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Angela M. Darragh, CPA, CFE, CISA, Director

May 18, 2016

Mr. Don Burnette
Clark County Manager
500 South Grand Central Parkway, 6th Floor
Las Vegas, Nevada 89106

Dear Mr. Burnette:

We recently completed an audit of the Assessor Application. The objective of this audit was to ensure the integrity and availability of information accessed through the Assessor's system. We determined that confidentiality of records in accordance with NRS 250.140 and 361.044 was a low risk and therefore confidentiality was not considered in this audit. The scope of our audit included transactions from January 1, 2015, to December 31, 2015. We also reviewed personal property certified values as of March 11, 2016. The last day of fieldwork was April 4, 2016.

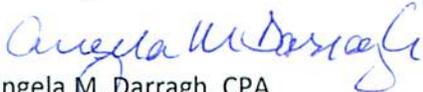
We identified the following opportunities for improvements to ensure the integrity and availability of data:

- Obtain authorization for generic user accounts or eliminate accounts.
- Formally approve database administrator user access.
- Eliminate right to deletion of accounts and parcels.
- Disable separated employee and inactive user access.
- Comply with Clark County Information Technology Directive for password configuration and frequency of change.
- Perform periodic recovery testing.
- Implement policies and acknowledgement forms for disallowing the changing of personal account information in CAMA

We provided a draft report to the Assessor and her response is included in our report.

We appreciate the cooperation and assistance provided by the staff and management of the Assessor's Office.

Sincerely,


Angela M. Darragh, CPA
Audit Director



Audit Report

Assessor's Office Assessor Application Audit

May 2016

Angela M. Darragh, CPA, CISA, CFE
Audit Director

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Commissioner Steve Sisolak
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REPORT DETAILS

BACKGROUND

The Assessor's Office is responsible for performing the assessment of real and personal property in accordance with NRS 361. Real and personal property information and valuations are processed in the Computer Assisted Mass Appraisal (CAMA) computer application, which went live December 2014. The application was last updated April 22, 2015. CAMA is supported by various consultants and the vendor that owns the application, Thomson Reuters. Both the database and the servers that store the application are backed-up continually by Clark County Information Technology. The database is administered through an assigned Clark County Information Technology employee. The CAMA application is one of the largest in Clark County, with 11.5 terabytes of data.

Real property assessed values in the State of Nevada are based on replacement cost. The Assessor's Office uses Marshall & Swift to provide electronic replacement cost values. These values are updated annually. Personal property is valued at acquisition cost. Real and personal property are also depreciated in accordance with state statutes. Depreciation is automatically calculated by CAMA based on information available in data tables and the appropriate property year. Exemption values are also maintained in CAMA.

In order to control the integrity of data within CAMA, interface programs are utilized to enter and verify data prior to updating real and personal property information. The Assessor's Office updates real property taxpayer and owner information by extracting information from the Recorder's Office computer system, which is used to record and index recorded documents and to retrieve copies of the documents. The Assessor's Office extracts data from the Recorder daily. The Assessor's Office verifies the information and then updates their files through a CAMA interface. Appraisers enter information for calculating real and personal property that are valued within CAMA.

CAMA calculates the assessed and taxable values from all the entered information, whether through manual entry or uploads. The replacement cost after depreciation and exemptions is the taxable value.

Nevada Revised Statutes (NRS) 361.225 sets the rate of assessment at 35% of taxable value for all property. NRS 361.227 also has a capping provision that states the taxable value of any property must not exceed its full cash value. The Assessor's Office has separate computer applications where market valuations are done for commercial and residential real properties. Files from these other applications are produced for those properties whose replacement cost must be adjusted down to comply with NRS 361.227. Adjustments for residential real property are based on sales. The adjustment rates for residential real property are known as obsolescence rates. Commercial properties cash value is determined by an estimated income valuation method. The adjustments to commercial property taxable values for these are known as income values. The Assessor's Office also makes other



adjustments due to value changes decided by the State Board of Equalization. The files from these various other programs are uploaded into CAMA by Information Technology database administrators to adjust the taxable value initially calculated from replacement cost.

The Assessor's Office provides the Clark County Treasurer information daily for taxpayer and owner name, address, parcel number, and tax district changes obtained through the Recorder's data extracts. The Assessor's Office also provides assessment rolls to the Treasurer's Office as required by state statutes. The Assessor's Office collects personal property tax payments in a separate module known as Aumentum. Data transfers of personal property certified values also occur from CAMA to Aumentum. Personal property is billed continuously. The assessment roll reviewed for August 2015 amounted to a total of \$65 billion. Personal property certified values as of March 11, 2016, amounted to \$3.7 billion.

OBJECTIVES, SCOPE, AND METHODOLOGY

The objective of this audit was to ensure the integrity and availability of information accessed through the Assessor's system. Confidentiality of records in accordance with NRS 250.140 and 361.044 was determined to be a low risk and was not considered in this audit. The scope of our audit included transactions from January 1, 2015, to December 31, 2015. Personal property certified values were reviewed as of March 11, 2016.

In order to achieve our objective, we obtained an understanding of the control and application processes for user access, security, back-ups, data entered from Recorder extracts, valuation calculations for real and personal property, and data output for Treasurer extracts. Recorder extracts are data that is queried through scripts by the Assessor's Office from the Recorder's Office's computer application used to record and index documents. The Treasurer extracts are data that is queried from the Assessor's Office CAMA application and forwarded to the Treasurer's Office for tax billing and includes the assessment rolls. We evaluated risk after our preliminary survey. We then designed our audit program to address the risks identified. We reviewed 100% of user access, including user access by Assessor's Office personnel and access by vendors, database, and security administration performed through the Information Technology department. We compared active employee lists to user access lists. We selected representative samples to trace data the Assessor's Office extracted from the Recorder's Office and entered into CAMA. We compared the August 2015 tax roll to the Unsecured Tax Roll Summary reported by the Assessor. We selected a representative sample from the August 2015 assessment roll using Excel random number generators and recalculated the real property valuations. We requested the most recent certified values, as of March 11, 2016, for personal property and reconciled the amounts to the Personal Property Total Register Detail. We then selected representative samples from the personal property certified value list and recalculated personal property valuations. All recalculations included individual line item recalculations and tracing all recalculations to the total taxable value and then to the net assessed value. Recalculations also included depreciation and obsolescence recalculations. We traced the samples selected from the Recorder extracts that were entered into CAMA by the Assessor's Office to the Treasurer extracts to determine that the data output



was accurate and complete. Finally, we calculated the number of days between the date entered and the date the data was made available to the Treasurer's Office.

Our review included an assessment of internal controls in the audited areas. Any significant findings related to internal control are included in the detailed results. The last day of fieldwork was April 4, 2016.

We conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

CONCLUSION

We identified the following opportunities for improvements to ensure the integrity and availability of data:

- Obtain authorization for generic user accounts or eliminate accounts.
- Formally approve database administrator user access.
- Eliminate right to deletion of accounts and parcels.
- Disable separated employee and inactive user access.
- Comply with Clark County Information Technology Directive for password configuration and frequency of change.
- Perform periodic recovery testing.
- Implement policies and acknowledgement forms for disallowing the changing of personal account information in CAMA.

Each finding includes a ranking of risk based on the risk assessment that takes into consideration the circumstances of the current condition including compensating controls and the potential impact on reputation and customer confidence, safety and health, finances, productivity, and the possibility of fines or legal penalties.

Auditee responses were not audited and the auditor expresses no opinion on those responses.



FINDINGS, RECOMMENDATIONS, AND RESPONSES

FINDING 1 – GENERIC USER ACCOUNTS ARE ACTIVELY USED (HIGH)

We found 22 generic CAMA user accounts. Five of the actively used accounts have access to the production environment, and allow changes to land and real property valuations. One of these five generic test accounts has the ability to delete accounts. The five generic test accounts indicate that testing may be occurring in the production environment.

Additionally, the vendor is currently using two generic user accounts that were initially set up to install the application. These vendor generic accounts have access to significant functions within the production system, with the ability to add, modify, and delete. These two accounts also have rights to access database tables through SQL. One of the generic vendor accounts is a common user account used by the vendor to install CAMA for clients. The Assessor's Office did not change the passwords for these accounts after installation. Often, other customers or individuals know standard users and passwords for applications. For this reason, owners should change accounts created for installation as soon as they are no longer necessary for that purpose.

The use of generic and guest accounts is not permitted under Clark County Information Technology Directive IV(C)(2)(e). Default passwords provided by vendors are also required to be changed when systems or applications are installed or implemented in accordance with Clark County Information Technology Directive IV(C)(2)(a)(6). The directive does provide for an exception process for generic accounts that requires approval by both the elected or Appointed Department Head and the Clark County Chief Information Officer. The Assessor's Office did not obtain approval for the use of these generic accounts. Clark County Information Technology Directive IV(F) also requires that separate environments be used for development, testing, and production.

The use of generic accounts reduces accountability, as the user cannot be identified. The use of test accounts may lead to the reduction of data integrity. Additionally, users are more likely to share passwords for accounts not specifically assigned to them. For these reasons, the use of generic accounts places production data at risk of unauthorized changes and loss of data.

RECOMMENDATION

1. Delete or disable any unnecessary generic accounts
2. Submit generic accounts for approval in accordance with Clark County Information Technology Directive V.
3. Change default passwords used during implementation of CAMA.
4. Adopt policies that disallow testing in the production environment.



MANAGEMENT RESPONSE

All generic user accounts have been deleted or disabled.

There will be no more generic user accounts, now that CAMA is past its development stages.

A policy has been implemented which includes disallowing testing in the production environment.

Vendor accounts have been disabled, or temporarily locked for those vendors who will require future access.

There are now only eight administrators with permission to set up user ID's and assign roles.



FINDING 2 – PRODUCTION AND INTERFACE DATABASE ACCESS NOT FORMALLY APPROVED (MEDIUM)

Assessor's Office personnel could not identify individuals assigned to seven user accounts in the SQL environment. These users may have access to CAMA production databases, interface databases, and scripts for extracting data and other purposes. The Assessor's Office does not have a formal process for approving requests for access. The Assessor's Office is the owner of the data produced in CAMA and related interfaces. All users that access CAMA production data and interfaces should be approved in accordance with Information Technology Directive No. 1, IV(B)(2) that requires access to County computing systems and networks be approved by the responsible Elected or Appointed Clark County Department Head or designee (no less than Manager level).

RECOMMENDATION

1. Adopt policies and procedures for adding users to the SQL environment and implement a formal documented approval process consistent with Information Technology Directive 1.

MANAGEMENT RESPONSE

The Assessor's Office met with County IT to resolve unknown user accounts on the sequel servers. Five user accounts have been deleted or disabled. The two user accounts that remain are valid and used by Assessor IT staff to access and upload or download data and applications. New users may no longer be added without approval from IT and the Assessor.



FINDING 3 – DELETION OF ACCOUNTS AND PARCELS ALLOWED (MEDIUM)

During our testing, we found a large number of users with rights for deleting accounts and parcels. Thirty-four users have the authority to delete accounts, and 27 users have authority to delete parcels. The Assessor's Office does not have a process in place to review deleted accounts or parcels. In order to ensure availability and integrity of the data for current and prior years, delete functionality should be restricted to a very small number of users or eliminated altogether.

RECOMMENDATION

1. Evaluate whether there are any instances where parcels or accounts need to be deleted and restrict access to only those individuals who need to have this function.
2. Implement an approval process for deleted parcels and accounts.

MANAGEMENT RESPONSE

The number of users with permission to delete parcels has been reduced to 4. The number of users with permission to delete accounts has been reduced to 6.

Users with this permission are managers and IT staff who are aware of the policies limiting the deletion of records. These users have been approved by the Department Head.

Records are deleted only in very limited circumstances. An example of a valid deletion might be where a record created for the first time freezes up in the system and cannot be unlocked. In contrast, a functional record in the system which is determined to be no longer subject to valuation is changed to an "inactive" status rather than deleted so that an audit trail is properly maintained.

As a further control measure, a report listing parcels and accounts that have been deleted will be generated quarterly for the Assistant Director to review.



FINDING 4 – ACCESS NOT TERMINATED ON INACTIVE USER ACCOUNTS (LOW)

Thirty-five users did not log in for over 60 days, ranging between 107 and 365 days. In accordance with Information Technology directive No. 1, IV(C)(1)(b) user accounts that remain inactive for a period of time exceeding 60 days must be disabled. User accounts that remain inactive for a period of time exceeding 90 days must be deleted. In this case, the accounts consisted of generic accounts, accounts for active employees, and a consultant user account. Leaving unnecessary access available to users can lead to unauthorized use and potential data corruption or loss.

RECOMMENDATION

1. Adopt and implement policies and procedures for locking out accounts in compliance with Clark County Information Technology Directive 1.

MANAGEMENT RESPONSE

All users that have been inactive for the past 60 days have been locked or deleted. Quarterly reports of inactive users will be generated and reviewed by the Assistant Director. The forced password feature activated as a result of Finding #5 automatically disables accounts if the password change prompt is not addressed by the user.



FINDING 5 – PASSWORD CONFIGURATION AND CHANGE FREQUENCY (LOW)

CAMA is not configured to require passwords that conform to Clark County Information Technology Directive No. 1, IV(C)(2)(a)(1) regarding make up and expiration frequency.

Data integrity and availability is at risk when passwords are not strong enough to deter unauthorized access and users do not change them frequently. IT Directive 1 requires users to have secure passwords, including the use of extra characters and upper and lower case letters.

While users are required to log on to the network to access the application, this does not secure the data. Users are more likely to share passwords or guess passwords to generic accounts when passwords are not complex and are not changed frequently. This could allow users to perform functions not normally allowed based on their job duties. Further, regular password changes reduce the likelihood that passwords are compromised for an extended period.

RECOMMENDATION

1. Implement policies and procedures for password requirements that meet IT Directive 1.
2. Implement CAMA application force password feature to comply with IT Directive 1. IV(C)(2)(a)(1).

MANAGEMENT RESPONSE

Password configuration requirements have been implemented to include a “forced password change feature” every 90 days in accordance with IT Directive 1. An office-wide email has been sent to communicate the mandate.



FINDING 6 – RECOVERY TESTING NOT DONE (LOW)

Assessor's Office technical staff do not perform recovery testing of the CAMA application data. Random recovery is done when the Assessor's Office needs for data to be restored. However, due to the large size of the database, full recoveries are not tested. We do not believe random recovery is an adequate method of assuring that full recoveries will be successful.

Periodic testing of full back ups is necessary to assure data can be recovered. In this case, the risk is increased, as configuration changes that can affect data recovery are made often. We believe periodic testing of recovery facilitates early identification of problems that could cause delays in restoring operations in case of a disaster.

RECOMMENDATION

1. Perform periodic recovery testing to ensure data integrity of back-ups.

MANAGEMENT RESPONSE

Service tickets shall be submitted to County IT to have scheduled validation checks initiated to verify that backups have all available data. This will be scheduled every 4 months.



FINDING 7 – EMPLOYEES CHANGE OWN CAMA ACCOUNT DATA (LOW)

We reviewed 84 Assessor employee owned parcel data in CAMA to determine whether employees significantly affected the valuation of their own accounts. We found that six employees entered a total of 33 line changes on their own property records. CAMA does not have security features that allow blocking access to employee personal accounts, and there is no policy restricting employees from altering their property records.

We rated this risk as low, as none of the account data changed was significant to valuations, and valuations were within a reasonable range of other similar properties within the neighborhood. Further, the department has procedures in place to identify properties with valuations significantly different from others in the area. However, we believe the department should have a policy restricting access to an employee's own accounts to prevent inappropriate changes.

RECOMMENDATION

1. Adopt a policy that restricts employees from accessing and changing information for their or their immediate family's parcel accounts.

MANAGEMENT RESPONSE

In some cases, mass updates to the CAMA database, which are performed by our managers and administrators, happened to include their own parcels. This is unavoidable.

In other cases, employees used their own parcel as an example to test a CAMA function. A policy has been implemented to disallow testing in the production environment.

In none of the instances did an employee purposely make a permanent valuation change to their own parcel.

In accordance with the recommendation for this finding, a policy has been implemented which includes restricting employees from accessing and changing information for their own or their immediate family's parcel accounts.