility could be modified.

The project budget was increased by $8,951,269 between 2003 and 2005.

Figure 23. Tesla Portal Disinfection Facility - Project Budget Changes from August 2003 to November 2005

Cost Categories	August 2003 Budget	Changes Between August 2003 and November 2005	November 2005 Budget
Planning	$111,213	$1,446,361	$1,557,574
Environmental	$68,508	$1,271,794	$1,341,302
Design	$1,278,953	$250,901	$1,529,854
Bid/Bid & Award	$111,213	($111,213)	$0
Construction	$7,587,821	$8,714,717	$16,302,538
Construction Management	$625,575	($625,575)	$0
Project Management	$729,838	($729,838)	$0
Subtotal	**$10,514,121**	**$10,217,147**	**$20,731,268**
Escalation	$1,265,879	($1,265,879)	$0
TOTAL	**$11,780,000**	**$8,951,269**	**$20,731,268**

Calaveras Reservoir Upgrade

Project Number as of the November 2005 WSIP: 37402

Project Background

The project descriptions outline the project background:

This project is a subproject of the Calaveras Dam Projects. It was initiated after the August 2003 report. Thus it first appears in the 2005 documents.

It is a project to enhance fish habitat and water quality.

Current Status of the Project

The project is essentially completed. It has come in at budget.

Itemization of November 2005 Project Budget

Figure 24. Calaveras Reservoir Upgrade - November 2005 Project Budget

Cost Categories	**2005 Budget**
Planning	$45,873
Environmental	$69
Design	$259,929
Bid/Bid & Award	$0
Construction	$1,481,129
Construction Management	$0
Project Management	$0
Subtotal	**$1,787,001**
Escalation	$0
TOTAL	**$1,787,001**

Irvington Tunnel Alternatives
(Now called New Irvington Tunnel)

Project Number as of the November 2005 WSIP: 35901
Prior Project Control Number: 9970

Project Background

The project descriptions outline the project background:

The Irvington Tunnel is a lifeline facility that conveys Tuolumne River and Alameda watershed supplies to the Bay Division Pipelines. The tunnel is 3.6 miles long, has no operational alternative; if it failed it would isolate 85 percent of PUC system customers. The tunnel has not been inspected or maintained for over 30 years because it cannot be taken out of service due to high water demands.

The operation of the Irvington Tunnel is controlled by a relatively short pipeline network, the Alameda Siphons. These are situated immediately upstream crossing the Calaveras Fault.

Current Status of the Project

As of December 2006, the project is at the 35 percent design phase. The second administrative draft of the EIR was delayed to incorporate new spoils disposal area alternatives. The U.S. Army Corps of Engineers is waiting for this to verify the wetlands delineation.

<u>May 2002 Project Description and Scope Summary</u>

- This project will construct a new facility of 115 to 150 million gallons a day capacity to provide sufficient capacity, operational redundancy, and flow to reliably deliver PUC water supplies and increase emergency response capability.

- The estimate assumes construction of a 3.6 mile, 10.5 foot wide tunnel, parallel to the existing tunnel, with isolation valves and cross connections.

- The project is scheduled for planning and environmental work in 2003 and 2004, with design in 2004 through 2006, and construction in 2006 through 2009.

Itemization of May 2002 Project Budget

Figure 25. Irvington Tunnel Alternatives - May 2002 Project Budget

Cost Categories	2002 Budget
Planning	$1,159,581
Environmental	$724,738
Design	$13,335,186
Bid/Bid & Award	$1,159,581
Construction	$113,417,294
Construction Management	$6,522,645
Project Management	$7,609,753
Subtotal	**$143,928,778**
Escalation	$21,867,222
TOTAL	**$165,796,000**

CHANGES FROM MAY 2002 TO AUGUST 2003 PROJECT SCOPE AND PROJECT BUDGET

Changes in Project Scope from May 2002 to August 2003:

Between 2002 and 2003, the project added a reliability upgrade related to the Alameda Siphons. Three different conceptual approaches are under evaluation: a new tunnel adjacent to the existing Irvington Tunnel with upgrade to Alameda Siphons, a new tunnel and pipeline combination via Sunol Valley Water Treatment Plant, and a new pipeline/pump station combination which bypasses the existing Irvington Tunnel and Alameda Siphons.

Figure 26. Irvington Tunnel Alternatives - Project Budget Changes from May 2002 to August 2003

Cost Categories	May 2002 Budget	Changes Between May 2002 and August 2003	August 2003 Budget
Planning	$1,159,581	$0	$1,159,581
Environmental	$724,738	$0	$724,738
Design	$13,335,186	$0	$13,335,186
Bid/Bid & Award	$1,159,581	$0	$1,159,581
Construction	$113,417,294	$0	$113,417,294
Construction Management	$6,522,645	$0	$6,522,645
Project Management	$7,609,753	$0	$7,609,753
Subtotal	**$143,928,778**	**$0**	**$143,928,778**
Escalation	$21,867,222	($1,435,000)	$20,432,222
TOTAL	**$165,796,000**	**($1,435,000)**	**$164,361,000**

CHANGES FROM AUGUST 2003 TO NOVEMBER 2005 PROJECT SCOPE AND PROJECT BUDGET

Changes in Description of Project Scope from August 2003 to November 2005:

At this point, an alternative has been chosen to construct a second tunnel, approximately 18,500 feet long and 10 feet in diameter. It will allow the existing tunnel to be inspected and rehabilitated if necessary.

Figure 27. Irvington Tunnel Alternatives - Project Budget Changes from August 2003 to November 2005

Cost Categories	August 2003 Budget	Changes Between August 2003 and November 2005	November 2005 Budget
Planning	$1,159,581	$4,693,309	$5,852,890
Environmental	$724,738	$4,940,519	$5,665,257
Design	$13,335,186	$2,554,915	$15,890,101
Bid/Bid & Award	$1,159,581	($1,159,581)	$0
Construction	$113,417,294	$73,824,458	$187,241,752
Construction Management	$6,522,645	($6,522,645)	$0
Project Management	$7,609,753	($7,609,753)	$0
Subtotal	**$143,928,778**	**$70,721,222**	**$214,650,000**
Escalation	$20,432,222	($20,432,222)	$0
TOTAL	**$164,361,000**	**$50,289,000**	**$214,650,000**

Bay Division Pipelines (BDPLs) Nos. 3 & 4 Cross Connections
(Now called Seismic Upgrades of BDPLs Nos. 3 & 4 at Hayward Fault)

Project Number as of the November 2005 WSIP: 35301
Prior Project Control Number: 202339

Project Background

The project descriptions outline the project background:

The Bay Division Pipelines (BDPLs, Nos. 1, 2, 3, and 4) are the main conveyance pipelines for the Tuolumne River and Alameda water supplies for PUC customers. These pipelines cross earthquake faults and portions are located in areas of soft, liquefiable soils. These cross connections are needed to provide flexibility in an emergency, and permit water supplies to be diverted from one pipeline to another.

Current Status of the Project

This project is now in the construction phase.

May 2002 Project Description and Scope Summary

- The project plans for four cross sections on BDPL Nos. 3 and 4 to bypass pipe sections most likely to fail in an earthquake. Potential locations include near the fault crossings or liquefiable zones.

- The first year (2006) includes project management, alternatives development, and conceptual engineering. The second year adds environmental review, detailed design, and pre-purchase of the valves. The third year includes the issuing of a construction contract and construction management.

Itemization of May 2002 Project Budget

Figure 28. BDPL Nos. 3 & 4 Cross Connections -May 2002 Project Budget

Cost Categories	**2002 Budget**
Planning	$116,931
Environmental	$73,082
Design	$1,344,708
Bid/Bid & Award	$116,931
Construction	$7,895,110
Construction Management	$657,737
Project Management	$767,360
Subtotal	**$10,971,859**
Escalation	$2,276,141
TOTAL	**$13,248,000**

CHANGES FROM MAY 2002 TO AUGUST 2003 PROJECT SCOPE AND PROJECT BUDGET

Changes in Project Scope from May 2002 to August 2003:

In August 2003, the project start date was moved two years earlier, but the project completion date was essentially the same. The only budget change was a reduction of $339,000 in escalation, presumably due to the earlier start date.

Figure 29. BDPL Nos. 3 & 4 Cross Connections - Project Budget Changes from May 2002 to August 2003

Cost Categories	May 2002 Budget	Changes Between May 2002 and August 2003	August 2003 Budget
Planning	$116,931	$0	$116,931
Environmental	$73,082	$0	$73,082
Design	$1,344,708	$0	$1,344,708
Bid/Bid & Award	$116,931	$0	$116,931
Construction	$7,895,110	$0	$7,895,110
Construction Management	$657,737	$0	$657,737
Project Management	$767,360	$0	$767,360
Subtotal	**$10,971,859**	**$0**	**$10,971,859**
Escalation	$2,276,141	($339,000)	$1,937,141
TOTAL	**$13,248,000**	**($339,000)**	**$12,909,000**

CHANGES FROM AUGUST 2003 TO NOVEMBER 2005 PROJECT SCOPE AND PROJECT BUDGET

Changes in Description of Project Scope from August 2003 to November 2005:

This project has now become Phase A of the Seismic Upgrades of BDPLs Nos. 3 & 4 at the Hayward Fault.

The project budget was increased by $14,691,157 between 2003 and 2005.

Figure 30. BDPL Nos. 3 & 4 Cross Connections - Project Budget Changes from August 2003 to November 2005

Cost Categories	August 2003 Budget	Changes Between August 2003 and November 2005	November 2005 Budget
Planning	$116,931	$1,180,634	$1,297,565
Environmental	$73,082	$155,707	$228,789
Design	$1,344,708	$1,368,507	$2,713,215
Bid/Bid & Award	$116,931	($116,931)	$0
Construction	$7,895,110	$15,465,479	$23,360,589
Construction Management	$657,737	($657,737)	$0
Project Management	$767,360	($767,360)	$0
Subtotal	**$10,971,859**	**$16,628,299**	**$27,600,158**
Escalation	$1,937,141	($1,937,141)	$0
TOTAL	**$12,909,000**	**$14,691,157**	**$27,600,158**

Bay Division Pipeline (BDPL) Hydraulic Capacity Upgrade
(Now called BDPL Reliability Upgrade)

Project Number as of the November 2005 WSIP: 36801
Prior Project Control Number: 201441

Project Background

The project descriptions outline the project background:

The Bay Division Pipelines (BDPLs, Nos. 1, 2, 3, and 4) are the main conveyance pipelines for the Tuolumne River and Alameda water supplies for PUC customers. Pipelines Nos. 1 & 2 are parallel and 21.4 miles long. Pipelines Nos. 3 & 4 are 34.1 miles long. These pipelines cross earthquake faults and portions are located in areas of soft, liquefiable soils. In addition, they are reaching their full capacity and constrain PUC water deliveries during periods of peak demands.

This project will construct approximately 17 miles of new BDPL No. 5 in the existing right of way of BDPLs Nos. 3 & 4.

Current Status of the Project

As of December 2006, the project has been broken into three separate projects, under the heading Bay Division Pipeline Reliability Upgrade. The three projects include a Bay Tunnel portion (36801), a pipeline (36802), and relocation of BDPLs Nos. 1 & 2 (36803).

<u>May 2002 Project Description and Scope Summary</u>

- Approximately 17 miles of BDPL #5 will be constructed in the existing right of way of BDPLs Nos. 3 & 4. The project will consider a number of alternative solutions to provide sufficient capacity to meet future water needs.

- The line will be built in sections best able to meet the increased demands of southern Alameda and Peninsula areas, and will be cross connected to BDPLs Nos. 3 & $ to provide operational redundancy.

- Planning is expected to begin in 2006, with the environmental review commencing in 2007. Construction is expected to begin in 2010.

Itemization of May 2002 Project Budget

Figure 31. BDPL – Hydraulic Capacity Upgrade - May 2002 Project Budget

Cost Categories	**2002 Budget**
Planning	$1,760,904
Environmental	$1,100,565
Design	$35,529,146
Bid/Bid & Award	$1,760,904
Construction	$187,357,273
Construction Management	$9,905,083
Project Management	$11,555,930
Subtotal	**$248,969,805**
Escalation	$68,429,195
TOTAL	**$317,399,000**

CHANGES FROM MAY 2002 TO AUGUST 2003 PROJECT SCOPE AND PROJECT BUDGET

Changes in Project Scope from May 2002 to August 2003:

Three different conceptual approaches are being considered: a new pipeline along BDPLs Nos. 1 & 2 crossing San Francisco Bay, a new pipeline along BDPLs Nos. 3 & 4 south of the Bay, and a new pump station. The scope was expanded to include increased environmental review and planning. In addition, the project was moved four years earlier, but the projected completion date is essentially the same.

The budget was increased by $2,354,000 to reflect increased costs for Planning and Environmental Review. The escalation was reduced, presumably due to the earlier project start.

Figure 32. BDPL – Hydraulic Capacity Upgrade - Project Budget Changes from May 2002 to August 2003

Cost Categories	May 2002 Budget	Changes Between May 2002 and August 2003	August 2003 Budget
Planning	$1,760,904	$854,000	$2,614,904
Environmental	$1,100,565	$1,500,000	$2,600,565
Design	$35,529,146	$0	$35,529,146
Bid/Bid & Award	$1,760,904	$0	$1,760,904
Construction	$187,357,273	$0	$187,357,273
Construction Management	$9,905,083	$0	$9,905,083
Project Management	$11,555,930	$0	$11,555,930
Subtotal	**$248,969,805**	**$2,354,000**	**$251,323,805**
Escalation	$68,429,195	($3,653,001)	$64,776,194
TOTAL	**$317,399,000**	**($1,299,001)**	**$316,099,999**

CHANGES FROM AUGUST 2003 TO NOVEMBER 2005 PROJECT SCOPE AND PROJECT BUDGET

Changes in Description of Project Scope from August 2003 to November 2005:

The alternative has been chosen, with BDPL No. 5 consisting of 16 miles of pipeline, and a five mile tunnel under the Bay and adjacent marshlands.

The project budget was increased by $255,922,640 between 2003 and 2005. The vast majority of this increase is in construction costs.

Figure 33. BDPL – Hydraulic Capacity Upgrade - Project Budget Changes from August 2003 to November 2005

Cost Categories	**August 2003 Budget**	**Changes Between August 2003 and November 2005**	**November 2005 Budget**
Planning	$2,614,904	$6,756,659	$9,371,563
Environmental	$2,600,565	$11,490,318	$14,090,883
Design	$35,529,146	$3,891,206	$39,420,352
Bid/Bid & Award	$1,760,904	($1,760,904)	$0
Construction	$187,357,273	$321,782,568	$509,139,841
Construction Management	$9,905,083	($9,905,083)	$0
Project Management	$11,555,930	($11,555,930)	$0
Subtotal	**$251,323,805**	**$320,698,834**	**$572,022,639**
Escalation	$64,776,194	($64,776,194)	$0
TOTAL	**$316,099,999**	**$255,922,640**	**$572,022,639**

SFPUC/EBMUD Intertie

Project Number as of the November 2005 WSIP: 38901
Prior Project Control Number: 203040

Project Background

The project descriptions outline the project background:

This project came into being in 2003, and thus was not in the May 2002 program.

It is a joint project between the PUC and the East Bay Municipal Utilities District (EBMUD). It will provide facilities for an Intertie that will provide water to the PUC and EBMUD in the event of major facility failures due to earthquakes and other disasters, and during planned shutdowns of certain segments of the system for repairs and inspections. This is a joint project, involving the PUC, EBMUD, the City of Hayward, and the Alameda County Water District.

Current Status of the Project

As of December 2006, the contractor had missed the completion date and had no action plan to accelerate or speed up their work. The contract is being managed by the City of Hayward.

<u>August 2003 Project Description and Scope Summary</u>

- The Intertie will provide up to 45 million gallons per day in either direction between the PUC and EBMUD. It will make use of existing or planned Hayward Water System facilities to convey water in either direction.

- The PUC, EBMUD, the City of Hayward, and the Alameda County Water District have each approved the project in concept.

- Planning is expected to begin in 2006, with the environmental review commencing in 2007. Construction is expected to begin in 2010.

Itemization of August 2003 Project Budget

Figure 34. SFPUC/EBMUD Intertie - August 2003 Project Budget

Cost Categories	**2003 Budget**
Planning	$25,000
Environmental	$25,000
Design	$600,000
Bid/Bid & Award	$0
Construction	$8,000,000
Construction Management	$500,000
Project Management	$0
Subtotal	**$9,150,000**
Escalation	$0
TOTAL	**$9,150,000**

CHANGES FROM AUGUST 2003 TO NOVEMBER 2005 PROJECT SCOPE AND PROJECT BUDGET

Changes in Description of Project Scope from August 2003 to November 2005:

At this time, construction is underway.

The project budget was decreased by $551,142.

Figure 35. SFPUC/EBMUD Intertie - Project Budget Changes from August 2003 to November 2005

Cost Categories	**August 2003 Budget**	**Changes Between August 2003 and November 2005**	**November 2005 Budget**
Planning	$25,000	$272	$25,272
Environmental	$25,000	($17,200)	$7,800
Design	$600,000	($556,003)	$43,997
Bid/Bid & Award	$0	$0	$0
Construction	$8,000,000	$521,789	$8,521,89
Construction Management	$500,000	($500,000)	$0
Project Management	$0	$0	$0
Subtotal	**$9,150,000**	**($551,142)**	**$8,598,858**
Escalation	$0	$0	$0
TOTAL	**$9,150,000**	**($551,142)**	**$8,598,858**

Sunset Reservoir -- Seismic Upgrade/Rehabilitation
(Now called Sunset Reservoir Upgrades)

Project Number as of the November 2005 WSIP: 35801
Prior Project Control Number: 9960

Project Background

The project descriptions outline the project background:

With this project, seismic upgrade work and other structural and general rehabilitation work will be carried out at the North Basin of the Sunset Reservoir. In particular, the roof has been identified as needing seismic strengthening. The roof was built in 1938, and is seismically deficient and roof concrete has spalled in many places.

In 2005, the project was divided into two phases: upgrading the embankment (Phase A) and roof structure (Phase B).

Current Status of the Project

As of December 2006, Phase A was completed and Phase B was about to enter the construction phase.

May 2002 Project Description and Scope Summary

- This project will do seismic upgrade work, and other structural and general rehabilitation work at the Sunset Reservoir.

Itemization of May 2002 Project Budget

Figure 36. Sunset Reservoir – Seismic Upgrade/Rehab May 2002 Project Budget

Cost Categories	2002 Budget
Planning	$405,530
Environmental	$253,456
Design	$4,669,592
Bid/Bid & Award	$405,530
Construction	$34,182,999
Construction Management	$2,281,105
Project Management	$2,661,289
Subtotal	**$44,853,501**
Escalation	$15,959,499
TOTAL	**$60,813,000**

CHANGES FROM MAY 2002 TO AUGUST 2003 PROJECT SCOPE AND PROJECT BUDGET

Changes in Project Scope from May 2002 to August 2003:

There was no scope change. The project start date was moved up ten years, and the project completion date was moved up seven years.

There was a reduction of $11,785,000 in escalation, presumably due to the accelerated schedule.

Figure 37. Sunset Reservoir – Seismic Upgrade/Rehab Project Budget Changes from May 2002 to August 2003

Cost Categories	May 2002 Budget	Changes Between May 2002 and August 2003	August 2003 Budget
Planning	$405,530	$0	$405,530
Environmental	$253,456	$0	$253,456
Design	$4,669,592	$0	$4,669,592
Bid/Bid & Award	$405,530	$0	$405,530
Construction	$34,182,999	$0	$34,182,999
Construction Management	$2,281,105	$0	$2,281,105
Project Management	$2,661,289	$0	$2,661,289
Subtotal	**$44,853,501**	**$0**	**$44,853,501**
Escalation	$15,959,499	($11,785,000)	$4,174,499
TOTAL	**$60,813,000**	**($11,785,000)**	**$49,028,000**

CHANGES FROM AUGUST 2003 TO NOVEMBER 2005 PROJECT SCOPE AND PROJECT BUDGET

Changes in Description of Project Scope from August 2003 to November 2005:

At this stage, the project has been divided into two phases: embankment and roof structure. The project scope does not appear to have changed. The project budget has increased by $12,948,000, due primarily to construction increases.

Figure 38. Sunset Reservoir – Seismic Upgrade/Rehab Project Budget Changes from August 2003 to November 2005

Cost Categories	**August 2003 Budget**	**Changes Between August 2003 and November 2005**	**November 2005 Budget**
Planning	$405,530	($96,120)	$309,410
Environmental	$253,456	($249,834)	$3,622
Design	$4,669,592	($44,576)	$4,619,017
Bid/Bid & Award	$405,530	($405,530)	$0
Construction	$34,182,999	$22,860,952	$57,043,951
Construction Management	$2,281,105	($2,281,105)	$0
Project Management	$2,661,289	($2,661,289)	$0
Subtotal	**$44,853,501**	**$17,122,499**	**$61,976,000**
Escalation	$4,174,499	($4,174,499)	$0
TOTAL	**$49,028,000**	**$12,948,000**	**$61,976,000**

Summit Reservoir Rehabilitation

Project Number as of the November 2005 WSIP: 30701
Prior Project Control Number: 99059

Project Background

The project descriptions outline the project background:

The Summit Reservoir was built in 1954. Its components are deteriorating and do not meet current seismic codes. This project will upgrade the reservoir to meet current seismic standards and to conform to all State health requirements.

Current Status of the Project

As of December 2006, construction was completed and close-out had been initiated.

May 2002 Project Description and Scope Summary

- Work at the Reservoir includes roof repair, seismic upgrade, and installation of a new pipeline, along with exterior and safety work.

- In addition, flushing, chlorination, and dechlorination activities are required as part of the project.

Itemization of May 2002 Project Budget

Figure 39. Summit Reservoir Rehabilitation -May 2002 Project Budget

Cost Categories	**2002 Budget**
Planning	$163,509
Environmental	$102,193
Design	$1,880,352
Bid/Bid & Award	$163,509
Construction	$11,887,536
Construction Management	$917,737
Project Management	$1,073,027
Subtotal	**$16,187,863**
Escalation	$1,334,137
TOTAL	**$17,522,000**

CHANGES FROM MAY 2002 TO AUGUST 2003 PROJECT SCOPE AND PROJECT BUDGET

Changes in Project Scope from May 2002 to August 2003:

The project start and completion dates have been moved two years earlier. In addition, additional close-out activities have been included.

There was a reduction of $415,000 in escalation, presumably due to the accelerated schedule.

Figure 40. Summit Reservoir Rehabilitation - Project Budget Changes from May 2002 to August 2003

Cost Categories	May 2002 Budget	Changes Between May 2002 and August 2003	August 2003 Budget
Planning	$163,509	$0	$163,509
Environmental	$102,193	$0	$102,193
Design	$1,880,352	$0	$1,880,352
Bid/Bid & Award	$163,509	$0	$163,509
Construction	$11,887,536	$0	$11,887,536
Construction Management	$917,737	$0	$917,737
Project Management	$1,073,027	$0	$1,073,027
Subtotal	**$16,187,863**	**$0**	**$16,187,863**
Escalation	$1,334,137	($415,000)	$919,137
TOTAL	**$17,522,000**	**($415,000)**	**$17,107,000**

CHANGES FROM AUGUST 2003 TO NOVEMBER 2005 PROJECT SCOPE AND PROJECT BUDGET

Changes in Description of Project Scope from August 2003 to November 2005:

At this stage, the project is in construction. The project budget was reduced by $2,179,141.

Figure 41. Summit Reservoir Rehabilitation - Project Budget Changes from August 2003 to November 2005

Cost Categories	August 2003 Budget	Changes Between August 2003 and November 2005	November 2005 Budget
Planning	$163,509	($31,800)	$131,709
Environmental	$102,193	($102,193)	$0
Design	$1,880,352	($661,726)	$1,218,626
Bid/Bid & Award	$163,509	($163,509)	$0
Construction	$11,887,536	$1,689,988	$13,577,524
Construction Management	$917,737	($917,737)	$0
Project Management	$1,073,027	($1,073,027)	$0
Subtotal	**$16,187,863**	**($1,260,004)**	**$14,927,859**
Escalation	$919,137	($919,137)	$0
TOTAL	**$17,107,000**	**($2,179,141)**	**$14,927,859**

Pump Station Upgrades (Forest Knolls)
(Now called Forest Knolls Pump Station Upgrade)

Project Number as of the November 2005 WSIP: 32101
Prior Project Control Number: 202536

Project Background

The project descriptions outline the project background:

The Forest Knolls pump station was built in 1960 and is in need of complete rehabilitation. The buildings are not up to current codes, and equipment and mechanical systems have deteriorated, affecting reliability. The pump station needs modernization and upgrading of systems and pumps to ensure reliability.

Current Status of the Project

As of December 2006, project staff was working on an easement and relocation agreement with the University of California.

May 2002 Project Description and Scope Summary

- This project includes demolition of the existing building, construction of a new building, and installation of two new pumps.
- In addition, new sprinkler and electrical systems will be installed, a new generator, fencing, landscaping, and other site work.
- The project will also provide necessary facilities to support the SCADA project by adding automation where needed.

Itemization of May 2002 Project Budget

Figure 42. Pump Station Upgrades (Forest Knolls) - May 2002 Project Budget

Cost Categories	2002 Budget
Planning	$30,373
Environmental	$18,983
Design	$349,284
Bid/Bid & Award	$29,139
Construction	$1,668,269
Construction Management	$170,845
Project Management	$199,320
Subtotal	**$2,466,213**
Escalation	$339,787
TOTAL	**$2,806,000**

CHANGES FROM MAY 2002 TO AUGUST 2003 PROJECT SCOPE AND PROJECT BUDGET

Changes in Project Scope from May 2002 to August 2003:

There was no scope change. The project start date was moved up one year, and the project completion date was moved up 19 months.

There was a reduction of $84,000 in escalation, presumably due to the accelerated schedule.

Figure 43. Pump Station Upgrades (Forest Knolls) - Project Budget Changes from May 2002 to August 2003

Cost Categories	May 2002 Budget	Changes Between May 2002 and August 2003	August 2003 Budget
Planning	$30,373	$0	$30,373
Environmental	$18,983	$0	$18,983
Design	$349,284	$0	$349,284
Bid/Bid & Award	$29,139	$0	$29,139
Construction	$1,668,269	$0	$1,668,269
Construction Management	$170,845	$0	$170,845
Project Management	$199,320	$0	$199,320
Subtotal	**$2,466,213**	**$0**	**$2,466,213**
Escalation	$339,787	($84,000)	$255,787
TOTAL	**$2,806,000**	**($84,000)**	**$2,722,000**

CHANGES FROM AUGUST 2003 TO NOVEMBER 2005 PROJECT SCOPE AND PROJECT BUDGET

Changes in Description of Project Scope from August 2003 to November 2005:

There appears to be no scope changes. The budget increased by $3,057,776.

Figure 44. Pump Station Upgrades (Forest Knolls) - Project Budget Changes from August 2003 to November 2005

Cost Categories	August 2003 Budget	Changes Between August 2003 and November 2005	November 2005 Budget
Planning	$30,373	$157,974	$188,347
Environmental	$18,983	($14,935)	$4,048
Design	$349,284	$288,702	$637,986
Bid/Bid & Award	$29,139	($29,139)	$0
Construction	$1,668,269	$3,281,126	$4,949,395
Construction Management	$170,845	($170,845)	$0
Project Management	$199,320	($199,320)	$0
Subtotal	**$2,466,213**	**$3,313,563**	**$5,779,776**
Escalation	$255,787	($255,787)	$0
TOTAL	**$2,722,000**	**$3,057,776**	**$5,779,776**

Pump Station Upgrades (McLaren Park)

(Now called Alemany Pump Station Upgrades (McLaren Park))

Project Number as of the November 2005 WSIP: 32301
Prior Project Control Number: 202538

Project Background

The project descriptions outline the project background:

The McLaren Park pump station was built in 1967 and is in need of complete rehabilitation. The buildings are not up to current codes, equipment and electrical and mechanical systems have deteriorated, and the pump station is not reliable. The station needs modernization and upgrading of the switchgear, electrical systems, pumps, and other items to ensure system reliability. This project will demolish the existing building and construct a new one.

Current Status of the Project

As of December 2006, the project has become the rebuilding of the Alemany Pump Station. At this point, 65 percent design had been completed and Arts Commission approval for Phase II had been obtained. Future work includes 95 percent design, and Arts Commission approval for Phase III.

May 2002 Project Description and Scope Summary

- This project includes demolition of the existing building, construction of a new 3,600 squared foot building, and installation of two new pumps.
- In addition, new sprinkler and electrical systems will be installed, a new generator, fencing, landscaping, and other site work.
- The project will also provide necessary facilities to support the SCADA project by adding automation where needed.

Itemization of May 2002 Project Budget

Figure 45. Pump Station Upgrades (McLaren Park) - May 2002 Project Budget

Cost Categories	2002 Budget
Planning	$57,596
Environmental	$35,998
Design	$662,360
Bid/Bid & Award	$57,596
Construction	$3,522,427
Construction Management	$323,980
Project Management	$377,977
Subtotal	**$5,037,934**
Escalation	$1,024,066
TOTAL	**$6,062,000**

CHANGES FROM MAY 2002 TO AUGUST 2003 PROJECT SCOPE AND PROJECT BUDGET

Changes in Project Scope from May 2002 to August 2003:

There was no scope change. The project start and dates were moved up one year.

There was a reduction of $198,000 in escalation, presumably due to the accelerated schedule.

Figure 46. Pump Station Upgrades (McLaren Park) - Project Budget Changes from May 2002 to August 2003

Cost Categories	May 2002 Budget	Changes Between May 2002 and August 2003	August 2003 Budget
Planning	$57,596	$0	$57,596
Environmental	$35,998	$0	$35,998
Design	$662,360	$0	$662,360
Bid/Bid & Award	$57,596	$0	$57,596
Construction	$3,522,427	$0	$3,522,427
Construction Management	$323,980	$0	$323,980
Project Management	$377,977	$0	$377,977
Subtotal	**$5,037,934**	**$0**	**$5,037,934**
Escalation	$1,024,066	($198,000)	$826,066
TOTAL	**$6,062,000**	**($198,000)**	**$5,864,000**

CHANGES FROM AUGUST 2003 TO NOVEMBER 2005 PROJECT SCOPE AND PROJECT BUDGET

Changes in Description of Project Scope from August 2003 to November 2005:

The CER recommendation is to rebuild the older Alemany Pump Station rather than the McLaren Park Pump Station. The rebuild of Alemany would accommodate the delivery of water through the new planned East/West transmission main currently under design. This will be a key piece to allow for the McLaren Park pump station to be taken out of service for complete replacement. The rebuilding of Alemany would also relieve the need to construct a temporary backup pump station during the construction of the new station.

Figure 47. Pump Station Upgrades (McLaren Park) Project Budget Changes from August 2003 to November 2005

Cost Categories	August 2003 Budget	Changes Between August 2003 and November 2005	November 2005 Budget
Planning	$57,596	$114,125	$171,721
Environmental	$35,998	($22,270)	$13,728
Design	$662,360	$228,058	$890,418
Bid/Bid & Award	$57,596	($57,596)	$0
Construction	$3,522,427	$5,793,264	$9,315,691
Construction Management	$323,980	($323,980)	$0
Project Management	$377,977	($377,977)	$0
Subtotal	**$5,037,934**	**$5,353,624**	**$10,391,558**
Escalation	$826,066	($826,066)	$0
TOTAL	**$5,864,000**	**$4,527,557**	**$10,391,558**

Tank Rehab and Seismic Upgrade McLaren #1
(Now called McLaren #1 Tank Rehab and Seismic Upgrade)

Project Number as of the November 2005 WSIP: 32801
Prior Project Control Number: 202543

Project Background

The project descriptions outline the project background:

Improvements are needed to all of the nine water tanks in San Francisco to ensure continued and reliable water supply from the storage facility. In addition, the tanks provide critical fire projection supplies. This project will provide for replacement and seismic improvements at McLaren #1 tank site. Work will be coordinated with the Pump Station Upgrade at the McLaren site project.

Current Status of the Project

This project is now for the rehabilitation and seismic upgrade of the McLaren #1 Tank.

May 2002 Project Description and Scope Summary

- This project includes demolition of the existing building, and construction of a new building.

- In addition, there will be landscaping and other site work. Flushing, chlorination, and dechlorination activities will be required as part of this project.

Itemization of May 2002 Project Budget

Figure 48. Tank Rehab and Seismic Upgrade McLaren #1 - May 2002 Project Budget

Cost Categories	**2002 Budget**
Planning	$76,316
Environmental	$47,698
Design	$877,638
Bid/Bid & Award	$76,316
Construction	$4,891,551
Construction Management	$429,280
Project Management	$500,826
Subtotal	**$6,899,625**
Escalation	$1,420,375
TOTAL	**$8,320,000**

CHANGES FROM MAY 2002 TO AUGUST 2003 PROJECT SCOPE AND PROJECT BUDGET

Changes in Project Scope from May 2002 to August 2003:

There was no scope change. The project start and end dates have been moved up one year.

There was a reduction of $88,000 in escalation, presumably due to the accelerated schedule.

Figure 49. Tank Rehab and Seismic Upgrade McLaren #1 - Project Budget Changes from May 2002 to August 2003

Cost Categories	May 2002 Budget	Changes Between May 2002 and August 2003	August 2003 Budget
Planning	$76,316	$0	$76,316
Environmental	$47,698	$0	$47,698
Design	$877,638	$0	$877,638
Bid/Bid & Award	$76,316	$0	$76,316
Construction	$4,891,551	$0	$4,891,551
Construction Management	$429,280	$0	$429,280
Project Management	$500,826	$0	$500,826
Subtotal	**$6,899,625**	**$0**	**$6,899,625**
Escalation	$1,420,375	($88,000)	$1,332,375
TOTAL	**$8,320,000**	**($88,000)**	**$8,232,000**

CHANGES FROM AUGUST 2003 TO NOVEMBER 2005 PROJECT SCOPE AND PROJECT BUDGET

Changes in Description of Project Scope from August 2003 to November 2005:

The project was revised to only include the rehabilitation and seismic upgrade of the tank, rather than its demolition and replacement. The budget decreased by $2,877,489.

Figure 50. Tank Rehab and Seismic Upgrade McLaren #1 - Project Budget Changes from August 2003 to November 2005

Cost Categories	August 2003 Budget	Changes Between August 2003 and November 2005	November 2005 Budget
Planning	$76,316	($12,473)	$63,843
Environmental	$47,698	($45,724)	$1,974
Design	$877,638	($129,125)	$748,513
Bid/Bid & Award	$76,316	($76,316)	$0
Construction	$4,891,551	($351,370)	$4,540,181
Construction Management	$429,280	(429,280)	$0
Project Management	$500,826	($500,826)	$0
Subtotal	**$6,899,625**	**($1,545,114)**	**$5,354,511**
Escalation	$1,332,375	($1,332,375)	$0
TOTAL	**$8,232,000**	**($2,877,489)**	**$5,354,511**

Chapter 3: Reconciliation and Vouching of 15 Projects

Introduction

In 2006, Robert Kuo Consulting and Lawrence Doyle issued a report, "Review of Water System Improvement Program Expenditures Under PUC's Commercial Paper Program." In the Report, we provided audit-related analyses of four WSIP projects: Bay Division Pipeline, Irvington Tunnel, San Joaquin Pipeline and the Calaveras Dam Replacement. In the current work scope, the RBOC requested an update to the analyses for the four projects, and an analysis of 11 additional WSIP projects. The types of audit analyses undertaken are:

- Tying project budget and expenditures to the Primavera system, and reviewing the reconciliation of expenditures from Primavera to FAMIS. Identifying and explaining significant reconciliation items and where figures do not reconcile.
- Tying the appropriations to the FAMIS system.
- Tying the appropriations to the authorizing budgetary documents adopted by the Board of Supervisors.
- Vouching a sample of expenditures to invoices, contracts, and other supporting documentation.
- Verifying that no expenditures from Proposition A funds were incurred prior to November 2002.
- Identifying any material differences noted and providing explanations.

Reconciliation of Project Budgets & Expenditures between Primavera and FAMIS

Before undertaking discussion of the FAMIS-Primavera reconciliation, it is important to understand that the two systems are utilized to meet different needs. FAMIS, which is the City's online accounting system, is a straight-forward accounting system used by all City departments. For each project, it reveals how much funding is currently available, how much has been expended, and what the funding was spent for. In contrast, Primavera (P3E) is a management tool, which allows monitoring of completion targets in relation to dollars spent and time consumed.

Here is one example of how the budget information shown in P3E will differ significantly from the information shown in FAMIS, and why.

- A project budget shown in the Primavera budget is based on each project's allocation of the total WISP budget.

- By contrast, the project "budget" shown in FAMIS is based only on funding that has been approved to date by the Board of Supervisors (i.e. appropriated).

As a result, the budgeted amounts in P3E and FAMIS will only agree when the Board of Supervisors has granted authority to expend the full WSIP budget for a given project. Therefore, a reconciliation of budget data between P3E and FAMIS should show significant, explainable, variances at this stage of the WSIP. Because the budget data in P3E and FAMIS are not expected to tie, most of our reconciliation analysis focused on each system's recordation of expenditures.

During our financial review process, we also learned more about the project budgets that were loaded into P3E by PUC staff in early 2006. We begin this section of the Report with a review of this information.

Changes From November 2005 Approved Projects Budgets To Project Budgets Loaded in Primavera in February 2006

At the phase-level (e.g. design, construction), the WSIP project budgets loaded into Primavera (P3E) in early 2006 are not identical to the phase-level budgets that were developed by Parsons/CH2MHill, and presented to the Commission in November 2005. PUC Program Development staff has indicated that this is because the Commission only adopted "bottom line" budget amounts for each WSIP project in November 2005, and that after the Commission approved those project budgets, PUC staff subsequently identified necessary changes to the phase-level budgets. Specifically, PUC Program Controls and Support staff informed us that the individual budgets presented by Parsons/CH2MHill in November 2005 "did not take into account actual expenditures" already recorded in FAMIS, "and in a number of cases, Parsons' recommendation established or identified lower budgets for activities and phases that were already completed at a higher actual expenditure. This resulted in having to adjust future phase budgets." This rationale for making changes to the phase-level budgets strikes us as reasonable.

In addition, according to the March 2006 WSIP Quarterly Report, following the adoption of WSIP by the Commission in November 2005, the PUC undertook a significant effort to update or further develop "Project Management Plans" or work plans for each phase within each WSIP project, using the November 2005 approved budget and schedule as a baseline. The March 2006 WSIP Quarterly Report, which provides the rationale for making changes to the phase-level budgets that were presented to the Commission in November 2005:

> "The basic project schedules were originally broken down to the four phase levels of project delivery: Planning, Environmental Review, Design and Construction. Work plans were re-evaluated and then further updated to drill down into the projects and provide more detailed work scopes and activities for each phase, based upon actual planned work. Detailed schedules based upon the work plans for the currently funded or soon to be initiated phase of each project (with the exception of the Environmental phase) have been developed and loaded into the Program/Project Controls

> System [P3E] this past quarter…
>
> The development of the work plans precipitated adjustments to the phase level budgets for each project loaded into [P3E]. As more detailed activities were identified and the required resources were confirmed, the estimated budgets for the phases were revised accordingly. The Right of Way (ROW) budgeted costs which were previously reported under the environmental phase have been recoded and shifted from Environmental Phase to the Design phase…There is no change in the overall project budgets and the construction cost estimate for the individual projects as approved by the Commission." (Emphasis added). [March 2006 WSIP Quarterly Report, Section 1, Page 1]

The WSIP Quarterly Reports present the data regarding the changes in the project phase-level budgets in the following manner:

- The column in each Quarterly Project Status Report that is labeled "Original Budget" displays the project budget as adopted by the Commission in November 2005, before the revision to the project work plans that occurred during late 2005 and early 2006;

- The column in each Quarterly Project Status Report that is labeled "approved Budget" displays the project budgets that were loaded into P3E in February 2006, following the revisions to the project work plans that occurred during late 2005 and early 2006, and the approval of those changes by the Assistant General Manager for Infrastructure.

The following table presents the phase-level budget changes from the November 2005 project budgets to the project budgets loaded into P3E. Most of the smaller projects experienced little or no change in their phase level budgets. Other, larger projects, such as New Irvington Tunnel and BDPL Reliability, experienced more significant reallocations of budgets between phases (e.g. to or from planning and design).

Figure 51. Phase-Level Project Budget Changes from November 2005 to March 2006 (as entered into P3E)

CUW	PROJECTS	Budget Nov 2005	Changes Between Nov 05 and P3E	Budget In P3E
37401	**Calaveras Dam Replacement**			
	Planning	**$7,310,000**	**($279)**	**$7,309,721**
	Environmental Review	**$5,008,000**	**($62)**	**$5,007,938**
	Design	**$20,456,000**	**($159)**	**$20,455,841**
	Bid	**$0**		
	Construction	**$223,738,000**	**($93)**	**$223,737,907**
	Construction Management	**$0**		
	Project Management	**$0**		
	Sub-Total Cost	**$256,512,000**		**$256,511,407**
	Escalation	**$0**		
	Total	**$256,512,000**	**($593)**	**$256,511,407**
35601	**New Crystal Springs Bypass Tunnel**			
	Planning	**$3,445,000**	**($11)**	**$3,444,589**
	Environmental Review	**$1,274,000**	**($155)**	**$1,273,845**
	Design	**$6,639,000**	**$5**	**$6,639,005**
	Bid	**$0**		
	Construction	**$71,865,000**	**$352**	**$71,865,352**
	Construction Management	**$0**	**$0**	
	Project Management	**$0**	**$0**	
	Sub-Total Cost	**$83,223,000**	**($209)**	**$83,222,791**
	Escalation	**$0**	**$0**	
	Total	**$83,223,000**	**($209)**	**$83,222,791**
30601	**Crocker Amazon Pump Station Upgrade**			
	Planning	**$0**	**$0**	**$0**
	Environmental Review	**$0**	**$0**	**$0**
	Design	**$789,000**	**$48,308**	**$837,308**
	Bid	**$0**	**$0**	
	Construction	**$2,591,000**	**$465,666**	**$3,056,666**
	Construction Management	**$835,000**	**($835,000)**	
	Project Management	**$609,000**	**($609,000)**	
	Sub-Total Cost	**$4,824,000**	**($930,026)**	**$3,893,974**
	Escalation	**$0**	**$0**	
	Total	**$4,824,000**	**($930,026)**	**$3,893,974**

Figure 51, continued.

CUW	PROJECTS	Budget Nov 2005	Changes Between Nov 05 and P3E	Budget In P3E
37301	**SJPL**			
	Planning	**$7,707,000**	**$1,665,117**	**$9,372,117**
	Environmental Review	**$6,947,000**	**$806,493**	**$7,753,493**
	Design	**$23,664,000**	**($1,686,719)**	**$21,977,281**
	Bid	**$0**	**$0**	
	Construction	**$314,414,000**	**($584,890)**	**$313,829,110**
	Construction Management	**$0**	**$0**	
	Project Management	**$0**	**$0**	
	Sub-Total Cost	**$352,732,000**	**$200,001**	**$352,932,001**
	Escalation	**$0**	**$0**	
	Total	**$352,732,045**	**$199,956**	**$352,932,001**
38701	**Tesla Portal Disinfection**			
	Planning	**$1,557,574**	**$64,256**	**$1,621,830**
	Environmental Review	**$1,341,302**	**($224,213)**	**$1,117,089**
	Design	**$1,529,854**	**$141,432**	**$1,671,286**
	Bid	**$0**	**$0**	
	Construction	**$16,302,538**	**$18,526**	**$16,321,064**
	Construction Management	**$0**	**$0**	
	Project Management	**$0**	**$0**	
	Sub-Total Cost	**$20,731,268**	**$1**	**$20,731,269**
	Escalation	**$0**	**$0**	
	Total	**$20,731,269**	**$0**	**$20,731,269**
37402	**Calaveras Reservoir Upgrade**			
	Planning	**$45,873**	**$156**	**$46,029**
	Environmental Review	**$69**	**$0**	**$69**
	Design	**$259,929**	**($15,369)**	**$244,560**
	Bid	**$0**	**$0**	
	Construction	**$1,481,129**	**($31,731)**	**$1,449,398**
	Construction Management	**$0**	**$0**	
	Project Management	**$0**	**$0**	
	Sub-Total Cost	**$1,787,000**	**($46,944)**	**$1,740,056**
	Escalation	**$0**	**$0**	
	Total	**$1,787,001**	**($46,945)**	**$1,740,056**
35901	**New Irvington Tunnel**			
	Planning	**$5,852,890**	**($1,395,845)**	**$4,457,045**
	Environmental Review	**$5,665,257**	**($2,277,257)**	**$3,388,000**
	Design	**$15,890,101**	**$3,092,774**	**$18,982,875**
	Bid	**$0**	**$0**	
	Construction	**$187,241,752**	**$580,330**	**$187,822,082**
	Construction Management	**$0**	**$0**	
	Project Management	**$0**	**$0**	
	Sub-Total Cost	**$214,650,000**	**$2**	**$214,650,002**
	Escalation	**$0**	**$0**	
	Total	**$214,650,000**	**$2**	**$214,650,002**

CUW	PROJECTS	Budget Nov 2005	Changes Between Nov 05 and P3E	Budget In P3E
35301	**BDPL Nos. 3&4 Crossover Isolation Valves**			
	Planning	**$1,297,565**	**($58,365)**	**$1,239,200**
	Environmental Review	**$228,789**	**($161,440)**	**$67,349**
	Design	**$2,713,215**	**$213,840**	**$2,927,055**
	Bid	**$0**		
	Construction	**$23,360,589**	**$5,965**	**$23,366,554**
	Construction Management	**$0**		
	Project Management	**$0**		
	Sub-Total Cost	**$27,600,158**	**$0**	**$27,600,158**
	Escalation	**$0**		
	Total	**$27,600,157**	**$1**	**$27,600,158**
36801	**BDPL Reliability Upgrades**			
	Planning	**$9,371,563**	**$9**	**$9,371,572**
	Environmental Review	**$14,090,883**	**($5,162,449)**	**$8,928,434**
	Design	**$39,420,352**	**$3,205,510**	**$42,625,862**
	Bid	**$0**	**$0**	
	Construction	**$509,139,841**	**$1,956,926**	**$511,096,767**
	Construction Management	**$0**	**$0**	
	Project Management	**$0**	**$0**	
	Sub-Total Cost	**$572,022,639**	**($4)**	**$572,022,635**
	Escalation	**$0**	**$0**	
	Total	**$572,022,639**	**($4)**	**$572,022,635**
38901	**EBMUD Intertie**			
	Planning	**$25,272**	**$0**	**$25,272**
	Environmental Review	**$7,800**	**$0**	**$7,800**
	Design	**$43,997**	**$0**	**$43,997**
	Bid	**$0**	**$0**	
	Construction	**$8,521,789**	**($7)**	**$8,521,782**
	Construction Management	**$0**	**$0**	
	Project Management	**$0**	**$0**	
	Sub-Total Cost	**$8,598,858**	**($7)**	**$8,598,851**
	Escalation	**$0**	**$0**	
	Total	**$8,598,858**	**($7)**	**$8,598,851**
35801	**Sunset Reservoir Upgrades**			
	Planning	**$309,410**	**$0**	**$309,410**
	Environmental Review	**$3,622**	**$0**	**$3,622**
	Design	**$4,619,017**	**$226,925**	**$4,845,942**
	Bid	**$0**	**$0**	
	Construction	**$57,043,951**	**($226,926)**	**$56,817,025**
	Construction Management	**$0**	**$0**	
	Project Management	**$0**	**$0**	
	Sub-Total Cost	**$61,976,000**	**($1)**	**$61,975,999**
	Escalation	**$0**	**$0**	
	Total	**$61,976,000**	**($1)**	**$61,975,999**

CUW	PROJECTS	Budget Nov 2005	Changes Between Nov 05 and P3E	Budget In P3E
30701	**Summit Reservoir Rehabilitation**			
	Planning	**$131,709**	**$0**	**$131,709**
	Environmental Review	**$0**	**$0**	**$0**
	Design	**$1,218,626**	**$0**	**$1,218,626**
	Bid	**$0**	**$0**	
	Construction	**$13,577,524**	**$0**	**$13,577,524**
	Construction Management	**$0**	**$0**	
	Project Management	**$0**	**$0**	
	Sub-Total Cost	**$14,927,859**	**$0**	**$14,927,859**
	Escalation	**$0**	**$0**	
	Total	**$14,927,859**	**$0**	**$14,927,859**
32101	**Forest Knolls Pump Station**			
	Planning	**$188,347**	**$0**	**$188,347**
	Environmental Review	**$4,048**	**$0**	**$4,048**
	Design	**$637,986**	**$1**	**$637,987**
	Bid	**$0**	**$0**	
	Construction	**$4,949,395**	**$0**	**$4,949,395**
	Construction Management	**$0**	**$0**	
	Project Management	**$0**	**$0**	
	Sub-Total Cost	**$5,779,776**	**$1**	**$5,779,777**
	Escalation	**$0**	**$0**	
	Total	**$5,779,776**	**$1**	**$5,779,777**
32301	**McLaren Park Pump Station**			
	Planning	**$171,721**	**$47,299**	**$219,020**
	Environmental Review	**$13,728**	**$0**	**$13,728**
	Design	**$890,418**	**($47,300)**	**$843,118**
	Bid	**$0**	**$0**	
	Construction	**$9,315,691**	**$0**	**$9,315,691**
	Construction Management	**$0**	**$0**	
	Project Management	**$0**	**$0**	
	Sub-Total Cost	**$10,391,558**	**($1)**	**$10,391,557**
	Escalation	**$0**	**$0**	
	Total	**$10,391,557**	**$0**	**$10,391,557**
32801	**McLaren Park Tank Rehab Seismic Upgrade**			
	Planning	**$63,843**	**$0**	**$63,843**
	Environmental Review	**$1,974**	**($175)**	**$1,799**
	Design	**$748,513**	**$175**	**$748,688**
	Bid	**$0**	**$0**	
	Construction	**$4,540,181**	**$0**	**$4,540,181**
	Construction Management	**$0**	**$0**	
	Project Management	**$0**	**$0**	
	Sub-Total Cost	**$5,354,511**	**$0**	**$5,354,511**
	Escalation	**$0**	**$0**	
	Total	**$5,354,511**	**$0**	**$5,354,511**

Changes to P3E Expenditure Reporting Since 2006 Report

The most significant change in P3E during this past year has been the implementation of the accrual tracking system. In December 2006, a system that tracks and monitors all professional services contracts and their invoices was implemented. The system can now generate electronic payment data that can be used to monitor detailed payments by individual purchase order number and index code. The system affords the opportunity to track which Task/Service Orders have been paid, and the amount of payment. The month-end accrual then becomes simply the difference between the amount invoiced and the amount paid. Eventually this process will be extended to include the construction contracts as well.

Early in 2007, a procedure was implemented allowing the system to track construction contracts and professional services contracts separately. Prior to this system change, the P3E project team was unable to differentiate between the two.

Year-end accruals are submitted by project managers based on unpaid invoices and these estimated expenses are reviewed by PUC Finance for appropriateness. The accruals are then recorded on the books for reporting purposes and are reversed immediately at the start of the new fiscal year.

Update on FAMIS

Although FAMIS has been "tweaked" since last year to provide project managers with more information, its internal control procedures remain intact. From the budget process through the procurement cycle, from signatory authority to segregation of duties, all required internal accounting controls are in place. Payment approvals require signatory authority from several layers of PUC management, as well as PUC Finance, before the payment is ultimately approved and dispersed by the Controller's Office.

Reconciliation of Project Expenditure Data between Primavera and FAMIS

The expenditures recorded in the two systems may never be in complete agreement due to timing issues. That is, an expenditure may be recorded in one system during one month, but not recorded in the other system until a later month. Because Primavera is closed every month, it may not be possible to fully reconcile the two systems, even at the end of the fiscal year. In terms of the future, the lack of reconciliation should not be a significant factor, since the problems often arise in the area of payroll reconciliation, rather than with respect to construction contracts.

Based on discussions in connection with the development of our 2006 Report, our understanding was that PUC staff would reconcile and "true up" the data in P3E against the data in FAMIS on a monthly basis. We reviewed two reconciliations between P3E

and FAMIS expenditure data:

- A reconciliation as of June 30, 2006; and

- A reconciliation as of December 31, 2006 (i.e. mid-fiscal year, when the expenditure data from the two system will not match).

Our review of the June 30, 2006, reconciliation revealed that the truing-up process had not occurred, or if it was undertaken, had not been completed. We found that:

- Uncorrected erroneous charges to the wrong project were still present as of June 30, 2006; and

- Some accruals in the FAMIS system had not been recorded in Primavera.

The erroneous charges to the wrong project will be addressed later in discussion of the December 31, 2006, reconciliation. Regarding the accruals, we have been assured by staff responsible for the reconciliation that this was due to the "newness" of the accrual process, and that this problem would be eliminated in next year's reconciliation. In discussions with P3E staff, they also believe that this type of problem will not occur again, and that the treatment of accruals in next fiscal year's reconciliation will work smoothly. Nonetheless, action needs be taken to correct the erroneous charges if the two systems are to be truly aligned.

For purposes of the December 31, 2006, reconciliation, we have concluded that a one percent deviation between the systems is acceptable, after removing the Primavera accruals for payroll and contracts. This is an arbitrary standard that we developed, but it strikes us as reasonable for a mid-year variance in expenditure reporting between the P3E and FAMIS.

Of the fifteen projects under review, nine met the one percent variance criterion. For these nine projects, the variances between the amounts reported in P3E versus in FAMIS ranged from 0.02 percent to 0.74 percent. In all instances, the reason for the variances was a direct charge recorded in FAMIS, which was not included in Primavera. These were charges recorded in FAMIS in December after P3E had closed for the month. The charges were recorded in P3E as January transactions. These were very small variances: the total amount of deviation for all nine projects was $78,431 and an amount of $5,311 caused the highest deviation of 0.74 percent.

The remaining six projects were found to have variances greater than one percent between the expenditures reported in P3E compared to the FAMIS, and require further explanation. They are:

- San Joaquin Pipeline,
- Tesla Portal Disinfection Station,
- Calaveras Dam Replacement,
- Calaveras Reservoir Upgrades,
- New Irvington Tunnel and

- Bay Division Pipelines 3 & 4.

The details regarding the variances associated with each of these six projects follow below.

San Joaquin Pipeline – Corrections Required to Pre-CIP Funding & Erroneous Expenditure Item in P3E

There is an amount of $426,739 included in P3E as "Pre-CIP funding" attributable to the San Joaquin Pipeline project. However, PUC Finance has denied the request to "credit" these funds to the San Joaquin project in FAMIS, because the funds were expended on a Hetch Hetchy-related project, and therefore should not be recorded against the San Joaquin project. However, this funding amount has not been removed from Primavera.

In addition, there is a $505,251 expenditure posted to P3E for which there was no corresponding index code in FAMIS. Therefore, no entry could be recorded in FAMIS. It appears that data regarding a projected expenditure was mistakenly posted to an actual expense column in P3E. Whatever the cause, the error needs to be corrected. This further highlights the need for continuous monitoring and reconciliation, including correction of the two systems.

Tesla Portal Disinfection Station

This project was by far the hardest to reconcile. We discovered $299,441 in FAMIS costs attributable to the Tesla project that are not included in P3E. There were three components to this amount:

- A $259,261 expense item and a $24,659 expense item, which were inadvertently deleted in P3E, but reported in the Tesla Treatment Facility.

- A expense third item for $34,921 in FAMIS, which was reported as a lower amount in P3E.

We also reviewed each index code attributable to this project. The net result of this analysis showed another $60,535 in costs recorded by FAMIS that are missing from P3E. P3E staff aim to have this project balanced by the June 30, 2007, reconciliation.

If these reconciling items are not corrected, a variance between the two systems in excess of 20 percent will continue for this project. Of course, any forecasting analysis that is undertaken based on the erroneous expenditure data in P3E for this project would not be reliable, until the items noted above are corrected. Needless to say, until these items are corrected, we would recommend that P3E and project management staff adjust for these variances in any analysis that they perform, and strongly recommend prompt follow-up to correct the data in P3E.

Calaveras Dam and Calaveras Reservoir Upgrades

There is $101,159 in staff labor costs chargeable to the Reservoir Upgrades phase, which were charged to the Calaveras Dam prior to creation of the Upgrades phase. The costs have been moved to the proper phase in P3E, but not in FAMIS. This has been an outstanding reconciling item for approximately two years. The issue, as we understand it, is that in order for the adjustments to be made in FAMIS, PUC must provide corrections to a "labor distribution" file that not only lists the staff people who worked on each of these phases and their associated labor charges, but also the details about the specific dates that were worked and the number of hours worked on each of those days. Our understanding is that given the level of effort required to pull this data, PUC project management does not believe that the variance is large enough to warrant correcting, since only the data for the phases are out of line, but there is not a problem at the project level. While we recognize that there are many competing demands on staff time and resources, from an auditor's perspective, we believe that if project phases are worth the effort to create, then the expenditures by phase should be accounted for appropriately.

New Irvington Tunnel

The issue with the Irvington Tunnel project is similar to the one described for Calaveras, and our conclusion is also the same. When the Alameda Siphon #4 phase was split off from the New Irvington Tunnel, our understanding is that PUC project management determined that $1.2 million pre-CIP funded expenses that had been residing in New Irvington Tunnel project were really attributable to Alameda Siphons. Consequently, these costs were moved in P3E, but no detail has been furnished to those responsible for the management of the data in FAMIS. As a result, FAMIS has not been changed, and the two systems remain $1.2 million apart at the phase level. At the project level, because one phase is over and the other under by the same amount, everything appears correct. (At the project level all phases are rolled up into one.) Nonetheless, if it makes management sense for the project to be split into distinct phases, then it also makes sense to ensure that the financial data for the phases is reported properly.

Bay Division Pipelines #3 & #4

This project's expenditures were overstated by $200,000 in P3E. We determined this was an expenditure item which was also inadvertently accrued. In other words, the item was recorded twice. This error has been already addressed, according to staff.

Conclusions on Reconciliation of Expenditure Data

The table below indicates that after taking into consideration all of the reconciling items that we identified, all of the fifteen projects under review are reconciled within our one percent variance criterion. The oversight of both these systems, P3E and FAMIS, are handled by very knowledgeable staff. From an oversight perspective, both systems seem to be delivering the information for which they were put in place. However, PUC's staff should ensure that reconciliations of the expenditure data between the two systems occur on a regular basis.

Please see the table on the following pages.

Figure 52. FAMIS/P3E Expenditure Reconciliation

Project	P3E 31-Dec-06	Contract & Payroll Accruals	Reconciling Items [1]	Adjusted P3E	FAMIS 31-Dec-06	Variance	One Percent Variance
			($426,739)				
San Joaquin Pipeline	$9,030,721	($339,329)	($505,251)	$7,759,402	$7,739,113	$20,289	0.26
			$299,441				
Tesla Portal Disinfection Station	$1,389,099	($92,332)	$60,535	$1,656,743	$1,646,482	$10,261	0.62
Calaveras Dam Replacement	$15,075,064	($1,495,653)	101,159	$13,680,570	$13,678,328	$2,242	0.02
Calaveras Reservoir Upgrades	$1,715,532		($101,159)	$1,614,373	$1,606,799	$7,574	0.47
New Irvington Tunnel	$6,916,288	($593,450)	$1,250,000	$7,572,838	$7,519,434	$53,404	0.71
Bay Division Pipelines No. 3 & 4	$11,507,514	($64,071)	($200,000)	$11,243,443	$11,240,994	$2,449	0.02
Bay Division PL Reliability Upgrade	$13,606,454	($1,492,409)		$12,114,045	$12,141,683	($27,638)	0.23
PUC/EBMUD Intertie	$7,929,778			$7,929,778	$7,926,043	$3,735	0.05

Project	P3E 31-Dec-06	Contract & Payroll Accruals	Reconciling Items [1]	Adjusted P3E	FAMIS 31-Dec-06	Variance	One Percent Variance
New Crystal Springs Bypass Tunnel	$8,331,520	($224,245)		$8,107,275	$8,109,419	($2,144)	0.03
Sunset Reservoir Upgrades - No. Basin	$13,068,567	($844,302)		$12,224,265	$12,260,096	($35,831)	0.29
Summit Reservoir	$11,398,241	($352,951)		$11,045,290	$11,043,368	$1,922	0.02
Crocker Amazon Pump Station Upgrades	$3,862,919	($4,034)		$3,858,885	$3,858,246	$639	0.02
Forest Knolls Pump Station	$665,076	($3,071)		$662,005	$662,512	($507)	0.08
Alemany Pump Station	$842,158	($13,507)		$829,101	$828,566	$535	0.06
McLaren #1 Tank Rehab	$976,826	($259,958)		$716,868	$722,179	($5,311)	0.74

[1] Reconciling items are discussed in the text for each project that precedes this table.

The above table assumes the appropriate corrections of the reconciling items listed. In order to get a sense of the potential consequences of not addressing reconciliation issues, the Committee requested that we develop a scenario in which these reconciliations are not corrected, and instead are allowed to compound at their current rate through the life of these projects. Based on this assumption, the following deviations between FAMIS and P3E would result:

Figure 53. Deviations Between P3E and FAMIS If Reconciliations Go Uncorrected

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Project	Uncorrected % from FAMIS	Total Budget	Final Projected Deviation
San Joaquin Pipeline	12%	$352,932,001	$42,351,840
Tesla Portal Disinfection	22%	$20,731,269	$4,560,879
Calaveras Dam Placement (1)	0.70%	$256,511,407	$1,795,580
Calaveras Reservoir Upgrades (1)	6%	$1,740,056	$104,403
New Irvington Tunnel (1)	17%	$214,650,002	$36,490,500
Bay Division Pipelines 3&4	2%	$27,600,158	$552,003

(1) The disparities occur only between sub projects within the same project. Because the differences off-set at the project level, the project level amounts are correct.

Of course, we urge the Committee to review these results with caution. The deviation projections are straight-line projections only. In other words, they assume that the same level of error will continue at the same rate in the future, which should not a foregone conclusion. Nonetheless, these results illustrate why correcting deviations between FAMIS and P3E are important to address early, and on a regular basis.

After our discussions with P3E staff, there seems to be momentum building to make the corrections that we have discussed above. We believe this needs be done sooner rather than later. These types of changes never get easier over time, only harder. If reconciling items are allowed to pile up over a long period of time, the expense data in P3E eventually will lose credibility, because of the myriad of variances from FAMIS. In addition, there is the concern that incorrect amounts will be capitalized when the phase is ultimately closed out.

Recommendations Regarding Reconciliation of P3E and FAMIS

R3.1 The RBOC should recommend that the Program Controls and Support Bureau designate an individual staff person to be responsible and accountable for correcting the reconciling errors as quickly as possible, in coordination with PUC Accounting staff. These responsibilities should be explicitly included in the staff persons' job duties. The longer that reconciling entries languish and accumulate, the harder it becomes to bring

two systems back into balance. And eventually that could harm the credibility of the expense data presented in P3E.

R3.2 The RBOC should recommend that the PUC Program Controls and Support Bureau designate a P3E staff person who would be responsible for reversing the accrual entries for both labor and contractual services at the start of the next month. These responsibilities should be explicitly included in the staff persons' job duties.

R3.3 The RBOC should ensure that the June 30, 2007, reconciliation be reviewed by an audit team to determine if prior year problematic areas have been corrected.

Reconciliation of Appropriations in FAMIS to Board of Supervisors Approved Budgets

Consistent with our 2006 Report, our appropriation analysis uncovered nothing of concern related to reconciling FAMIS appropriations back to Board of Supervisors approved budgets. The appropriation amounts reflected in FAMIS as of December 31, 2006, were traced back to the authorizations of the Board of Supervisors. We then accounted for the pre-CIP funding, as well as two budget transfers, to balance to the total FAMIS appropriation. The table on the following page shows the various components for each of the fifteen projects under review.

Figure 54. Appropriations Reconciliation

PROJECT	JUNE 2003	APRIL 2004	JULY 2004	APRIL 2005	AUG 2005	MAY 2006	TOTAL APPRVD BD OF SUPES	PRE-CIP	REVENUE TRANSFER	TOTAL FAMIS APPROPS.
San Joaquin Pipeline	$2,514,000		$500,000	$1,000,000	$4,337,000	$8,748,000	**$17,099,000**			**$17,099,000** (1)
Tesla Portal Disinfect			$100,000		$1,350,000	$13,000	**$1,463,000**	$1,054,158		**$2,517,158**
Calaveras Dam Replace	$7,893,000			$2,869,000	$4,197,000	$8,616,774	**$23,575,774**	$544,617		**$24,120,391**
Calaveras Reservoir Upgrade		SEE FOOTNOTE 2								**$1,606,616**
Irvington Tunnel	$1,330,000		$3,515,000	$500,000	$4,754,000	$9,444,013	**$19,543,013**	$2,098,323		**$21,641,336** (3)
BDPL 3 & 4	$724,000		$4,000,000	$2,883,000	$15,800,000	$1,766,357	**$25,173,357**	$791,200		**$25,964,557** (4)
Hydraulic Cap Upgrade	$2,850,000		$1,000,000	$1,446,000	$11,700,000	$15,894,264	**$32,890,264**	$1,612,592		**$34,502,856** (5)
EBMUD Intertie		$8,400,000					**$8,400,000**	$69,269		**$8,469,269**
Crystal Spring Bypass	$1,811,000		$1,250,000		$3,361,000	$174,961	**$6,596,961**	$3,225,683		**$9,822,644**
Sunset Reservoir Upgrade	$2,038,000		$4,415,000		$24,389,000	$22,117,794	**$52,959,794**	$1,595,857	$850,000 (6)	**$54,555,651**
Summit Reservoir Upgrade	$5,736,000		$2,000,000	$3,089,000	$2,777,000		**$13,602,000**	$1,319,086	($600,000) (7)	**$14,321,086**
Crocker Amazon Pump Station	$1,903,000		$750,000	$145,000	$1,265,000		**$4,063,000**	$760,682		**$4,823,682**
Forest Knolls Pump Station	$99,000		$150,000	$64,000	$1,314,000	$3,196,489	**$4,823,489**			**$4,823,489**
McLaren Park Pump Station			$39,000	$116,000	$753,000	$866,000	**$1,774,000**			**$1,774,000**
McLaren Park Tank Rehab			$200,000	$300,000	$848,000	$3,361,061	**$4,709,061**			**$4,709,061**
TOTALS - 15 WSIP PROJECTS	**$26,898,000**	**$8,400,000**	**$17,919,000**	**$12,412,000**	**$76,845,000**	**$74,198,713**	**$216,672,713**	**$13,071,467**	**$250,000**	**$229,994,180**

Notes:

1) The San Joaquin Pipeline has a 2nd phase for rehabilitation of existing pipelines in the amount of $2,745,000.
2) The Calaveras Dam Replacement Project now has 3 phases: a) Replacement - $21,113,539
b) Reservoir Upgrade - $1,606,616 and, c) San Antonio Back-up - $855,620.
3) Of this amount $3,175,013 is applicable to the Alameda Siphon #4 project and could not be specifically segregated.
4) Of this amount $1,588,507 is budgeted for BDPL at Hayward and could not be specifically segregated.
5) There are 3 phases in this particular project: a) Hydraulic Capacity - $25,346,833;
b) BDPL Reliability - $8,146,023; and, c) Relocation of BDPL - $1,010,000.
6) Funding of $850,000 was transferred from the University Mound Reservoir Project to Sunset Reservoir Project.

Authorization Procedures

The request for bond fund expenditure authority is derived from a "ground up" set of project budgets that are ultimately approved by the Public Utilities Commission as the WSIP program. The PUC Finance budget unit then requests approval of appropriations at the program level. Finally, a worksheet is prepared breaking down these amounts by project, and these amounts are reflected in FAMIS.

These projects can be further broken down into subprojects. There are normally special circumstances that dictate creation of subprojects. The major rationale for creating subprojects is differences in capitalization timelines. Regardless of the reason, the information is given to the budget unit by project management.

The subprojects are then set up as subsets of the parent project on the expenditure side of FAMIS. However, the revenues continue to be maintained at the higher level. As a result, the appropriated revenues cannot be specifically attributed to any individual subproject expenditure. For purposes of this audit, revenues and expenditures were reconciled at the higher level of project and the component subproject amounts were footnoted.

Reconciliation

During the course of the appropriation reconciliation, two budget transfers were encountered. These funding transfers were based upon the financial need of the various projects within the same funding allocation, i.e. local to local. In both these instances, a transfer was made from a project that is projected to be completed under-budget to another project (within the same regional program) that requires additional expenditure authority. The PUC was given authority to move funding between projects within the same regional program by the Board of Supervisors as part of the appropriations process.

During our last audit, we learned that there were two funding sources for the WSIP projects: Proposition A bond funds and "pre-CIP funds." These pre-CIP funds were derived from the sale of Pleasanton property ($9.8 million) and the proceeds of pre-Proposition A bonds. Specifically, this included $2.2 million from the 1996A bonds and approximately $7.7 million from the 1998A bonds. Last year, the pre-CIP funds (totaling $19.7 million) were segregated from the Proposition A funds and were categorized in different accounts in FAMIS. At the conclusion of our last audit, PUC staff was working to combine these accounts, in order to be better able to show total WSIP project costs. We recommended that there be safeguards put in place to ensure that bond fund expenditures and appropriations can be easily "carved out" for reporting purposes in the future.

During the past year, the Proposition A and pre-CIP funding sources have been successfully combined at the WISP project level in FAMIS. The fund information can be segregated. However, you need a fairly sophisticated working knowledge of the FAMIS system to do so. With the help of PUC staff, we were able to navigate to the sub-fund level where the various funding sources are enumerated. Individuals with a working knowledge of the FAMIS system were able to cull the information quite readily.

In every instance, we verified that the pre-CIP funding was fully expended. In addition, the index codes used for the transfer into the bond funds have been closed, so that further pre-CIP transactions are next to impossible. We verified with the Controller's staff that only they have the ability to reopen these appropriations and to do so would be highly unlikely. With the knowledge that all pre-CIP funding has been fully expensed, any balance available for expenditure is necessarily from Proposition A bond proceeds.

Recommendations Regarding Appropriations

R3.4 PUC staff should be applauded for combining both sources of revenue into one project appropriation while maintaining the integrity of each source. However, PUC Finance staff and the Controller should consider adopting a simpler system to help determine whether someone who is looking at appropriations data is reviewing appropriations for the entire project, or looking at one of several subprojects when reviewing the "01" project in FAMIS. An "01" project can be either/or right now, depending on which FAMIS screen is being viewed. We believe using "00" for the total project and then "01", "02", etc… for the subprojects would be better instead of using "01" for both project and subproject. We recommend that PUC's Finance Director, or his designee, discuss the implementation of this recommendation with the Controller's Office.

Vouching a Sample of Invoices

During our 2006 audit, a question arose from the Committee regarding industry standards for vouching. We are not aware of any specific industry standards regarding the appropriate sample size for a vouching examination. We reviewed one of the key sources of guidance for governmental auditors, the U.S. Government Accountability Office's "Government Auditing Standards" Handbook. In it, Chapter 7 has information concerning fieldwork, and contains the following text:

> "Sec 7.17 When laws, regulations or provisions of contracts or grant agreements are significant to the audit objectives, auditors should design the audit methodology and procedures to provide reasonable assurance of

> detecting violations which could have a significant effect on the audit results…..
>
> Sec 7.18 It is not practical to set precise standards for determining whether laws, regulations or provisions of contracts or grant agreements are significant to audit objectives because government programs are subject to many laws, regulations and provisions of contracts or grant agreements, and audit objectives may vary widely."

Given the lack of a firm standard in this area, we used our professional judgment to determine how many invoices to examine in connection with this task. We reviewed 93 invoices totaling approximately $15 million. This represented 10 percent of the invoices and 27 percent of the non-personal services expenditures associated with the 15 projects under review. In most instances, a minimum of two of the largest transactions were reviewed per project and lesser amounts were chosen by random sample. In the non-personal services area, there were three objects that accounted for the preponderance of expenditures. They were engineering services, construction contracts, and overhead.

A summary of the invoices reviewed is presented in the next table.

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Figure 55. WSIP Invoice Recap

PROJECT	FISCAL YEAR	TOTAL NON-PERSONAL SERVICES COSTS (1) (Excluding Overhead)	AMOUNT REVIEWED	% OF TOTAL	NO. OF INVOICES	% OF INVOICES
SAN JOAQUIN	2003 - 2004	$526,711	$120,711	23	2 of 14	14
PIPELINE	2004 - 2005	$602,696	$222,508	37	2 of 18	11
	2005 - 2006	$1,118,362	$158,533	14	2 of 31	6
	to 12-31-06	$372,198	$40,947	11	2 of 30	7
	Total	*$2,619,967*	*$542,699*	*21*	*8 of 93*	*9*
TESLA PORTAL	2005 - 2006	$37,680	$5,656	15	1 of 12	8
DISINFECTION	to 12-31-06	$28,901	$7,424	26	1 of 3	33
	Total	*$66,581*	*$13,080*	*20*	*2 of 15*	*13*
CALAVERAS	2003 - 2004	$2,563,177	$474,344	19	2 of 25	8
DAM	2004 - 2005	$1,792,021	$241,354	13	2 of 43	5
REPLACEMENT	2005 - 2006	$4,005,885	$768,310	19	3 of 68	4
	to 12-31-06	$1,016,734	$209,012	21	3 of 26	12
	Total	*$9,377,817*	*$1,693,020*	*18*	*10 of 162*	*6*
CALAVERAS RESERVOIR UPGRADE	to 12-31-06	$1,274,599	$343,061	27	2 of 8	25
	Total	*$1,274,599*	*$343,061*	*27*	*2 of 8*	*25*
IRVINGTON	2003 - 2004	$523,704	$110,000	21	1 of 12	8
TUNNEL	2004 - 2005	$980,592	$171,980	18	2 of 34	6
	2005 - 2006	$432,957	$158,232	37	3 of 40	8
	to 12-31-06	$416,483	$76,140	18	3 of 39	8
	Total	*$2,353,736*	*$516,352*	*22*	*9 of 125*	*7*
BAY DIVISION	2003 - 2004	$94,914	$20,699	22	1 of 6	17
PIPELINES	2004 - 2005	$80,704	$27,996	35	1 of 9	11
NOS. 3 & 4	2005 - 2006	$1,768,622	$409,680	23	2 of 4	50
	to 12-31-06	$3,980,953	$1,233,870	31	2 of 15	13
	Total	*$5,925,193*	*$1,692,245*	*29*	*6 of 34*	*18*
BAY DIVISION PIPELINES HYDRAULIC CAPACITY UPGRADES	2003 - 2004	$372,469	$71,832	19	2 of 14	14
	2004 - 2005	$997,275	$138,248	14	2 of 22	9
	2005 - 2006	$4,415,469	$619,917	14	6 of 86	7
	to 12-31-06	$850,802	$203,233	24	5 of 61	8
	Total	*$6,636,015*	*$1,033,230*	*16*	*15 of 183*	*8*

PROJECT	FISCAL YEAR	TOTAL NON-PERSONAL SERVICES COSTS (1) (Excluding Overhead)	AMOUNT REVIEWED	% OF TOTAL	NO. OF INVOICES	% OF INVOICES
NEW CRYSTAL SPRINGS BYPASS TUNNEL	2003 - 2004	$137,640	$23,836	17	1 of 7	14
	2004 - 2005	$795,355	$126,394	16	2 of 13	15
	2005 - 2006	$959,595	$288,007	30	4 of 43	9
	To 12-31-06	$298,971	$37,367	13	2 of 20	10
	Total	*$2,191,561*	*$475,604*	*22*	*9 of 83*	*11*
SUNSET RESERVOIR UPGRADES	2003 - 2004	$62,657	$25,218	40	1 of 8	13
	2004 - 2005	$159,377	$39,866	25	2 of 18	11
	2005 - 2006	$4,893,902	$2,023,863	41	6 of 44	14
	To 12-31-06	$1,159,894	$516,993	45	3 of 22	14
	Total	*$6,275,830*	*$2,605,940*	*42*	*12 of 92*	*13*
SUMMIT RESERVOIR UPGRADES	2003 - 2004	$1,453,290	$728,302	50	2 of 15	13
	2004 - 2005	$2,660,608	$817,583	31	3 of 41	7
	2005 - 2006	$3,924,190	$850,773	22	4 of 40	10
	To 12-31-06	$33,707	$11,740	35	1 of 6	17
	Total	*$8,071,795*	*$2,408,398*	*30*	*10 of 102*	*10*
CROCKER AMAZON PUMP STATION UPGRADE	2003 - 2004	$143,547	$80,885	56	1 of 4	25
	2004 - 2005	$1,668,385	$549,797	33	2 of 12	17
	2005 - 2006	$353,177	$140,491	40	1 of 6	17
	To 12-31-06	0	0	0	0	0
	Total	*$2,165,109*	*$771,173*	*36*	*4 of 22*	*18*
FOREST KNOLLS PUMP STATION UPGRADE (2)	NO NON-PERSONAL SERVICES IN EXCESS OF $10,000 PER YEAR AS OF 12-31-06					
MCLAREN PARK PUMP STATION	2005 - 2006	$55,029	$19,097	35	1 of 5	20
	To 12-31-06	$12,238	$5,030	41	1 of 6	17
	Total	*$67,267*	*$24,127*	*36*	*2 of 11*	*18*
MCLAREN PARK TANK REHAB	To 12-31-06	$202,392	$158,400	78	1 of 6	17
	Total	*$202,392*	*$158,400*	*78*	*1 of 6*	*17*
GRAND TOTAL		***$54,727,862***	***$14,777,329***	***27***	***93 of 944***	***10***

Notes:
(1) Appropriations under $10,000 were excluded.
(2) The Forest Knowles Pump Station Upgrade project had not incurred any non-personal services expenses over $10,000 with the exception of overhead. Therefore, no invoices were reviewed for this project.

In reviewing the contract payment and other invoices, we determined that all but two of the expenditures sampled had the proper "encumbrance" documents in place to allow payment. The payments themselves were for the appropriate time period, for the proper amount, to the correct vendor, and for the appropriate goods and services. We also determined that a current listing of authorized signatories dated April 21, 2006, is on file in the Accounting Unit. However, the signatory process remains as cumbersome as last year.

Regarding the two unsupported expenditures, in each instance, upon further review and discussions with both PUC and Controller's staff, it was determined that these were direct charges from the Department of Public Works (DPW). For these services, no invoices were issued. Apparently, for transactions of this nature, the scope of work and cost are predetermined between the departments involved. In these instances, the agreed upon amount was simply transferred from the PUC account into the DPW account. No subsequent invoice is issued to PUC by DPW upon completion of the work. It is left to the PUC project manager to determine that the work was rendered satisfactorily. These direct charges are handled in a similar manner for all departments throughout the City and County. Our understanding is that DPW could issue an invoice to PUC for services that it performs.

Overhead

During our discussions of our Report findings with the RBOC, the issue of Overhead expenses was raised. We did not undertake a detailed examination of overhead in 2007, but we did review the issue in detail in our 2006 Report. This section draws heavily on our findings from last year. Based on discussions with PUC staff and other City finance staffs last year, we determined that the methodology for calculating the overhead rate was appropriate. We also determined that this methodology has been consistently applied over the last several years. However, the magnitude of what is now a 204% overhead rate in FY2007 (comprised of a 174% overhead rate and a 30% fringe benefit rate) caused us to inquire further into its reasonableness.

We determined the rate to be high due to the small base to which it was applied, rather than any inappropriateness of the costs included. Only the direct labor costs of the Department are used as the denominator to determine the rate. We verified that both the Municipal Railway and Department of Public Works use this same methodology in establishing their indirect rates. We noted that the

costs charged as indirect cost to the various projects do not include those administrative personnel charged directly to the enterprise system. The figures for fiscal years 2005 and 2006 can be seen in the table below. The data come from PUC Finance.

Figure 56. Overhead Rate

Cost Category	FY2005 Total	FY2006 Total
Total – Personnel Fund	$10,643,939	$12,462,825
Total Indirect Non-Labor Costs	$7,896,208	$8,035,965
Total Costs	$18,540,208	$20,498,790
Total Direct Charges	$10,288,819	$11,799,214
Overhead Rate	180%	174%
Plus Fringe Benefits Charge to Projects (estimate)	19%	30%
Total Overhead Rate Charged to Projects	199%	204%

It should be noted that fringe benefits expenses are included already in the indirect labor costs. It is only the direct labor costs that are missing the fringe benefit costs, due to the way the financial systems work. As fringe benefits are a genuine cost associated with labor, it is appropriate to include them in the overall costs.

In 2006, the RBOC asked us to identify the types of costs that are included in the overhead rate. Our understanding is that the overhead rate is used to recover the costs of: a) "indirect labor," which includes the Office of the Deputy General Manager, and Managers and administrative staff in several PUC bureaus that work on the WSIP, but do not charge to any specific project; b) Rent, travel and materials and supplies for all PUC staff, whether they be "direct" or "indirect"; and c) certain costs from other City Departments, that so far as we can tell, are not charged directly to projects. Please note that a more detailed review of the overhead rate calculations and methodology is beyond the scope of our current review.

Recommendations On Invoice Approval Process

R3.5 The invoice approval process, with its many required signatures, appears cumbersome. We recommend that PUC Financial Services investigate the utilization of electronic signature approvals as a means of streamlining and expediting the process.

R3.6 There are vacancies in the PUC Accounting unit. These positions should be filled as quickly as possible to ensure the quality of the document review and approval process.

R3.7 There needs to be more accountability for direct charges from other City Departments at the conclusion of the required work. In the case of DPW, which is cited above, invoices should be issued by DPW to PUC to provide the proper audit trail for those expenditures. We recommend that PUC Project Managers request such invoices from other City Departments, and that PUC's Finance Director instruct the Accounting staff to follow-up with Project Managers when invoices are not received on a timely basis.

Verify No Proposition A Funds Spent Before November 2002

We reviewed the appropriation status as of November 2002, and at the fiscal year-end to ensure that no expenses were back dated. We found no Proposition A charges at either time period. In discussions with PUC staff, we learned that the Controller does not allow capital projects to be charged after the close of the fiscal year. Based on these facts, we believe that it would not have been possible to spend Proposition A bond funds before November 2002.

Identify Any Material Differences Noted and Provide Explanations

Any discrepancies found in our analysis have been described elsewhere in the report. None of them were found to be significant.

Chapter 4 – Review of Program Controls and Internal Controls

Introduction

Given the depth and breadth of the WSIP program, it is inevitable that major scope, schedule and cost changes will occur throughout the life of the program. These changes should be expected during both the design and construction phases. This reality requires that the PUC develop a formal set of guidelines for WSIP project managers on "Project Change Control," and a well-structured process for evaluating the trade-offs that will arise as changes are considered. This process must balance the need for:

- Supporting changes that are necessary to maintain the function and performance of a project, including an awareness of the original program approved by the voters;
- Keeping an eye on the Program's bottom-line; and
- Facilitating prompt decision-making, so that projects are not delayed while awaiting a decision.

Task 2 of our scope of work asks us to:

- Identify changes since March 2006 to SFPUC's program controls system (Primavera or P3E) and internal control procedures for accounting of capital projects;
- Evaluate reasonableness and effectiveness of such changes; and
- Provide recommendations for areas of improvement.

Change Order Procedures as of the RBOC 2006 Financial Review

At the time that Kuo & Doyle conducted the review of the WSIP program in 2006, the PUC's Program Development and Support Bureau had prepared draft CIP Change Control Procedures, which included the following provisions:

- A Project Manager may approve budget changes of up to $100,000;
- A Senior Project Manager may approve budget changes of up to $300,000;
- Decisions concerning project budget increases of between $300,000 and $500,000 would require the approval of the Managers of the Engineering Design Bureau, the Construction Management Bureau, the Program Development Bureau and the Project Management Bureau; and

- Decisions concerning project budget changes of over $500,000 would be elevated to the CIP Steering Committee, which will recommend whether to approve or reject a proposed change to the Assistant General Manager (AGM) for Infrastructure. The AGM will in turn develop a recommendation concerning whether to approve or reject a change over $500,000 to the Deputy General Manager for Infrastructure and Operations.

While the approval parameters laid out in the draft Procedures appeared reasonable, we noted that it was possible that many relatively small (under $300,000) scope changes could occur, which in the aggregate, would add up to millions of dollars in cost increases, without undergoing scrutiny by Bureau Managers, the AGM of Infrastructure, or the DGM of Infrastructure and Operations. We noted that the AGM for Infrastructure and the DGM for Infrastructure and Operations would need to be aware of the changes that have already occurred within each project's budget, and within the program as a whole, when they make their decisions concerning changes exceeding the $500,000 threshold, in order to protect the Program's bottom-line.

One additional factor to note is that a $100,000 approval threshold for project managers may be reasonable for a small project, but may be administratively burdensome for larger, multi-million dollar projects, which are likely to experience many change orders. This is one example of the balancing act that exists when establishing approval threshold levels between ensuring that significant changes are adequately scrutinized, while also ensuring that the approval process itself does not become bogged down, thereby affecting schedule adherence.

Highlights of the Current Change Control Procedures

In June 2006, PUC staff approved the final version of their "Project Change Control" procedures, which are incorporated in section 5 of the PUC Infrastructure Division's "Procedure Manual, Volume 4, Program and Project Management." These Change Control procedures apply to all PUC capital projects, including WSIP projects. Members of the RBOC received an electronic copy of this document from PUC staff in May 2007.

There were several significant changes between the draft procedures and the approved procedures. Levels of authorization were changed, and certain approval bodies from the draft procedures, such as the group of Bureau Managers, with the exception of the Bureau Manager for Project Management, and the CIP Steering Committee, were removed from the approval path in the approved version of the procedures. In addition, a new position, the Capital Programs Executive Manager, was added to the approval path.

The highlights of the current procedures include:

- They make "successful implementation" of the change control procedures the responsibility of the Project Manager for each project.
- They designate roles for following project staff to play in the review and development of "Change Authorization" requests:
    - Project Controls Engineer
    - Project Engineer
    - Resident Engineer
    - Design Lead Engineer
    - Environmental Project Manager
    - Operations Representative
    - Lead Cost Estimator
    - Project Controls Manager
    - Regional Project Manager
    - Construction Manager
    - Project Management Bureau Manager
    - Capital Programs Executive Manager
    - Assistant Deputy General – Infrastructure Division
    - Deputy General Manager

Approval Path for Project Budget and Schedule Changes

- Indicates that when a Project Manager proposes a project budget modification, he or she will:
    - Determine if funds are available from another phase of the same project to fund the change order; or
    - If insufficient funds are available within a project's own contingency budgets to fund a change order, then the Project Manager must "consult with the Regional Project Manager regarding the availability and transfer of funds from another regional project."
- A Project Manager has the authority to approve the use of up to 75 percent of his or her project's contingency funds to fund a change order. Unlike in the draft procedures, a Project Manager is no longer limited to approving only changes below $100,000;
- If the cost of design comes in below the amount budgeted for that phase, the remaining dollars remain in the design phase. The Project Manager does not have the discretion to transfer those unused funds to

the construction phase, and must submit a Change Authorization request to move unused budget amounts to another phase.

- A Regional Project Manager has the authority to approve the use of up to 90 percent of his or her project's contingency funds to fund a change order. Unlike in the draft procedures, a Regional Project Manager is no longer limited to approving only changes between $100,000 and $300,000.
- A Regional Project Manager has the authority to transfer non-contingency funds within a project, (i.e., if there unspent budget left in the Planning Phase, and the Planning Phase is complete, the Regional Project Manager can transfer the remaining unspent budget amount to the Design Phase).
- The Project Development and Support Bureau Manager must approve any change order that results in the use of 100 percent of a project's contingency funds, and reviews (but is not required to approve) all other project change order requests; and
- The Capital Programs Executive Manager must approve:
  - Any change order that exceeds 100 percent of a project's contingency funds;
  - Any change order that exceeds $500,000; and
  - Any schedule change greater than three months.

Please note that the draft 2006 procedures had called for $300,000 and $500,000 to require the approval of the Managers of the Engineering Design Bureau, the Construction Management Bureau, the Program Development Bureau and the Project Management Bureau. The Capital Programs Executive Manager appears to be a newly created function that, in this context, replaces the approval role of the three Bureau managers.

- The AGM for Infrastructure must approve:
  - Any change order that exceeds 100 percent of a project's contingency funds;
  - Any change order that exceeds $500,000
- The Deputy GM must approve any change order that exceeds $500,000. This is consistent with 2006 draft procedures. Please note that the "CIP Steering Committee" referred to in the 2006 draft procedures is no longer part of the approval path, except when the AGM and DGM are to review, the Steering Committee provides the prior recommendation/approval;
- The General Manager must approve any change order that changes a project's total budget or that changes its phase-level schedule. In addition, the Commission must be notified of these budget and/or schedule changes.

- All changes in a project's total budget and phase-level schedule must be approved by the General Manager, and the Commission must be notified of all such changes.

The table which follows summarizes the roles of the key players the approved Change Control Procedures, compared to the draft procedures that were reviewed in 2006:

Figure 57. Summary of Draft Vs. Final Change Order Process: Roles of Key Players

	2006 Draft Change Control Procedures	**Final Approved Change Control Procedures**
Project Manager approval level	Budget changes up to $100,000	Up to 75% of his or her project's contingency funds
Regional Project Manager approval level	Budget changes up to $300,000	Up to 90% of his or her project's contingency funds
Approval by following Bureau Managers: Engineering Design Construction Management Program Development Project Management	Budget increases of between $300,000 and $500,000	Not Included in Final Procedures
Capital Program Executive Manager	Not Included in Draft Procedures	• Any change order that exceeds 100% of a project's contingency funds • Changes over $500,000
CIP Steering Committee	Changes over $500,000	Not Included in Final Procedures
AGM for Infrastructure approval level	Changes over $500,000	Changes over $500,000
Deputy General Manager	Changes over $500,000	Changes over $500,000
General Manager	Not Included in Draft Procedures	Any change in total project budget, or phase-level schedule
Commission	Not Included in Draft Procedures	Notification of changes in total project budget and project phase-level schedule

Findings on the Current Change Control Procedures

A major consideration in evaluating the "reasonableness" of the change control procedures is how well they balance the need for senior management oversight of the WSIP program with the need to facilitate prompt decision-making.

F4.1 WSIP projects range from under $5 million to well over $500 million. Because of the wide variation in the budget and contingency amounts involved, it is challenging to develop a single set of approval thresholds that can be applied to all WSIP projects, and difficult to determine whether it is better to base those thresholds on fixed dollar amounts or a percentage of each project's budget or contingency amount.

F4.2 We are more accustomed to seeing fixed dollar thresholds used in change control approval procedures. However, we do not recommend changing the PUC's "percentage of contingency" approval thresholds, and are interested in learning whether over time, the PUC finds the percentage of contingency thresholds to be an effective measure for balancing the needs of oversight vs. minimizing the number of small, non-controversial changes that require review.

F4.3 Larger WSIP projects have multi-million contingency budgets. So it is prudent to require that the AGM for Infrastructure and Deputy General Manager be required to approve any change order over $500,000, regardless of whether it can be funded within a project's existing contingencies.

F4.4 Requiring the General Manager's approval for any increase in a project's total budget, and any change in phase-level schedules (which often drive budgetary changes) is also a prudent way of ensuring there is adequate senior management scrutiny and oversight over the WSIP's budget and schedule.

F4.5 Reporting changes in total budget and phase-level schedule to the Commission is prudent, and adds an element of transparency to the management of the Program.

Recommendations

We would make the following recommendations concerning the PUC's approved Change Control procedures:

R4.1 The authority of Project Managers and Regional Project Managers to reallocate funds already budgeted at the phase level (e.g. their budgets for planning, design, construction, etc.) should be clearly stated in the Change Control Procedures. We would recommend that they have the ability to manage these funds, with appropriate reporting requirements (i.e. at a minimum, reallocations of these funds should be identified and reported in the WSIP Quarterly Project Status Reports). However, please note that this recommendation was reviewed by a representative of the Program Controls and Support Bureau, who indicated that this

would represent a significant procedural change that would require overall changes in how allocations are tracked in P3E.

R4.2 Over time, the PUC should review the effectiveness of the "Percentage of Contingency" approval threshold levels for project managers and regional project managers, in order to determine whether senior managers with authority over the WSIP (e.g. Capital Programs Manager, Assistant General Manager, Deputy General Manager) are reviewing all significant project changes before they are implemented, and whether senior managers are becoming overwhelmed by the volume of approval requests that rise to their level.

Chapter 5: Projects Removed from the WSIP

Overview

Task 3 of the engagement is to identify which projects had been removed from the WSIP between 2002 and 2005, and to discuss the decision-making process that led to their removal; to identify funding sources for removed projects; and to examine and report on the implications of removing the projects from the WSIP. This chapter addresses these issues. In addition, although it was not in the original scope, this chapter identifies projects which have been reassigned within the WSIP, and projects which have been added to the WSIP since 2002.

It should be noted that routine maintenance is distinguished from R&R and other capital improvements. Routine maintenance covers items such as adjusting equipment or changing filters and light bulbs, and repairing plumbing leaks, broken windows, and painting. These are considered operating costs necessary to provide services, and are not a part of this discussion.

Background: City's Capital Planning Process

In August 2005, the Board of Supervisors adopted legislation requiring the City to develop and annually adopt a 10-year capital expenditure plan for all city-owned facilities and infrastructure, including those operated by the PUC. The legislation also established the City's Capital Planning Committee (CPC). The CPC is chaired by the City Administrator and consists of the President of the Board of Supervisors, the Mayor's Finance Director, the Controller, the City Planning Director, the Director of Public Works, the Airport Director, the Executive Director of the Municipal Transportation Agency, the General Manager of the Public Utilities System, the General Manager of the Recreation and Parks Department, and the Executive Director of the Port of San Francisco.

The purpose of the CPC is to develop a citywide capital plan and annual capital budget, based on its review and assessment of capital improvements proposed by City departments. The Committee establishes prioritization and assessment criteria to assist the City Administrator and staff in developing the capital plan.

Water Enterprise Capital Programs

The PUC Water Enterprise's Capital Program consists of three parts: WSIP, R&R, and Enhancement. In the City and County of San Francisco's proposed 10-Year Capital Plan for Fiscal Years 2008-2016, the different programs are described as follow:

- The WSIP will deliver capital improvements that enhance the PUC's ability to provide reliable, affordable, high quality water to its 2.4 million customers in an environmentally sustainable manner,

- The Renewal and Repair (R&R) Program provides for "on-going maintenance and to keep the water systems operational with the goal of reaching a good state of repair," and

- The Enhancement Program involves larger-scale, multi-year projects such as "renovations, additions, and new facilities that are the result of legislative mandates, programmatic changes, or modernization."

For reference, the PUC's proposed Water Enterprise FY2007-2008 annual capital budget (for non-WSIP capital improvements) is presented in the table that follows. This annual capital budget request was presented to the City's Capital Programming Committee in April 2007. Please note that the funding source for each project is identified in the column labeled "source, "and that the table is a blend of projects funded by existing fees and revenue bonds.

Figure 58. Proposed PUC FY2007-08 Annual Capital Budget for R&R and Enhancement Programs

Project Title	Project Type*	Funding Source	Total Budget Request
Aging Infrastructure - Odor Control	R	Revenue Bonds	$9,920,000
Aging Infrastructure - Pump Stations	R	Revenue Bonds	$4,287,000
Aging Infrastructure - Treatment Facilities	R	Revenue Bonds	$7,585,000
Wastewater Repair and Replacement Program	R	Wastewater Revenue	$17,618,000
Hetchy Water R&R - Water Infrastructure	R	Hetchy Revenue	$4,000,000
Hetchy Water R&R - Power Infrastructure	R	Hetchy Revenue	$1,500,000
Hetchy Water R&R - Facilities Maintenance	R	Hetchy Revenue	$2,500,000
Regional Water R&R - Treatment Facilities	R	Water Revenue	$846,000
Regional Water R&R – Water Conveyance/Transmission	R	Water Revenue	$3,000,000
Local Water Repair and Replacement Program	R	Water Revenue	$12,220,000
Local Water Repair and Replacement Program	R	1985 Water Revenue Bonds	$6,500,000

Project Title	Project Type*	Funding Source	Total Budget Request
Hetchy Microwave Replacement	E	Hetchy Revenue	$400,000
Peninsula Sportsman's Club Remediation	E	Water Revenue	$3,900,000
CDD 1990 Newcomb Facility Improvements	E	Water Revenue	$2,000,000
Regional Water R&R – Storage	E	Water Revenue	$750,000
Polhemus Creek Restoration	E	Water Revenue	$600,000
Wastewater Master Plan	E	1991 Sewer Revenue Bond	$3,370,000
5 Yr Sewer Improvement Program	E	Revenue Bonds	$13,328,800
Collection System Assessment	E	Revenue Bonds	$1,500,000
Treasure Island Capital Improvement Project	E	TIDA	$560,000
Mayor's Energy Conservation Account	E	Hetchy Revenue	$8,000,000
Treasure Island Capital Improvement Project	E	TIDA	$790,000
Shore Power for Cruise Ships	E	Hetchy Revenue	$295,000
SFE Energy/Green Building Project	E	Hetchy Revenue	$465,000
Hunters Point Municipal Power	E	Hetchy Revenue	$7,772,000
Treasure Island Capital Improvement Project	E	TIDA	$340,000
Wastewater Commercial Paper Expense	n/a	Revenue Bonds	$2,520,000
		TOTAL	**$116,566,800**
* R = R&R, E= Enhancment			

As the Team looked more carefully into the distinctions between the WSIP, R&R, and Enhancement programs, it become clear that it can be hard to distinguish between them. While a detailed analysis of the Enhancement and R&R programs are outside the scope of this current engagement, what follows is an attempt to present an overview of each, as presented in the City's capital

document, to aid in distinguishing between them. However, overlap remains, which can lead to confusion.

WSIP Overview

The WSIP program contains both regional and local projects. It is currently budgeted at approximately $4.3 Billion, including bond financing costs and is focused on projects that will help the water system meets its level of service goals. Of that $4.3 Billion projected cost, $1.6 Billion in Proposition A bonds have been approved by the voters thus far, in November 2002.

Renewal and Replacement Program (R&R) Overview

Within the R&R program, there are both local and regional projects. Recent funding for the R&R program has ranged from $25 million to $30 million per year. To fully fund the R&R program would take $60 million to $70 million per year. Currently, it is funded out of fees.

In accordance with the City's FY2006-07 Capital Project Budget Request Procedures, R&R projects encompass the "repair or replacement of components or fixed equipment and the systems they form at scheduled intervals, in order to keep [a] facility operating." Systems and equipment have a life expectancy and need to be repaired or replaced on a regular basis in order to meet this life expectancy. Examples of this type of work are roof and boiler replacement and new mechanical equipment.

Enhancement Program Overview

The Enhancement Programs appears to focus on new or significantly augmented projects. Some examples include a San Antonio Reservoir Oxygenation System and the Sunol Quarries. Enhancement projects total an additional $300 million in capital improvements over the ten-year period. It is expected that these projects will be funded by revenue bonds, and/or additional revenue. To the extent that revenues are not available, projects will be deferred. The Enhancement Program was included in the City's 2007-2015 Capital Plan.

Water Enterprise Capital Improvement Funding

Water Enterprise capital projects can be funded by either current revenue or debt. As stated in the 1996 Series A Water Bonds Official Statement, water enterprise revenue bonds were issued then to finance or refinance the "reconstruction or replacement of existing water supply, storage, and distribution system facilities." Based on this broad definition of the type of projects that are eligible for bond financing, it is likely that both R&R and Enhancement Program capital improvements could be eligible for bond financing, assuming that the R&R improvements have a sufficiently long useful life. However, the PUC's practice

has been to finance R&R improvements from operating revenues, while financing Enhancement Program projects and the WSIP from bond funds.

Changed Projects: An Overview

As has been mentioned elsewhere in this report, the changes that have occurred, both internally and externally, in the management of the WSIP program have presented challenges in locating historical information. In the case of the projects removed from the WSIP, the PUC's Manager of Projects for the Infrastructure Program Management Bureau, was an invaluable source.

Finding Regarding Rationale for Decisions to Remove Projects From WSIP

Regarding the criteria used for deciding which projects would be removed from the WSIP, the PUC's Manager of Projects indicated that as part of the November 2005 adoption of the WSIP, the program was refined to focus on Level of Service (LOS) goals.

F5.1 Projects that did not meet or further LOS were removed from the WSIP.

F5.2 In addition, facilities that were functioning but in need of repairs (for example, the tunnel projects), were removed from the WSIP in favor of projects that were at risk of failure or could not go out of service in order to be repaired because of a lack of redundant systems.

The table below presents a summary of the projects that have been removed from the WSIP, reassigned within the WSIP, or added to the WSIP. All the changes are from a base of May 2002, and reflect the status as of November 2005. Projects are grouped by their status (removed, reassigned, or added), and listed by project number. To the extent that information exists, project numbers and controls numbers are listed, as are project budgets as of May 2002, August 2003, and November 2005. Finally, for those projects removed, the disposition of the project has been identified. Information regarding the disposition of projects comes from Project Managers and the Manager of Projects for the Infrastructure Program.

Figure 59. Changes in the WSIP Program: 2002 versus 2005

PROJECTS REMOVED FROM WSIP				
	Project Number/ (Control Number)	**Project Budget as of May 2002 (escalated $)**	**Project Budget as of August 2003 (escalated $)**	**Status of Removed Project as of 2005**
Project Title				
BDPL #1 & #2 Repair of Caisson and Pipe Bridge	99	$24,444,019	$24,291,000	Eliminated due to the adoption of the Preferred Engineering Alternative of the BDPL Reliability Upgrade Project, which eliminates the need for BDPL's #1 and #2.
Mountain Tunnel Lining (Hetch Hetchy)	202167	$3,426,367	$4,262,000	Moved to R&R. Inactive.
Early Intake Res-Resurface Dam (Hetch Hetchy)	202166	$1,773,533	$1,739,000	Moved to R&R. Inactive.
Early Intake Res-Spillway + Adj. Weir (Hetch Hetchy)	202180	$2,274,501	$1,762,000	Consultant report recently issued. Moved to R&R. Inactive.
Foothill Tunnel Repairs (Hetch Hetchy)	202415	$4,284,905	$5,919,000	Moved to R&R. Inactive.
Sunol Quarry Reservoirs	99079	$12,175,851	$12,070,000	Moved to the Enhancement Program.

PROJECTS REASSIGNED WITHIN WSIP				
	Project Number/ (Control Number)	**Project Budget as of May 2002 (escalated $)**	**Project Budget as of August 2003 (escalated $)**	**Project Budget as of November 2005 (escalated $)**
Project Title				
BDPL nos. 3&4 Crossover/Isolation Valve at Hayward Fault	35302/ NA	N/A	N/A	$27,064,000
Groundwater Projects (from local)	30101/ 291	$14,968,314	$15,587,000	$69,011,000
Recycled Water Project (from local)	30201/ 292	$121,448,361	$124,335,000	$201,526,000

PROJECTS ADDED TO WSIP				
	Project Number/ (Control Number)	**Project Budget as of May 2002 (escalated $)**	**Project Budget as of August 2003 (escalated $)**	**Project Budget as of November 2005 (escalated $)**
Project Title				
BDPL 4 Slipline PCCP Sections	393	N/A	N/A	Unknown
SFPUC/EBMUD Inter-tie	38901/ 203040	N/A	$9,150,000	$8,598,859
Baden and San Pedro Valve Lot Improvements	39101	N/A	N/A	$47,320,000
SF Bay Desalination	39001/ 203066	N/A	$650,000	$10,000,000
Program Environmental Impact Report	38801	N/A	N/A	$9,271,000
Watershed and Environmental Improvement Program	Unknown	N/A	N/A	$20,000,000

Removed and Reassigned Projects: Project Specific Information

For the projects removed from the WSIP, or reassigned within the WSIP, additional information is included below, on a project by project basis.

Removed Projects

Bay Division Pipeline (BDPL) Nos. 1 & 2 Repair of Caisson and Pipe Bridge

Originally, this project was intended to assess the condition of the structures and develop seismic rehabilitation or replacement plans for the pipes, pipe bridge, and caisson. However, the Preferred Engineering Alternative of the BDPL Reliability Upgrade consists of 16 miles of pipeline and a five mile tunnel, which allows the PUC to meet Level of Service goals without using BDPLs #1 and #2. This is preferable because the stretch of existing BDPLs #1 and #2 is at risk of failure in a seismic event, and is in a marine environment that results in more rapid deterioration. To rehabilitate these facilities would be expensive, time consuming, and environmentally problematic. The Bay Tunnel, due to its much larger size, eliminates the need to use or maintain these two pipelines.

Mountain Tunnel Lining (Hetch Hetchy)

This project was removed from the WSIP, and transferred to the R&R program. The project description from May 2002 states that the Mountain Tunnel was built in 1920, and had a useful life of 60 years. The project was intended to replace or repair the lining near the Priest Bypass when that project was underway, at an estimated cost of $3.4 million (escalated). The cost of replacing all of the lining in the tunnel was estimated at $50 million, and the remainder of relining was planned for after 2010 This project is inactive, pending additional funding in the R&R program.

Early Intake Reservoir Resurface Dam (Hetch Hetchy)

This project was removed from the WSIP and transferred to the R&R program. According to the May 2002 project description, the Early Intake Dam was built in 1924 and is subject to significant weathering due to freezing and thawing. This leads to water leaking through the dam and weakening the structure. The project was to repair the face of the dam. This project is inactive, pending additional funding in the R&R program.

Early Intake Reservoir – Lower Spillway & Adjustable Weir Project

This project was removed from the WSIP and transferred to the R&R program. In the May 2002 project description, it is noted that the Early Intake Reservoir has drum gates on its spillway that became inoperable 15 years prior. In the event of large flow in the Tuolumne River, turbid water could enter the Mountain Tunnel and could lead to overtopping of the dam. In addition, over-topping the dam could cause foundation damage and potentially cause dam failure. The design to address this problem was complete, and this project was to lower the spillway and replace the drum gates with a weir that could be adjusted seasonally. The project also included the removal of the exiting piers, pedestrian bridge, and lowering three feet of the spillway structure. A consultant study was recently completed for this project. This project is inactive, pending additional funding in the R&R program.

Foothill Tunnel Repairs (Hetch Hetchy)

This project was removed from the WSIP and transferred to the R&R program. In the May 2002 project description, the Foothill Tunnel is a part of the water delivery system for the city of San Francisco. Over time, the carrying capacity of the tunnel has deteriorated due to leaks and deposited material. This project was to remove the debris in the unlined areas of the tunnel, and leaks repaired. In the lined parts of the tunnel, the lining was to be repaired or replaced. This project is inactive, pending additional funding in the R&R program.

Sunol Quarry Reservoirs

This project was removed from the WSIP because it did not contribute to Level of Service Goals. It was noted in the AB1823 report of March 8, 2006, that development of the quarry pits will require coordination of activities with current quarry contractors and will need to be linked to the current and future lease of the quarries. The May 2002 project description, notes that potential for water storage in the Sunol quarries was being examined. The project is to begin the planning and development of the six pits for water storage in order to increase the storage capacity within the Alameda watershed and to improve system reliability and flexibility.

This project appears as an Enhancement Program project in the proposed FY2008-17 Capital Plan.

Reassigned Projects

BDPL Nos. 3&4 Crossover/Isolation Valve at Hayward Fault

This project was originally part of the regional project, "Upgrade of BDPL Nos. 3&4 at the Hayward Fault." One phase of the original project was to address the vulnerability of the pipelines to seismically induced failure where they intersected with the Hayward Fault through the installation of crossover and shutoff facilities on each side of the fault zone. Another phase included bypass infrastructure, which required significant environmental review and planning efforts to design and construct. Due to the critical nature of the first phase, the two phases were unlinked and turned into separate projects.

Groundwater Project

This project was originally a part of the Local Program of the WSIP. It has been expanded to include benefits to the regional water system and revised to provide additional supply during drought years.

Recycled Water Project

This project was originally part of the Local Program of the WSIP, and is to benefit the local water system supply of San Francisco. The revised project has been expanded to provide benefits to the regional water system supply and will explore the possibility of partnering with other wholesale customers to provide for regional recycled water options.

Findings and Recommendations

Findings

F5.3 Approximately $50 million in projects were removed from the WSIP. After accounting for the elimination of the BDPL #1 & #2 project, the cost of the projects that were moved from the WSIP to another PUC program is approximately $26 million. Of these remaining projects, the largest one, the Sunol Quarry Reservoirs ($12.1 million) was moved to the Enhancement Program, and other projects were either placed into "inspection only" mode, or moved to the R&R program.

F5.4 Projects were pulled from the WSIP because they did not meet Level of Service goals, or were deemed to be less critical than other projects that are at risk of failure or could not go out of service in order to be repaired because of a lack of redundant systems.

F5.5 In recent years, the funding for the R&R program has been in the range of $25 million to $30 million per year. However, fully funding the R&R program would require $60 million to $70 million per year. This is in contrast to the WSIP program, which is currently fully funded. Thus, moving projects to the R&R program can delay their implementation due to a lack of funding. However, each project is assessed separately.

F5.6 Within the capital program, the identification of which projects are included in the WSIP, which projects are included in the R&R program, and which projects are included in the Enhancement program can be confusing. This is exacerbated by the overlap in funding sources utilized by each of these programs.

F5.7 Moving a project from the WSIP to either the R&R program or the Enhancement program simply shifts the cost of the improvement from one PUC Water Enterprise program to another.

- If a project is moved to the R&R program, then its capital cost is paid for directly from annual water system operating revenues, i.e. water rates.

- If a project is moved to the Enhancement Program, and the project proceeds, then we assume that its capital cost likely would be paid from bond funds, which would result in an increase in annual debt service costs. The net effect on PUC's finances would be the same as issuing additional debt for the WSIP.

Recommendations

Given that PUC approved a dramatic increase in the estimated cost of the WSIP in November 2005, the agency may be reluctant to increase the size of the program again in the future, if program's cost estimate rises. This raises the issue of "affordability," which was discussed in the Committee's 2006 Financial Review.

In our 2006 Report, we noted that many WSIP projects face significant uncertainty with regard to project scope and schedule, both of which could significantly affect a project's final cost. Although PUC has built a substantial amount of Contingency funding throughout the WSIP budget ($454 million in construction estimate contingency and $225 million in construction cost contingency), it is still quite early in the life of the WSIP, and several factors could cause the overall $3.7 Billion WSIP budget (excluding financing costs) to come under pressure. Many of these were discussed in the Parsons/CH2M Hill "Program Assessment Report" (October 21, 2005). These include:

- *Scope, schedule and associated cost changes driven by changes in policy.* Although extensive work and public outreach was undertaken to devise the 2005 Level of Service goals that drive the scope of WSIP, there is the risk that changes in policy, which could in turn be prompted by changes in the political environment or other factors, could cause these goals to be changed in the future. Our understanding is that a significant change in a key Level of Service goal could produce substantial changes to the program's scope, schedule and cost.

- *Scope changes, and associated cost changes, associated with increasingly detailed project designs.* Typically, cost estimates become more precise as a project progresses through the design phase. As a result, at this time, the project cost estimates associated with the majority of WSIP projects still reflect a significant degree of uncertainty.

  In the November 2005 WSIP, the PUC addressed this issue by including large construction estimate contingency factors in many project budgets, which varied depending upon each project's current phase of development. These range from 25% to 40% for projects in Pre-Planning, 20% to 35% for projects in Alternative Analysis, 15% to 30% for those in Conceptual Engineering, and 10% to 20% for those at the Midpoint of Design.

  These contingency factors are much higher than what PUC had previously used, and are based in part on analyses by Parsons/CH2MHill of the contingency factors used by other large water improvement programs in the country. The open question is whether in aggregate, the contingencies will provide enough cushion to keep the program as a whole within the November 2005 budget by the time all projects have completed design.

- *Schedule changes and associated cost changes due to environmental review processes.* As the Parsons/CH2MHill Report indicates, the Programmatic EIR "is the most significant risk factor" to the program's schedule, and the schedule "presents the single greatest risk to the delivery of this program." (page ES-8). The PEIR creates the critical path for most of the large WSIP projects, and continued delays in its completion would impact the program's currently adopted schedule and budget.

  To the extent that the program's schedule, or one or more major project schedules, slips due to delays in the environmental review process, construction cost estimates would be escalated by approximately 3.5% per year or by the appropriate escalation factor in use at that time.

  On a WSIP construction budget of approximately $2.146 Billion, using a back-of-the-envelope calculation, a one-year delay in the program would result in an extra 3.5% in escalation, which translates into about $75.1 Million in

additional construction cost. And this assumes that the 3.5% escalation factor does not underestimate the actual impact of construction cost inflation.

- *Timing and cost impacts associated with the need for right of way or easement acquisition.* In certain cases, projects require right of way acquisition before they can proceed. For example, the San Joaquin Pipeline No. 4 faces power line and farm land encroachment issues affecting its right of way. In 2005, Parsons/CH2MHill indicated that these issues could take four years to assess, negotiate and litigate (page 4-7).

- *Changes in scope and/or schedule due to unforeseen conditions or weather-related delays encountered during construction.* Obviously, weather can play havoc with construction schedules. Construction schedules usually include a specific number of "weather days" of float. The *El Nino* season of 1998 used up all of the weather days for many SFO construction projects, even though the construction program was not scheduled to be completed until 2000.

  In addition, there is the potential for unforeseen conditions – conditions that do not become apparent until construction is in progress, and are not incorporated into design phase cost estimates -- to arise, such as in connection with the replacement or rehabilitation aging infrastructure. Our understanding is that PUC has built a 10% construction contingency into its project budgets specifically for unforeseen conditions.

Early on in the life of the WSIP, proposed budget changes will be funded from on each project's own contingency reserves, leaving the rest of the Program's budget unaffected. Over time, however, increases in a project's budget may be above and beyond the project's own contingency reserves. That raises the question of how such budget changes would be funded. One possibility is from transfers from another WSIP project. So long as a set of projects are coming in under budget, that approach provides a feasible funding strategy.

- But at some point, PUC may face the choice of whether to scale back the scope of one or more projects, or to increase the overall budget of the WSIP program. And that raises the question of how PUC will determine what level of changes are affordable.

The Parsons/CH2MHill Report framed this issue another way, when they recommended that the PUC undertake a WSIP "project prioritization." This is a key issue that the RBOC should keep in mind as it reviews the findings from the 2007 WSIP Risk Assessment that recently has been released. Also, based on the current appropriations language approved by the Board of Supervisors, budget transfers within a subregion do not require Board action, but budget transfers from one subregion to another, or to and from certain stand alone projects, do require Board action.

If the PUC is intent upon keeping the bottom line of the WSIP unchanged going forward, then one way they may seek to manage the WSIP program is to delay certain "less essential" projects, or to shift projects out of the WSIP to another Water Enterprise program. As a result:

R5.1 We recommend that the RBOC review a copy of the current AB1823 report (now available on PUC's website), and all future reports in order to stay abreast of the changes to the WSIP program.

R5.2 We recommend that the RBOC request that PUC management commit to include an explanation in its quarterly WSIP reports regarding any project that are removed from the WSIP in the future, including a discussion of why the project was removed, and its disposition (e.g. moved to R&R program as a funded project, or delayed indefinitely, etc…).

R5.3 We recommend that the RBOC ask for a presentation from the PUC Deputy General Manager, or other appropriate staff, on the capital program and how its different components (WSIP, R&R, and Enhancement) relate to each other.