Office of the Washington State Auditor
Pat McCarthy

# Performance Audit Report

# Opportunities to Improve City of Redmond's Information Technology Security

*Published: March 11, 2021*

**Report Number: 1027932**

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# Introduction

## Critical government services depend on information technology systems with confidential information, which must be protected to avoid service disruptions and financial losses

Governments depend on information technology (IT) systems to deliver an array of critical functions. The security of IT systems and related data underpins the stability of government operations, and the safety and well-being of residents. Therefore, protecting these systems is paramount to public confidence, because the public expects governments to protect these systems from IT security incidents that could disrupt government services.

These IT systems also process and store confidential data. Aside from the loss of public confidence, a data breach involving this information can cause governments to face considerable tangible costs, including those associated with identifying and repairing damaged systems and notifying and helping victims.

**IT security incident**

Any unplanned or suspected event that could pose a threat to the confidentiality, integrity or availability of information assets.

**Data breach**

An IT security incident that results in the confirmed disclosure of confidential information to an unauthorized party.

## Government IT systems and data are attractive targets for cyberattacks

Government IT systems present a particularly tempting target to cyber criminals. In addition to selling stolen information for financial gain, attackers often target government systems with ransomware, essentially rendering IT systems and data unavailable until the attackers are paid. Because government IT systems support critical operations, attacked governments are often placed in the difficult position of either failing to deliver core services or paying an expensive ransom to the attackers.

Government organizations across the United States and around the world have been and continue to be critically affected by cybercrime. In addition to harming governments' ability to access their data and carry out operations, hackers have managed to disable telephone systems, email, water utility pumps, emergency dispatch centers, online tax and utility payment systems, and the ability to open jail cell doors remotely. According to a study by Emsisoft, at least 113 state and local governments in the United States were affected by ransomware in 2019 alone. When combined with ransomware attacks on healthcare and education organizations, the study estimated that the total cost of these attacks in 2019 may have exceeded $7.5 billion. School districts nationwide have continued to be targeted, resulting in increased disruption for students who are already adapting to remote learning due to COVID-19.

Washington governments have also been affected by cyberattacks. From 2016 through to the end of 2020, 11 Washington governments reported data breaches to the Washington State Attorney General's Office as a result of a cyber-attack. Multiple state and local governments have also reported cybersecurity incidents to the State Auditor's Office, including frauds that occurred as the result of cybersecurity activity and a city whose operations were crippled by ransomware.

To help Washington's local governments protect their IT systems, we offer them the opportunity to participate in a performance audit designed to identify opportunities to improve their IT systems.

The City of Redmond chose to participate in this audit.

## This audit looked for opportunities to improve the city's IT security

To help the City of Redmond protect its IT systems and secure the data it needs to operate, we conducted a performance audit designed to identify opportunities to improve IT security. This audit answered the following questions:

- Does the city have vulnerabilities in its IT environment that could lead to increased risk from external or internal threats?
- Do the city's IT security practices align with selected security controls?

### Evaluating effective implementation of IT security practices

To determine if the city has implemented effective IT security practices, we conducted tests to determine if selected controls were implemented properly and functioning effectively.

### Comparing the city's IT security program to leading practices

We assessed the city's IT security policies, procedures and practices to selected leading practices in this area to identify any improvements that could make them stronger.  We selected leading practices from the Center for Information Security's *CIS Controls*, which were developed by a broad community of private and public sector stakeholders after examining the most common attack patterns. The *CIS Controls* are a prioritized list of control areas designed to help organizations with limited resources optimize their security defense efforts to achieve the highest return on investment.

We gave city management the results of the tests as they were completed.

## Next steps

Our performance audits of local government programs and services are reviewed by the local government's legislative body and/or by other committees of the local government whose members wish to consider findings and recommendations on specific topics. The City of Redmond's legislative body will hold a public hearing to consider the findings of the audit. Please check the City of Redmond's website for the exact date, time and location. The State Auditor's Office conducts periodic follow-up evaluations to assess the status of recommendations, and may conduct follow-up audits at its discretion. See **Appendix A**, which addresses the I-900 areas covered in the audit. **Appendix B** contains more information about our methodology.

## Audit Results

The results of our audit work and recommendations were communicated to the City of Redmond's management for its review, response and action. We found that, while the city's IT policies and practices partially align with industry leading practices, there are areas where improvements can be made. The city has taken steps to address issues we identified, and is continuing to make improvements.

Because the public distribution of tests performed and test results could increase the risk to the city, distribution of this information is kept confidential under RCW 42.56.420(4), and under Generally Accepted Government Auditing Standards, Sections 9.61-9.67. We shared detailed results with the city.

## Recommendations

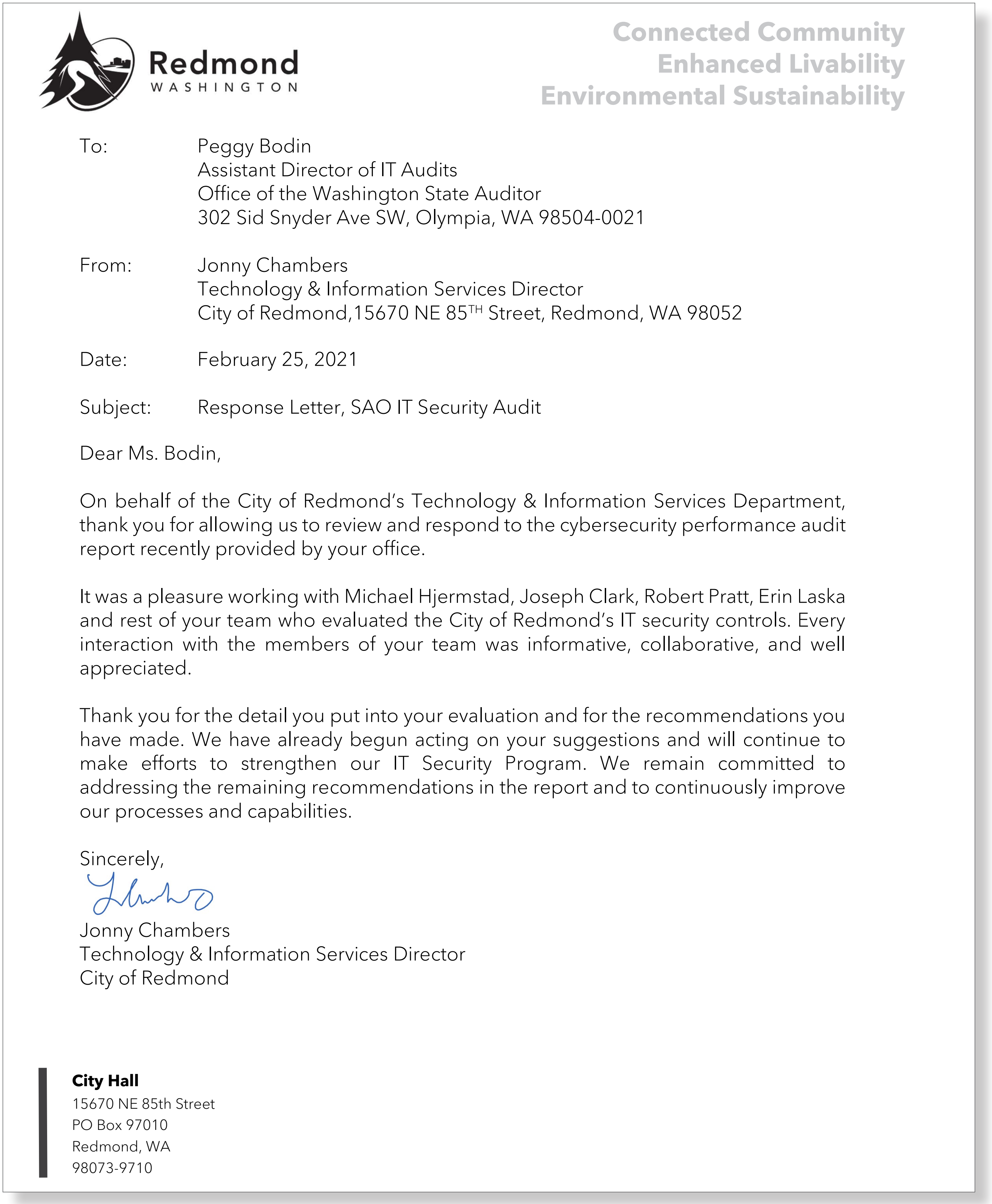
To help ensure the City of Redmond protects its IT systems and the information contained in those systems, we make the following recommendations:

- Continue remediating identified gaps
- Revise the city's IT security policies and procedures to align more closely with leading practices

## Auditor's Remarks

The Washington State Auditor's Office recognizes the City of Redmond's willingness to volunteer to participate in this audit, demonstrating its dedication to making government work better. It is apparent the city's management and staff want to be accountable to the citizens and good stewards of public resources. Throughout the audit, they fostered a positive and professional working relationship with the State Auditor's Office.

# Auditee Response



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To: Peggy Bodin
Assistant Director of IT Audits
Office of the Washington State Auditor
302 Sid Snyder Ave SW, Olympia, WA 98504-0021

From: Jonny Chambers
Technology & Information Services Director
City of Redmond,15670 NE 85TH Street, Redmond, WA 98052

Date: February 25, 2021

Subject: Response Letter, SAO IT Security Audit

Dear Ms. Bodin,

On behalf of the City of Redmond's Technology & Information Services Department, thank you for allowing us to review and respond to the cybersecurity performance audit report recently provided by your office.

It was a pleasure working with Michael Hjermstad, Joseph Clark, Robert Pratt, Erin Laska and rest of your team who evaluated the City of Redmond's IT security controls. Every interaction with the members of your team was informative, collaborative, and well appreciated.

Thank you for the detail you put into your evaluation and for the recommendations you have made. We have already begun acting on your suggestions and will continue to make efforts to strengthen our IT Security Program. We remain committed to addressing the remaining recommendations in the report and to continuously improve our processes and capabilities.

Sincerely,

Jonny Chambers
Technology & Information Services Director
City of Redmond

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# Appendix A: Initiative 900 and Auditing Standards

Initiative 900, approved by Washington voters in 2005 and enacted into state law in 2006, authorized the State Auditor's Office to conduct independent, comprehensive performance audits of state and local governments.

Specifically, the law directs the Auditor's Office to "review and analyze the economy, efficiency, and effectiveness of the policies, management, fiscal affairs, and operations of state and local governments, agencies, programs, and accounts." Performance audits are to be conducted according to U.S. Government Accountability Office government auditing standards.

In addition, the law identifies nine elements that are to be considered within the scope of each performance audit. The State Auditor's Office evaluates the relevance of all nine elements to each audit. The table below indicates which elements are addressed in the audit. Specific issues are discussed in the Results and Recommendations sections of this report.

| I-900 element | Addressed in the audit |
|---|---|
| **1.** Identify cost savings | **No.** The audit did not identify measurable cost savings. However, strengthening IT security could help the city avoid or mitigate costs associated with a data breach or security incident. |
| **2.** Identify services that can be reduced or eliminated | **No.** The audit objectives did not address services that could be reduced or eliminated. |
| **3.** Identify programs or services that can be transferred to the private sector | **No.** The audit did not identify programs or services that could be transferred to the private sector. |
| **4.** Analyze gaps or overlaps in programs or services and provide recommendations to correct them | **Yes.** The audit compared the city's IT security controls against leading practices and made recommendations to align them. |
| **5.** Assess feasibility of pooling information technology systems within the department | **No.** The audit did not assess the feasibility of pooling information systems; it focused on the city's IT security posture. |
| **6.** Analyze departmental roles and functions, and provide recommendations to change or eliminate them | **Yes.** The audit evaluated the roles and functions of IT security at the city and made recommendations to better align them with leading practices. |
| **7.** Provide recommendations for statutory or regulatory changes that may be necessary for the department to properly carry out its functions | **No.** The audit did not identify a need for statutory or regulatory change. |
| **8.** Analyze departmental performance data, performance measures, and self-assessment systems | **Yes.** The audit examined and made recommendations to improve IT security control performance. |
| **9.** Identify relevant best practices | **Yes.** The audit identified and used leading practices published by the Center for Internet Security to assess the city's IT security controls. |

## Compliance with generally accepted government auditing standards

We conducted this performance audit under the authority of state law (RCW 43.09.470), approved as Initiative 900 by Washington voters in 2005, and in accordance with Generally Accepted Government Auditing Standards (July 2018 revision) issued by the U.S. Government Accountability Office. 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.

# Appendix B: Scope, Objectives and Methodology

## Scope

The audit assessed the extent to which the City of Redmond's IT security programs, including their implementation and documentation, aligned with selected *CIS Controls* and the supporting sub-controls. This audit did not assess the city's alignment with federal or state special data-handling laws or requirements.

## Objectives

To help the City of Redmond protect its IT systems and secure the data it needs to operate, we conducted a performance audit designed to identify opportunities to improve IT security. This audit answered the following questions:

- Does the city have vulnerabilities in its IT environment that could lead to increased risk from external or internal threats?
- Do the city's IT security practices align with selected security controls?

## Methodology

To answer the audit objectives, we conducted technical testing on the city's internal network, and we compared the city's IT security programs to selected leading practices.

### *Vulnerability testing*

To determine if the city has vulnerabilities in its IT environment we conducted limited technical analysis of select portions of the city's internal network. We performed this work in March 2020 using automated tools configured by our IT security specialists. This included identifying vulnerabilities and assessing them to determine whether they could be exploited.

### *Comparing the city's IT security programs to leading practices*

To determine whether the city's IT security practices align with leading practices, we interviewed key city IT staff, reviewed the city's IT security policies and procedures, observed city security practices and settings, and conducted limited technical analysis of city systems. This work was completed at the city between February and April 2020, with some additional follow-up afterwards.

We used selected controls from the *CIS Controls*, version 7.1, as our criteria to assess the city's IT security programs and to identify areas that could be made stronger.

CIS is a nonprofit organization focused on safeguarding public and private organizations against cyber threats. Its *CIS Controls* are a prioritized set of leading practices for cyber defense created to stop the most pervasive and dangerous attacks, are informed by analysis of real-world attack data, and are developed and vetted across a broad community of government and industry practitioners. Contributors to the *CIS Controls* have included the U.S. Department of Defense, the National Security Agency, the U.S. Department of Energy national energy labs, law enforcement organizations, Verizon, HP and Symantec.

Each control consists of a series of sub-controls that are distinct and measurable tasks; when the sub-controls are implemented together, they fully meet the requirements of the overall control. We assessed the city against all applicable sub-controls to determine the alignment with each of the overall controls examined. We did this by assessing the extent to which the city met each sub-control in three areas:

1. **Implementing** the sub-control
2. **Automating or technically enforcing** the sub-control, which minimizes the possibility of the sub-control failing due to human error or inconsistent processes
3. **Maintaining documentation** to support the sub-control, such as policies or procedures

We also assessed the extent to which the city's IT management was **reporting** on the control to city leadership.

## Work on internal controls

This audit assessed the IT security internal controls at the City of Redmond. We used a selection of controls from the 20 *CIS Controls* as the internal control framework for the assessment. The first six are considered among the most important controls to put in place to protect an organization. Based on an initial assessment, we selected four controls to include in the scope. To protect the city's IT systems, and the confidential and sensitive information in those systems, this report does not identify the specific controls assessed during the audit. We completed our assessment for the purpose of identifying opportunities for the city to improve its internal IT security controls but not to provide assurance on the city's current IT security posture.