



A Report
to the
Board of
Supervisors

Maricopa County
Internal Audit
Department

Ross L. Tate
County Auditor

Department of Transportation

Controls over Construction Project Management and Information Technology Need Improvement

June ■ 2011

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The mission of Maricopa County is to provide regional leadership and fiscally responsible, necessary public services so that residents can enjoy living in a healthy and safe community.

The mission of the Internal Audit Department is to provide objective information on the County's system of internal controls to the Board of Supervisors so they can make informed decisions and protect the interests of County citizens.

The County Auditor reports directly to the Maricopa County Board of Supervisors, with an advisory reporting relationship to the Citizen's Audit Advisory Committee.

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"Do the Right Things Right!"



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June 29, 2011

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We completed our fiscal year (FY) 2011 review of the Maricopa County Department of Transportation (MCDOT). This audit focused on selected areas within MCDOT and was performed in accordance with the annual audit plan approved by the Board of Supervisors. Jefferson Wells and KPMG assisted us in the construction project management and information technology sections. The specific areas reviewed were selected through a formal risk-assessment process.

No material weaknesses came to our attention during testing of construction procurement and restricted fund expenditures. However, control weaknesses were noted in the following areas:

- Construction project management
- System application controls over security and program changes

Within this report, you will find an executive summary, specific information on the areas reviewed, and MCDOT's response to our recommendations. We reviewed this information with the Director and appreciate the excellent cooperation provided by management and staff. If you have any questions, or wish to discuss the information presented in this report, please contact Richard Chard at 506-7539.

Sincerely,

A handwritten signature in cursive script that reads "Ross L. Tate".

Ross L. Tate
County Auditor

Executive Summary

Project Schedules (Page 7)

Project schedules were unavailable for the ten transportation projects reviewed. According to MCDOT, project schedules were created but not retained after the projects were closed. However, schedules were unavailable for two open projects reviewed. The lack of project schedules can result in increased project costs, scheduling inefficiencies, and poor productivity. MCDOT should ensure that project schedules are developed and properly retained for all open construction contracts.

Change Order Management (Page 9)

Oversight of contract change orders and work assignment amendments needs improvement. Project management does not review or approve change orders, work assignments, or work assignment amendments, although these items can significantly impact project costs and timeframes. Weak oversight also significantly increases the risk of improper payments, fraud, waste, and abuse. MCDOT should establish and enforce written policies and procedures that ensure strong controls over change orders, work assignments, and work assignment amendments.

Contractor Payment Processes (Page 12)

A number of internal controls could be implemented to ensure the propriety of payments made to construction contractors. For example, payment requests are not properly submitted, validated, or approved. These weaknesses greatly increase the risk of improper payments, fraud, waste, and abuse. MCDOT should establish and enforce written policies and procedures that (a) ensure strong controls over contractor payment processes, and (b) set forth the responsibilities of those tasked with validating, processing, and approving payments.

Construction Project Accounting (Page 14)

MCDOT does not have procedures in place to ensure project costs are properly reconciled between the two systems used to record costs, which increases the risk of inaccurate financial reporting. MCDOT should ensure that the two systems are reconciled at least monthly.

Construction Procurement (Page 15)

For those construction contracts we selected for review, MCDOT appears to generally comply with applicable requirements of the County's Procurement Code. However, we noted opportunities to improve file documentation for public notifications, rejection letters, and change orders. Incomplete contract documentation increases the County's financial and legal risk. MCDOT should ensure required contract documents are complete and present in contract files.

Restricted Funds (Page 17)

For those restricted-fund expenditures we selected for review, MCDOT appears to comply with fund requirements. Our testing for duplicate payments found six minor exceptions. MCDOT should recover any duplicate payments made to vendors.

IT Control Environment (Page 20)

Through observation, limited testing, and interviews, we determined that Infrastructure Technology Center controls generally followed the COBIT framework in the following areas: information security policy, segregation of duties, account management, authentication, super user access, physical access controls, virus protection, and incident management.

System User Access (Page 22)

In general, Public Works ITC and MCDOT have IT security controls in place. However, user access controls, such as password management, privileged account administration, and access review policies, need strengthening. Weak access controls may compromise the integrity and confidentiality of system data. Public Works ITC and MCDOT should strengthen controls in these areas.

Application Change Management (Page 24)

Public Works ITC and MCDOT have a formalized application change management process, however, it is not consistently followed. Test program changes were not always correctly documented and change access is not restricted. Unauthorized changes can introduce unintended or malicious functions into an application and jeopardize system availability, data confidentiality, or data integrity. Public Works ITC and MCDOT should consistently follow internal change control practices.

IT Policies and Procedures (Page 26)

Although Public Works ITC and MCDOT's operational policies and procedures are well documented, formalized policies over security, job scheduling, and business continuity are not in place. Without formalized documented policies, ITC could experience errors, data confidentiality or integrity issues. Public Works ITC and MCDOT should document formal written IT policies.

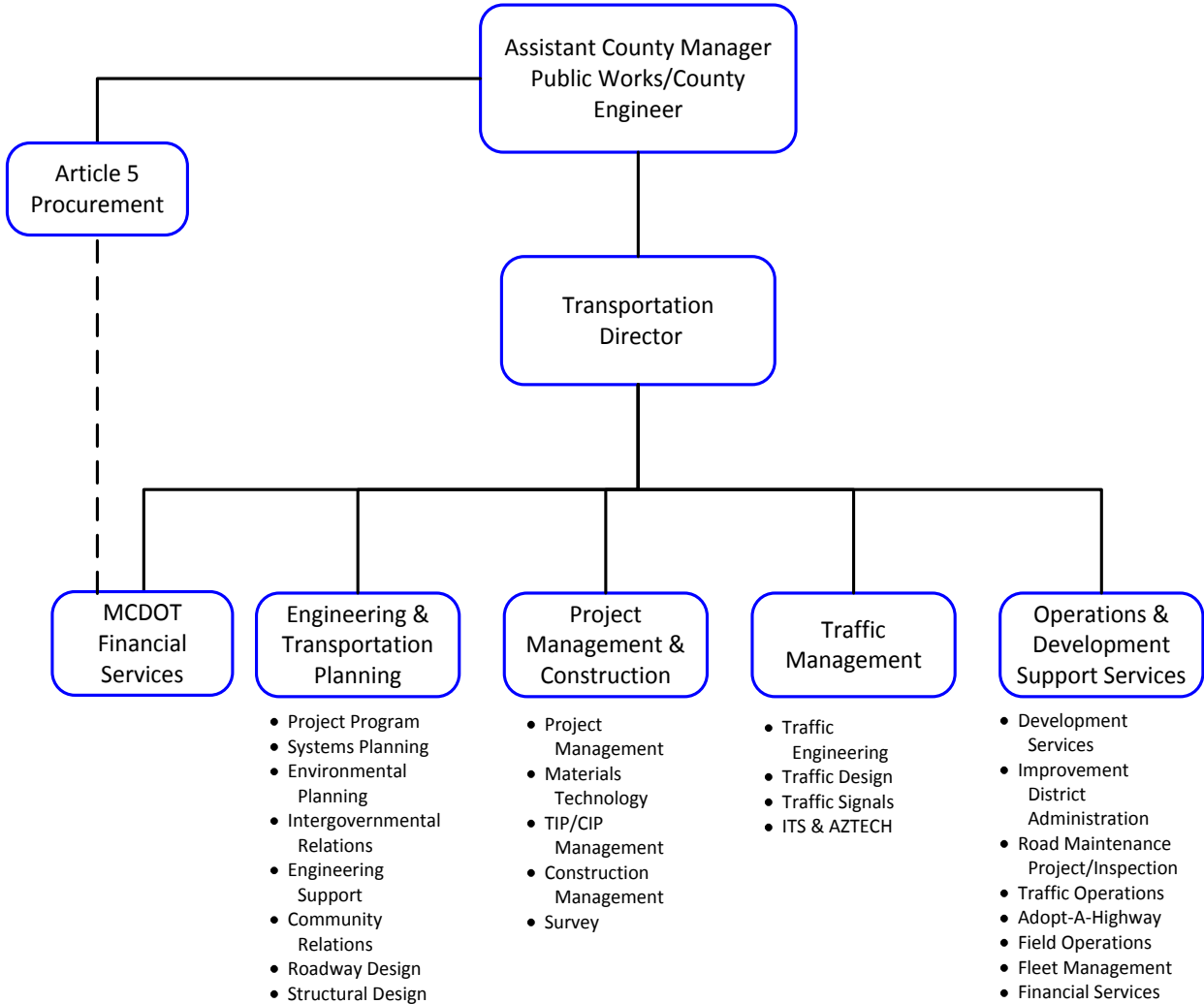
Introduction

Background

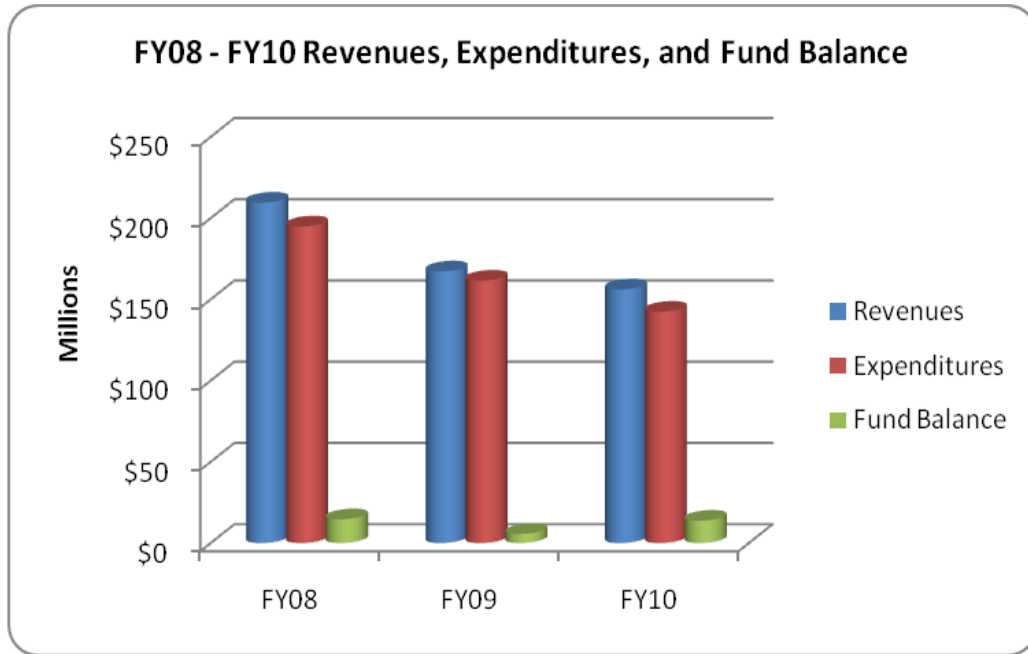
The Maricopa County Department of Transportation (MCDOT) is responsible for providing transportation infrastructure and related services to people within Maricopa County so they can live, work, conduct business, and travel in a safe and clean environment. Numerous federal, state, and local regulations govern road, traffic, and general transportation issues. MCDOT is currently responsible for 2,048 paved miles, comprised of arterial, residential, and park roads, and 446 miles of dirt roads.

Organizational Structure and Operating Budget

MCDOT had 510 authorized positions as of September 2010. These positions are divided into five main divisions, as shown in the following organizational chart.



Shared revenue distributions from the Arizona Highway User Revenue Fund (HURF), Arizona Vehicle License Tax (VLT), and Maricopa Association of Governments (MAG) are MCDOT’s primary revenue sources. Personnel, general (including consultant fees), and capital expenditures comprise the primary outflows. Recent financial trends are summarized in the following chart.



From FY 2008 to FY 2010 Revenues Decreased by 25%

Scope and Methodology

Audit Objectives

The objectives of this audit were to determine if:

- MCDOT is adequately managing construction of Transportation Improvement Projects (TIP)
- MCDOT adheres to Maricopa County Article 5 Procurement requirements, including vendor selection, bidding process, Board of Supervisors (Board) approval, and contract terms
- MCDOT is correctly using restricted revenues (HURF, VLT, and MAG) in compliance with laws and regulations
- IT general controls over MCDOT’s information systems are sufficient to protect data integrity
- MCDOT application controls ensure the confidentiality, integrity, and availability of application data

To achieve our objectives, we reviewed ten of the largest transportation projects during FY 2008 through FY 2010, with total budgets and expenditures of approximately \$91.6 million. Eight of the projects were completed at the time of our review and two were open. In addition, we reviewed 86 payment requests totaling \$63.2 million.

Audit Timeframe

Our audit covered fiscal years 2008, 2009, and 2010.

Auditing Standards

We conducted this performance audit in accordance with generally accepted government auditing standards. These standards require the following:

- An independent audit staff and audit organization
- An objective audit staff performing the work
- A competent staff, current with continuing education requirements
- A system of quality control procedures
- Sufficient and appropriate evidence based on audit objectives

Department Reported Accomplishments

Maricopa County Department of Transportation provided the Internal Audit Department with the following information for inclusion in this report.

Major Activities
<ul style="list-style-type: none"> Completed the American Recovery and Reinvestment Act (ARRA) projects on time, within \$6.9 million budget, and according to Federal Guidelines
<ul style="list-style-type: none"> Finalized all Sun City paving and upgrades this year
<ul style="list-style-type: none"> Paved half of Sun City West roads with the rest being completed in FY12
<ul style="list-style-type: none"> Completed the Northern Parkway Phase 1 design and received \$55 million in Federal obligation authority for construction to begin in FY12
<ul style="list-style-type: none"> Finalized Ellsworth Rd project with City of Queen Creek and Pinal County advancing the project by two years
<ul style="list-style-type: none"> Completed the El Mirage project from Bell Rd to Deer Valley Rd
System Status
<ul style="list-style-type: none"> Road pavement condition is monitored and evaluated on a continuous basis to develop long term maintenance plans; the road network has 82% of roads rated very good to excellent for pavement condition rating
<ul style="list-style-type: none"> MCDOT paved 475.5 lane miles at a cost of \$24 million
<ul style="list-style-type: none"> There are 420 bridges and structures on County roads; of the 420 structures, 98.8% have a Sufficiency Rating of 70 or better
Other Notable Accomplishments
<ul style="list-style-type: none"> Coordinated the implementation of the new Disadvantaged Business Enterprise (DBE) program for Federal Projects at MCDOT
<ul style="list-style-type: none"> Advertised Request for Proposals for 10 projects and added consulting firms to allow more participation in work
<ul style="list-style-type: none"> Advanced and launched 35 scoping projects with emphasis on County priorities
<ul style="list-style-type: none"> Implemented the 3rd round of the Scoreboard System to track significant activities and to monitor achievement of efficiency targets

Construction Project Management

MCDOT's Project Management and Construction Division is responsible for construction project management. The purpose of construction project management is to ensure proper oversight over the life of a project so that infrastructure improvements are completed on time, within budget, and within scope. Typical project management functions include (a) defining the scope, budget, and performance requirements of a project, (b) selecting project participants, (c) developing construction activity schedules, and (d) ensuring strong payment controls.

MCDOT could improve the effectiveness and efficiency of construction project management by strengthening controls in the following areas: Project Schedules, Change Order Management, Contractor Payment Processes, and Construction Project Accounting.

Issue 1 Project Schedules

Summary

Project schedules were unavailable for the ten transportation projects reviewed. According to MCDOT, project schedules were created but not retained after the projects were closed. However, schedules were unavailable for two open projects reviewed. The lack of project schedules can result in increased project costs, scheduling inefficiencies, and poor productivity. MCDOT should ensure that project schedules are developed and properly retained for all open construction contracts.

Criteria

Generally accepted industry standards, including the common Critical Path Method, require project owners to maintain project schedules that identify all aspects of a project. Examples include:

- Internal Reviews and Approvals
- Right-of-Way Acquisitions
- Designs
- Cost Estimates
- Pre-Bid Activities
- Construction Activities
- Close-outs

The schedules should delineate all activities required to complete the project, the time (duration) required to complete each activity, and the dependencies between the activities, to help ensure that the projects are completed on time and within budget.

Condition

MCDOT does not have written policies and procedures needed for effective and efficient construction project management. For example, there is no requirement that essential overall project schedules be prepared and retained for all transportation construction projects. Project schedules are an important tool for monitoring progress over time to ensure predetermined objectives are met.

According to MCDOT, project schedules are prepared for all projects but are not retained once a project is completed. MCDOT was unable to provide project schedules for any of the ten transportation projects reviewed, including two open projects. However, MCDOT did provide schedules for some open projects not included in our sample.

Effect

The lack of project schedules can result in increased project costs, scheduling inefficiencies, and poor productivity.

Cause

MCDOT did not have procedures that require the preparation and retention of project schedules. Such project schedules identify and list activities for project completion.

Recommendations

MCDOT should:

- A.** Establish and enforce written policies and procedures over transportation project management, setting forth responsibilities for all construction delivery teams to provide reasonable assurance that project management goals are met.
- B.** Ensure that accurate and complete project schedules are properly prepared and retained for all transportation projects.

Issue 2 Change Order Management

Summary

Oversight of contract change orders and work assignment amendments needs improvement. Project management does not review or approve change orders, work assignments, or work assignment amendments, although these items can significantly impact project costs and timeframes. Weak oversight also significantly increases the risk of improper payments, fraud, waste, and abuse. MCDOT should establish and enforce written policies and procedures that ensure strong controls over change orders, work assignments, and work assignment amendments.

Criteria

The County's Article 5 Procurement Code requires the Board to approve contract change orders that exceed \$1 million. In addition, commonly accepted industry standards for change orders include the following:

- Project managers should maintain change order logs to assess and document (1) executed change orders, (2) estimated contract completion, and (3) reconciliation with contractors' payment requests
- Authorized project managers should validate costs and approve change orders submitted by contractors
- Contractors should not begin work on changed conditions until approved by the project manager

Background

Because construction projects are awarded on a competitive bid basis, the scope of work and payment terms must be clearly defined before construction commences. As changes arise or problems occur during the construction phase, a change order form is completed. Common reasons for initiating change orders include (a) changes in scope (e.g., design-related changes) (b) unforeseen conditions (e.g., site condition changes), and (c) human errors and omissions.

Change orders detail the revised terms and conditions and supplement the contract as a legally binding agreement. While change orders are common in the construction industry, strong controls are essential to minimize the risk of improper and unjustified project changes.

Condition

Project management does not review or approve change orders, work assignments, or work assignment amendments. In addition, there is not an effective system in place to ensure that project managers are aware of changes that may significantly impact project costs and timeframes.

Change Orders and Work Assignment Amendments

The system in place to identify change order/work assignment amendments is not systematic or properly documented with the fundamental cost analysis, review, and approval processes needed to maximize project cost efficiency and accountability. For example, change order logs are not utilized to ensure that project management is kept apprised of changes that may significantly impact project costs and timeframes. While construction managers review and approve change orders and work assignments and amendments, project managers may be unaware of such changes until the formal approval process has been reached.

We noted numerous change orders and amended work assignments that added significant increases to community relations support and traffic control costs. For example, we noted one instance where \$210,000 in costs for a uniformed police officer exceeded the maximum lump sum allowed under the contract for community relations support and traffic control costs. There was no supporting documentation or contract scope changes to justify the increase. The payment effectively increased the value of the contract and should have been formally documented and approved as a contract amendment.

We noted instances where change orders and work assignment amendments were implemented on the same date as the contractor's invoice. This indicates work was completed prior to issuance of the change order or work assignment amendment without the proper approvals.

Final Quantity Adjustments

Final Quantity Adjustments (FQA) are an accounting of a project's final quantities and costs. Although MCDOT completes an FQA as part of a contract closing, no formal policies exist to evaluate, approve, and document FQA justifications. FQA review and approval processes are inconsistent and may involve any number of MCDOT employees. Although FQAs may substantially increase contract costs, FQAs are not treated as change orders. Of six closed contracts we reviewed, four had FQAs resulting in total payments of \$1.3 million in excess of contract values. One of the four increases exceeded \$1 million, which may have required Board approval.

Effect

MCDOT does not ensure that contract change orders and work assignment amendments are reasonable and properly justified, which can significantly impact project costs and timeframes. Weak oversight may significantly increase the risk of improper payments, fraud, waste, and abuse.

Cause

MCDOT does not have formal policies and procedures for change order processes. Logs that should document the reasons, costs, analysis, and approvals for change orders do not exist. In addition, FQAs are not processed as change orders and do not include documentation of appropriate review and approval.

Recommendations

MCDOT should:

- A.** Establish and enforce written policies and procedures that ensure strong controls over change orders, work assignments, and work assignment amendments.
- B.** Develop Pending Change Order/Work Assignment Amendment Logs that include the required cost analysis, managerial review, and approval of change order/work assignment amendments. FQAs that exceed contract values should follow the same approval process as change orders.
- C.** Analyze pending Change Order/Work Assignment Amendment Logs for potential cost impact and percentage of work completed. Conduct and document contract amendment costs analysis for reasonableness. The analysis should be incorporated in amendment approval processes.
- D.** Consider auditing large dollar change order/work assignment amendments when significant cost increases are proposed.
- E.** Allow construction to commence only after appropriate change order and work assignment amendment approvals have been obtained.

Issue 3 Contractor Payment Processes

Summary

A number of internal controls could be implemented to ensure the propriety of payments made to construction contractors. For example, payment requests are not properly submitted, validated, or approved. These weaknesses greatly increase the risk of improper payments, fraud, waste, and abuse. MCDOT should establish and enforce written policies and procedures that (a) ensure strong controls over contractor payment processes, and (b) set forth the responsibilities of those tasked with validating, processing, and approving payments.

Criteria

Industry standards state that payment requests should include the original contract value amount, summary of change orders, total of previous payments, and the current contract value. Section 109 of the Maricopa Association of Governments (MAG) Uniform Standard Specifications states that all work completed under a contract will be measured by the project owner engineer according to United States standard measures. The contractor is responsible for providing the engineer with measurement information, such as duplicate weighmaster certificates. The Code of Federal Regulations (CFR) Title 23 (Highways) Section 635.123 requires that quantities of completed work are determined accurately and on a uniform basis.

Condition

We reviewed payment requests totaling \$63.2 million for the ten projects sampled, and found a number of payment controls were lacking. MCDOT's practice is to initiate and prepare estimated payment requests that is reviewed and approved by the contractor.

However, payment requests did not properly document that cost validations were completed or otherwise ensured the propriety of amounts billed. For example, we noted several instances where specific line item unit costs varied from, or were not included with, negotiated contract unit costs. In one instance, a payment request exceeded the contract value by \$36,000 and constituted 110% of completed work. MCDOT reports that a credit for this amount will be reflected in a future payment request.

Further, while construction managers approved payment requests, project managers with project management responsibilities had not approved them. These weaknesses greatly increase the risk of improper payments, fraud, waste, and abuse.

Effect

Current contract payment practices significantly reduce accountability and increase the risk of improper payments, fraud, waste, and abuse.

Cause

MCDOT has not established written policies and procedures needed to ensure adequate controls are in place over payments to contractors.

Recommendations

MCDOT should:

- A.** Establish and enforce written policies and procedures that ensure strong controls over contractor payment processes and set forth the responsibilities of those tasked with preparing, validating, processing, and approving payments.
- B.** Ensure that all payment requests contain sufficient detail and documentation to verify the propriety of the amount billed. Payment requests should be reviewed and approved prior to payment by the project manager for construction.

Issue 4 Construction Project Accounting

Summary

MCDOT does not have procedures in place to ensure project costs are properly reconciled between the two systems used to record costs, which increases the risk of inaccurate financial reporting. MCDOT should ensure that the two systems are reconciled at least monthly.

Criteria

The American Institute of Certified Public Accountants recommends a variety of internal controls over capital projects, including:

- Reconciling detailed project records with general ledger control accounts
- Establishing and maintaining project cost records for expenditures
- Reporting procedures for in-progress and completed projects
- Distributing written policies and procedures to appropriate personnel

Condition

MCDOT does not have formal policies and procedures to ensure a proper reconciliation of the two systems used to record construction project details. The County's financial system, Advantage, is used to record project financial data (e.g., budgets, contract values, expenditures, etc.) and MCDOT's Job Cost system is used to record detailed project records. Data is manually entered into both systems but no reconciliations are performed to ensure accuracy.

Effect

Failure to reconcile the Advantage and Job Cost systems increases the risk of inaccurate financial reporting.

Cause

MCDOT lacks policies and procedures requiring a reconciliation of cost data between the two financial operating systems.

Recommendations

MCDOT should:

- A. Reconcile the Advantage and Job Cost systems at least monthly.
- B. Review the feasibility of acquiring and implementing a job cost module within the Advantage system.

Issue 5 Construction Procurement

Summary

For those construction contracts we selected for review, MCDOT appears to generally comply with applicable requirements of the County's Procurement Code. However, we noted opportunities to improve file documentation for public notifications, rejection letters, and change orders. Incomplete contract documentation increases the County's financial and legal risk. MCDOT should ensure required contract documents are complete and present in contract files.

Criteria

Article 5 of the Maricopa County Procurement Code defines the requirements and authorities for procurement and contract activities associated with design, construction, and reconstruction. The Procurement Code requires County departments to perform detailed procurement procedures, which should be documented in the contract file. Procedures include:

- Obtain appropriate project approvals
- Publish public notice (notarized copy must be on file)
- Receive vendor bid proposals
- Create selection committee
- Evaluate proposals
- Award contract to successful vendor
- Document reasons for proposal rejections
- Obtain appropriate approvals for contract vendor
- Obtain required documentation (e.g., evidence of insurance, etc.)
- Document justifications for contract modification (i.e., change orders)

Condition

We reviewed 4 of the 280 construction contracts that were active from FY 2008 through FY 2010. Total contract expenditures for the period totaled \$156 million; expenditures for the contracts selected for review totaled \$24.8 million. For these contracts, MCDOT appears to generally comply with applicable requirements of the County's Procurement Code. However, documentation for public notifications, rejection letters, and change orders could be improved. The following table summarizes the exceptions found.

Article 5 Exceptions and Expenditures for Reviewed Contracts (FY08 – FY10)		
Vendor Name	Exceptions	Total (millions)
Kiewit Western Co.	<ul style="list-style-type: none"> • No affidavit of publication of public notice • No rejection letters on file 	\$ 17.4
AJP Electric, Inc.	<ul style="list-style-type: none"> • The forms for Change Orders 2, 4, and 5 did not include justification 	3.3
Aztec Engineering Arizona, LLC	<ul style="list-style-type: none"> • No rejection letters on file 	0.3
Nesbitt Contracting Co.	<ul style="list-style-type: none"> • No exceptions noted 	3.8
Total		\$ 24.8

Effect

Construction contracts that do not comply with all applicable Procurement Code requirements, such as supporting documentation, increase the County’s financial and legal risk.

Cause

The documentation exceptions found were a result of procurement personnel changes and a lack of contract file review.

Recommendation

MCDOT should improve contract file documentation procedures to ensure compliance with the Procurement Code.

Issue 6 Restricted Funds

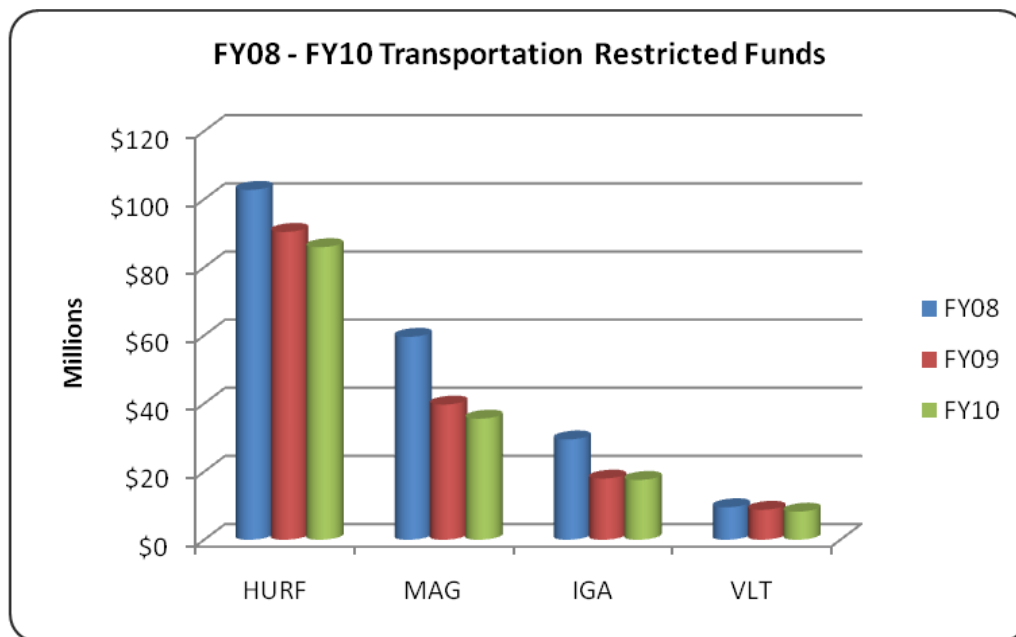
Summary

For those restricted-fund expenditures we selected for review, MCDOT appears to comply with fund requirements. Our testing for duplicate payments found six minor exceptions. MCDOT should recover any duplicate payments made to vendors.

Criteria

MCDOT's largest funding source is the State of Arizona, which transfers Highway User Revenue Funds (HURF) and Vehicle License Tax (VLT) funds to MCDOT monthly. MCDOT transportation projects may have other funding sources, such as the Maricopa Association of Governments (MAG), intergovernmental agreements (IGAs) with other governments, and federal and state grants.

The State is responsible for the distribution of these funds to counties, incorporated cities, and towns, to be used solely for highway and street purposes, which includes right-of-way acquisitions, and expenses related to construction, reconstruction, maintenance, repair, and roadside development of county, city, and town roads, streets, and bridges.



From FY 2008 to FY 2010 Restricted Funds Decreased by an Average of 17%

As stated in the Arizona Constitution (Article 9 Section 14) and in various Arizona Revised Statutes, HURF funds are restricted, and are to be expended only for highways or street purposes.

MCDOT Policy T4000, Appropriate Use of HURF, defines allowable expenses as those directly related to highway or street purposes. Examples of allowable expenses include the following:

- Transportation management, administrative support, and information technology expenses that support a county transportation department
- Costs related to road and bridge construction, reconstruction, maintenance, and repair, such as personnel, supplies, materials, contracts, equipment, and right-of-way acquisitions
- Geographical information system programming and analysis used to plan, design, and maintain public roadways
- Regional and environmental planning directly related to highway or street purposes
- Traffic studies

Unallowable expenses include employee and department resources that cannot be directly related to highway or street purposes. Examples of unallowable expenses include the following:

- Promotional products and personalized promotional items
- Catered food and services for non-MCDOT programs
- Development services related to commercial or residential development

Condition

We performed an Expenditure Compliance Test and a Duplicate Payment Test on all MCDOT expenditures obtained from payment vouchers for fiscal years 2008, 2009, and 2010 (35,509 expenditures valued at \$255,976,129). We used our Audit Command Language (ACL) software to download and analyze this data and to report our results.

Expenditure Compliance Testing

To evaluate if expenditures paid from restricted funds complied with requirements, we judgmentally selected 180 expenditures (60 from each fiscal year: 2008, 2009, and 2010). Our selection included 168 invoices paid with HURF/VLT funds, 6 invoices paid with MAG funds, 4 invoices paid with IGA funds, and 2 invoices paid with unrestricted funds. Conclusion: All invoices were correctly coded and approved, and met the restricted funds requirements.

Duplicate Payment Testing

To determine that expenditures were not duplicate payments, we performed four automated tests with our ACL software.

We identified 6,858 non-unique invoice numbers. We reviewed the invoices to make sure none were duplicates, which would result in an overpayment. Conclusion: No exceptions were found.

We identified 12,449 non-unique expenditure amounts. We reviewed the expenditures to make sure none were duplicates. Conclusion: We found three duplicates that had been paid twice (\$24, \$112, and \$222 = \$358).

We identified 2,501 invoices that were potential duplicates because of their sequential numbering. We reviewed the invoices to make sure none were duplicates. Conclusion: We found three duplicates that had been paid twice (\$78, \$127, and \$98 = \$303).

We identified 116 instances where vendor names and/or addresses were very similar. We reviewed the expenditures for these vendors to make sure none were duplicates. Conclusion: No exceptions were found.

Payroll Compliance Testing

To further test that HURF funds were being used appropriately, we judgmentally selected 60 employees (13%) being paid within MCDOT. We reviewed the June 27, 2010 payroll for these employees. Conclusion: No exceptions were found. Payroll expenditures appear to meet the fund requirements. MCDOT also appears to be preparing journal entries to allocate the expenditures to the appropriate funds.

Confirmation of External Review

We confirmed that the State of Arizona Auditor General's Office (AG) performs an annual compliance audit to ensure that MCDOT has internal controls to ensure compliance with HURF and VLT statutory requirements. The last two AG audits found no instances of noncompliance with the requirements.

Effect

Transportation funds are misused when a vendor is paid multiple times for the same purchase.

Cause

Duplicate payments may occur if invoice review procedures are not effective. In one of the situations noted in the audit, the vendor added an extension number to some invoices. This change resulted in the County's financial system not detecting the duplicates.

Recommendation

MCDOT should recover any duplicate payments made to vendors.

Information Technology

Public Works Infrastructure Technology Center (ITC) staff is responsible for supporting Information Technology (IT) in all the Public Works departments, including MCDOT. ITC provides centralized information technology services such as (1) Business Solutions: project management, business analysis, database administration, and programming; (2) GIS¹ Solutions; and (3) Network Solutions.

MCDOT uses several computer software applications to support its operations. We focused our testing on the five key systems² that support MCDOT's Article 5 procurement activities. We reviewed both general and application controls for these systems. General controls are overarching policies and procedures that apply to MCDOT's network and countywide information systems. Application controls are specific to a single information system, and are designed to support business processes and ensure the confidentiality, integrity, and availability of application data. Our review considered controls over the information technology environment and security of MCDOT's applications.

Issue 7 IT Control Environment

Summary

Through observation, limited testing, and interviews, we determined that ITC controls generally followed the COBIT framework in the following areas: information security policy, segregation of duties, account management, authentication, super user access, physical access controls, virus protection, and incident management.

Criteria

COBIT, an international, generally accepted IT control framework, gives guidance about control requirements, technical issues, and business risks. Internal Audit uses COBIT as an authority for good IT control practices. The COBIT framework recommends:

- Establishing policies and procedures to ensure system security. Policies should address user account management, identity management, physical access, and IT security.
- Defining and implementing policies and procedures for managing data. Policies should address backups and restoration, storage and retention, disposal, and security of data.
- Establishing an effective employee training program to reduce errors, increase productivity, and increase compliance with key security controls.

¹ Geographic Information System

² JAMIS, Job Cost, Contracts, Road Runner, and Road Maintenance Systems

- Developing a well-designed and well-executed service desk and incident management process to allow for timely and effective responses to IT user queries and problems.
- Managing the physical environment to protect computer equipment and personnel.

Condition

Through observation, limited testing, and interviews, we determined that the following key ITC controls generally followed the COBIT framework.

IT Controls Reviewed	
Area	Description
Information Security Policy/User Awareness	Quarterly information security policy training is provided to new hires. New hire training forms are signed and maintained.
Segregation of Duties	We noted no exceptions for four of the five applications reviewed (JAMIS, Job Cost, Road Runner, and RMS).
Account Management	We tested 20 new and 20 terminated accounts and found that ITC followed its new account authorization and account termination procedures.
Identification and Authentication	User access was appropriately established for four of the five applications (Job Cost, Road Runner, RMS, and Contracts) and the SQL database.
Super User Access³	Super user access appeared appropriate for four of the five applications reviewed (JAMIS, Road Runner, Job Cost, and RMS), and Windows Directory.
Physical Access Controls over Data and Work Centers	Physical access to the data centers appears appropriate.
Virus Protection	ITC uses the County computer virus protection software.
Incident Management	ITC incident management (help desk) procedures appeared well documented. Help desk ticket resolution appeared to be timely and accurate.

Recommendation

None, for information only.

³ Super users are users with administrative level access

Issue 8 System User Access

Summary

In general, Public Works ITC and MCDOT have IT security controls in place. However, user access controls, such as password management, privileged account administration, and access review policies, need strengthening. Weak access controls may compromise the integrity and confidentiality of system data. Public Works ITC and MCDOT should strengthen controls in these areas.

Criteria

The COBIT framework recommends:

- Maintaining user identities and access rights in a central repository and enforcing access rights. Ensuring all users and their activities on IT systems are uniquely identifiable and that user access rights are appropriately approved and in line with business needs and job requirements.
- Establishing user account management procedures that address appropriate system access as well as issuing, suspending, modifying, and closing user accounts. Performing regular management review of all accounts and related privileges.

Condition

Overall, we found that ITC and MCDOT's general and application controls protect data confidentiality, integrity, and availability, with the following exceptions:

- MCDOT Active Directory and JAMIS application password settings do not require strong enough password authentication controls, including expiration, complexity, length, reuse, account lockout, and idle timeout
- 7 administrator-level user accounts out of 32, accessing various MCDOT databases, were insecure; 2 belonged to terminated employees and 5 were unused accounts
- Users granted the "public" role within the Contract application have too much access and can insert, update, and delete data on most database tables
- ITC's periodic user-access reviews are not documented and appear to be ineffective based on the testing described above

Effect

Inadequate controls over system user access, including weak password controls, inappropriate user-access levels, and ineffective user access reviews, make it easier for unauthorized persons to perform application or system functions. Unauthorized or incorrect changes may go undetected and adversely affect application functionality, including system availability, data integrity, and confidentiality.

Cause

ITC has configured password parameters according to the requests of MCDOT users rather than adhering to good control practices. ITC states that they perform periodic access reviews; however, they do not document these reviews.

Recommendations

MCDOT should work with Public Works ITC to:

- A.** Update Active Directory domain and JAMIS application password settings according to industry standards (expiration within 90 days, enable complexity, enable timeouts at maximum of 15 minutes of inactivity, minimum password length of six characters, prevent passwords from being reused within one year, and lock user accounts after 5 failed logon attempts).
- B.** Limit “public” database roles to “read-only” access.
- C.** Review database administrator accounts regularly to ensure administrative access permissions are appropriate and perform periodic user access reviews over all critical IT applications, operating systems, and databases; take corrective action as necessary. Document all reviews and corrective action taken.

Issue 9 Application Change Management

Summary

Public Works ITC and MCDOT have a formalized application change management process, however, it is not consistently followed. Test program changes were not always correctly documented and change access is not restricted. Unauthorized changes can introduce unintended or malicious functions into an application and jeopardize system availability, data confidentiality, or data integrity. Public Works ITC and MCDOT should consistently follow internal change control practices.

Criteria

COBIT recommends managing all system changes in a controlled, formal manner by logging, assessing, and authorizing changes and tracking the status of individual requirements during design, development, and implementation, through an established change management process.

Public Works ITC internal change management procedures require that developers:

- Store source files on the developers' network space
- Enter a Production Change Request form for all changes
- Track all changes in the ITC Request Portal or the Non-Project Request Application
- Segregate development and production environments

Condition

We reviewed ITC's change management procedures and found they do not consistently follow documented agency policies.

- 14 out of 15 program changes tested did not have a valid Production Change Request form to record management's authorization, testing, and approval for system and application changes.
- Developers have unrestricted access to MCDOT's applications giving them the ability to bypass documented change management procedures.
- ITC does not consistently use software version control tools. The accuracy and completeness of software versioning is dependent upon the organizational abilities of each assigned developer.

Effect

Weak application change management controls may allow unauthorized or untested changes to be introduced into the application production environment. Unauthorized or untested changes may degrade system performance, jeopardize system availability, and threaten data integrity.

Cause

While ITC has developed formal change management policies and procedures, following these procedures has not been a priority. With its small developer staff, ITC has accepted the risk of allowing developers to work in the production environment without tracking their application modifications.

Recommendations

MCDOT should work with Public Works ITC to:

- A.** Ensure that ITC personnel adhere to the Production Change Request Procedure, including completing Production Change Request forms for all program changes.
- B.** Ensure that developers cannot make changes directly to the production environment. If developer access cannot be segregated, ITC should implement monitoring controls and review the changes on a regular basis.
- C.** Implement software version control tools to help manage and control modifications to all critical MCDOT applications.

Issue 10 IT Policies and Procedures

Summary

Although Public Works ITC and MCDOT's operational policies and procedures are well documented, formalized policies over security, job scheduling, and business continuity are not in place. Without formalized documented policies, ITC could experience errors, data confidentiality or integrity issues. Public Works ITC and MCDOT should document formal written IT policies.

Criteria

The COBIT framework recommends:

- Establishing and maintaining IT security policies, procedures, standards, and roles and responsibilities to minimize the business impact of security vulnerabilities and incidents.
- Developing, maintaining, and communicating a set of policies to support IT strategy. Policies should include policy intent, roles and responsibilities, exception process, compliance approach, and reference to procedures, standards, and guidelines.

Condition

ITC has developed many IT policies and procedures to support its operations; however, at the time of the audit, there were no formalized policies or procedures for the following critical areas:

- Agency IT Security
- Logical and Physical Security Access Review
- Security Patch Management
- Emergency Change
- Job Scheduling and Data Flow
- Backup and Recovery

Prior to the close of our engagement, ITC began to implement several of these procedures.

Effect

Incomplete or undocumented IT policies and procedures could result in users being unaware of current IT infrastructure requirements and guidelines. This could lead to data confidentiality or integrity errors, and system availability and performance issues.

Cause

ITC has relied on informal departmental procedures and the County's Office of Enterprise Technology general security policies to guide some of their key activities.

Recommendation

MCDOT should work with Public Works ITC to implement formal documented IT policies and procedures over security, logical and physical security access reviews, patch management, emergency changes, job scheduling, and backup and recovery. These policies should be reviewed on a periodic basis, and made readily available to MCDOT employees.

Department Response

AUDIT RESPONSE
TRANSPORTATION DEPARTMENT
June 29, 2011

Issue #1:

Project schedules were unavailable for the ten transportation projects reviewed. According to MCDOT, project schedules were created but not retained after the projects were closed. However, schedules were unavailable for two open projects reviewed.

Recommendation A: Establish and enforce written policies and procedures over transportation project management, setting forth responsibilities for all construction delivery teams to provide reasonable assurance that project management goals are met.

Response: Concur. We will consolidate existing policies.

Target Completion Date: 12/11/11

Benefits/Costs: Effective project management

Recommendation B: Ensure that accurate and complete project schedules are properly prepared and retained for all transportation projects.

Response: Concur – in process. We will consolidate and clarify existing policies regarding schedules, supplement with written procedures, and publish in the Construction Manual.

Target Completion Date: 12/11/11

Benefits/Costs: Improved management of project schedules.

Issue #2:

Oversight of contract change orders and work assignment amendments needs improvement. Project management does not review or approve change orders, work assignments, or work assignment amendments, although these items can significantly impact project costs and timeframes.

Recommendation A: Establish and enforce written policies and procedures that ensure strong controls over change orders, work assignments, and work assignment amendments.

Response: Concur with intent of recommendation. There is a Design Project Manager and a Construction Project Manager for each project. We will consolidate and clarify existing policies on change orders and work assignments, supplement with written procedures and publish in the Construction Manual.

Target Completion Date: 12/11/11

Benefits/Costs: Improved documentation for change orders and work assignments.

Recommendation B: Develop Pending Change Order/Work Assignment Amendment Logs that include the required cost analysis, managerial review, and approval of change order/work assignment amendments. FQAs that exceed contract values should follow the same approval process as change orders.

Response: Concur. In addition to the log currently maintained on the integrated Pay Estimate/Change Order spreadsheet, we will establish a standard written log containing all the noted elements for use on all construction projects. The log will be mandated in the Construction Manual and will also be available on the project's electronic file.

Target Completion Date: 12/11/11

Benefits/Costs: Increased control over accountability.

Recommendation C: Analyze pending Change Order/Work Assignment Amendment Logs for potential cost impact and percentage of work completed. Conduct and document contract amendment costs analysis for reasonableness. The analysis should be incorporated in amendment approval processes.

Response: Concur. This is the current practice, but will be reaffirmed and reinforced with the process outlined in the Construction Manual.

Target Completion Date: 12/11/11

Benefits/Costs: Improved documentation for changes orders and work assignments.

Recommendation D: Consider auditing large dollar change order/work assignment amendments when significant cost increases are proposed.

Response: Concur. MCDOT does have a process in place to evaluate large dollar change orders. This process will be delineated in the update of the Construction Manual.

Target Completion Date: 12/11/11

Benefits/Costs: Improved documentation for changes orders and work assignments.

Recommendation E: Allow construction to commence only after appropriate change order and work assignment amendment approvals have been obtained.

Response: Concur. This is the current practice with the exception of change orders for actual cost work as delineated in MAG 109.5. This will be included in the Construction Manual. Additionally, a pre-approval process will be implemented for cases to start work to avoid delays and associated extra costs.

Target Completion Date: 12/11/11

Benefits/Costs: Improved documentation for changes orders and work assignments.

Issue #3:

A number of strong controls could be implemented to ensure the propriety of payments made to construction contractors. For example, payment requests are not properly submitted, validated, or approved.

Recommendation A: Establish and enforce written policies and procedures that ensure strong controls over contractor payment processes and set forth the responsibilities of those tasked with preparing, validating, processing, and approving payments.

Response: Concur. We will consolidate and clarify existing policies and controls for contractor payments, supplement with written procedures and publish in the Construction Manual.

Target Completion Date: 12/11/11

Benefits/Costs: Stronger oversight of the pay request process.

Recommendation B: Ensure that all payment requests contain sufficient detail and documentation to verify the propriety of the amount billed. Payment requests be reviewed and approved prior to payment by the project manager for construction.

Response: Concur. We will consolidate and clarify existing policies and controls for contractor payments, supplement with written procedures and publish in the Construction Manual.

Target Completion Date: 12/11/11

Benefits/Costs: Improved documentation for pay requests.

Issue #4:

MCDOT does not have procedures in place to ensure project costs are properly reconciled between the two systems used to record costs, which increases the risk of inaccurate financial reporting.

Recommendation A: Reconcile the Advantage and Job Cost systems at least monthly.

Response: Concur – in process. We use Advantage each month to develop project reports for project managers. Job cost information is used in the department to supplement information not available in Advantage. We will review the Job Cost systems and reconciliations.

Target Completion Date: 12/31/11

Benefits/Costs: Reduces risk of inaccurate reporting.

Recommendation B: Review the feasibility of acquiring and implementing a job cost module within the Advantage system.

Response: Concur – in process. We will review job cost options with the Finance Department.

Target Completion Date: 12/31/11

Benefits/Costs: Lessens need for internal cost system.

Issue #5:

For those construction contracts we selected for review, MCDOT appears to generally comply with applicable requirements of the County's Procurement Code. However, we noted opportunities to improve file documentation for public notifications, rejection letters, and change orders.

Recommendation: Improve contract file documentation procedures to ensure compliance with the Procurement Code.

Response: Concur - completed. The Contracts Branch uses a checklist to track file documents.

Target Completion Date: Completed

Benefits/Costs: File documentation shows compliance with the Procurement Code.

Issue #6:

For those restricted-fund expenditures we selected for review, MCDOT appears to comply with fund requirements. Our testing of restricted-fund expenditures for duplicate payments found six minor exceptions.

Recommendation: Recover any duplicate payments made to vendors.

Response: Concur – in process. Vendors have issued credits.

Target Completion Date: 9/1/11

Benefits/Costs: Potential additional revenues.

Issue #7:

Through observation, limited testing, and interviews, we determined that ITC controls generally followed the COBIT framework in the following areas: information security policy, segregation of duties, account management, authentication, super user access, physical access controls, virus protection, and incident management.

Recommendation: None, for information only.

Issue #8:

In general, Public Works ITC and MCDOT have IT security controls in place. However, user access controls, such as password management, privileged account administration, and access review policies, need strengthening.

Recommendation A: Work with Public Works ITC to update Active Directory domain and JAMIS application password settings according to industry standards (expiration within 90 days, enable complexity, enable timeouts at maximum of 15 minutes of inactivity, minimum password length of six characters, prevent passwords from being reused within one year, and lock users accounts after 5 failed logon attempts).

Response: Concur-completed. For Active Directory we implemented password expiration at 45 days, enabled timeouts at maximum of 15 minutes of inactivity, required minimum password length of eight characters, cannot use 12 previous passwords and user accounts are locked after 3 failed logon attempts for 30 minutes and password complexity was implemented. In Jamis we implemented password expiration at 90 days, minimum password length of 8 characters, cannot reuse password for 360 days, users account is locked after 5 failed logins.

Target Completion Date: 6/7/11

Benefits/Costs: Increased controls improve security.

Recommendation B: Work with Public Works ITC to limit “public” database roles to “read-only” access.

Response: Concur – completed. All access to the Public Database Role has been removed from the Contracts Database.

Target Completion Date: 2/1/11

Benefits/Costs: Increased controls improve security

Recommendation C: Work with Public Works ITC to review database administrator accounts regularly to ensure administrative access permissions are appropriate and perform periodic user access reviews over all critical IT applications, operating systems, and databases; take corrective action as necessary. Document all reviews and corrective action taken.

Response: Concur – in process. We will develop a PPD that puts in place stricter user access controls by performing annual user access review audits on all productions/databases.

Target Completion Date: 6/30/11

Benefits/Costs: Increased controls improve security

Issue #9:

Public Works ITC and MCDOT have a formalized application change management process, however, it is not consistently followed. Test program changes were not always correctly documented and change access is not restricted.

Recommendation A: Work with Public Works ITC to ensure that ITC personnel adhere to the Production Change Request Procedure, including completing Production Change Request forms for all program changes.

Response: Concur – in process. We will develop PPD that requires all application changes be managed by the Business Solutions Manager and the Application Development Manager through the Cipher Tool.

Target Completion Date: 7/15/11

Benefits/Costs: Increased controls improve security

Recommendation B: Work with Public Works ITC to ensure that developers cannot make changes directly to the production environment. If developer access cannot be segregated, ITC should implement monitoring controls and review the changes on a regular basis.

Response: Management accepts risk of this issue. The department has decided to accept the risk because of the limited staff and cross training required. The risk is mitigated through the department's vigorous backup and restores processes in place.

Target Completion Date: 11/01/10

Benefits/Costs: Increased controls improve security

Recommendation C: Work with Public Works ITC to implement software version control tools to help manage and control modifications to all critical MCDOT applications.

Response: Concur – in process. Will develop a PPD to ensure versioning is controlled by the Application Development Manager by displaying the versions on the title pages of applications.

Target Completion Date: 6/30/11

Benefits/Costs: Increased controls improve security

Issue #10:



Although Public Works ITC and MCDOT's operational policies and procedures are well documented, formalized policies over security, job scheduling, and business continuity are not in place.

Recommendation: Work with Public Works ITC to implement formal documented IT policies and procedures over security, logical and physical security access reviews, patch management, emergency changes, job scheduling, and backup and recovery. These policies should be reviewed on a periodic basis, and made readily available to MCDOT employees.

Response: Concur – in process. Will create, post and communicate a summary of the noted items in an over reaching Security document on the pwinfo ITC How Do I page. Some of the items in other findings need to be complete to finalize this.

Target Completion Date: 9/30/11

Benefits/Costs: Increased controls improve security

Approved By:	 _____	<u>6-28-2011</u>
	Department Head	Date
	 _____	<u>6.28-2011</u>
	Assistant County Manager	Date
	 _____	<u>6/29/11</u>
	County Manager	Date