REPORT OF

THE

STATE AUDITOR

Contract Management
Highway Design and Construction Projects

Performance Audit
May 2004

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May 12, 2004

Members of the Legislative Audit Committee:

This report contains the results of a performance audit of the Colorado Department of Transportation's contract management practices for public bridge and highway transportation projects. The audit was conducted pursuant to Section 2-3-103, C.R.S., which authorizes the State Auditor to conduct audits of all departments, institutions, and agencies of state government. The report presents our findings, conclusions, and recommendations, and the responses of the Department of Transportation.

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OFFICE OF THE STATE AUDITOR **REPORT SUMMARY**

JOANNE HILL, CPA
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Contract Management
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Authority, Purpose, and Scope

This performance audit was conducted under the authority of Section 2-3-103, C.R.S., which authorizes the Office of the State Auditor to conduct performance audits of all departments, institutions, and agencies of state government. The audit reviewed the Department of Transportation's contract management practices for public bridge and highway transportation projects. The audit work, performed from August 2003 through February 2004, was conducted in accordance with generally accepted government accounting standards. We acknowledge the assistance and cooperation extended by management and staff at the Department of Transportation.

Background

The Colorado Department of Transportation (Department) designs, constructs, and maintains state highways throughout Colorado. During Fiscal Year 2003 the Department spent $769.3 million on engineering consulting and construction services purchased from private contractors, representing 64 percent of the Department's total expenditures of $1.2 billion. The Department enters into contracts with private firms for work on highway and bridge transportation projects. First, the Department contracts with professional engineering consultants (consultants) to perform design, materials testing, and other engineering-related services. In Fiscal Year 2003 the Department spent $140.9 million on consultant contracts and contracted out 72 percent of its design work and 64 percent of its materials testing and other engineering-related services. Second, the Department contracts with private construction companies (contractors) to build highways and bridges. In Fiscal Year 2003 the Department spent $628.4 million on construction contracts.

Summary of Audit Findings

Project Costs

We reviewed the Department's methods for managing cash flows and costs for consultant and construction contracts and found:

C **Surplus funds are not released in a timely manner.** We reviewed 17 of the almost 600 construction projects that were closed in Fiscal Year 2003 and found that it took the Department an average of 663 days, or almost two years from the final acceptance date, to close these projects. We also found that 11 of the 17 projects (65 percent) had surplus funds totaling more than $4.3 million. For all 11 projects, the regions retained the full amount of surplus funds after project acceptance, rather than retaining only the amount needed for final payment. As a result, the $4.3 million sat unused for almost two years when the dollars could have been reallocated to other projects.

- **Some claims payments need further scrutiny**. Claims in excess of $250,000 must be reported to the Department's Division of Audit and reviewed for reasonableness. We identified three claims with a combined total of $10.6 million that were not reported to the Division. On average, the Division's reviews have recommended that claims be reduced by 77 percent. If the auditors review the three unreported claims and recommend similar reductions, the $10.6 million in claims may be reduced by as much as $8.1 million.

- **Some contract modification order (CMO) costs are not justified.** If a contractor's proposed price for additional labor or materials is not within 10 percent of the price in the Department's Cost Data Book, justification must be provided. We found that for 32 of the 37 items (87 percent) reviewed, the contractor's proposed and accepted price was not within 10 percent of the Cost Data Book price and did not include the appropriate cost justification. For 14 of the 32 items (44 percent), the contractor's proposed prices were, in total, almost $403,000 higher than the Cost Data Book prices.

- **Accuracy of project plans and cost estimates could be improved.** We reviewed the Department's plans and specifications for construction projects and found that, for projects awarded during Fiscal Years 2002 and 2003, more than half required revisions after advertisement, causing delays in bid openings for some projects. In addition, we reviewed the Department's cost estimates and found that for 64 percent of the construction contracts awarded between January and September 2003, cost estimates averaged 17 percent higher than the low bid. Currently the Department does not track trends or analyze data on project revisions or cost estimate variances to improve its design review process and the accuracy of its cost estimates.

- **The Department does not adequately review the basis for indirect costs paid on consultant contracts.** We estimate that the State will spend approximately $326.6 million on indirect costs for the 162 consultant contracts active at the end of Fiscal Year 2003. We reviewed the Department's methods for evaluating indirect costs and found that (1) the Department has neither defined "reasonable costs" nor established criteria for including or excluding costs based on their reasonableness and (2) the Department does not require consulting firms to provide detailed cost information to support their indirect cost schedules. Rising indirect costs have been, at least partly, attributed to increases in executive compensation paid to owners, principals, and executives of consulting firms. The Department's pre-contract audit does limited review of executive compensation and does not require consulting firms to provide documentation to support these costs. As a result, the Department may be paying higher indirect costs than it should be.

- **Staff do not consistently complete independent work hour estimates for task orders.** The Department uses independent work hour estimates to provide a benchmark by which Department staff can evaluate consultants' proposed work hours for reasonableness. We reviewed 54 task orders from a sample of 17 consultant contracts. Of the 54 task orders, 53 were issued without an independent work hour estimate. The final contract cost of these 53 task orders was $11.5 million.

- **Consultant contracting timelines are lengthy.** We reviewed the timeliness of the Department's consultant contracting process and found that in Fiscal Year 2001 the average time to complete basic consultant contracts was approximately 11 weeks. This average increased to around 13 weeks in Fiscal Year 2002 and 21 weeks in Fiscal Year 2003. Lengthy contracting timelines unnecessarily delay the start of work on projects and adversely impact the Department's ability to effectively manage project resources and promote fiscal accountability.

Project Quality

The Department monitors quality in construction contracts by ensuring projects are built with high-quality materials and in accordance with specifications. It also uses the prequalification process to review the qualifications and capacity of construction contractors before allowing them to bid on contracts. The Department ensures consultant service quality by reviewing qualifications and selecting the most highly qualified firm for the project. We reviewed the Department's quality assurance mechanisms and noted:

- **Weaknesses in some quality assurance processes exist.** We reviewed the Department's construction quality assurance activities and found that materials testing and independent assurance tests were not completed as required. Specifically, we found that required materials tests were not completed for 19 of the 153 (12 percent) items in our sample. We also found that 10 of the 26 (38 percent) required independent assurance tests were not completed. In addition, the five interregion peer reviews completed in Fiscal Year 2003 lacked sufficient detail to conclude on the quality of the project or the effectiveness of the construction management process.

- **Contractor past performance should be considered in prequalification.** We found the Department does not consider a contractor's past performance on Department projects because staff do not conduct performance evaluations at the conclusion of projects.

- **Qualification-based consultant selection process needs improvement.** We reviewed the Department's qualification-based selection process and found the Department does not ensure that (1) consultant evaluations are completed on a regular or consistent basis so that past performance on state contracts can be considered during the selection process, (2) consultants meet their commitments to contract a certain percentage of work with disadvantaged business enterprises, and (3) consultant debriefings on project proposals are conducted timely in accordance with federal regulations.

- **Project management strategy was not effectively implemented.** We reviewed the Department's Total Project Leadership (TPL) management approach and found that the Department did not adequately plan for and establish an infrastructure for implementing TPL effectively. Specifically, the Department did not assess staff project management skill levels, nor did it develop a training curriculum to address skill deficiencies prior to implementing TPL. Although staff have identified concerns, such as a loss of subject matter expertise among project staff, the Department has not taken steps to address these problems, nor has it developed measures to track TPL's success.

Administration

Accountability and information systems are crucial to the effective contract management of design and construction projects. In this audit, as well as prior audits dating back to 1996, we found the Department continues to lack information necessary to effectively manage its operations. Our findings include:

- **Information management systems need to be improved.** We reviewed the various information management systems that the Department has in place, as well as the accuracy and completeness of data maintained in those systems. We noted problems with the accessibility, accuracy, and completeness of information maintained in the Department's systems. As a result, the Department lacks the fundamental tools to oversee the nearly $700 million it invests in design and construction projects.

- **Criteria to help staff identify the best type of contract for a project have not been developed.** The type of contract selected should ultimately depend on the nature of the project (e.g., resurfacing, corridor reconstruction, bridge construction) and the established delivery goals (e.g., cost, timeline, quality). We reviewed the Department's consultant and construction contracts and found that the Department lacks criteria to help staff identify the best type of contract that will achieve project goals and provide the best value for the State.

Our recommendations and the responses of the Department of Transportation can be found in the Recommendation Locator.

RECOMMENDATION LOCATOR
All recommendations are addressed to the Department of Transportation

Rec. No.	Page No.	Recommendation Summary	Agency Response	Implementation Date
1	17	Ensure projects are closed in a timely manner and surplus funds are released by expediting the submission of forms, retaining only the estimated final payment amount, and releasing any other surplus funds.	Agree	December 31, 2004
2	19	Improve the claims tracking system, notify the Division of Audit of all claims over $250,000, and notify the FHWA of claims as appropriate.	Agree	July 2005
3	21	Improve the Contract Modification Order review process by ensuring staff provide cost justification documentation and establishing tiered approval levels.	Agree	April 2005
4	24	Mitigate the number of revisions issued on construction projects prior to bid opening and improve the accuracy of engineering cost estimates by tracking revisions, modifying pre-advertisement design review processes, analyzing cost estimates and low bid pricing, and revising cost-estimating processes.	Agree	July 2005
5	27	Improve management of indirect cost rates by defining clear criteria to determine the reasonableness of consultants' proposed costs and for reviewing executive salaries and bonuses included in the rate.	Agree	April 2005
6	30	Verify and substantiate indirect cost rates by requiring consultants to submit audited schedules of direct labor, fringe benefits, and general overhead and supporting documentation when appropriate and developing an audit program to conduct quality assurance reviews of CPA reports and indirect cost rate audits.	Agree	June 2005
7	32	Improve efforts to control the costs of task orders by completing independent work hour estimates for consultant contracts, requiring headquarters staff to review estimates prior to task order execution, and providing training to staff.	Agree	September 2004

RECOMMENDATION LOCATOR
All recommendations are addressed to the Department of Transportation

Rec. No.	Page No.	Recommendation Summary	Agency Response	Implementation Date
8	35	Improve the timeliness of the consultant contracting process by evaluating the reasonableness of existing timeline goals and interim deadlines, reviewing indirect cost rates separate from the contracting process, working with the Attorney General's Office to develop standard contracts, and developing standard contract review checklists.	Agree	January 2005
9	38	Develop and implement agencywide criteria for the effective use of consultant services contracts and allocation of in-house staff resources.	Agree	December 2005
10	40	Revise the construction project bonding requirements to ensure that bond amounts are sufficient to cover the total final cost of the construction project.	Agree	October 2004
11	43	Improve the quality assurance process by ensuring all materials and independent assurance tests are completed, monitoring the accuracy of testing schedules, and providing sufficient data through interregion peer reviews to conclude on project quality.	Agree	December 2004
12	45	Ensure contractors bidding on construction projects are qualified by developing an annual performance evaluation process and evaluating all of the prequalification criteria.	Agree	June 2006
13	48	Ensure the selection of qualified consultants by facilitating the use of performance evaluations, tracking and monitoring compliance with contract terms related to disadvantaged business enterprise goals, and improving the debriefing process.	Agree	July 2005

RECOMMENDATION LOCATOR
All recommendations are addressed to the Department of Transportation

Rec. No.	Page No.	Recommendation Summary	Agency Response	Implementation Date
14	51	Evaluate the effectiveness of Total Project Leadership by developing performance criteria, assessing the contract management skills and training needs of staff, and developing a training curriculum.	Agree	December 2005
15	55	Improve information management systems by developing a workplan that prioritizes IT projects, providing training to staff, verifying the accuracy of data in systems, and establishing deadlines for providing documentation to Central Files.	Agree	December 2005
16	57	Ensure that contracting methods selected for projects achieve project goals and provide the best value by evaluating current projects that use alternative types of contracts, developing criteria for use on selecting contracting methods, and evaluating whether various contract types are working as intended.	Agree	April 2005
17	59	Work with key management staff to maximize the effective use of available audit resources and expertise by clarifying responsibilities of the pre-audit function, requiring the Agreements Office to rely on audited costs, ensuring pre-audits comply with auditing standards, and considering integrating the pre-audit and final audit functions into one organization.	Agree	June 2005

Description of the Department of Transportation

Background

The Colorado Department of Transportation (Department) is responsible for constructing, operating, and maintaining over 9,000 miles of state highways throughout Colorado. The Department's mission is to provide the best multimodal transportation system for Colorado that most effectively moves people, goods, and information.

Policy and budgetary direction for Department activities is provided by the Transportation Commission (Commission), whose 11 members are appointed for a four-year term by the Governor with the consent of the State Senate. The Commission formulates general policy with regard to the management, construction, and maintenance of public highways and other transportation systems in the State. The Commission is also responsible for developing and supervising the Department's annual budget and determining the priority of construction projects throughout the State.

The Department consists of five organizational divisions under the authority of the Executive Director:

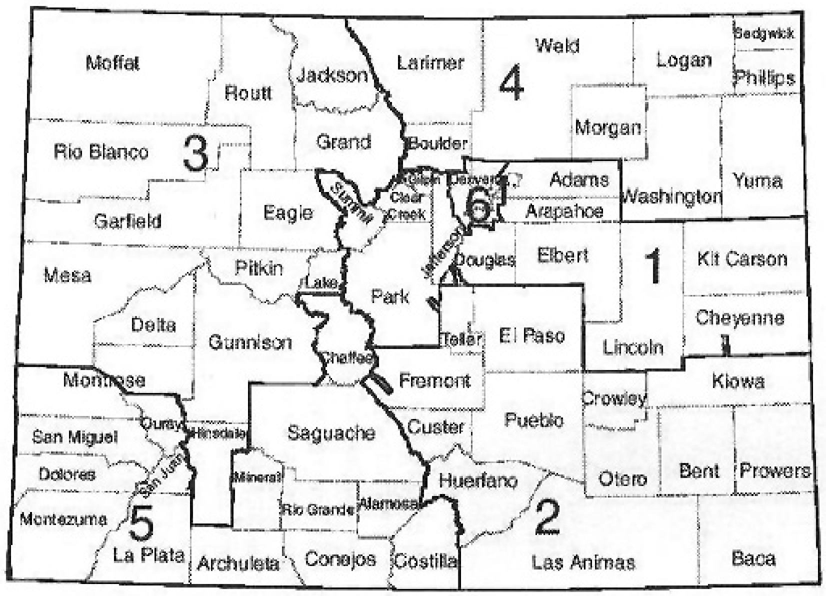
- Highway Operations and Maintenance
- Engineering, Design, and Construction
- Transportation Development
- Aeronautics
- Human Resources and Administration

The Department also has a Division of Audit, which reports to the Transportation Commission.

Transportation Services

Transportation services include the design, construction, and maintenance of highways located throughout the State. Colorado's transportation services are provided by the 3,300 FTE located at the Department's centralized headquarters unit in Denver and the six geographic transportation regions located across the State.

Department headquarters provides the central policy-making and oversight function, and the individual transportation regions are responsible for transportation planning and product delivery. The map below shows the six transportation regions.



Sections 43-1-109 and 110, C.R.S., establish the Office of Chief Engineer and designate the Chief Engineer as the chief administrative officer of the Department's Highway Operations and Maintenance Division and the Engineering, Design, and Construction Division. The Chief Engineer is subject to the direction and supervision of the Executive Director and oversees all engineering, design, and construction operations for the Department statewide.

The Chief Engineer oversees almost 300 FTE at headquarters who are responsible for developing policies and procedures for providing transportation services and managing contracts. In addition, headquarters staff serve as a resource for region staff and provide some centralized functions, such as administering the contracting process for both design and construction projects.

The Chief Engineer also oversees the Regional Transportation Directors and the more than 2,500 FTE employed at the six transportation regions. The regions each have their own business offices, materials testing, and other engineering specialty units, and are further subdivided into geographic areas for purposes of managing and overseeing project design and construction. Within the regions there is a hierarchy of engineers who are in charge of actual contract administration and project oversight. Each region has one to three Program Engineers who are responsible for high-level project oversight and contract administration including planning and budgeting. Under the Program Engineers are Resident Engineers who oversee several projects at once, but who also work more closely with the Project Engineers on the day-to-day supervision of projects. Finally, the Project Engineers are responsible for a majority of the day-to-day operations on the project site, overseeing contractors and consultants, and ensuring that projects are built to Department specifications.

Funding Sources

The State Highway Fund, which was created by Section 43-1-219, C.R.S., is the Department's primary source of revenue for funding highway-related design, construction, and maintenance costs. The Fund receives revenues from several sources, including the following:

- **Highway Users Tax Fund (HUTF) -** The HUTF receives monies primarily from excise taxes on motor fuel and motor vehicle registrations and other fees. The Department only receives a portion of the total funds included in the HUTF. These funds are also used to pay the highway-related expenditures of the Department of Revenue, Ports of Entry Division, and the Department of Public Safety. Cities and counties also receive a portion of HUTF funds.

- **Senate Bill 97-1 -** This legislation, as subsequently amended by House Bill 99-1206, authorizes permanent diversion of 10 percent of state sales and use tax revenues (e.g., General Fund monies) to the HUTF for transportation purposes. In order for Senate Bill 97-1 transfers to occur, the State must have enough revenues to meet its general fund appropriations for that year as well as to fulfill the statutory general fund reserve requirement. If these conditions are not met, the Department will not receive any Senate Bill 97-1 funds. The Department has not received any Senate Bill 97-1 funds since Fiscal Year 2002.

- **Transportation Revenue Anticipation Notes (TRANs) -** The Department received the authority under a voter-approved referendum to issue bonds to accelerate projects that are part of the Strategic Transportation Project Investment Program, referred to as the Strategic 28 or 7th Pot. The 7th Pot consists of about 28 projects throughout the State considered to be of the highest priority, including the Transportation Expansion Project or T-REX along the Southeast I-25 Corridor in Denver. The State matches 50 percent of the debt service and the other 50 percent is covered with federal funds. House Bill 99-1325, enacted in Section 43-4-703, C.R.S., established a maximum principal amount of $1.7 billion and a maximum repayment amount of $2.3 billion for the bonds, including interest. As of June 2003, approximately $1.4 billion in TRANs bonds had been issued.

- **Federal Appropriations** - The Transportation Equity Act for the 21st Century (TEA-21), which is administered by the Federal Highway Administration (FHWA), is the primary source of federal funds for transportation. TEA-21 is funded primarily through federal motor fuel taxes. These funds are provided to states for construction, reconstruction, resurfacing, restoration, rehabilitation, planning, traffic monitoring, and highway research for both the Interstate System and the National Highway System. Generally, at least a 20 percent state match is required for the State to receive federal funds for a project.

In Fiscal Year 2003 the Department received approximately $878 million in revenues and was appropriated about 3,300 FTE. The majority of the Department's revenues come through transfers from the Highway Users Tax Fund (HUTF) and matching federal-aid highway funds. As the table below shows, the Department's overall revenues decreased by almost 11 percent over the past five fiscal years. However revenues, without TRANS bonds, decreased by almost 14 percent. Revenues dropped almost 50 percent from Fiscal Years 2001 to 2003 due to a significant decrease in Senate Bill 97-1 transfers and TRANs bonds proceeds.

Department of Transportation Revenues by Revenue Sources Fiscal Years 1999 Through 2003 (In Millions of Dollars)							
Source	**1999**	**2000**	**2001**	**2002**	**2003**	**Percent Change 1999-2003**	**Funding Source as Percentage of Total FY 2003**
HUTF Transfers	$376.7	$397.7	$396.0	$404.3	$398.1	5.7%	45.3%
Senate Bill 97-1 Funds[1]	$171.9	$186.8	$197.2	$35.2	$0	-100.0%	0.0%
Federal Funds	$328.0	$364.1	$301.1	$317.0	$376.2	14.7%	42.8%
Other[2]	$107.3	$103.9	$137.9	$119.2	$74.1	-30.9%	8.5%
SUBTOTAL	$983.9	$1,052.5	$1,032.2	$875.7	$848.4	-13.8%	96.6%
TRANs Bonds	-	$538.9	$581.8	$264.2	$29.8	-94.5%[3]	3.4%
TOTAL	**$983.9**	**$1,591.4**	**$1,614.0**	**$1,139.9**	**$878.2**	**-10.7%**	**100.0%**
FTE	**3,297**	**3,297**	**3,297**	**3,297**	**3,301**	**0.1%**	

Source: Office of the State Auditor's analysis of COFRS data.
[1] Senate Bill 97-1 funds are transfers from the General Fund that flow through the Highway Users Tax Fund to the State Highway Fund.
[2] Other includes funds from the capital construction fund, the State Gaming Fund, interest earnings, and other miscellaneous sources, such as private grants.
[3] Percent change is calculated from 2000 to 2003.

Transportation Project Planning

As mentioned previously, statutes assign the Transportation Commission the responsibility for formulating general policy with respect to the management, construction, and maintenance of public highways and other transportation systems in the State. To meet this goal, the Transportation Commission works with the Department to develop the 20-Year Statewide Plan. The 20-Year Plan is developed from statewide and regional public planning processes and reflects a combination of transportation policies and strategic projects and priorities from regional transportation plans. The Statewide Transportation Improvement Program (STIP) documents the transportation projects included in the 20-Year Statewide Plan that the Transportation Commission intends to fund over the upcoming six years. To be eligible for inclusion on the STIP, projects must first be included in the Department's 20-Year Statewide Plan and must be approved by the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) if federal funds are to be used on the project. The STIP is updated every other year through a continuing and cooperative process involving the Department, FHWA, FTA, transportation regions, city and county governments, and the general public.

Audit Scope and Methodology

Our audit reviewed the Department of Transportation's processes for procuring and managing consultant and construction contracts for public bridge and highway transportation projects. During the audit, we reviewed files and data related to consultant and construction contracts and interviewed Department staff at headquarters and the transportation regions. In addition, we conducted a survey of design and construction contracting processes in seven other state departments of transportation, including Arizona, Florida, Kansas, Oregon, Texas, Utah, and Washington. We selected Florida and Arizona because they had been identified as best practices states and Texas because its transportation department is very decentralized. We selected the remaining states because they are of similar size or are in the same region as Colorado. Audit work was conducted from August 2003 through February 2004. We acknowledge the management and staff at the Department of Transportation and the transportation regions for their efforts and cooperation during the audit.

Project Costs

Chapter 1

Background

One of the Department's primary responsibilities is to oversee the design and construction of the State's highways and bridges. The Department contracts with private firms for the majority of the design work and almost all of the construction of state transportation projects. Consequently, contract management is a key Department activity, consuming significant staff resources.

The Department enters into contracts with private firms for work on highway and bridge transportation projects. First, the Department contracts with professional engineering firms (consultants) to perform design, materials testing, and other engineering-related services. The Department selects consultants on the basis of their competence and qualifications, as required by statutes. Once a qualified consultant is selected, statutes require the consultant's fee to be "fair and reasonable." Although the Department has used lump sum and cost plus fixed fee type contracts, the Department typically contracts using a specific per hour rate that includes direct labor, overhead, and profit on a majority of its consultant contracts. In Fiscal Year 2003 the Department contracted out 72 percent of its design work and 64 percent of its materials testing and other engineering-related services. The Department awarded 29 consultant contracts at a total value of $79 million and as of June 30, 2003, had 162 open and active consulting contracts totaling $604.9 million.

Second, the Department contracts with private construction companies (contractors) to build highways and bridges based on a unit price bid using estimated quantities for construction materials. Statutes require the Department to use a sealed, competitive bidding process to select the contractor bidding the lowest price. The Department awarded 206 construction contracts in Fiscal Year 2003 at a total value of $418 million.

Consultant and construction contracts are often multiyear contracts, which means that expenditures on a contract can occur over several years. Therefore, the amount awarded on contracts each year is not the same as the amount expended. The following table shows actual expenditures for consultant and construction contracts for the past five fiscal years.

Contract Expenditures Colorado Department of Transportation Fiscal Years 1999 Through 2003 (Dollars in Millions)									
	1999	**2000**	**Percent Change**	**2001**	**Percent Change**	**2002**	**Percent Change**	**2003**	**Percent Change**
Consultant Contracts	$102.6	$143.9	40.3%	$162.4	12.9%	$160.0	-1.5%	$140.9	-11.9%
Construction Contracts	$483.2	$518.8	7.4%	$567.9	9.5%	$663.1	16.8%	$628.4	-5.2%
Total	**$585.8**	**$662.7**	**13.1%**	**$730.3**	**10.2%**	**$823.1**	**12.7%**	**$769.3**	**-6.5%**
Source: Office of the State Auditor's analysis of Department of Transportation data.									

The table shows that during Fiscal Year 2003 the Department spent $769.3 million on engineering consulting and construction services purchased from private contractors. This represents 64 percent of the Department's total expenditures of $1.2 billion. These consulting and construction projects have a significant impact on Colorado's highway system, as well as on its economy and citizens.

This chapter discusses our review of the Department's methods for managing cash flows and costs for consultant and construction contracts. Our findings and recommendations follow.

Surplus Funds

According to Department and Federal Highway Administration (FHWA) procedures, construction projects should be closed within six months of the date the Department accepts a project as complete. When a project is closed, it means that all of the required paperwork has been submitted to the appropriate parties, no additional charges can be made against the project, and all final payments are issued. If a project has surplus funds, those funds can be released and reallocated to other projects. Surplus funds can also be released after project acceptance, but prior to closure, if the region retains sufficient funds to cover the final payment for the project and sets the funds aside in an escrow account.

We reviewed 17 of the almost 600 construction projects that were closed in Fiscal Year 2003 and found that it took an average of 663 days, or almost two years from the final acceptance date, to close these projects. Further, we found that 11 of the 17 projects (65 percent) in our sample had surplus funds totaling more than $4.3 million available after the projects were accepted by the Department. For all 11 projects, the regions retained the full amount of surplus funds after project acceptance, rather than retaining only the amount needed for final payment. As a result, the $4.3 million sat unused on these projects for almost two years when the dollars could have been reallocated to other projects.

We identified problems with efficient cash management in our 2000 and 2002 audits of the Department. We noted that the Department consistently maintained a monthly operating cash balance in excess of $200 million, raising concerns about whether cash was being used in the most efficient manner. We raise similar concerns about the Department's management of surplus funds.

According to the Department, contractors and region staff are not filing required paperwork on time, and both contractors and region staff are responsible for project closure delays. The Department needs to ensure that, after project acceptance, regions retain only the final payment amount and that they release excess funds for use on other projects. In addition, the Department should require contractors and region staff to submit final paperwork within the six-month time frame, and provide training on these requirements when appropriate. Timely paperwork submission should be included as an evaluation factor for contractors and region staff in project management positions. The Department should also consider other methods for ensuring that the appropriate paperwork is submitted in a timely manner such as retaining performance bonds, which are described later in this Chapter, for contractors who consistently fail to meet project closure timelines.

Recommendation No. 1:

The Department of Transportation should ensure that construction projects are closed in a timely manner and that surplus funds are released for use on other projects by:

a. Implementing measures to expedite the submission of forms required for project closure by both contractors and region staff. This may include providing training to region staff and contractors on project closure requirements, considering the timely submission of paperwork in contractor and staff evaluations, and retaining performance bonds for contractors who consistently fail to meet project closure timelines.

b. Establishing requirements and monitoring region practices to ensure they retain only the estimated final payment amount on projects and then release any surplus funds within six months of the date the project was accepted as complete by the Department.

Department of Transportation Response:

Agree. The Center for Accounting and the Staff Services Branch will work cooperatively with Regional Finals Engineers to identify ongoing issues related to project closure and the subsequent release of funds. Action will be taken to improve this process based upon issues identified. Training will also be provided as necessary.

Implementation Date: December 31, 2004.

Construction Costs

Statutes require the Department to award construction contracts to the lowest bidder, and the low bid amount establishes the initial cost of a project. However, Contract Modification Orders (CMOs) can significantly increase the total cost of a project. CMOs may result from a number of factors, including changes in the scope of work, an increase or decrease in amount or type of materials required, and increases in costs due to weather delays. CMOs also include contractor claims, which result when a contractor has a dispute with the Department regarding contract terms, scope of work, or other requirements. In Fiscal Years 2002 and 2003, CMOs increased the original cost of more than $1 billion in construction contracts by a total of $135 million, or about 14 percent. Costs related to contractor claims are discussed below. Costs related to CMOs, in general, are discussed in the next section.

Contractor Claims

A contractor files a claim when the contractor and the Department disagree about whether the scope of work, or the time required to complete the work, exceeds the amount defined in the contract. The Project Engineer is responsible for reviewing all claims and determining whether a claim should be paid and, if so, the payment amount. Claims in excess of $250,000 must be reported to the Department's Division of Audit and reviewed for reasonableness. According to the Department's construction manual, all claims on federal oversight projects and claims in excess of $250,000 on federal-aid projects must be reported and reviewed by FHWA. During Fiscal Year 2002, contractors filed 18 claims totaling $10.5 million. During Fiscal Year 2003, contractors filed 29 claims totaling $4 million.

We reviewed the Department's claims payment and settlement process and identified a number of problems. First, we identified three claims filed during Calendar Years 2001 and 2002 that exceeded $250,000, but were not reported to the Division of

Audit. These claims totaled $10.6 million. The Division of Audit reviewed three other claims totaling $2.8 million between Calendar Years 2002 and 2003. The auditors recommended that these claims be reduced by a total of $2.1 million, or 77 percent. If the auditors review the three unreported claims and recommend similar reductions, the $10.6 million in claims may be reduced by as much as $8.1 million.

Second, we identified two claims on federal oversight projects that were not reported to the FHWA for review prior to settlement. One claim was for about $93,000 and the other claim was for a 28-day project extension. Failure to report claims to the FHWA before settlement can potentially reduce the amount of federal reimbursement the State receives on the claims.

Third, we found the Department does not maintain data on the types of claims filed or the settlement amount. Claims may be settled for less than the original amount. Without information on the types of claims filed and their final settlement amounts, the Department cannot identify recurring problems with particular contractors or project managers and use this information to reduce the number and value of future claims.

The Department needs to improve its management of the claims payment and settlement process. At minimum, this should include improving its existing claims tracking process by including the number, nature, amount, and outcome of all claims filed with the Department. This information should be used to identify trends among contractors, regions, and the State as a whole. In addition, the Department should hold the regions accountable for notifying the Division of Audit and the FHWA of all appropriate claims.

Recommendation No. 2:

The Department of Transportation should improve management of the claims payment and settlement process by:

a. Improving its process for tracking the number, nature, total value, and final outcome of all claims that are filed with the Department. This information should be used to identify trends among contractors, regions, and the State as a whole, and to improve the claims review and payment process.

b. Holding region staff accountable for notifying the Division of Audit of all claims over $250,000 as required by Department policy.

c. Ensuring region staff notify the FHWA of all appropriate claims.

Department of Transportation Response:

Agree.

a. Due to the relatively small number of claims, CDOT does not do an in depth analysis to establish trends among Contractors and Regions, but the information is fairly obvious from the report. The report will be modified to include settlement amount. An increased number of claims may warrant creation of a more formal analysis process.

b. The Region Staff are required to report all claims to the Area Engineer (AE) in the Project Development Branch. The AE notifies Division of Audit if an audit is required. The reporting system will be modified to include an entry field for notification of Audit to serve as a reminder to Area Engineers.

c. The Region Staff are required to report all claims to the Area Engineer (AE) in the Project Development Branch. The AE prepares the quarterly report and submits a copy to FHWA. The Department will ensure the FHWA is notified about all claims.

Implementation Date: July 2005.

Contract Modification Orders

The Contract Modification Order (CMO) is a written order issued to the construction contractor, changing the terms of the original contract. As stated previously, CMOs cover alterations to the original plans and specifications, increases or decreases in the type or quantity of materials, increased costs due to extra work, and contingencies. The Department and the contractor must establish a fair and equitable price for contract modifications using the Department's Cost Data Book, which is updated annually and contains average unit prices for construction items and materials. If a contractor's proposed price is not within 10 percent of the Cost Data Book's price, the proposed price must be further justified in the CMO. The Project Engineer, as well as the Resident, Program, and Area Engineers assigned to a project, must review and approve all CMOs.

We reviewed a sample of 11 approved CMOs representing nearly $2 million in contract modifications for projects completed during Fiscal Years 2001 and 2002. For these 11 CMOs there were 37 items where the contractor's proposed and accepted price was not within plus or minus 10 percent of the Cost Data Book price.

We found that 32 of these 37 items (87 percent) did not include the appropriate cost justification. For 14 of the 32 items (44 percent), the contractors' proposed prices were, in total, almost $403,000 higher than the Cost Data Book prices. In one case, the contractor's proposed price was almost $288,000 more than the Cost Data Book price. The Department paid these higher prices without providing any justification that the price was reasonable.

We also evaluated the Department's multilevel review and approval process for CMOs. During Fiscal Years 2002 and 2003, Area Engineers—the fourth and highest level of CMO review—reviewed all 678 CMOs, regardless of the dollar value or complexity of the CMO. In contrast, four of the seven states we surveyed (Arizona, Texas, Utah, and Washington) have a tiered approval process based on CMO value and complexity. Washington requires high-level of review of only those CMOs in excess of $200,000 and Arizona requires high-level review of only those CMOs in excess of $250,000. Of the 678 CMOs processed by Department Area Engineers during Fiscal Years 2002 and 2003, only 74 (11 percent) had values exceeding $200,000.

The Department could streamline its review process, and reduce costs, by using a risk-based, tiered approval system. By limiting Area Engineer review to only those CMOs with high dollar values or complexity, CMOs with the greatest risk may be scrutinized more closely, and CMOs with less risk may be executed more quickly, avoiding construction delays. A 2003 internal Department audit made similar recommendations for improving review efficiency.

Since CMOs occur on most construction projects and may represent a sizeable portion of a project's overall cost, it is important that the Department's review and approval process minimize risks and errors from irregularities and ensure that all changes are appropriate and necessary. The Department should require that Project Engineers provide price justification, when necessary, before CMOs can be approved. Additionally, the Department should consider implementing a tiered approval process to expedite the review process and to ensure that CMOs requiring significant or complicated changes, as well as those with higher monetary value, receive a more detailed review by top project management.

Recommendation No. 3:

The Department of Transportation should improve its Contract Modification Order (CMO) review process by:

a. Ensuring that cost justification documentation be provided, when necessary, before a CMO is approved.

b. Establishing tiered approval levels based on the size, complexity, and monetary value of CMOs to reduce costs and expedite the approval process.

Department of Transportation Response:

Agree.

a. Providing cost justification is the responsibility of the Project Engineer and the Resident Engineer. It is clearly stated in the CDOT Construction Manual. Reminders can be delivered in the Annual Residency Visits conducted by Area Engineers of Project Development Branch. Improved methods of ensuring accountability as well as potential tiered approval process will be discussed with Region Program Engineers.

b. More formal criteria or tiers to govern Area Engineer involvement will be developed.

Implementation Dates: a. April 2005. b. September 2004.

Plan Revisions and Cost Estimates

Before publicly advertising a construction project for bid, Department staff prepare the project's plans, specifications, and cost estimates. At the point of advertisement, the plans and specifications for a project should accurately describe the location, design features, construction materials and estimated quantities, and other standard construction specifications in sufficient detail to facilitate bidding on and construction of the project. The cost estimates should provide a benchmark for determining whether bid prices are reasonable and whether adequate cost data exist to support award of the construction contract to the lowest responsible bidder.

We reviewed the Department's plans and specifications for the construction projects awarded during the past three years and found that a substantial percentage have required revision after advertisement, as shown in the following table.

Revisions to Construction Project Plans and Specifications Fiscal Years 2001 Through 2003			
Fiscal Year	**Number of Contracts Awarded**	**Percent Revised After Advertisement**	**Average Number of Revisions per Project[1]**
2001	154	47%	1.2
2002	164	65%	1.4
2003	206	53%	1.4

Source: Office of the State Auditor's analysis of Department of Transportation data.
[1]This figure pertains only to those construction projects where revisions occurred.

The table shows that more than half of the plans and specifications for construction contracts awarded during the past two years have required revisions. The number and types of revisions issued on a project are important indicators of design quality. A high number of revisions increases internal costs and could indicate problems and deficiencies with the project scope and the Department's pre-advertisement design review processes.

Additionally, plan revisions, if substantial, may cause a deferred bid opening. Our analysis showed that about 15 percent of the construction projects awarded during Fiscal Years 2001 through 2003 had deferred bid openings. We reviewed a sample of 13 projects that were revised after advertisement and found that 5 (38 percent) had deferred bid openings that delayed the start of construction for an average of 20 days.

We also reviewed the Department's cost estimates and found that for 64 percent of the construction contracts awarded between January and September 2003, cost estimates averaged 17 percent higher than the low bid. According to FHWA guidelines, if cost estimates consistently range 15 to 20 percent above the low bid price and there is not a shortage of available project work, contractors may become aware that Department estimates are not accurate and inflate their bids to secure a higher contract price.

Currently the Department does not track trends or analyze data on project revisions to improve its pre-advertisement review process. Further, the Department does limited analysis of the variances between its own cost estimates and the low project bid to improve the accuracy of its estimates. Systematic tracking and analysis needs to be an integral part of the Department's quality assurance system to ensure revisions to construction project plans and specifications are minimized and project cost estimates are sufficiently accurate to evaluate project bids.

Recommendation No. 4:

The Department of Transportation should mitigate the number of revisions issued on construction projects prior to the bid opening and improve the accuracy of its engineering cost estimates. More specifically, the Department should:

a. Systematically track and analyze the revisions issued on construction projects to identify the types of revisions and their causes.

b. Use the results of this analysis to modify pre-advertisement design review processes and target staff training to improve the accuracy and quality of construction project plans and specifications.

c. Analyze its cost estimates and low bid pricing to identify the reasons why low bids vary from the engineering cost estimates. At a minimum, the Department should conduct regular and systematic analysis of cost data.

d. Use the results of bid analyses to revise cost-estimating processes and procedures, focus communication between cost-estimating engineers and the project engineers regarding project details, and develop targeted training programs for cost-estimating engineers.

Department of Transportation Response:

Agree.

a, b. The Agreements Unit will track the revisions on construction projects while they are advertised. They will form a task force with Region personnel to develop a system to classify the revisions and to determine what type of data is to be tracked and reported. A quarterly report will be provided to management, the Regions, and to Staff. Specific required actions and implementation schedule are dependent upon results of analysis done on data gathered in response to recommendation 4.a.

c, d. A system will be developed to expand the current analysis of low bid variances, with periodic review to identify areas where significant variances occur most often. This information will be used to:

a) Focus the unit's efforts to improve the quality of the estimating process, b) Provide discussion points with project engineers when preparing estimates, and c) Provide input into the preparation of employees' training plans.

It will take several months of tracking data to be able to sufficiently identify trends to provide the focus called for. In addition, the estimating program has a new manager as of the beginning of May due to retirement of the previous manager. Additional time is being provided in the implementation time to allow him sufficient time to become familiar with the estimating procedure and the operations of the unit.

Implementation Dates: a. September 2004. b. July 2005. c and d. January 2005.

Consultant Fees

As stated previously, statutes require the Department to select consultants based on their qualifications. Once a qualified consultant is selected, statutes require the Department to negotiate fees that are ***fair and reasonable*** (emphasis added). The Department's Consultant Audit Unit reviews a consultant's proposed fees for fairness and reasonableness after the consultant has been selected, but before the start of formal contract negotiations.

Consultant fees include three cost components: indirect costs, direct costs, and profit. Indirect costs are often referred to as "overhead" and include those costs that cannot be directly associated with a particular project (e.g., salaries of managerial and administrative staff, benefits, rent, utilities, and workers' compensation insurance). Indirect costs (overhead) are established as a percentage of direct labor costs on a project. We estimate that the State will spend approximately $326.6 million in indirect costs, or 54 percent of total contract costs of $604.9 million, for the 162 consultant contracts active at the end of Fiscal Year 2003.

Direct costs include the actual costs of labor (e.g., salaries) for personnel assigned to the project and any nonlabor costs (e.g., travel, photocopying) that can be directly associated with and billed to a particular project. Finally, consultant contracts include a profit component equal to a percentage of the total direct and indirect costs on a project. On average, the Department pays about a 10 percent profit margin on consultant contracts.

We reviewed the Department's management of indirect cost rates in consultant contracts. We found that (1) the Department lacks criteria for determining that consultant indirect cost rates are reasonable and (2) the Department approves the proposed indirect cost rates with limited verification of the underlying charges.

Reasonableness Criteria

Section 31.201-3 of the Federal Acquisition Regulations (FAR) states that "a cost is reasonable if in its nature and amount, it does not exceed that which would be incurred by a prudent person in the conduct of competitive business." In addition, according to Section 31.201-3 of the FAR, states should not presume that the indirect cost rates proposed by consultants are reasonable. We reviewed the Department's methods for evaluating indirect costs and found that the Department has neither defined "reasonable costs" nor established criteria for including or excluding costs based on their reasonableness. As a result, the Department may be paying higher indirect cost rates than it should be.

The Department's Division of Audit recently reported that indirect cost rates have been increasing. The Audit Division has attributed the increases, in part, to the increases in executive compensation paid to owners, principals, and executives of consulting firms, which are recovered through the indirect cost rate on contracts. The auditors have recommended that the Department consider market rates when evaluating executive compensation, and that the Department scrutinize large executive bonuses, which can be paid from profits. Since the Department already pays an average profit percentage of 10 percent on consultant contracts, paying executive bonuses can result in paying profit twice: once in the profit percentage and, if bonuses are paid from profits, again through the indirect cost rate. The Department audit suggested that increased scrutiny of executive compensation could save as much as $1.6 million annually ($16 million over 10 years).

We requested salary and bonus information for the top ten salaried employees from a sample of five consulting firms. Two of the five firms did not supply us with any of the requested data. One of the firms provided us only with bonus data (i.e., this firm did not provide salary data). Only two of the firms supplied us with both salary and bonus data, as requested. The Department will work on obtaining information that was not provided to us during the audit.

We compared the salary and bonus data for the two firms supplying the requested information against market data collected by the Division of Audit. The Division has recommended that, on the basis of market data, principal-president salaries plus bonuses in excess of $162,500 be scrutinized further. The Department is currently evaluating this and other standards that could be used when reviewing executive compensation. For purposes of this analysis, however, we used the $162,500 standard and found that 16 of the 20 (80 percent) top-salaried employees at these two firms had base salaries plus bonuses in excess of this threshold. The average salary plus bonus was $244,720. In total, the salaries and bonuses for these 16 employees exceeded the threshold by $1.7 million.

We compared employee bonuses (without salaries) against the Division's $162,500 salary plus bonus threshold for the one firm providing only bonus information. Even without including salaries, we identified three employees whose bonuses alone exceeded the $162,500 threshold. Each bonus was $200,000.

We surveyed seven other state departments of transportation to determine if they had established criteria to define "reasonableness" and to determine whether they have established criteria related to executive compensation. We found that two states, Utah and Texas, had established "reasonableness" criteria for executive compensation. Utah does not reimburse any bonuses or incentives for key management officers. Texas reviews executive compensation on a case-by-case basis, but any allowable compensation over $200,000 must be disclosed along with justification in the notes to the firm's schedule of indirect costs.

The Department needs to establish criteria for reviewing executive compensation and define "reasonable costs" in general. This should include identifying those indirect costs that are generally recognized as ordinary and necessary for the conduct of competitive business or contract performance. This could also include conducting a market analysis to determine if a consultant's proposed costs are generally consistent with what the Department would expect to see had the selection been based on competitive pricing. The Department could also compare proposed indirect costs with those of other firms of the same size, in the same industry, in the same geographic area, and engaged in similar nongovernment work under comparable circumstances. In addition, the Department should maintain historical cost data for consultants so that any significant changes in a firm's indirect cost rate can be easily identified and reviewed for reasonableness.

Recommendation No. 5:

The Department of Transportation should improve its management of indirect cost rates to ensure costs are reasonable. More specifically, the Department should:

a. Define clear criteria to determine the reasonableness of consultants' proposed costs on consultant contracts. Criteria should be consistent with the cost principles established in the Federal Acquisition Regulations and audit procedures outlined in the American Association of State Highway Transportation Officials Audit Guide and FHWA regulations. At a minimum, this process should involve tracking and maintaining historical cost data for consultants that contract with the Department and conducting market comparisons.

b. Define clear criteria for reviewing executive salaries and bonuses included in the indirect cost rate. This should include comparing market rates for executive compensation, establishing reasonable cost thresholds, and excluding executive compensation above those thresholds without adequate justification.

Department of Transportation Response:

Agree.

a. The Department will continue to maintain cost data for consultants, and will establish a system of capturing historical consultant cost records, then will use the information to help determine fair and reasonable compensation. We will use a number of factors to assess fair and reasonable costs, and to establish a tiered analysis and decision process.

b. We will develop criteria for reviewing and reporting on executive salaries in the pre-contract audit evaluations. The criteria will include comparisons to market rates for use in determining reasonable costs.

Implementation Date: April 2005.

Cost Verification

The Department's Consultant Audit Unit reviews proposed cost schedules submitted by consulting firms and approves the indirect cost rate. We found that the Consultant Audit Unit does not consistently verify supporting data before establishing audited indirect cost rates. The Unit relies on highly summarized schedules of direct labor, fringe benefits, and general overhead prepared by independent certified public accounting (CPA) firms and, if these are not available, on self-reported schedules prepared by consultants. The Department requires consulting firms to provide limited detailed cost information to support their indirect cost schedules. Additionally, the Department does not require firms to provide a crosswalk from their indirect cost schedules to their audited financial statements to show how costs were derived. As stated earlier, indirect costs comprise roughly 50 percent of the contract. Therefore, it is important to determine that indirect costs are reasonable.

We performed a detailed review of the audited indirect cost rates and supporting documentation for a sample of five consulting firms under contract with the Department. The audited indirect cost rates for these five firms ranged from 147 to 174 percent of their total direct labor cost pools. We identified problems in the following areas:

- **Insufficient documentation.** Although all five sampled firms had an indirect cost schedule that had been audited by an independent certified public accounting firm, four of the firms provided only limited detailed financial documentation to support their audited indirect cost rates. One of the five consulting firms we reviewed did not provide any of the detailed financial documentation we requested. Documentation provided was not sufficient to determine whether the audited indirect cost rate was reasonable.

- **Indirect cost reconciliations.** We could not reconcile indirect costs to the audited financial statements for three of the four firms submitting documentation. Unreconciled indirect costs for these three firms totaled $625.5 million and represent each firm's total indirect cost pool, which is applied as a percentage to direct labor hours on specific contracts. Every time the Department purchases an hour of labor from these firms, it pays for a portion of these unreconciled costs. Because the Consultant Audit Unit does not consistently review supporting documentation, staff were not aware of these substantial differences and did not attempt to reconcile them. The Department will work with these consulting firms to address this problem.

- **Direct labor cost reconciliations.** The four firms in our sample submitting documentation had direct labor cost pools totaling $509.8 million. However, we could not reconcile direct costs to the audited financial statements for three of the four firms submitting documentation. The direct cost pools for these three firms totaled $407 million. This is a concern because understating direct labor costs could result in an overstatement of the indirect cost rate.

- **Documentation for indirect salary expenses.** None of the five firms in our sample could provide information (such as job title or operating component detail) to verify that the firm was charging salaries to overhead correctly. Indirect salary allocations totaled $258 million and represented 31 percent of the total indirect cost pool for these five firms. Since indirect salaries are a significant portion of the indirect cost expense, firms should be able to provide evidence that salaries have been charged appropriately.

It is clear that the Department does not have sufficient procedures to substantiate and scrutinize indirect cost rates prior to contracting with consultants. Consequently, the basis for the approximately $326.6 million in indirect costs that will be paid over the contract life on the 162 executed consultant contracts outstanding at the end of Fiscal Year 2003 is in question.

We contacted seven states (Arizona, Florida, Kansas, Oregon, Texas, Utah, and Washington) to determine the extent to which their pre-contract audit functions reviewed consultant indirect cost rates. We found that four of the seven states we contacted (Arizona, Florida, Oregon, and Washington) require consultants to submit an indirect cost schedule that has been audited by an independent CPA firm. However, these states also review all of the CPA audits for appropriateness and reasonableness and conduct regular quality assurance reviews of the CPA audits (e.g., examine working papers and other financial documentation used to prepare the CPA audit report). These states also conduct their own indirect cost audits of consultant rates when appropriate.

The Department needs to verify and substantiate indirect cost rates prior to contracting with consultants. This should include developing documentation requirements and pre-contract audit programs that are extensive and rigorous enough to provide the Department with assurance that proposed indirect costs are allowable and reasonable according to the established criteria, and to minimize the risks of errors and irregularities. When developing audit programs, the Department should consider best practices established by other states as well as guidelines established by the American Association of State Highway Transportation Officials Audit Guide.

Recommendation No. 6:

The Department of Transportation should adequately verify and substantiate indirect cost rates to ensure consultant fees are fair and reasonable. This should include:

a. Developing requirements that consultants and subconsultants who perform work on consultant contracts over a certain dollar threshold submit a schedule of direct labor, fringe benefits, and general overhead that has been audited by an independent CPA firm. For contracts under this threshold, the principal agent of the consulting firm should be required to certify a self-prepared schedule with supporting documentation. The Department should review all of these CPA firm audit reports and self-prepared indirect cost schedules for appropriateness and to identify areas where additional detailed supporting documentation and audit work is required. This detailed supporting documentation should include a copy of the firm's audited financial statements along with a crosswalk from the financial statements to the indirect cost schedules to show how costs were derived.

b. Developing and implementing an audit program to conduct quality assurance reviews of CPA firm audit reports and ensure that indirect cost rates are prepared in accordance with Department policy. Such reviews should be conducted at regular intervals on a sample basis according to predetermined risk factors such as the dollar value of the contract, results of final cost audits, or lack of concurrence on CPA audits from other federal or state transportation agencies.

c. Developing and implementing an audit program to conduct, on a sample basis, actual indirect cost rate audits at regular intervals according to predetermined risk factors.

Department of Transportation Response:

Agree.

a. The Department will develop criteria for obtaining accurate financial information from firms with contracts over a certain dollar amount. A review of recent contracting activity will be used to determine the appropriate level. Testing of the CPA audits and the self-prepared indirect cost schedules will be included in the audit reviews. The requirement of a CPA audit will be based on the reliability of the financial information received from the firm.

b. The Department will develop an audit program to conduct quality assurance reviews of CPA audit reports and assure that the indirect rates are prepared in accordance with Department policy. Reviews will be selected on the basis of risk factors such as those listed in the recommendation.

c. The Department will develop a program to conduct these audits. Selection will be according to risk-based criteria. The biggest issue is training staff to conduct these complex audits.

Implementation Date: a and b. December 2004. c. June 2005.

Independent Work Hour Estimates

Consultant contracts are generally paid on a labor per hour basis. The Department divides the contract into "tasks," and no work begins on the contract until the Department initiates a "task order." A task order provides a detailed description of the work to be performed and includes an estimate of the work hours required to perform the work. Consequently, the number of work hours assigned to each task order (which is then multiplied by the contracted hourly rate) is a significant driver in the cost of consultant contracts.

According to Department procedures, the contract administrator or his or her representative, typically the project manager, negotiates with the consultant on the number of work hours at the time a task order is issued. As part of this negotiation, the project manager must prepare a work hour estimate and analysis that is independent of the consultant's proposed work hours prior to issuing the task order authorizing the contract work. The purpose of the independent work hour estimate is to provide a benchmark by which Department staff can evaluate consultants' proposed work hours.

We reviewed 54 task orders from a sample of 17 consultant contracts. Of the 54 issued task orders, 53 (about 98 percent) were issued without a work hour estimate prepared by the Department. In each case, the Department issued the task order for the full amount included in the consultant's proposal. The final contract cost of these 53 task orders was $11.5 million.

An April 2001 internal Department audit also found that region staff were not completing independent work hour estimates and negotiating work hours with contractors prior to initiating a task order. Although staff we spoke with recognized the importance of completing independent work hour estimates for task orders, the Department does not monitor staff performance at the region level to make sure that estimates are actually completed and used for negotiations. Headquarters staff, who are responsible for approving contracts, indicated they have begun working with region staff to offer training courses for project managers on how to prepare and use independent work hour estimates on consultant contracts. Training courses such as these should be required of all staff in contract administration and management positions. In addition to training, headquarters staff should require regions to provide evidence that an independent work hour estimate was completed and utilized prior to approving and executing task orders.

Recommendation No. 7:

The Department of Transportation should improve efforts to control the costs of task orders by:

a. Implementing procedures and monitoring staff performance to ensure that those responsible for administering and managing the consultant contracts complete independent work hour estimates on task orders and use those estimates to review consultants' proposed work hours for appropriateness and reasonableness. Completion of independent work hour estimates should be considered in staff performance evaluations.

b. Requiring headquarters staff to review evidence from region staff that an independent work hour estimate was completed and used in contract negotiations prior to executing a task order on a consultant contract.

c. Continuing efforts to train the region staff responsible for contract administration and management on how to prepare and use independent work hour estimates on task order contracts.

Department of Transportation Response:

Agree. A task order request form will be developed to include all the information required to process a task order. The form will include both information to be filled in and a checklist of items to be included with the submittal. One of the items the form will require will be information to be filled in regarding the independent cost estimate, the consultant's original proposal, and the final amounts agreed on. The form will be developed with input from the regions. As this will be a new process that will directly affect the regions, it will be submitted for approval by the Chief Engineer and the Regional Transportation Directors. On-going training will continue and be improved. The relation between completion of independent cost estimates and employee evaluations, if implemented, would not be anticipated until April 2005, when performance plans are developed.

Implementation Date: September 2004.

Contracting Timeliness

The Department's goal is to obtain consultant contracts in the shortest time possible. To this end, the Department has established a performance goal of 10 weeks from the time the Chief Engineer approves a project for public advertisement until a consultant contract is executed. We reviewed the timeliness of the Department's consultant contracting process and found that the Department is not meeting established timeline goals. Lengthy contracting timelines unnecessarily delay the start and completion of projects. In addition, lengthy contracting timelines adversely affect the Department's ability to effectively manage project resources and promote fiscal accountability.

We reviewed Department data on consultant contracts processed during the last three fiscal years and found that in Fiscal Year 2001 the average time to complete basic consultant contracts was approximately 11 weeks. This average increased to around 13 weeks in Fiscal Year 2002 and 21 weeks in Fiscal Year 2003. However, we found that over this same time period, the number of basic contracts processed fell from 86 in Fiscal Year 2001, to 31 and 29 in Fiscal Years 2002 and 2003, respectively. Thus, while the average time to complete consultant contracts almost doubled, the number of contracts processed decreased by 66 percent. The Department was not able to provide data to explain these changes. On the basis of our review, we determined that the Department needs to make the following changes to improve the timeliness of the consultant contracting process:

- **Reassess interim and overall performance goals.** Department staff reported that the 10-week performance goal was set arbitrarily without evaluating how long each part of the contracting process actually takes to complete. We found that the 10-week goal may not be reasonable, considering the extensive nature of the current consultant contracting process.

- **Separate the pre-contract audit of indirect cost rates from the consultant contracting process.** As discussed previously, the Department reviews consultants' indirect cost rates through the pre-contract audit. The pre-contract audit is a component of the contracting process. To save on contracting time, the Department should explore ways to separate the review and audit of indirect cost rates from the actual consultant contracting process. For example, three of the seven departments of transportation in other states we contacted (Florida, Texas, and Utah) review and establish consultants' indirect cost rates on an annual basis apart from the actual contracting process. Thus, a consultant's indirect cost rate is on file prior to contract initiation.

- **Improve contract review process.** All consultant contracts must be reviewed by the Attorney General's Office before they can be fully executed. We determined that 35 of the 51 contracts (69 percent) rejected by the Attorney General's Office during Fiscal Year 2003 and the first quarter of Fiscal Year 2004 were rejected due to problems, such as incorrect or missing documentation or signatures, that should have been identified by the Department as part of its internal review process. We estimate that failing to identify errors in the consultant contracts prior to forwarding them for legal review unnecessarily adds about a week to the Department's contracting timeline. To expedite contract execution, the Department should continue to work with the Attorney General's Office to develop standard contract language for every contract. Once approved, contracts would no longer require the Attorney General's Office review, unless the contracts contained exceptions or unique circumstances. Additionally, the Department could develop a checklist of items that need internal review and approval to make sure all contracts are complete and meet all requirements before execution.

We recognize that selecting and negotiating a consultant contract with a qualified consultant takes time. However, lengthy consultant contracting timelines have an adverse impact on the Department's ability to start contract work when needed and to deliver transportation projects to the public in a timely manner. Delays affect the Department's credibility with customers and stakeholders. Region staff further stated that lengthy contracting timelines limit their ability to adapt their use of consultant services contracts to changes in project priorities or new funding opportunities.

Recommendation No. 8:

The Department of Transportation should improve the timeliness of the consultant contracting process by:

a. Evaluating the reasonableness of existing consultant contract timeline goals and interim deadlines. Reasonable goals should take into account the Department's current process and approach to procuring consultant contracts.

b. Reviewing and establishing consultants' indirect cost rates as part of an annual administrative process that is separate from the consultant contracting timeline.

c. Working with the Attorney General's Office to develop standard contract provisions to be included in all contracts, eliminating the need for the Attorney General's Office review of every contract before execution.

d. Developing and using standard contract review checklists to ensure the accuracy and completeness of consultant contracts prior to execution.

Department of Transportation Response:

Agree.

a. A draft of a rewrite of the contracting process manual has been completed and is now in the review stage. The manual will be sent to the regions and headquarters staff for review and comment, and their input will be considered in completing a final draft.

As part of the process review, the timeline goals for the various contracting processes will be examined for reasonableness and modified as necessary. The review will also examine the process to assure that there is value added in all steps of the process.

b. The Department has rewritten the basic consultant contract to update it. As part of this rewrite, a master-pricing contract process has been incorporated, which would establish the indirect rate for each consultant on an annual basis. This rate would then apply to all work the consultant has with the Department. The master-pricing contract has been written and has been reviewed with the consultant industry and received favorable response. Preliminary discussion with the State Controller's Office has indicated that this contract will be approved and given a waiver to eliminate Attorney General review of each contract. The waiver request is currently being written.

c. Over the past year, the Department has worked with the Attorney General's Office to rewrite the standard contracts for intergovernmental, consultant, and construction contracts. The intergovernmental contract has been approved and received a waiver. The consultant and construction contracts have been reviewed with the respective industries and are in final draft. These contracts have been discussed with the State Controller's Office, and the waiver requests are being drafted for submittal to the State Controller's Office.

d. The Agreements office will work with the Attorney General's Office to develop a checklist for contract preparation that will incorporate the main areas of concern. This document will be reviewed periodically, and will incorporate additional items that arise as common problems in processing contracts.

Implementation Dates: a. January 2005. b, c and d. July 2004.

Consultant Utilization

Currently the Department makes extensive use of consultant contracts. As the following table shows, the Department has contracted for over 70 percent of its design work and over 50 percent of its construction management work during the past two years. The balance of work was performed using Department staff resources.

Utilization of Consultants Percent of Total Service Costs Performed by the Department and by Consultants by Type of Service Fiscal Years 2002 and 2003			
Fiscal Year	**Type of Service**	**Percent Performed by Department Staff**	**Percent Performed by Consultant Contractors**
2002	Design Work	21%	79%
	Construction Management	36%	64%
2003	Design Work	28%	72%
	Construction Management	44%	56%
Source: Department of Transportation data.			

Section 24-50-503, C.R.S., requires state agencies to make cost comparisons when contracting for personal services. A cost comparison is a good contract management practice used by other states and recommended by the federal government. Our audit found that the Department has not analyzed the cost of outsourcing consultant services compared with the cost of completing the same projects in-house. Further, the Department has not established criteria for determining when the use of contractual consulting services is most cost-effective. The Department had 162 active consultant contracts at the end of Fiscal Year 2003 valued at a total of $604.9 million. Although this amount represents a significant expenditure for the State, the Department has no data showing that contracting for these services is the most appropriate option.

Other states have performed studies indicating that using consultants costs state departments of transportation more than performing the work with in-house staff. A Mississippi study found that costs for engineering and inspection services using state personnel averaged nearly 7 percent lower than the costs of similar services provided under contract with consultants. A Nebraska study estimated that 25 to 39 percent less money could be spent overall by targeting design work in-house.

We reviewed the costs associated with providing design and construction management services by consultants and Department staff. As mentioned previously, consultant fees include three cost components: direct costs, indirect costs, and profit. We found that direct labor costs are about the same for Department and contractor staff with similar qualifications and skills. In addition, we estimate that indirect costs represent about 54 percent of the total cost of consultant contracts. We found, however, that the Department has not calculated its own indirect costs and lacks the data necessary to determine the full cost of completing design work in-house. To compare Department costs with consultant costs, the Department needs to calculate its own indirect cost rate and include all appropriate costs such as depreciation and infrastructure expense. Finally, consultant contracts also include a profit component which is typically about 10 percent of the direct and indirect costs. The Department does not incur this cost when completing projects using in-house staff.

Once the Department has valid costs for comparison, it should consider other factors that may also contribute to evaluating the cost effectiveness of consultant services. There may be instances where consultants can address fluctuating workloads more effectively than in-house staff. When workloads increase temporarily, consultants can fill the gap. When workloads decline, consultant service levels may be easily reduced. Unlike state employees, there are no issues with hiring and laying off staff. Second, some highway construction projects require specialized expertise that the Department does not have. It would not be cost-effective for the Department to acquire expertise that it needs only periodically. Finally, consultants may be able to complete certain tasks more efficiently. For example, it is possible that some consultants with specialized expertise may be able to complete tasks in fewer hours than Department staff with generalized expertise. If so, the final cost for using the consultant may not be any higher, overall, than using Department staff.

The Department develops an annual consultant usage plan that tracks information on where and how consultant contract dollars have been spent. However, the plan does not project future consultant usage on the basis of specific criteria such as the availability of in-house resources, the need for specialized expertise, fluctuating workloads, or costs. These factors are important considerations in determining whether to outsource for services, or whether the decision to outsource is cost-beneficial.

We recognize the need for the Department to supplement its workforce with specialized experts to successfully deliver bridge and highway transportation projects to the public. In many instances, the additional cost of using a consultant contract to perform design or other engineering-related work may be justified. However, without agencywide criteria on the use of consultant services contracts and an evaluation of the cost of consultant services when compared with those provided by employees in the state personnel system, the Department cannot effectively plan and manage consultant contracting activities or allocate in-house staff resources in a manner that maximizes available project dollars.

Recommendation No. 9:

The Department of Transportation should develop and implement agencywide criteria for the effective use of consultant services contracts and allocation of in-house staff resources. To assist in developing these criteria, the Department should calculate its own indirect costs associated with design and construction management work. The Department should use this information to complete a formal comparison of the cost of work completed by contracted consultants versus the cost of similar work completed using Department staff resources and consider this information in its outsourcing decisions.

Department of Transportation Response:

Agree. CDOT Program Engineers are in the middle of developing a method of determining, documenting, and communicating staffing needs for active and upcoming projects. CDOT Region Directors are working with the Chief Engineer to identify Critical Functions and related staffing needs as part of CDOT's Performance Measurement System. A merger of these two efforts will help set criteria on the decision process regarding use of consultant services. Cost will be one factor in the decision process.

Implementation Date: December 2005.

Construction Bonds

According to the Department's highway and bridge bidding and construction rules, the low bidder awarded a construction contract must furnish two surety bonds—a payment bond and a performance bond. The payment bond is meant to ensure that the contractor pays for all labor, materials, and other supplies used on the project. The performance bond is meant to ensure that the contractor performs its duties and obligations under the contract. Department rules set the amount of each bond in accordance with the original contract price.

We reviewed the Department's bonding process and found that bond amounts are not revised when the construction project contracts are modified or amended to include additional increased project costs. As a result, if a contractor fails to meet the terms of its contract, the State will not be able to recover the full cost of the project from the bonds. The final contract price exceeded the original contract price by 14 percent for contracts completed during Fiscal Years 2002 and 2003. This equates to an additional $135 million in construction bonds that should be required.

Recommendation No. 10:

The Department of Transportation should revise its construction project bonding requirements to ensure that bond amounts are sufficient to cover the total final cost of the construction project in those instances when the project costs increase beyond the original contract amount.

Department of Transportation Response:

Agree. The Department specifies the form of the bonds to be provided by the contractor. The Department is currently working with the Attorney General's Office and the bonding industry to update the bond forms. This issue will be addressed with the bonding industry to assure that the bond covers the risks associated with change order work.

Implementation Date: October 2004.

Project Quality

Chapter 2

Background

Contracts are a critical component of the Department's efforts to deliver high-quality design and construction products. The Department monitors quality in construction contracts by ensuring projects are built with high-quality materials and in accordance with specifications. It reviews the quality of projects by conducting interregion peer reviews after projects are complete. It also uses the prequalification process to review the qualifications and capacity of construction contractors before allowing them to bid on contracts.

The Department ensures consultant service quality by reviewing qualifications and selecting the most highly qualified firm for the project. The Department uses a project management system, Total Project Leadership (TPL), to manage all phases of design and construction projects effectively.

Construction Quality

Our audit reviewed three mechanisms the Department uses to ensure the quality of construction projects:

- **Materials testing.** The Department conducts materials testing to make sure contractors construct their projects in accordance with the materials and specifications contained in the bid packet prepared by the Department. The Department develops a schedule for testing materials at key points in the construction project. The Department's Field Materials Manual states that the testing schedule represents the minimum frequency necessary to control the quality of project materials and completed work. We reviewed nine projects completed during Fiscal Year 2003 and identified a total of 153 materials items scheduled for testing. We found that the required tests were not completed for 19 of the 153 items (12 percent). Further, we found no justification for eliminating the tests from the prescribed schedule, as required by Department policy.

- **Independent Assurance Testing.** The Department conducts independent assurance testing to monitor the quality of materials testing. Independent assurance tests ensure that all materials testing is conducted with appropriate equipment and in accordance with standards. Each region develops a schedule for conducting independent assurance tests on every construction project. Our audit reviewed 26 independent assurance tests scheduled for 8 projects. We found that 10 of the 26 scheduled tests (38 percent) were not completed as required.

- **Interregion Peer Reviews.** The Department conducts interregion peer reviews to evaluate the quality of construction projects once they are substantially complete. We reviewed five of the six peer reviews completed during Fiscal Year 2003. The Department misplaced the sixth peer review and was unable to provide it to us. We found that, overall, peer review assessments lacked sufficient detail to conclude on the quality of the project or the effectiveness of the construction management process. Assessment results were not compiled and analyzed to identify best practices or areas for improvement. Additionally, one project that was selected did not meet the Department's criteria for inclusion in the peer review process.

The Department needs to take the following steps to ensure that contractors meet their obligations to deliver quality products. First, the Department needs to improve its monitoring and tracking of materials and independent assurance testing to make sure testing is conducted according to schedules and guidelines established in contracts. Monitoring procedures should include reviewing variances from testing schedules to ensure all changes are documented and justified. This is important because many of the materials and independent assurance tests must be completed at specific points in the project or they cannot be completed at all. For example, the Department cannot test the quality of a concrete roadbed after applying the resurfacing material without destroying the road surface.

Second, the Department should improve its management of interregion peer reviews. Projects should be sufficiently complete before undergoing peer reviews, and assessment guidelines should be strengthened to make sure sufficient detail is provided in assessment reports to conclude on the quality of the project. The peer reviews should be compiled and analyzed by the Department to identify common problems and best practices. Problems can be addressed by strengthening controls and improving staff training.

Recommendation No. 11:

The Department of Transportation should improve its quality assurance process to ensure that construction projects are built in accordance with contract specifications by:

a. Holding Project and Resident Engineers accountable for overseeing the materials testing and independent assurance processes and ensuring that the appropriate number of tests specified by the materials and independent assurance testing schedules are completed.

b. Improving the monitoring and tracking of materials and independent assurance testing to ensure appropriate tests are completed. This should include identifying problems and trends by region or staff and providing training or taking appropriate corrective action as indicated.

c. Ensuring interregion peer reviews provide sufficient data to conclude on project quality. Results should be compiled and analyzed to ensure maximum value from the review process.

Department of Transportation Response:

Agree. The Project Engineers and Resident Engineers are responsible for this task. To increase accountability and strengthen our Quality Assurance processes, discussions will be held with Region Program Engineers to identify the best solution. Possibilities include establishing IPO's in Project Engineer Performance Plans and/or development of a quarterly tracking report, similar to existing claims reports.

The Department will establish a process for review of results from multiple inter-region reviews. Most likely will result in a presentation and discussion at a quarterly Program Engineer meeting and at the Annual Resident Engineer meeting.

Implementation Date: December 2004.

Contractor Prequalification

The Department prequalifies contractors before they are eligible to bid on construction projects. The purpose of prequalification is to assess a contractor's ability to complete a construction project in accordance with the Department's standards. The American Association of State Highway and Transportation Officials (AASHTO) and other states also recommend a thorough review of contractor qualifications before allowing contractors to bid on projects.

According to Department rules, when determining whether to grant a contractor prequalified bidding status, staff should evaluate the prequalification application based on the following factors:

- Necessary equipment available to accomplish work type.
- Availability of trained personnel to accomplish work.
- Organizational and technical capacity to accomplish work.
- Financial capability to perform the type and size of work.
- Demonstrated work experience in the required areas.
- Past performance on Department projects.
- Any pending administrative or legal claims against the contractor.
- Presentation of false or fraudulent statements on past prequalification forms.

We reviewed the Department's prequalification process and found that the Department does not conduct performance evaluations for contractors. As shown above, Department rules require staff to evaluate the contractor's work experience and past performance when determining prequalification status. Without performance evaluations, however, the Department does not have a formal mechanism to assess a contractor's past performance. A 2001 AASHTO management study showed that conducting objective contractor evaluations is considered a best practice for state transportation departments. In addition, five of the seven other states we contacted (Kansas, Florida, Oregon, Utah, New Jersey) annually evaluate construction contractors on a variety of performance factors. Two of these states (Utah and New Jersey) use the results of performance evaluations as a factor when selecting contractors for future projects.

Staff have raised concerns about the qualifications of some of the Department's contractors. Although staff indicated that the majority of contractors are qualified to complete the projects they bid on, staff believe that there have been instances where contractors have been awarded contracts for projects they did not have the capacity or qualifications to complete. When this occurs, the Department must spend additional resources to oversee contractor performance. For example, staff report that contractors who are not knowledgeable of Department construction standards may require up to 15 percent more time from Project Engineers and other Department staff to make sure the project is completed according to contract requirements.

The Department's current prequalification factors are comprehensive and should provide a fair assessment of a contractor's qualifications if they are actually used. Therefore, the Department should ensure that staff consider all of the appropriate factors when determining prequalification status, including contractor performance evaluations. The Department should develop and implement an evaluation process for contractors that is objective and applied consistently.

Recommendation No. 12:

The Department of Transportation should ensure that contractors bidding on construction projects are qualified to work on state highway projects by:

a. Developing and implementing an annual performance evaluation process that is objective and applied consistently.

b. Evaluating all of the prequalification criteria when determining prequalification status, including past performance on Department projects.

Department of Transportation Response:

Agree.

a. The Department will create a task force to develop an objective evaluation process to provide annual evaluations of contractor performance on CDOT projects. After developing a draft process, it will be reviewed with the regions and the industry so that the comments and concerns of those most directly affected by the process can be considered. Final approval of the process will come from the Chief Engineer and the Region Transportation Directors.

b. Once the evaluation process is put into effect, the evaluations will be reviewed as part of the prequalification process. It may take 6 – 12 months to develop sufficient data to be an effective part of the prequalification process.

Implementation Dates: a. June 2005. b. June 2006.

Consultant Selection

Section 24-30-1403(2), C.R.S., provides that state agencies shall select consultants "deemed to be most highly qualified to perform the required professional services after considering, and based upon, such factors as the ability of professional personnel, past performance, willingness to meet time and budget requirements, location, current and projected work loads, the volume of work previously awarded to the person by the state agency, and the extent to which said persons have and will involve minority subcontractors." We reviewed the Department's qualification-based consultant selection process and identified areas for improvement, as discussed below.

Consultant Evaluations

Section 24-30-1403(2), C.R.S., requires the Department to consider past performance when evaluating a consulting firm's qualifications to perform contract work. According to Department staff, the current policy is to complete annual performance evaluations for all consulting firms with active contracts. When the Department evaluates consultant proposals for future projects, the Department considers past performance only if the Department has an evaluation on file for all of the consultants submitting bids.

Our audit found that the Department is not completing evaluations for all consultants on a regular or consistent basis. Our review of a sample of 16 consulting firms found that as of November 2003, there were no evaluations on file for 5 consultants. These five consultants had multiple active contracts with the Department, some of which date back to 1998. We also found that the Department had completed 64 evaluations for the remaining 11 firms in our sample. However, only 10 of the 64 (16 percent) evaluations had been completed since 2000, even though the 11 firms had 66 different active contracts that had been executed since 2000. We were unable to determine if these completed evaluations represented all of the evaluations that should have been filed. This is because the Department does not centrally track and monitor the filing of consultant evaluations to ensure evaluations are completed when required. Further, the Department has not clarified its policy that evaluations be completed annually and has not communicated its policy to staff.

A June 2000 internal Department audit also concluded that consultant evaluations were not being completed timely or being used effectively during the consultant selection process. Department management committed to address the internal audit recommendations by December 2000. However, we identified the same problems with consultant evaluations during this audit.

Disadvantaged Business Enterprise Goals

Federal regulations require state departments of transportation to maintain a disadvantaged business enterprise (DBE) program to receive federal-aid highway funds. The goal of the DBE program is to provide assistance to minorities, women, and other socially and economically disadvantaged individuals to enter into the highway construction and design industries. On an annual basis, the Transportation Commission establishes a statewide DBE goal, which is a commitment from the State to the federal government that a certain percentage of the total federal-aid contract dollars will go to DBE firms. In an effort to meet its statewide DBE goals, the Department establishes specific DBE goals for some consultant projects.

In addition to federal requirements, Section 24-30-1403(2), C.R.S., includes “the extent to which consultants will use minority subcontractors” as a factor that the Department should consider when evaluating a consulting firm’s qualifications for contract work. During the selection process, the Department awards points to consultants on the basis of their proposed use of DBE firms. Once a consultant is selected for the project, the DBE commitment contained in the consultant’s proposal is incorporated by reference into the terms of the contract.

Our review of the Department’s DBE program found that a large percentage of consultants are not meeting their contracted commitment to use DBE firms as subconsultants. Specifically, we found that only $3.1 million of the $8 million in contract funds (39 percent) committed to DBE firms were actually paid to these firms. This can jeopardize future federal-aid highway funding when it affects the Department’s ability to meet its statewide DBE goals. Data reported by the Department show that Colorado has not met its statewide DBE goals for the past four federal fiscal years.

DBE goals are included as a contractual term. However, prior to October 2003, the Department did not monitor or track actual DBE usage so that this information could be used on consultant performance evaluations and considered in future selections. Including DBE goals in the consultant performance evaluations would hold consultants accountable for meeting or failing to meet their contracted DBE commitments and help ensure compliance with federal regulations.

Consultant Debriefings

The Federal Acquisition Regulations require the Department to provide a timely debriefing on the evaluation of a project proposal upon request of a consultant. Debriefings allow consultants to gain valuable feedback from the Department on the strengths and weaknesses of their project proposals.

We reviewed the consultant debriefing process and found that debriefings are not always complete, timely, and in accordance with federal regulations. For example, the Department does not provide consultants with the overall ranking of all consultants submitting proposals as required by federal regulations. In addition, the Department does not track the time elapsed between the date the consultant requests a debriefing and the date the debriefing occurs. Federal regulations state that debriefings should occur within five days after receipt of the debriefing request whenever possible.

During our audit, Department staff reported that significant time and staff resources are required to prepare a consultant debriefing, and as a result, consultant debriefings are a lower priority. While we recognize that the debriefing process can be time-consuming, debriefings are important because they directly affect the quality and competitiveness of future project proposals. Making consultant debriefings a higher priority may require the Department to reduce their resource burden by streamlining the debriefing process. For example, the Department could have selection board members compile debriefing information as part of their duties. When consultants do not receive complete and timely feedback, consultants are unable to make targeted quality improvements in project proposals to compete effectively in future contract selection rounds.

Recommendation No. 13:

The Department of Transportation should ensure the selection of qualified consultants for contracts by:

a. Facilitating the effective use of performance evaluations in the consultant selection process. At a minimum, the Department should develop a clear and consistent policy for evaluating performance on consultant contracts on an annual basis for all active contracts, implement a means for centrally tracking consultant evaluation due dates, and monitor staff performance to ensure that consultant evaluations are completed in a timely manner and in accordance with established policies and procedures.

b. Tracking and monitoring consultant compliance with contract terms related to disadvantaged business enterprises, and include a review of consultants' progress toward meeting the disadvantaged business enterprise goals in the consultant performance evaluations.

c. Providing the overall ranking for all consultants submitting project proposals, implementing a mechanism to track the dates of all debriefing requests and their disposition, and exploring ways to streamline the consultant debriefing process.

Department of Transportation Response:

Agree.

a. The Department will create a task force to develop an objective evaluation process to provide annual evaluations of consultant performance on all CDOT projects. After developing a draft process, it will be reviewed with the regions and the industry so that the comments and concerns of those most directly affected by the process can be considered. Final approval of the process will come from the Chief Engineer and the Region Transportation Directors.

b. The Department has developed a database and software to track DBE usage on contracts, but it has not performed to our expectations. The firm that developed the system is no longer available to work on it, and our internal Information Systems staff is attempting to correct the problems to allow us track this information and make it available during consultant selections. The new automated system is scheduled to be functional in July, 2005. An interim system to capture data will continue until the new system is implemented.

c. The overall ranking is currently being provided. This item was implemented immediately upon being made aware of it during the audit several months ago. The Agreements Office will develop a means of tracking the dates of debriefing requests and the debriefings. As part of the current rewrite of the contracting manual, all of the processes are being examined for streamlining.

Implementation Dates: a. June 2005. b. July 2005. c. Implemented

Project Management and Training

Approximately seven years ago, the Department adopted Total Project Leadership (TPL) as its project management system. The Department intends TPL to be its single, comprehensive tool for holding project staff accountable for managing the State's design and construction projects in the most cost-effective manner. TPL requires all phases of a project—design, bidding, construction, and closure—to be managed by the same individuals (i.e., Resident Engineer). The Department reports that assigning the same individuals full responsibility for managing projects from start to finish streamlines the contract management process. It can also improve communication between the project team members, increase the knowledge base of staff, provide cross-training opportunities, and improve project quality.

Our audit reviewed the Department's implementation of TPL. We found that the Department did not adequately plan for and establish an infrastructure for implementing TPL effectively. For example, the Department did not assess staff project management skill levels, nor did it develop a training curriculum to address any skill deficiencies prior to implementation. Although staff have expressed concern over problems that have resulted from the implementation of TPL, the Department has not taken steps to address these problems, nor has it developed measures to track TPL's success.

In 2002, five years after TPL was implemented, the Department conducted an informal survey to assess the effectiveness of TPL and to identify any areas of concern. We reviewed the survey responses and found that although 23 percent (13 of 57) of respondents reported positive results from TPL, the majority of respondents reported problems. More specifically, 58 percent (33 of 57) of respondents reported that TPL has had a negative impact on the contract management process overall. During our interviews with region staff, engineers reported that TPL had diluted critical expertise. Further, engineers were concerned that the overall quality of work in both the design and construction phases has suffered.

We also found the Department has not assessed the skills of its project managers or developed a training curriculum to ensure its staff have the skills necessary to manage projects under TPL. Contract management is one of the Department's primary responsibilities, yet training on TPL and contract management is not required. In this and the prior chapter, we have identified numerous areas where additional training is needed to ensure staff have the skills to manage contracts effectively.

Although TPL may be able to streamline the contract management process, which could help reduce costs, there has been no evaluation to determine whether contracts are managed more efficiently or project quality has improved. Further, the Department has not developed any performance criteria for measuring the success of TPL. Performance measures provide important information about the outcomes of efforts, including whether the Department is producing more or getting better results with the revenues it is receiving and expending. As we have noted in prior audits, however, the Department's information systems are not able to link costs with project outcomes. This issue must be addressed for the Department to obtain critical information for decision making. We discuss our concerns with the Department's information systems in more detail in Chapter 3.

Even though the Department cannot currently link costs with project outcomes, it needs to develop methods for evaluating project completion timelines and expenditures to ensure maximum efficiency and effectiveness. The Department could also evaluate the number and dollar amount of contract modification orders (CMOs) on projects to determine if plans, specifications, and final project costs meet accuracy standards. Finally, the Department needs to establish minimum training requirements for managing contracts under TPL. This should include assessing the training needs of staff, developing a curriculum that reinforces critical project management skills, and ensuring all appropriate staff attend required training courses.

Recommendation No. 14:

The Department of Transportation should evaluate the effectiveness of Total Project Leadership (TPL) to ensure that design and construction contracts are managed consistently and efficiently, and result in quality projects. This should include:

a. Developing performance criteria, including linking costs with project outcomes, for measuring the effectiveness of the TPL contract management process and the quality of projects.

b. Assessing the skills and training needs of its staff, specifically in the areas of contract management and oversight, and developing a training curriculum. The curriculum should include courses that introduce and reinforce skills that are critical for successful project management under TPL and are required of all staff in project management positions.

Department of Transportation Response:

Agree.

a. The Department is in the process of revising its Performance Measurement system. Refined definitions of critical Tools and Services for the Project Delivery Core Service will be developed during Fiscal Year 2005.

b. The Project Development Branch will work with Region Program Engineers to identify training needs and establish a training curriculum to address those needs. (Similar to a recent effort on Construction Inspection training.)

Implementation Dates: a. July 2005. b. December 2005.

Administration

Chapter 3

Background

Department headquarters is responsible for administering the contracting process for both design and construction projects. The individual transportation regions are responsible for contract management on the projects. Accountability and information systems are crucial to an effective contracting process and effective management of projects. In prior audits dating back to 1996, we found that the Department lacked the necessary systems for managing projects and we made recommendations to improve project management systems and hold managers accountable. During this audit we reviewed the Department's various management systems and found that the Department continues to lack the information necessary to effectively manage its operations. For example, the Department has not made improvements to its information management systems to address the cash management problems identified in both our 2000 and 2002 audits. In this chapter we discuss various issues related to the Department's administration of design and construction projects and recommend areas for improvement.

Information Management

The Department has more than 240 different automated information systems containing open and closed project data. In addition, the Department maintains a Central Files Unit that serves as a central repository for key forms and other documentation for completed projects. We reviewed the various information management systems that the Department has in place, as well as the accuracy and completeness of data maintained in those systems, and noted problems in the following areas:

- **Basic project information not easily accessible**. During our audit, we requested what we considered to be basic project management information. For example, we asked for data on the number of active consultant contracts, actual contract expenditures, and the dollar amount remaining on consultant contracts. In addition, we asked for a breakdown of the different types of funds used on construction and consultant contracts. The Department was able to provide some of the information requested, but only after staff compiled and prepared the information specifically for us. If data are not readily accessible and routinely analyzed, the Department is not able to effectively and comprehensively monitor its progress on highway projects, determine where improvements are needed, and provide information for decision making. We identified similar problems in our 1996, 1997, 2000, and 2002 audits of the Department.

- **Inaccurate and incomplete data in information systems.** We reviewed electronic data records for a sample of 20 consultant contracts and 20 construction contracts and found missing data and data entry errors. In one case the value of a task order was understated by almost $725,000, while in another the value of a task order was overstated by $8,682. In addition, we found an instance where electronic date fields did not agree with dates recorded in the project files. If data contained in the automated systems are not complete and accurate, the Department cannot have confidence that reports generated from its systems are reliable for decision making.

- **Incomplete documentation in Central Files.** We reviewed the Central Files for 17 closed construction projects and found that 40 of the 153 documents (26 percent) required to be in the files were missing, even though all of the projects had been closed for at least six months at the time of our review. Although the documents may have been available at the regions, management could not have retrieved them easily for internal review or review by federal auditors.

The Department has recently reorganized its Information Technology section and developed a new strategic plan for improving information systems. The plan appears to address many of the information systems concerns we identified in this and prior audits. To ensure changes are implemented, the Department should develop a workplan that prioritizes projects and includes critical dates, implementation timelines, and budgets. The Department should also improve internal controls over the maintenance of electronic and hard copy data by training staff on the electronic data fields that need to be populated and implementing a review process to verify that data are accurate. Finally, the Department should take steps to ensure that all of the required project documentation and information is submitted to Central Files in a timely manner. This should include establishing specific deadlines for document submission and developing a checklist that must be signed and submitted by the Project Engineer before a project can be closed.

Recommendation No. 15:

The Department of Transportation should improve its information management systems by:

a. Developing a workplan that prioritizes information technology projects and establishes budgets, timelines, and critical dates for the implementation of changes.

b. Providing training to staff regarding the electronic data fields that must be populated and verifying the accuracy of such data contained in the systems prior to contract or task order execution.

c. Establishing specific deadlines for when project documentation is to be submitted to Central Files and developing a checklist that must be signed and submitted by the Project Engineer before a project can be closed.

Department of Transportation Response:

Agree.

a. CDOT's Information Technology Office is in the process of developing a comprehensive work plan. It will be in place by July 1, 2004.

b, c. Action plans and implementation schedules for both elements are dependent on an as yet to be determined document management strategy.

Implementation Dates: a. July 1, 2004. b. June 2005. c. December 2005.

Contract Selection

The Department uses traditional contracting methods for the majority of its construction and consulting projects. For construction contracts, the Department procures work based on a low bid amount for the cost of construction materials and labor. For consultant contracts, the Department typically procures work based on the cost of the project plus a negotiated profit margin. In addition to these traditional contracting methods, alternatives are available. These include:

- **Design-Build.** Under a design-build contract, a single contractor provides both design and construction services. This approach accelerates project completion by allowing construction to begin before the final design has been completed. Although the Southeast I-25 Corridor Project (also known as T-REX) is the Department's only current design-build project under construction, the I-25 Corridor Project through Colorado Springs, which is still in the planning phase, will also be completed with a design-build contract.

- **Warranty Contracts.** Under a warranty contract, the contractor guarantees the materials and craftsmanship of a specific product or work item for a specified period of time. Placing this risk on the contractor motivates the contractor to follow good construction practices, use innovative techniques, and improve product quality. The Department completed a pilot study of warranty contracts for asphalt resurfacing in December 2001; however, the results of the pilot study were inconclusive. The Department reports that it plans to continue to evaluate its use of warranty contracts.

- **Incentive Contracts.** Under an incentive contract, a portion of the compensation is based on the contractor's meeting or failing to meet the agreed-to performance objectives. Although the Department has not used incentive provisions on consultant contracts, staff reported that they plan to study the feasibility of doing so in the future to help control contract costs.

The type of contract selected, whether traditional or alternative, ultimately depends on the nature of the project (e.g., resurfacing, corridor reconstruction, bridge construction) and the established delivery goals (e.g., cost, timeline, quality). We reviewed the Department's construction and consultant contracts and found that the Department lacks criteria for identifying the best type of contract for a project. Additionally, the Department has not evaluated the costs and benefits of using one type of contract over another.

Our survey of other state departments of transportation found that the advantages and disadvantages of alternative contracting may vary by the contracting method. For example, Arizona and Utah both reported cost savings and time savings from design-build contracts. Washington reported that design-build contracts produced higher-quality projects but required more administrative oversight.

More evaluation is needed to determine the best contracting method for specific projects. The Department needs to research the advantages and disadvantages of each contracting method and identify the project attributes best suited for each method. The Department should then develop criteria and guidelines to assist project managers with selecting the type of contract method, whether traditional or alternative, that best achieves project goals. Once a contracting method is implemented, the Department should evaluate whether the type of contracts chosen is working as intended and producing the desired results.

Recommendation No. 16:

The Department of Transportation should ensure that the contracting method selected for a specific construction and consultant project achieves project goals and provides the best value for the State by:

a. Evaluating the results of current projects or pilot studies that use alternative types of contracts and identifying the advantages and disadvantages of using alternative contract types over the standard contract approaches.

b. Using the results of this evaluation to develop specific criteria for project managers to use to select the appropriate type of contract for projects.

c. Evaluating whether the various types of contracts are working as intended and producing the desired results.

Department of Transportation Response:

Agree. CDOT is in the process of developing an Innovative Contracting Unit. The purpose of this new unit is to institutionalize a menu of non-traditional contracting approaches (including Design-Build). The proposed workplan includes research on CDOT and other DOT's experience and practices, development of a matrix of options and project types to determine best method, formalizing processes and procurement documents, and training/consultation to Region project managers.

Implementation Date: April 2005.

Consultant Audits

The Department has three different units that are involved in reviewing consultant contract costs. The Consultant Audit Unit conducts pre-audits on persons or firms entering into professional services contracts with the Department, establishes an audited indirect cost rate, and supplies cost evaluation data to the Contracting Officers to aid in contract negotiations. The Contracting Officers in the Agreements

Office coordinate the consultant procurement process and negotiate the consultant rates. The Division of Audit conducts final cost audits on consultant contracts to determine if the actual costs incurred on completed contracts are allowable and reasonable under the contract terms and applicable cost principles. Our audit determined that the Department could manage these units more effectively to ensure they work together to provide maximum value and assurance to the contracting process.

We identified a number of problems with the services provided by these units. First, according to Contracting Officers, the audit information provided by the Consultant Audit Unit is not sufficient to negotiate a fair and reasonable rate for consulting services. As a result, the Contracting Officers are conducting their own cost reviews and analyses. This duplicates efforts and applies limited resources inefficiently. If the pre-contract audits consider the needs of Contracting Officers and rest on well-developed, documented, and systematic audit methodologies as we recommend in this report, the Contracting Officers should receive reliable and useful information for negotiating contracts, and should not need to conduct additional analyses of their own.

Second, we identified one instance where a Contracting Officer negotiated an indirect cost rate for a consultant contract that was 15 percent higher than the audited indirect cost rate, increasing the cost of the contract by $201,000. The Contracting Officer determined that the financial data used by the Consultant Audit Unit to determine the audited indirect cost rate were outdated. Although the Contracting Officer's decision may be appropriate, the Contracting Officer should not be able to overrule the indirect cost rates determined by the Consultant Audit Unit. Establishing an allowable and reasonable audited indirect cost rate should be the responsibility of the Consultant Audit Unit. If the auditors apply cost allocation principles and audit standards properly, the Contracting Officer should be able to rely on the results of pre-contract audits when establishing contract rates.

Third, we found that the audits of consultant cost proposals lacked sufficient evidence to support audit findings and consultant rates. Additionally, audits were not in compliance with applicable audit standards. Audit standards exist to ensure that auditor conclusions rest on a thorough, systematic, and nonarbitrary evaluation of audit evidence. When audit evidence is insufficient, the Department lacks a credible basis for approving consultant rates.

Finally, we determined that the Department's decision to separate the Consultant Audit Unit from the Division of Audit has reduced the coordination and value of audit services. The Division of Audit identifies high-risk cost areas through post-audit review of consultant contract costs. This information is important for identifying potential risk areas in pre-contract audits, yet the Consultant Audit Unit does not consider the results of these post-audits in its review of proposed consultant costs. Additionally, the Consultant Audit Unit reports that it has a "busy" and "slow" audit season, and we found that it can take up to 14 weeks to complete a pre-contract audit. Consolidating the two audit groups would allow auditors to share information. Additionally, it would allow the Department to allocate audit staff in accordance with the fluctuating demand for pre-contract audit services.

In Chapter 1, we recommended improvements to the Department's management of indirect costs through pre-contract audits. Maximizing audit resources will be key to applying additional effort within existing resources. Consolidating the audit functions, along with clearly delineating the responsibilities of auditors and Contracting Officers, will increase the likelihood that the Department will be able to apply appropriate, effective scrutiny to consultant contract costs and negotiate fair and reasonable rates.

Recommendation No. 17:

The Department of Transportation should work with key management and staff to maximize the effective use of available audit resources and expertise by:

a. Clarifying the responsibilities of the pre-audit function to ensure the Department receives the necessary information and assurance that enables it to contract for consultant services at fair and reasonable prices.

b. Requiring the Agreements Office to rely on audited costs reviewed through pre-contract audits when establishing contract rates.

c. Ensuring that consultant pre-audits comply with auditing standards and include sufficient evidence and analysis to provide a credible basis for consultant rates and contract negotiations.

d. Considering integrating the consultant pre-contract and final audit functions into one organization. If this is not feasible, the Department should establish formal lines of communication between audit groups to facilitate the sharing of information and coordination of audit functions. The Department should also monitor the demand for pre-contract audit services and allocate staff appropriately.

Department of Transportation Response:

Agree.

a. Audit staff will meet with contracting officers to assure that audit reports contain information necessary for contract negotiations. Meetings will be ongoing as the format of the audit reports changes in order to meet the requirements of previous recommendations. Audit and contracting managers currently meet twice monthly, and will use these meetings to address the audit format.

b. The contracting officers will rely on the information in the audit report as part of the analysis to determine contract rates. A tiered decision-making process will be developed to improve consistency in and accountability for contract rates.

c. The Department will develop a program to train audit staff and review audits to assure they comply with auditing standards, and to assure that audit reports contain relevant information for contracting officers' use in contract negotiations.

d. The Department will consider integrating the pre-contract and final audit functions and determine if organizational integration is critical to success or whether the functions can be addressed through improved communication of findings and processes, coordinated methods, and joint training activities.

Implementation Dates: a and b. December 2004. c. June 2005.
d. September 2004.

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