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OFFICE OF THE STATE AUDITOR'S REPORT ON THE EXAMINATION OF CONTROLS OVER INFORMATION TECHNOLOGY-RELATED ASSETS AT NORTH SHORE COMMUNITY COLLEGE

July 1, 2002 through December 21, 2004

OFFICIAL AUDIT REPORT JUNE 9, 2005

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INTRODUCTION

North Shore Community College (NSCC) is a two-year Massachusetts institution of higher education offering associate degree and certificate programs. The College, which was established in 1965, is a member of the Massachusetts State College System and is regulated by Chapter 15A, Section 5, of the Massachusetts General Laws (MGL). The College's primary mission is to provide academic preparation for transfer to four-year institutions, career preparation for entry into occupational fields, developmental courses to prepare students for college-level work, and job retraining.

North Shore Community College is governed by a Board of Trustees and is under the direction of the College's President. The Board of Higher Education provides additional oversight to the College and monitors each Massachusetts higher educational institution to help ensure that state funds support measurable performance, productivity, and results.

The College's main campus is located on Ferncroft Road in Danvers, with a second campus located on Broad Street in Lynn, and a satellite location on Elliot Street in Beverly. The College maintains its information technology (IT) facility in Danvers and computer labs at all three locations. The College offers 89 degree and certificate programs. For the fall semester 2004, the College had an enrollment of 2,774 full-time and 3,916 part-time students. At the time of our audit, the College employed 388 full-time and part-time faculty, administrators, and staff members, and was supported by a fiscal year 2004 budget of approximately \$42.9 million.

The College's administrative and academic operations are supported by information technology services provided by their Information Services (IS) Department. The IS Department is comprised of 17 staff members and a Chief Information Officer who reports directly to the Vice President of Finance and Administration. The IS Department provides a range of services to assist and guide administrative and academic staff in the use of administrative computer-based systems, college portal, online programs and web services, telecommunications, print servers, copier management, IT security, and e-mail. The IS Department also supports a campus-wide network and client infrastructure (NSCC network) consisting of 56 network file servers that are configured on a Wide Area Network (WAN) for use throughout the College. The NSCC network is connected throughout the campus by an Ethernet network gateway that uses a fiber optic backbone to allow connectivity to internal and external users. An independent T1 line with its own proprietary firewall provides full connectivity to the College's Internet provider, the University of Massachusetts. The campus portal was implemented in 2000, and according to College management, provides a secure integrated environment for providing online services to

members of the college community. NSCC has recently installed an updated firewall software product on the NSCC network to help protect the network from unauthorized access. The College's WAN also supports applications consisting of the Microsoft suite of software products and provides Internet and e-mail connectivity for use throughout the College.

From an administrative perspective, IT systems are used to process the College's financial management, administrative, and student information activities. In this area, the primary mission-critical application is the Banner system (Banner). The Banner system is a vendorsupplied software product that can be configured to consist of a suite of five integrated subsystems: advancement, finance, financial aid, human resources, and student. At the time of our audit, the College had installed and was using the advancement, finance, financial aid, and student subsystems. Each of these integrated subsystems is comprised of an array of program modules. For example, the student system includes the admissions, registration, and academic history modules. The financial aid subsystem enables the College to process student eligibility information for tuition assistance for qualified applicants. In addition, the administrative system integrated within the NSCC campus portal, known as the Campus Pipeline, allows users to electronically view email and information, such as financial aid status and final grades. Although NSCC had installed the finance subsystem, at the time of our audit, the College had not yet implemented the fixed asset module and was using a Microsoft Access-based application to maintain its fixed-asset inventory. The College had more than 1,300 workstations, including 86 laptops, of which over 400 had accessibility to the Banner system. The College also has access to the state Human Resources Compensation Management System (HR/CMS) and the Massachusetts Management Accounting and Reporting System (MMARS). The College uses HR/CMS for all payroll purposes and to electronically update MMARS and the Banner finance subsystem with payroll expense information.

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AUDIT SCOPE, OBJECTIVES, AND METHODOLOGY

Audit Scope

In accordance with Chapter 11, Section 12, of the Massachusetts General Laws, we performed an information technology (IT) examination of controls over IT-related equipment at the North Shore Community College (NSCC) covering the period of July 1, 2002 through December 21, 2004. The audit, which was conducted from November 8, 2004 through December 23, 2004, included a general control examination of the College's internal controls regarding accounting for and safeguarding IT-related equipment and the College's compliance with applicable laws and regulations regarding fixed assets of the Commonwealth. Specifically, we examined the College's documented policies and procedures regarding the receiving, recording, accounting for, and disposition of IT-related equipment. Furthermore, we examined the College's inventory system of record for IT-related equipment for validity, accuracy, and completeness, and reviewed controls related to physical security and environmental protection for areas housing IT resources that were included in our audit tests.

Audit Objectives

Our primary audit objective was to determine whether NSCC had adequate controls in place and in effect to provide reasonable assurance that the College's IT-related equipment would be properly received, accounted for, and safeguarded. We sought to determine whether NSCC's internal control processes, including policies, procedures, practices, and organizational structures, provided reasonable assurance that the College's business objectives in the area of inventory control would be achieved and that undesired events, such as unauthorized use, loss or theft of IT resources, would be prevented or detected and, if detected, corrected. In conjunction with our primary audit objective, we sought to determine whether NSCC had implemented formal, approved policies and procedures regarding the proper recording, accounting for, and safeguarding of IT-related equipment. We also sought to determine whether adequate controls were in place to restrict access to the College's two data centers and areas containing IT-related equipment that we visited during our physical testing of the College's inventory. We also sought to determine whether adequate physical security controls were in place to safeguard IT-related equipment. Further, we sought to determine whether adequate environmental protection controls were in place to prevent damage to, or loss of, IT-related equipment in these areas. With respect to the College's adherence to applicable laws and regulations regarding fixed assets of the Commonwealth, we sought to determine if NSCC was in compliance with Chapter 647 of the Acts of 1989 regarding requirements for reporting lost or stolen equipment; Office of the State Comptroller's "Internal Control Guide for Departments" and policies pertaining to assets, including Office of the Comptroller's Memos 310 and 313A, and 802 CMR 3:00 of Operational Services Division's regulations regarding the disposition of surplus state equipment.

Audit Methodology

To determine the audit scope and objectives, we obtained an understanding of NSCC's mission, organizational structure, and primary business functions. We performed pre-audit steps, including reviewing NSCC's enabling legislation, reviewing documentation of the College's business processes, and identifying IT resources used to support the College's business operations. We reviewed information posted on the College's web site, obtained and recorded an understanding of relevant business and IT operations, and reviewed documentation regarding NSCC's mission, operations, and IT organization and management. To obtain an understanding of the College's business operations and information technology control environment, we interviewed the College's Vice President of Administration and Finance, Chief Information Officer, Director of Networking and User Services, Comptroller, Supervisor of Auxiliary Services, Chief of Campus Police, and other NSCC personnel. To assess the appropriateness of the College's IT inventory controls, we first evaluated the degree to which NSCC had documented, authorized, and approved control policies and procedures for receiving, recording, monitoring, and safeguarding IT-related equipment. We then assessed whether the existing inventory control policies and procedures addressed the requirements of the College and the nature and extent of the IT environment. We also obtained an understanding of computer operations at NSCC and conducted site visits of the College's two data centers.

With respect to the College's receiving and recording of purchased IT-related equipment, we reviewed the adequacy of operational and management controls, including documentation of the College's segregation of duties and the extent of management supervision over the receiving and recording of new hardware items. We also assessed the strengths and weaknesses of NSCC's internal control system over the College's inventory control activities.

To identify the College's system of record for IT-related equipment, we interviewed Fiscal Services and IS Department management and obtained and reviewed both Fiscal Services' official system of record for all NSCC fixed assets and the IS Department's listing of IT-related

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equipment. We reviewed the IS Department's listing of the College's 1,657 computer hardware items valued at \$2.68 million and compared it to the computer hardware items listed on Fiscal Services' official system of record that contains all of the College's fixed assets. Further, we reviewed both records to ensure that they contained adequate fields of information for IT configuration management. To verify the integrity of the information on the IS Department's computer hardware inventory listing, we assessed the level of data completeness for all required data fields for the full inventory of IT resources, and tested data accuracy for all data fields based on a sample of IT resources. Finally, to determine whether computer hardware purchases in fiscal years 2003 and 2004, valued at \$890,000, were listed accurately on the IS Department's system of record for IT-related assets, we verified the amounts recorded on the inventory record to the College's purchase orders and invoices.

To verify the integrity and completeness of the College's system of record for IT-related assets, we selected a judgmental sample of 131 items, or over 40% of the College's purchased IT equipment from invoices for fiscal years 2003 and 2004, and 301 items, or 100%, of the College's leased IT equipment acquisitions for the same period. Moreover, to determine whether the College's inventory records were current, accurate, and valid, we used audit software to select a statistical sample with a 95% confidence level and 5% tolerable error rate, or 60 computer hardware items valued at \$156,510 from all items appearing on the IS Department's listing of IT-related assets to compare to the actual computer hardware on hand. We verified, by visual inspection, the existence and location of these 60 computer hardware items and determined whether they were properly tagged, in good condition, and whether the serial numbers affixed to the equipment were accurately recorded on the system of record for IT-related equipment. Further, to verify the integrity and completeness of NSCC's system of record for IT-related equipment, while conducting our visual inspection of these 60 IT-related assets, we selected 26 additional computer hardware items in adjacent locations and determined if they were properly recorded on the College's system of the were properly recorded.

To determine whether the College's IT-related equipment was safeguarded from damage or loss, we reviewed on a limited basis, physical security and environmental controls over IT resources through review of written policies and procedures in this area, observation during the walk through of the College, and during the physical testing of the inventory. Further, to determine whether NSCC had appropriate control practices in place and in effect to account for and safeguard laptop computers, we interviewed IS Department and Fiscal Services Department's

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senior management and requested for review the College's documented policies and procedures to control the assignment and use of laptop computers.

To determine whether NSCC was in compliance with Commonwealth of Massachusetts regulations for accounting for assets, we reviewed evidence supporting the College's performance of an annual physical inventory of IT-related assets. Further, to determine whether NSCC was in compliance with Commonwealth of Massachusetts regulations for disposal of surplus property, we reviewed records and supporting documentation for IT-related equipment that was disposed of during the audit period as well as IT-related equipment that the College plans to request Commonwealth approval to dispose of as surplus. Finally, to determine if the College was in compliance with Chapter 647 of the Acts of 1989 regarding reporting requirements for missing or stolen assets, we interviewed the College's Vice President of Administration and Finance and Chief of Campus Police, reviewed incident reports for missing or stolen IT-related equipment for the audit period, and verified that these incidents were reported to the Office of the State Auditor.

Our review was conducted in accordance with Generally Accepted Government Auditing Standards (GAGAS) and industry auditing practices. The audit criteria used for our control examination were based on applicable legal requirements, control objectives, generally accepted IT control practices found in Control Objectives for Information and Related Technology (CobiT), and Office of the State Comptroller's "Internal Control Guide for Departments" promulgated under Chapter 647 of the Acts of 1989.

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AUDIT CONCLUSION

Our audit disclosed that North Shore Community College needed to strengthen inventory controls to provide reasonable assurance that IT resources are properly recorded and accounted for. Although NSCC made a conscientious effort to maintain an accurate and complete inventory of IT equipment, the College needed to enhance inventory control policies and procedures to ensure timely recording of equipment received, signed agreements regarding user responsibilities for personally-assigned laptop computers, sufficiently-documented control practices, and adequate maintenance, monitoring, and reconciliation of inventory records. Our examination of NSCC's inventory of IT resources indicated that an acceptable level of data integrity existed at the time of our audit, and that the College had appropriate policies and procedures for ordering and purchasing of IT-related equipment.

With respect to the adequacy of the College's system of record for IT-related assets, our audit disclosed that NSCC's perpetual inventory system of record contained appropriate data fields, including dates of acquisition, cost, location, identification tag and serial number, and description. However, the College's inventory record would be strengthened by including a data field for "condition of item" to support asset or IT configuration management by noting the asset's status, such as being repaired, obsolete, or designated for surplus.

Our audit also disclosed that NSCC did not record purchased computer hardware items on the College's perpetual inventory when the equipment was received. Instead, the College recorded these items on the inventory only after they were taken out of storage and deployed, often months after the equipment had been received. At the time of our audit, the delay in recording received IT equipment resulted in the College's inventory system of record being incomplete and understated by \$66,951, the cost of 63 new computers that we found were held in storage for four months awaiting deployment to user areas and had not yet been recorded. In order to maintain a current, accurate, and complete perpetual inventory of IT-related equipment, the College needs to ensure that IT equipment is recorded upon receipt.

Our audit also disclosed that NSCC needed to strengthen controls over the monitoring of its inventory to provide reasonable assurance to ensure that all IT-related equipment would be adequately accounted for and that an accurate and complete listing of IT-related assets would be made in a timely manner. Specifically, although the College's senior management stated that they had performed an annual physical inventory, the College could not provide a complete set of verification records supporting the physical inventory nor a reconciliation of the physical

inventory to the College's system of record for IT-related assets. As a result, NSCC's lack of documentation of monitoring and reconciliation of its inventory added to the risk of unauthorized use, loss or theft of the College's IT-related equipment or that inventory-related data may become unreliable.

Our review of NSCC's records and supporting documentation for computer hardware items that were disposed of during the audit period, as well as IT-related assets the College plans to request Commonwealth approval to dispose of as surplus, determined that the College was in compliance with Commonwealth of Massachusetts regulations for disposal of surplus property.

Our audit disclosed that NSCC did not have adequate controls in place and in effect to monitor the assignment and use of laptop computers. Specifically, our audit determined that NSCC assigned multiple laptop computers to department heads to be distributed for use by faculty, staff, and students without requiring signed responsibility and usage sheets from assigned users, thereby increasing the risk that adequate security may not be maintained, equipment may not be recovered from an assigned user, or equipment loss may go undetected.

Our audit revealed that the College had adequate physical security and environmental protection controls in place to provide reasonable assurance that IT-related equipment was safeguarded from damage or loss. No deficiencies came to our attention during our on-site observations of areas housing IT resources, or resulting from our review of written policies and procedures in this area, to indicate that the College was not providing adequate physical security and environmental protection to safeguard its IT-related equipment.

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AUDIT RESULT

Information Technology-Related Inventory Controls

Our audit of North Shore Community College disclosed that policies and procedures for ordering and purchasing of IT-related assets were adequate, appropriate controls were maintained for safeguarding the College's computer equipment, and the College maintained an inventory system of record with fields of information, including date of acquisition, cost, location, identification tag, serial number, and description. Our audit disclosed, however, that the College needed to strengthen its documented internal control policies, procedures, and practices regarding inventory control of IT-related assets in the areas of receiving, recording, and inventory verification.

Our audit disclosed that the College needed to strengthen its procedures related to recording of purchased IT-related equipment on the College's inventory records. Specifically, we found that although receiving department staff entered required information for new equipment on inventory cards as the items were received, no information was entered into the College's inventory system of record until the items were ultimately transferred from storage and deployed in user areas. At the time of our audit, NSCC's documented policies and procedures did not indicate the timeframe required for recording purchased IT-related equipment on the College's inventory system of record.

With respect to the College's receiving function, our review of the College's documented policies and procedures and our observation of the workflow in the receiving area revealed that the duties in this area were not assigned to separate staff members. As a result, receiving, tagging, recording, and distribution duties were often performed by one employee without an adequate level of supervision or oversight. An appropriate level of segregation of duties decreases the risk of undetected data entry errors, unrecorded items, and loss or theft of IT-related equipment.

Our inventory tests of the College's system of record as of November 8, 2004, which included 1,657 IT-related assets valued at \$2.68 million, disclosed that controls over the recording of IT-related equipment entering the College needed to be strengthened. Our assessment of data elements contained in NSCC's inventory system of record disclosed that appropriate data fields existed in the system of record, except for the absence of data on the status of the item. The inventory did not include the data field "condition of item" to note an asset's status, such as not functional, being repaired, obsolete, or designated for surplus, necessary for IT

configuration management. This data field could have been used by the College to identify computer hardware items held in storage awaiting initial deployment. Our audit also revealed that purchased computer hardware items were not always recorded on a timely basis. Specifically, our audit tests performed on 432 computer hardware items purchased during fiscal years 2003 and 2004 revealed that 25 of these items were not included on the College's system of record. We were able to verify that these 25 items were part of 63 unrecorded computers that the College held in storage for four months awaiting initial deployment. At the time of our audit, the delay in recording the 63 new computers held in storage resulted in the College's inventory system of record to be incomplete and understated by \$66,951 at the time of the audit test. We found that cost figures were accurate, complete, and valid for the 432 items tested, except for the 25 items not yet included on the inventory. The weaknesses noted in NSCC's inventory control system could hinder proper accounting of IT resources and timely detection of missing or misplaced equipment. The Office of the State Comptroller's guidelines and prudent business practices require the College to record received assets in a timely manner in order to reduce the risk of loss or misuse

Based on a statistical sample of 60 IT-related assets, valued at \$156,510, randomly selected from the inventory record that were compared to actual items of equipment on location, we found that all 60 items could be located within the College and that 58, or 96.67% of the sample drawn, had the correct location listed on the inventory record. Two items were found in locations other than those stated on the inventory record. Data integrity tests for description, tag number, serial number, and vendor/manufacturer for the sample drawn revealed that accuracy levels for data elements ranged from 95% to 100%.

Our audit indicated that NSCC's monitoring of IT equipment inventory needed to be strengthened. Specifically, although NSCC senior management stated that they performed an annual physical inventory, the College could not provide verification records supporting the physical inventory nor a reconciliation of IT-related equipment to the College's inventory system of record. The absence of documented policies and procedures regarding inventory verification hindered the College's ability to ensure the integrity of its inventory system of record as it pertained to IT-related assets.

We also found that NSCC lacked a centralized policy to control the assignment and use of the College's laptop computers. We determined that NSCC assigned multiple laptop computers to department heads to distribute for use by students and College staff without requiring signed responsibility and usage sheets from staff or students using the computers, thereby increasing the

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risk of loss or theft of these assets. NSCC's lack of a centralized policy to control laptop computers hindered the College's ability to properly account for available hardware systems, undermined its ability to determine if IT resources were properly allocated to users, and decreased the opportunity for recovery from an assigned user in the event of loss or theft of these assets.

Recommendation

We recommend that NSCC senior management strengthen the College's documented internal control policies, procedures, and practices regarding inventory control of IT-related equipment in the areas of receiving, recording, and inventory verification to help ensure that the College properly records, accounts for, and monitors its IT-related equipment.

With respect to the College's receiving function, the College needs to enhance inventory control policies and procedures related to the receiving function by implementing segregation of duties and increasing supervision and oversight. The functions of receiving, tagging, recording, and distribution of assets should be segregated to reduce the risk of undetected data entry errors, unrecorded items, and theft of IT-related equipment. Improving the level of documentation and segregating duties in the receiving area will help to ensure that all computer hardware items are properly recorded on the College's inventory list in a timely manner and adequately safeguarded.

With respect to the recording of IT-related equipment, we recommend that the College strengthen its documented procedures related to the timely recording of purchased IT-related equipment on the College's inventory system of record. The College should enter all IT-related equipment on the inventory system of record when received, rather than waiting until the items are deployed, which could be months later. NSCC should implement these control procedures to help ensure that all IT-related equipment is recorded on the inventory record in a timely manner so that the College can produce a complete record of all IT-related equipment on a perpetual basis. These procedures should include, at a minimum, that a perpetual inventory record of computer hardware items be maintained and periodically verified through reconciliation to computer equipment acquisition and disposal records. Further, the College's inventory records should reflect any changes to computer hardware items, including location or status, for both deployed equipment and items held in storage. Also, the College should include on its inventory system of record an additional data field of "condition of item" to properly note an asset's status, such as not functional, being repaired, obsolete, or designated for surplus.

With respect to NSCC's monitoring of its IT-related equipment, the College should improve documentation supporting the annual physical inventory, including a reconciliation of the physical inventory to the College's inventory records. This improved documentation will help ensure the integrity of NSCC's perpetual inventory system of record for IT-related assets and provide reasonable assurance that the College's inventory records can be effectively used to support IT configuration management and help safeguard its computer equipment. Furthermore, once NSCC has completed its annual physical inventory of computer equipment, we recommend that the College maintain supporting documentation of the physical inventory performed and its reconciliation to the perpetual inventory system of record. To maintain proper internal control, staff that are not responsible for maintaining the College's system of record for fixed-assets should perform the periodic reconciliation. Furthermore, to eliminate duplication of inventory records, we recommend that the College consider using a single inventory system, such as the Banner ERS fixed assets module to support inventory and configuration management requirements for the College's Fiscal Services and Information Services Departments.

Finally, with respect to laptop computers, we recommend that NSCC develop a centralized policy requiring users who are assigned laptop computers or other IT resources must sign a responsibility and acceptable usage form. Procedures to support the policy should be documented and implemented to help ensure that the equipment is used for approved purposes and that appropriate security measures are taken to reduce the risk of loss or misuse of the equipment.

Auditee Response

North Shore Community College management agrees with the recommendations of the State Auditors' Office, specifically to further refine current inventory control policies and procedures. NSCC has already made progress and implemented improvements based on these recommendations.

Procedures for newly received computers awaiting deployment are now recorded within two weeks noting the storage location with a final change of location being recorded upon deployment. Our written procedures have also been augmented to provide additional detail for tasks and personnel responsibilities, more fully list segregation of duties, and to ensure inventory verification/documentation records are in place and properly utilized by the appropriate staff. In addition we will begin utilizing the condition data field within our inventory database to track asset status such as "not functional", "being repaired", "obsolete" or "designated for surplus". This addition will provide more information to assist in our system replacement decisions. As has been past practice, a complete reconciliation of IT assets to the physical inventory of record will be conducted annually and inventory documents will be stored appropriately. Interim periodic verifications will occur after major

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semester deployments. During this summer we will continue to refine our procedures.

Some of the weaknesses described by the audit were influenced by reductions in the Receiving department staff and changes in IT management personnel due to the Commonwealth Early Retirement Program. The College Receiving department, which was reduced by one management and two classified staff through the Commonwealth's Early Retirement Programs, has recently been reorganized including the addition of one clerical staff in February 2005. This will assist with the segregation of inventory duties and supervisory responsibilities more appropriately. Some of the incomplete or missing IT verification forms were formerly under the control of the Director of Networks, who had also taken an ERIP; the College replaced that management position in August 2004. To assist with this process another clerical position was added to the IT department in February 2005. One primary responsibility of this position consists of tracking, monitoring, controlling and reconciling IT inventory assets. We expect that refined and more detailed procedures along with staff additions will have a positive impact on internal controls, segregation of duties, and ensure consistency regardless of personnel changes.

NSCC will develop and implement a standard form listing the responsibilities and procedures required for laptop usage. Long term and temporary laptop users who receive laptops from the IS department will be required to sign the form. The IS department will keep record of these forms. The IS department will also communicate these procedures to departments that provide loaner laptops and it will be their responsibility to have users sign the forms and keep appropriate records of such. The IS department will review these departmental records during its annual inventory process.

During the past few years of State appropriation reductions, replacement of our Inventory Access database has been analyzed and was on the radar screen, however, due to financial and resource support reasons did not get completed. The College is now investigating an alternative inventory system as recommended. This spring several College IT staff further researched utilizing the Banner Fixed Assets and Stores Inventory modules and discovered that this solution may be inadequate to properly record adds, moves and changes, which are critical for our inventory control requirements. College management is committed to finding a proper solution for inventory control and will further review the Banner solution, purchase a solution or develop a more sophisticated consolidated Database system.

Auditor's Reply:

We commend the College for initiating appropriate corrective action in a timely manner. We are pleased that the College is taking steps to strengthen the integrity of the fixed-asset inventory record. We believe a comprehensive inventory control system for all fixed assets, including IT resources, is an important ingredient for your overall internal control structure. Strengthening inventory control procedures will improve the integrity of the inventory system of record and enhance knowledge of the IT infrastructure management capabilities.

We believe that controls to ensure adequate accounting of IT resources, including laptop computers, will be strengthened by updating the inventory record when changes in status or location occur and then routinely, or on a cyclical basis, reconciling the physical inventory to the system of record. Maintenance of a perpetual inventory, coupled with routine reconciliation, should also improve the detection and subsequent accounting for any lost, stolen, or surplused equipment. In addition, these efforts should help minimize the risk of lost or stolen equipment and improve the identification of the status of equipment for configuration management purposes.