



DISTRICT OF COLUMBIA WATER AND SEWER AUTHORITY

Board of Directors

Audit and Risk Committee

October 27, 2022

9:30 a.m.

Microsoft Teams Meeting

Join on your computer or mobile app

[Click here to join the meeting](#)

Meeting ID: 243 842 014 913

Passcode: rHtJ8U

Or call in (audio only)

[+1 202-753-6714,,196972543#](#)

Phone Conference ID: 196 972 543#

1. **Call to Order**..... Floyd Holt, Chairperson
2. **Roll Call**.....Alfonzo Kilgore Stukes, Acting Board Secretary
3. **Enterprise Risk Management Briefing** Wayne Griffith, EVP Strategy & Performance
4. **Internal Audit Update**..... Dan Whelan, RSM, Auditor General
 - A. FY 2022 Internal Audit Plan Status Update
 - B. Status Update on Prior Audit Findings
 - C. [Department Sewer Operations Work Order Management Audit](#)
 - D. Employee Retention Management Assessment
 - E. Hotline Update
 - F. Risk Assessment Results & Proposed FY23 Audit Plan
5. **Executive Session*** Floyd Holt, Chairperson
6. **Adjournment**..... Floyd Holt, Chairperson

¹The DC Water Board of Directors may go into executive session at this meeting pursuant to the District of Columbia Open Meetings Act of 2010, if such action is approved by a majority vote of the Board members who constitute a quorum to discuss certain matters, including but not limited to: matters prohibited from public disclosure pursuant to a court order or law under D.C. Official Code § 2-575(b)(1); terms for negotiating a contract, including an employment contract, under D.C. Official Code § 2-575(b)(2); obtain legal advice and preserve attorney-client privilege or settlement terms under D.C. Official Code § 2-575(b)(4)(A); collective bargaining negotiations under D.C. Official Code § 2-575(b)(5); facility security matters under D.C. Official Code § 2-575(b)(8); disciplinary matters under D.C. Official Code § 2-575(b)(9); personnel matters under D.C. Official Code § 2-575(b)(10); third-party proprietary matters under D.C. Official Code § 2-575(b)(11); train and develop Board members and staff under D.C. Official Codes § 2-575(b)(12); adjudication action under D.C. Official Code § 2-575(b)(13); civil or criminal matters or violations of laws or regulations where disclosure to the public may harm the investigation under D.C. Official Code § 2-575(b)(14); and other matters provided under the Act.



Strategy & Performance

Enterprise Risk Management Briefing to Audit & Risk Committee

DISTRICT OF COLUMBIA WATER AND SEWER AUTHORITY

Wayne Griffith, EVP Strategy & Performance

Status

1. The Enterprise Risk Management (ERM) team is devising a plan to advance ERM phase 2:
 - Strategizing how to support portions of the scope of work leveraging internal resources.
 - In parallel, the team is working with the Budget Office to identify funds to finance components of phase 2. We anticipate phase 2 to commence in January.
2. Environmental Social Governance (ESG) Report
 - Showcase ERM's approach to identifying and addressing risks and opportunities related to ESG factors.

Appendix

What we want to accomplish in Phase 2

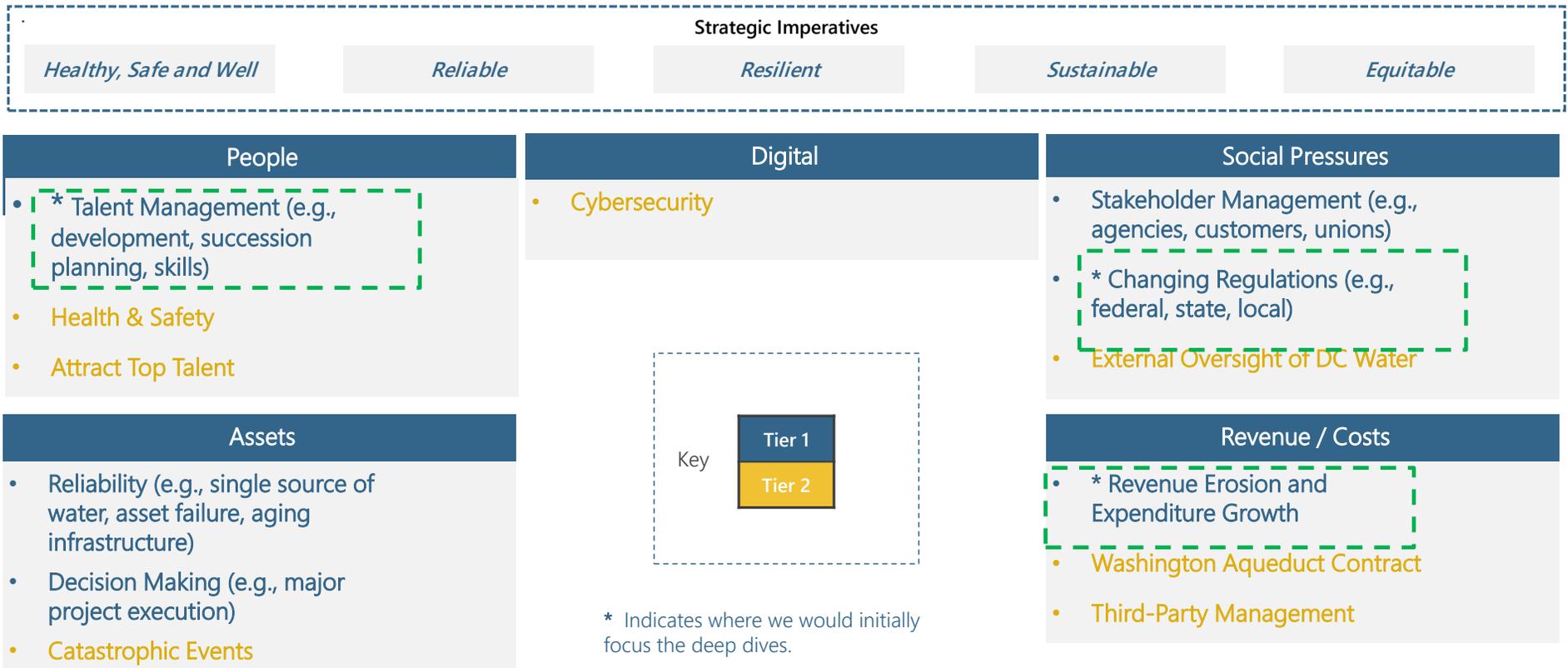
Desired Outcomes | ERM

- **Deeper understanding** of top enterprise risks, their **underlying root causes** and drivers, and associated risk indicators to enable more effective **risk-informed decision making**.
- Clear understanding of **potential gaps** in risk mitigation plans for the Authority's top enterprise risks.
- Ability to **report on top enterprise risks** that face the Authority along with their trends to better **inform senior leadership** and **Board members**.
- Methods to **promote a strong risk-aware culture** at DC Water to advance risk thinking and awareness, **drive engagement**, and bolster risk understanding across the Authority.
- Leverage the **Origami Solution** for **automation** of ERM processes.



DC Water Top Enterprise Risks

Below is the prioritized list of top enterprise risks. This is the output at the end of the top-down enterprise risk assessment. Using a combination of identification methods: surveys and interviews with DC Water Leadership and specific board members, and internal and external research, top risks to DC Water were identified and ranked.



DC WATER

Audit & Risk Committee Meeting



October 27, 2022

Agenda

- FY 2022 Internal Audit Plan Status Update
- Status Update on Prior Audit Findings
- Report on Completed Audits
 - DSO Work Order Management Audit
 - Employee Retention Management Assessment
- Hotline Update
- Risk Assessment Results & Proposed FY23 Audit Plan
- Executive Session
 - Cyber Threat Intelligence

AUDIT PLAN STATUS UPDATE

Internal Audit Plan Status Update

Audit	Status
FY 2022	
Contract Monitoring & Compliance Audit	Report Complete
Supply Chain Assessment	Report Complete
Accounts Payable Audit	Report Complete
Incident Response Tabletop Exercise	Report Complete
Expenditures Analytics Assessment	Report Complete
Strategic Plan Monitoring Audit	Report Complete
Employee Retention Assessment	Report Complete
Physical Security Audit – HQO & Ft. Reno	Report Complete
Work Order Management Audit – DSO	Report Complete
Cyber Threat Intelligence	Report Complete
FY2023 Risk Assessment	Report Complete
Remediation & Follow Up	On-going
Hotline Management	On-going

Internal Audit Plan FY 2022 Timeline

	Oct - 21	Nov - 21	Dec - 21	Jan - 22	Feb - 22	Mar - 22	Apr - 22	May - 22	Jun - 22	Jul - 22	Aug - 22	Sep - 22	Oct - 22
▶ Contract Compliance Audit	█												
▶ Supply Chain Assessment				█									
▶ Accounts Payable Audit					█								
▶ Incident Response Tabletop Exercise					█								
▶ Expenditures Analytics Assessment							█						
▶ Strategic Plan Monitoring Audit							█						
▶ Employee Retention Assessment								█					
▶ Physical Security Audit – HQO & Ft Reno							█						
▶ Work Order Management Audit – DSO										█			
▶ Cyber Threat Intelligence										█			
▶ FY 2023 Risk Assessment											█		
▶ Ongoing Follow-up Procedures	█												
▶ Ongoing Hotline Monitoring	█												

PRIOR AUDIT FINDINGS – FOLLOW UP STATUS

Open High Risk Prior Audit Findings

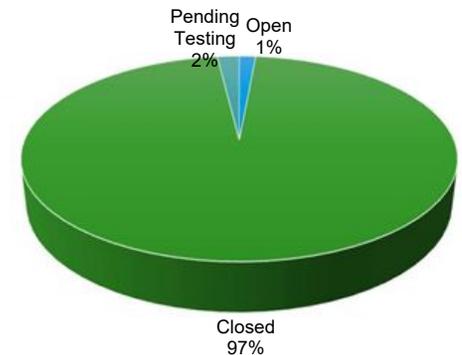
	Audit FY	Issue Date	Audit Report	High Risk Open Finding	Original Target Date	New Target Date	# Extensions
1	2022	7/28/2022	Strategic Plan Monitoring	Missing, incomplete, or outdated goals data	3/31/23	N/A	0
				<p>Status notes: The Goal Master List has been updated to include an "as of" field to more easily monitor timeliness of inputs from the business units. The Strategic Management team will develop formal SOPs to address a notification / escalation protocol for goal data updates. The Strategic Management team is developing a process to validate the completeness, accuracy, and quality of data used to monitor progress of the strategic goals aligned to Blueprint 2.0.</p>			

Legend	
	Past due
	Original target date has not yet come due

Status Update on Prior Audit Findings

Audit Report/Subject	Report Issue Date	Corrective Actions			
		Total	Open	Closed	Pending Testing ¹
Prior to FY21 Audit Findings					
Training, Licensing & Certification	7/28/2016	7	0	6	1
Entity Level Review	10/26/2017	7	0	6	1
Integrated Work Order Management Audit	1/24/2019	10	0	9	1
Fleet Management Review	1/24/2019	3	1	2	0
Occupational Safety and Health	4/25/2019	4	1	2	1
Customer Billing and Collections Audit	10/22/2020	3	1	2	0
Total		34	3	27	4

FY16 – FY20 Prior Audit Findings Status



¹“Pending Testing” indicates that Management represents that the Action Plan is Completed, but Internal Audit has not yet performed testing to validate the status.

Note that the audit findings reported above only represent findings prior to FY21 with the status of “Pending Testing” or “Open”. Audits conducted prior to FY21 for which all findings have been closed are not represented in this table. However, the pie chart to the right includes status of all audit findings FY16 – FY20.

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Color Key	
	At least 1 original remediation target date has been extended



Status Update on Prior Audit Findings

Audit Report/Subject	Report Issue Date	Corrective Actions			
		Total	Open	Closed	Pending Testing ¹
FY21 Audit Findings					
Work Order Management – DMS Audit	1/28/2021	1	0	1	0
Procurement Audit	4/22/2021	2	0	2	0
Succession Planning Review	4/22/2021	1	0	1	0
Remote Workforce Security Review	4/22/2021	2	0	2	0
Contract Compliance Audit	7/22/2021	3	1	2	0
PCS Review	10/28/2021	8	0	8	0
Materials Management Audit	10/28/2021	1	0	1	0
	Total	18	1	17	0



Color Key	
	At least 1 original remediation target date has been extended

¹“Pending Testing” indicates that Management represents that the Action Plan is Completed, but Internal Audit has not yet performed testing to validate the status.

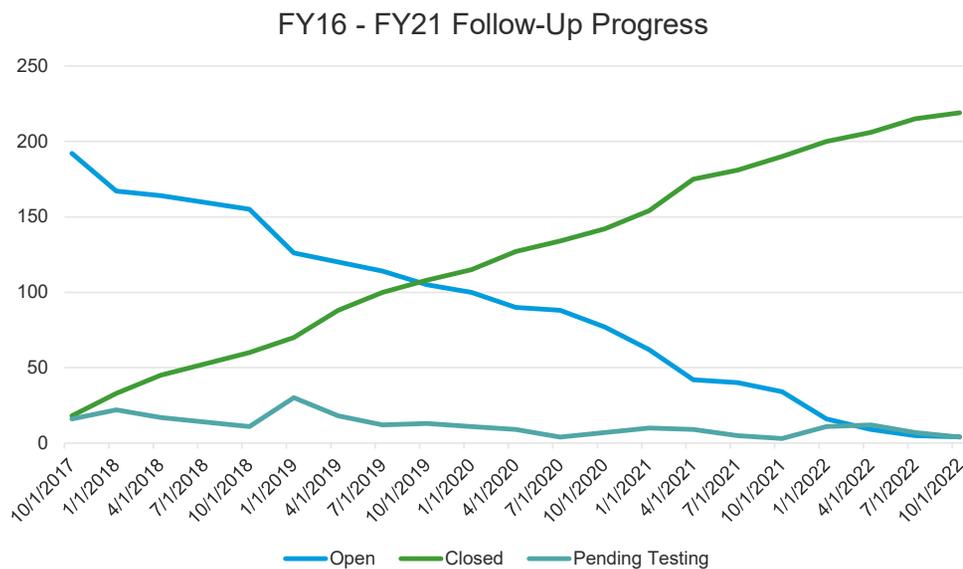
In total, 96% of all prior audit findings from FY16 – FY21 are closed. Management’s target closure rate is 90%.

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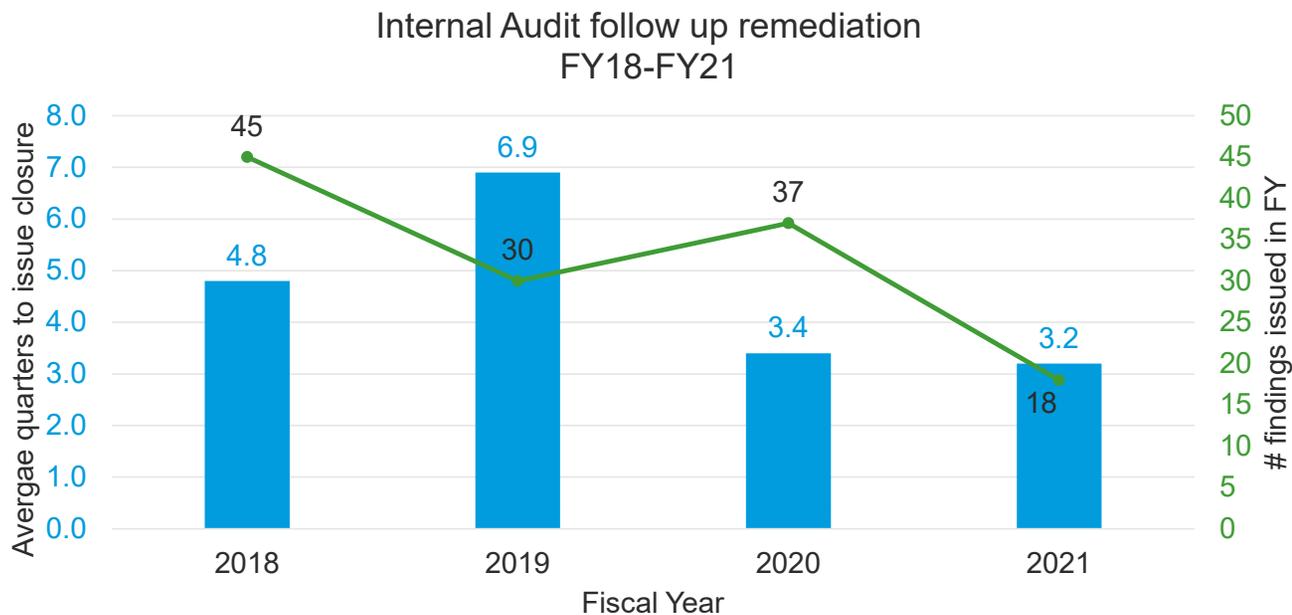
Follow-up Summary

- For FY16 – FY21 prior audit findings:
 - At the start of FY22 (October 2021), there were:
 - 34 open audit items
 - 190 closed audit items
 - 3 pending testing
 - As of October 2022, there are:
 - 4 open audit items
 - 219 closed audit items
 - 4 pending testing
- In total, 96% of all prior audit findings from FY16 – FY21 are closed
 - 29 audit items were closed in FY22



Time to closure by fiscal year

The below graphs illustrate the average number of quarters from audit finding issuance to audit finding closure year-over-year as of October 2022. Management has made significant improvements to achieve timelier audit finding closure as illustrated by the decline in time to close for FY20 and FY21 audits.



DSO WORK ORDER MANAGEMENT AUDIT



DSO Work Order Management Audit

Purpose

The purpose of this review was to obtain an understanding of how the Department of Sewer Operations (“DSO”) work order management process is managed and assess whether the system of internal controls is adequate and appropriate. The testing period was January 1, 2022 through July 31, 2022.

Scope

The audit scope was based upon the following objectives:

- Assess whether the system of internal controls over DSO work order management is adequate and appropriate through transactional testing over the following subprocesses:
 - Work order initiation and approval
 - Work order execution and data entry
 - Work order closeout
 - Reporting and monitoring;
- Perform analytics over work order data to identify process permutations, bottlenecks, and exceptions; and
- Identify process improvement opportunities and recommend internal control enhancements to improve the overall DSO work order management process.

DSO Work Order Management Audit

The following table is derived directly from Maximo data provided by management for work orders completed between January 1, 2022, through July 31, 2022.

Work Order Type	# of Work Orders	% of Population	Avg. Duration to Completion
Preventive Maintenance (PM)	12,673	57%	30 days
Inspection (INSP)	5,666	26%	47 days
Emergency Investigation (EMERG)	2,063	9%	3 days and 18 hours
Emergency Maintenance (EM)	470	2%	17 days
Event (EV)	338	1.5%	13.5 hours
Plumber's Report (PLUMR)	307	1%	58 minutes

Note: Any work order type that made up less than 1% of the population was excluded from the above analysis.

DSO Work Order Management Audit

Observations	Risk Rating
1. Failure to capture work order labor hours and material costs consistently	High
<p>Management Action Plan:</p> <ol style="list-style-type: none"> DSO's Catch Basin App currently records zero-hour labor records in the Maximo work order. An upgrade of the application is anticipated to begin this fiscal year. The team will engage IT on an appropriate solution during the upcoming upgrade project. Develop a weekly Labor report to list all DSO work orders in COMP status that have zero labor hours. The report will be grouped by DSO division as well as supervisor. Develop a weekly Material report to list all EM workorders in COMP status that have zero material. The report will be group by DSO division as well as supervisor. Sewer operations will administer a mandatory Maximo Training program to commence 10/26/22. Each staff member will attend no later than January 25, 2023. <p>Responsible Party: Construction & Repair/Maximo Administrator/DPSO Asset Management Team/DC Water IT</p> <p>Target Date: January 25, 2023</p>	

DSO Work Order Management Audit

Observations	Risk Rating
2. Inaccuracies in reported KPI data	High
<p>Management Action Plan:</p> <ol style="list-style-type: none"> 1. Develop a Catch Basin CSS Area Cleaning/Inspection actual percentage report that will be generated from Maximo every month. 2. Develop a QA/QC Standard Operating Procedure to ensure data oversight <p>Responsible Party: Maximo Administrator/DPSO Assets Management Team</p> <p>Target Date: November 30th, 2022</p>	

EMPLOYEE RETENTION MANAGEMENT ASSESSMENT



Employee Retention Management Assessment

Purpose

The purpose of this review was to analyze employee satisfaction and engagement at the Authority. Internal Audit performed analysis to evaluate risk related to various phases of the employee lifecycle and provided management with analysis to inform decision-making surrounding employee engagement initiatives. Our procedures were performed in accordance with the internal audit scope and approach set forth in our approach document and were limited to the procedures described therein.

Scope

The scope was based upon the following three employee lifecycle areas:

- Leadership and management
- Culture, vision, and value
- Performance management, feedback, and recognition

Survey data gathered related to the employee lifecycle components listed above was analyzed in the context of employee cross-sections including department/cluster, location, tenure, and union membership.

Note: The assessment was analytics-driven and did not include transactional testing to determine operating effectiveness of internal controls.

Employee Retention Management Assessment

Procedures:

- Internal Audit's procedures included the following:
 - Conducted planning meetings with leadership to identify any key concerns within the employee lifecycle and/or employee cross-sections
 - Designed and administered an employee survey distributed to a representative sample of 220 DC Water employees (received 96 responses; 43.6% response rate)
 - Analyzed survey results to identify trends and aggregated into common themes
 - Performed targeted confidential employee interviews to supplement survey results
- Internal Audit provided management with a report highlighting analysis and insights emerging from survey data and interviews. The report will allow management to identify trends, scrutinize approach to supporting various employee cross-sections, and inform decision-making.



HOTLINE UPDATE

Hotline Update

Five new calls have been received since last Audit Committee meeting.
As of 10/17/22:

FY 22 Hotline Call Summary	
FY 22 Calls Received	18
FY 22 Cases Closed	17
FY 22 Calls Open	1

Total calls by Fiscal Year:

Year	FY 13	FY 14	FY 15	FY 16	FY 17	FY 18	FY19	FY20	FY21
# of calls	10	20	16	36	31	21	28	10	7
Action Taken	0	2	7	7	2	0	1	0	0

**the numbers in the chart above may be inflated based on repeat calls regarding the same matters*

RISK ASSESSMENT & AUDIT PLAN

Risk Assessment approach

Internal Audit conducted a Risk Assessment, considering the following:

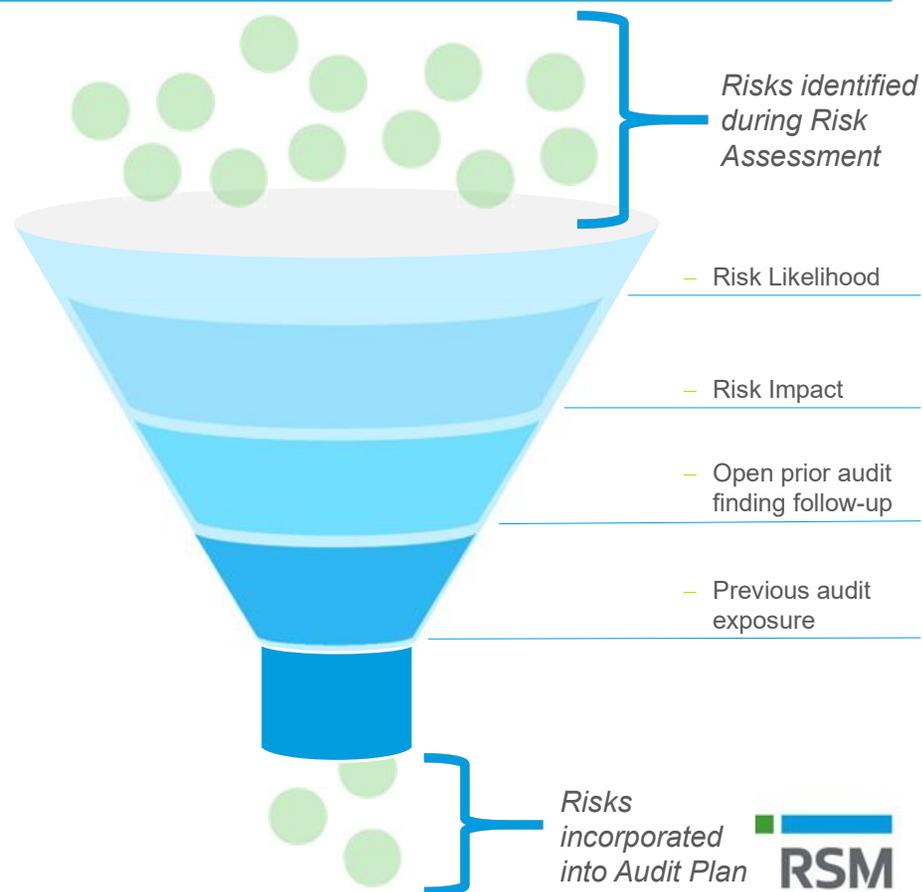
- Interviewed various members of management and the Audit Committee
- Distributed a survey to 30 members of management
- Distributed an anonymous survey to all Board members
- Revisited risks identified in prior year audits
- Considered current DC Water environment, strategic initiatives and industry trends

Based on the results of the Risk Assessment, Internal Audit performed the following:

- Compiled a risk register of risks identified, rated by impact and likelihood
- Reconciled Internal Audit risk register to management’s identified ERM risks
- Considered open prior audit finding follow-up that management is in the process of remediating
- Considered each process’ previous audit exposure
- Prioritized risks where internal audit can provide value
- Created an audit plan based on top priority risks for the year
- *Note: Internal Audit is a finite resource – Internal Audit cannot incorporate all risks discussed during Risk Assessment interviews into the Audit Plan. Risks are prioritized based on the factors listed above.*

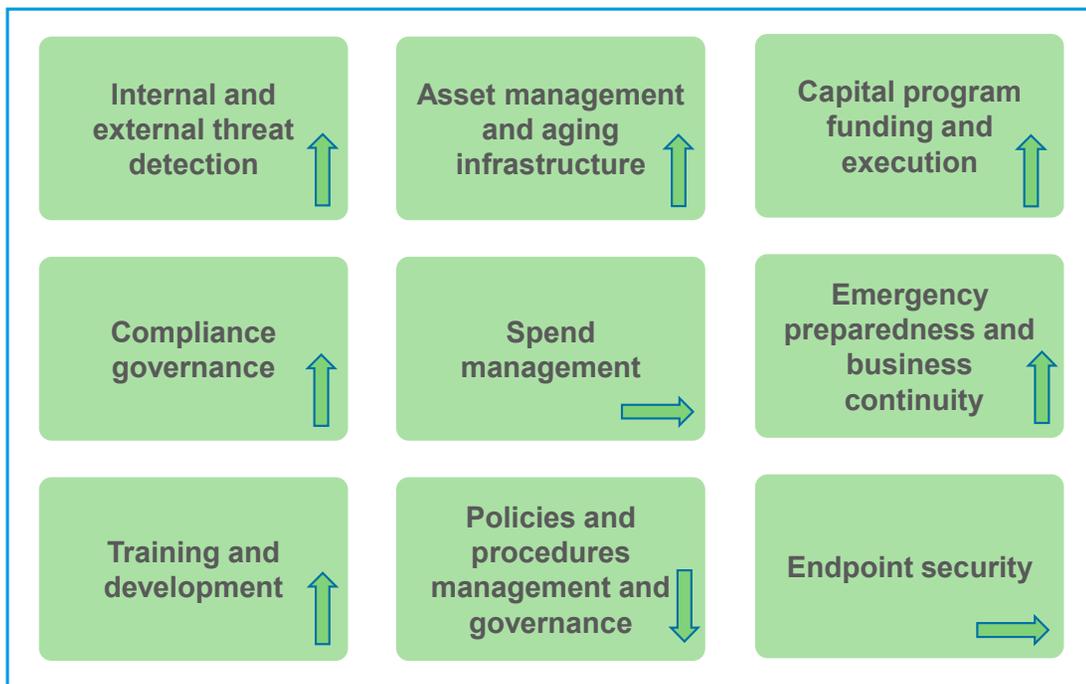
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Risk themes

Below are the top risk themes that emerged during the risk assessment. The arrows represent the year-over-year trend of each risk identified (increasing / decreasing / constant).



Survey results

Internal Audit distributed a risk assessment survey to all **Board members**, of which we received 10 responses. The top four **Blueprint 2.0 strategic plan imperatives** that Board members identified as a priority to DC Water's success in FY23 were the following:

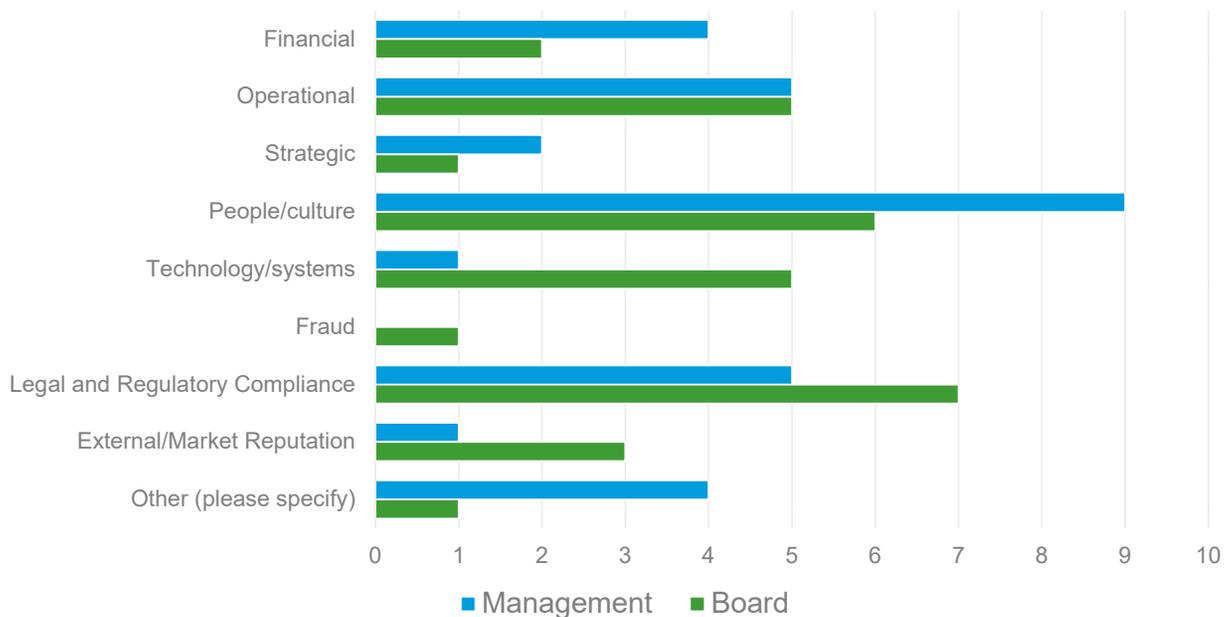
1. **Reliable:** Safeguarding a high-performing network of systems and assets
2. **Resilience:** Securing resilience of water supply
3. **Equitable:** Providing affordable and equitable rates
4. **Healthy, Safe and Well:** Delivering world-class, healthy water services

Internal Audit distributed a risk assessment survey to 30 members of **DC Water leadership**, of which we received 10 responses. The top five **Blueprint 2.0 strategic plan imperatives** that leadership identified as a priority to DC Water's success in FY23 were the following:

1. **Healthy, Safe and Well:** Delivering world-class, healthy water services
2. **Equitable:** A totally engaged and aligned DC Water
3. **Healthy, Safe and Well:** A safe DC Water for all, above all else
4. **Reliable:** Safeguarding a high-performing network of systems and assets
5. **Resilience:** Securing assets through value-driven asset management and proactive maintenance

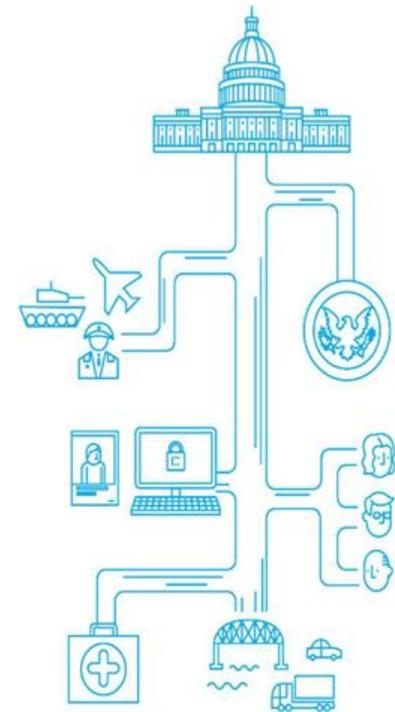
Survey results (continued)

This chart represents where Board members (green) and Management members (blue) identified the highest degree of exposure to the Authority (i.e. could potentially pose a threat or disruption to productivity, effectiveness or achievement of strategic imperatives).



Internal Audit approach

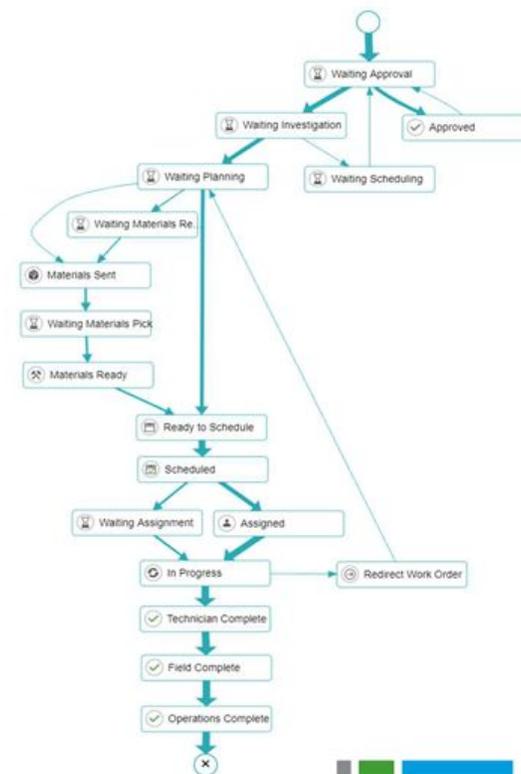
- Project types:
 - **Cycle audits** - Conduct formal reviews of management’s controls at a specified frequency based on highly transactional processes that have elevated risk exposure across the industry
 - **Ad hoc audits** - Perform formal reviews of management’s control environment over a specific area/process with elevated risk or limited audit exposure
 - **Management assessments** - Leverage Internal Audit’s expertise and institutional knowledge to assist in identifying process improvements, best practices, automation opportunities, benchmarking, etc. Assessment results will be delivered to management to help inform future strategic decision-making.
- Approach:
 - For each audit conducted, Internal Audit evaluates the design and operating effectiveness of the internal control environment (draft process flowcharts, establish risk and control matrix, conduct sample-based transactional testing, issue audit report)
 - For management assessments conducted, Internal Audit will review and analyze existing processes and data to identify strategic improvement opportunities for management.



Internal Audit approach (continued)

Internal Audit is committed to developing and deploying innovative solutions to inform scoping and sample selections, facilitate audit fieldwork, highlight business process trends and/or inefficiencies, and identify outliers. Opportunities for incorporation of data analytics into the audit process are below.

Internal Audit has started leveraging process intelligence for select projects. Process intelligence allows Internal Audit to visualize workflow permutations, analyze time and cost to complete, identify time consuming process steps, and determine correlation between transaction variables. The chart on the right illustrates an example macro-level visual of a most common path transaction derived from a large dataset.



Proposed FY23 Internal Audit Plan

Proposed Project	Cycle Audit	Ad Hoc Audit	Management Assessment
Finance & Procurement			
1. Payroll & Timekeeping Audit	X		
2. Procurement Audit (CIP scope)	X		
Shared Services			
3. Fleet Management Audit		X	
4. Business Continuity Assessment (OEM)			X
Ops & Engineering			
5. Work Order Management Audit - DWO	X		
6. Contract Compliance Audit (CIP scope)	X		
Customer Care			
7. Metering, Billing and Collections Audit	X		

Proposed Project	Cycle Audit	Ad Hoc Audit	Management Assessment
Information Technology			
8. Oracle ITGC Audit (CM & CO)		X	
9. Oracle Identity & Access Management Audit		X	
10. Penetration Testing Audit – External Network	X		
Ongoing Activities			
11. Hotline Case Management			
12. Open Action Items - Remediation & Follow Up			
Authority-Wide			
13. FY24 Risk Assessment			

Proposed FY23 Internal Audit Plan – project justification

Auditable entity	Project justification
<p>Payroll & Timekeeping</p>	<p><i>Payroll and timekeeping controls are meant to mitigate the risk of timecard errors, time theft, and inaccurate payroll processing that could impact DC Water's financial statements. Internal Audit will evaluate the ability for the control environment to adequately address system and manual process risks.</i></p>
<p>Contract Compliance</p>	<p><i>To evaluate individual contracts from departments throughout the Authority. Internal Audit will evaluate for compliance with contract terms and conditions, contract monitoring best practices, and invoice payment controls. Internal Audit will look for Authority-wide themes regarding reliance on and engagement with contractors that may emerge consistently in year-over-year reviews.</i></p>
<p>Procurement</p>	<p><i>DC Water has a detailed Procurement Manual to align the purchasing function to the best interests of the Authority. The solicitation, evaluation, and selection processes promote competition, ethical award, optimal dollar value, and fraud prevention. Adequate Procurement controls is critical to Authority-wide spend management.</i></p>
<p>Fleet Management</p>	<p><i>To evaluate how Fleet Management operates, examine potential cost savings, and assess whether the system of internal controls are adequate and appropriate, at the department and Authority-level. Fleet impacts the Authority across departments, given that employees across the Authority utilizes fleet vehicles which facilitates day-to-day operations.</i></p>

Proposed FY23 Internal Audit Plan – project justification

Auditable entity	Project justification
<p>OEM Business Continuity Assessment</p>	<p><i>The Office of Emergency Management oversees the Incident Management Team, DC Water Alerts, and Incident Response plans/procedures. The Office's ability to operate effectively when the Authority experiences events outside of the scope of normal operations is critical to continued Authority operations, safety, and reputation.</i></p>
<p>Work Order Management - DWO</p>	<p><i>Maximo work orders facilitate all maintenance of DC Water assets. The controls surrounding appropriate workflow, data capture, and overall utilization of the system are critical to the Authority's ability to quantify the effectiveness of asset management and execute on data-driven strategic decisions.</i></p>
<p>Metering, Billing and Collections</p>	<p><i>Metering, billing and collections is DC Water's direct line to revenue, which impacts the Authority's ability to execute on day-to-day operations, strategic initiatives, and critical capital projects. Any significant breakdown in controls on both billing and collections processes can limit the Authority's ability to carry out such functions.</i></p>
<p>Oracle Information Technology General Controls (ITGC) Review</p>	<p><i>DC Water implemented Oracle Cloud over the past two fiscal years. Internal audit will use this assessment to evaluate the design and effectiveness of the IT General Controls (ITGCs) over the application.</i></p>



Proposed FY23 Internal Audit Plan – project justification

Auditable entity

Project justification

Oracle Identity & Access Management Assessment

To evaluate provisioning and de-provisioning of access, application passwords, administrator access, and periodic access reviews related to the newly implemented Oracle ERP. Lack of consistency and rigor in the design and implementation of controls over management access to key business applications can introduce security vulnerabilities into DC Water’s environment.

External Penetration Testing

To validate preventative and detective technology control effectiveness. Annual penetration testing is considered a best practice activity to identify critical vulnerabilities and to identify technology control gaps.

APPENDIX

Illustrative 5 Year Audit Plan

Legend:

Business Process Cycle Audit
IT Cycle Audit
Business Process Ad Hoc Audit
IT Ad Hoc Audit
Ongoing IA Activity

Year 1	Year 2	Year 3	Year 4	Year 5	Frequency
Internal Audit Projects					
Shared Services					
	Physical Security - Fleet Facility Physical Security - Sewer Facility		Physical Security - Blue Plains Physical Security - Bryant Street		every 2 years (rotating locations) every 2 years (rotating locations)
		WOM Facilities			every 1 year (rotating depts - other d
Fleet Management Audit		Safety			Ad hoc
Business Continuity Assessment (OEM)					
Finance & Procurement					
Payroll & Timekeeping		Accounts Payable	Payroll & Timekeeping		every 3 years every 3 years
Contract Compliance - CIP scope	Pcard / Tcard Contract Compliance	Contract Compliance	Contract Compliance	Pcard / Tcard Contract Compliance	every 3 years every 1 year every 2 years
Procurement - CIP scope		Procurement	Budgeting & Planning	Materials Management	Ad hoc Ad hoc
People & Talent					
	Training			Training	every 3 years
	Recruiting Alignment Assessment				Ad hoc
Customer Care					
Billing and Collections			Billing and Collections		every 3 years
Information Technology					
Oracle ITGC Assessment (CM & CO)	IT Contract Management & Service Provider A	Information Security & Threat Management (Enterprise SDLC Assessment	HR Onboarding / Offboarding Review (Provis	Ad hoc
Oracle Identity & Access Management Review	Data Privacy Program Assessment	Software & Asset Management Review		IT Risk Management & Compliance	Ad hoc
					Ad hoc
Pen Testing external network	Pen Testing Mobile Web Application	Pen Testing SCADA	Pen Testing PCS	Pen Testing internal network	every 1 year (rotating systems)
Strategy & Performance					
		Strategic Plan Monitoring			every 3 years
			ESG Management Assessment		Ad hoc
Ops & Engineering					
WOM DWO	WOM DPO		WOM DMS	WOM DSO	every 1 year (rotating departments)
		Permit Operations	Construction Design and Asset Management	Business Development Plan Subcontractor As	Ad hoc
Legal Affairs					
	Compliance Monitoring Assessment			Legal Operations Case Management Audit	Ad hoc
Ongoing IA Activity					
Remediation of Open Findings	Remediation of Open Findings	Remediation of Open Findings	Remediation of Open Findings	Remediation of Open Findings	Ongoing
Hotline Monitoring	Hotline Monitoring	Hotline Monitoring	Hotline Monitoring	Hotline Monitoring	Ongoing
Risk Assessment	Risk Assessment	Risk Assessment	Risk Assessment	Risk Assessment	every 1 year

Prior audits performed

FY 2015

Intellectual Property
SCADA/PCS Review
Procurement Pre-Award Selection Process
Retail Rates Pre-Implementation Monitoring
Engineering - Vendor / Contractor Monitoring & Project Administration - Phase I
Timekeeping
IT Vendor Risk Management / Compliance and Monitoring
Information Security Policy Review
Network Penetration Testing (Corp/SCADA/Wifi)

FY 2016

Blue Horizons - Strategic Monitoring
Contract Monitoring & Compliance Review
Business Development Plan
Customer Billing & Collections
Retail Rates Post-Implementation Monitoring
Training, Certification and Licensing
Engineering - Construction Management Phase 2 Overtime
Annual Budgeting & Planning
Rolling Owner Controlled Insurance Program (ROCIP)
IT Incident Management & Response Review
Enterprise Project Governance Maturity Assessment

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FY 2017

Contract Monitoring & Compliance Review
Entity-Level Assessment
Work Order Management (Maintenance Services)
Materials Management - Operations and Inventory
Purchasing Cards (PCard Program)
Automated Meter Reading (AMR) Implementation
MTU Implementation Review
Fleet - Accident and Incident Reporting
Engineering - Construction Management Phase 3
Intermunicipal Agreement
IT Human Resource/Employee Data Privacy Review
Vulnerability Management Review and Platform Technical Audit (Windows/UNIX)

FY 2018

Recruiting, Selection, and On-Boarding
Automated Meter Replacement (AMR) Implementation Progress Update
Office of Emergency Management Review
DB/OS Privileged User
Network Penetration Testing
Affordability Programs
Contract Monitoring & Compliance Review
Crisis Management/Business Continuity
Integrated Work Order Management (DWS, DSS, DDCS)
CIS Post-Implementation Review
Payroll & Timekeeping
Accounts Payable

FY 2019

Permit Operations - Reimbursable Projects
Mail Room Procedures
Fleet Management
Legal Operations
Occupational Safety and Health
Automated Meter Reading Implementation Progress Update
Cloud Security Rapid Assessment
Active Directory Cloud Migration Security Review
Purchasing Card Internal Audit
Severance Assessment
Wifi Security Testing
CIS Application Security Segregation of Duties (SOD) Review
Contractual Services
Asset Management Assessment
Physical Security and Social Engineering

FY 2020

Work Order Planning Assessment
Phase 2: Physical Security Penetration Testing
Facilities Management Audit
Benefits and Compensation Audit
Engineering Change Order Assessment
Industrial Control System (ICS) Review
Customer Billing and Collections Audit
Oracle Embedded Risk Assurance Phase 1



Prior audits performed (continued)

FY 2021
Department of Maintenance Services (DMS) Work Order Management
Remote Workforce Assessment
Succession Planning
Procurement PreAward Selection
Contract Compliance
Materials Management
PCS Review

FY 2022
Contract Compliance
Accounts Payable
Expenditure Analytics Assessment
Work Order Management - DSO
Supply Chain Assessment
Employee Retention Assessment
Strategic Plan Monitoring
Physical Security Audits
Incident Response Tabletop
CTI Program Development



Internal Audit project survey results

DC Water's Strategy & Performance team sends out satisfaction surveys following each Internal Audit business process project conducted. Summary results of four of the surveys from FY2022 are below:

- **Contract Compliance:**
 - 67% response rate (4 out of 6)
 - 2 respondents felt that the audit added value and provided meaningful results; 1 respondent felt neutral
- **Accounts Payable:**
 - 60% response rate (3 out of 5)
 - All respondents felt the recommendations put forth were relevant and constructive
 - 2 respondents felt that the audit added value; 1 respondent felt neutral
- **Supply Chain Assessment:**
 - 78% response rate (7 out of 9)
 - 4 respondents felt that the assessment added value; 2 respondents felt neutral
 - 5 respondents stated the recommendations put forth were relevant and constructive; 1 respondent felt neutral
- **Strategic Plan Monitoring:**
 - 100% response rate (3 out of 3)
 - All respondents felt that the audit added value
 - 2 respondents felt the Internal Audit team exhibited appropriate knowledge of the business; 1 respondent felt neutral
 - 2 respondents felt that the Internal Audit team put forth relevant recommendations to improve the overall monitoring of goals described in Blueprint 2.0; 1 respondent felt neutral



QUESTIONS AND ANSWERS

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DC WATER

DSO Work Order Management Internal Audit



October 2022



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EXECUTIVE SUMMARY, BACKGROUND AND APPROACH

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Executive Summary and Objectives

Objective and Scope

The purpose of this audit was to obtain an understanding of how the Department of Sewer Operations (“DSO”) work order management process is managed and assess whether the system of internal controls is adequate and appropriate. Our procedures were performed in accordance with the internal audit scope and approach set forth in our audit notification letter and were limited to those procedures described therein. The testing period was January 1, 2022 through July 31, 2022. The audit scope was based upon the following objectives:

- Assess whether the system of internal controls over DSO work order management is adequate and appropriate through transactional testing over the following subprocesses:
 - Work order initiation and approval
 - Work order execution and data entry
 - Work order closeout
 - Reporting and monitoring;
- Perform analytics over work order data to identify process permutations, bottlenecks, and exceptions; and
- Identify process improvement opportunities and recommend internal control enhancements to improve the overall DSO work order management process.

Fieldwork was performed August 2022 through September 2022.

Overall Summary and Highlights

There were three observations identified during our audit, which are summarized below:

1. Failure to capture work order labor and material data on a consistent basis
2. Inaccuracies in reported KPI data
3. Lack of adherence to established work order procedures

These observations are described in the detailed observations section on pages 9 through 15 of the report. We assigned relative risk or value factors to each observation. Risk ratings are the evaluation of the perceived likelihood of an adverse event occurring and the potential impact an occurrence could have on the operations of each item. All observations require management action plans with estimated completion dates that will be included in the routine follow-up procedures for internal audit observations.

Summary of Observation Ratings (See Appendix for risk rating definitions)

Number of Observations by Risk Rating		
High	Moderate	Low
2	0	1

We thank all DC Water team members who assisted us throughout this review.

Background

The purpose of the DSO is “to provide for the operation and maintenance of the sewer system which collects and transports wastewater and stormwater flow to treatment areas and authorized discharge points and deliver clean, safe and reliable drinking water to its customers with an efficient flow of sewer effluent to Blue Plains.”

Per the FY22 Approved Budget Departmental Summary, DSO involves two main branches:

- The **Investigation and Maintenance** team within DSO retains primary responsibility for the following activities:
 - Inspect public sewers and sewer laterals.
 - Clean sewers and inlet/outlet structures.
 - Operate and maintain sewer regulator structures;
 - Remove floatable debris; and
 - Monitor and control operations.
- The **Construction & Repair** team within DSO retains primary responsibility for the following activities:
 - Install and repair sewer mains and sewer laterals;
 - Install and repair catch basins;
 - Cleaning and maintenance operations of regular catch basins, stormceptors, and grate ponds; and
 - Oversee maintenance program for storm water structures, filter bio-retention and water quality catch basin cleaning.

Background (Continued)

The following table is derived directly from Maximo data provided by management for work orders completed between January 1, 2022, through July 31, 2022.

Work Order Type	# of Work Orders	% of Population	Avg. Duration to Completion
Preventive Maintenance (PM)	12,673	57%	30 days
Inspection (INSP)	5,666	26%	47 days
Emergency Investigation (EMERG)	2,063	9%	3 days and 18 hours
Emergency Maintenance (EM)	470	2%	17 days
Event (EV)	338	1.5%	13.5 hours
Plumber's Report (PLUMR)	307	1%	58 minutes

Note: Any work order type that made up less than 1% of the population was excluded from the above analysis.

Approach

Our audit approach consisted of the following phases:

Understanding of the Process

The first phase of our review consisted primarily of inquiry in an effort to obtain an understanding of the Authority's structure and key processes within our scope. The following procedures were conducted as part of the first phase of our review:

- Conducted interviews with key personnel to obtain a detailed understanding of the Authority's policies and procedures, operating functions, and key performance indicators for the following areas:
 - Work order initiation and approval,
 - Work execution and data entry,
 - Work order closeout, and
 - Reporting and monitoring.
- Reviewed documented policies and procedures, organization charts, and other key process information available to further our understanding of the function.
- From our interviews and review of policies, we identified key risks and controls, and developed a detailed control testing script.

Approach (Continued)

Detailed Testing

The second phase of our review consisted of an assessment of the design of key controls, and testing of the operating effectiveness of those controls. This process was facilitated through the testing of a sample of work orders closed by DSO during the period of 1/12/2022 – 7/31/2022. Our procedures during this phase included, but were not limited to:

- From the population of closed or completed work orders, we selected a sample of twenty-five (25) work orders from the Maximo Computerized Maintenance Management System (“CMMS”).
- For each work order selected, we requested and reviewed relevant supporting documentation in an effort to determine the operating effectiveness of controls within the Authority’s work order function. Key areas of focus included:
 - Labor hours;
 - Material costs; and
 - Supervisory review.

Reporting

At the conclusion of this internal audit, we summarized our observations related to the DSO Work Order Management function and reviewed the results of our testing with Management.



OBSERVATIONS AND RECOMMENDED ACTION

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Observation 1: Failure to capture work order labor and materials on a consistent basis

Risk Rating: High

Observation: Based on our testing of sample work orders and review of the data for the full population of work orders completed during the testing period, we noted that the DSO is not capturing labor hours and material costs within Maximo on a consistent basis. Costs that are expected to be captured, such as labor hours and materials costs, are not always included on the work orders within the Maximo system. We identified the following inconsistencies in data entry for the seven-month testing period:

- **Labor hours:** 7,339 of 15,355 total work orders that should have required labor hours (47.8%) had zero labor hours captured within Maximo. More specifically:
 - Catch basin: 60% with zero labor hours - 7,186 of 11,934 total work orders (see catch basin-specific root cause analysis below)
 - Non-catch basin: 4.5% with zero labor hours - 153 of 3,421 total work orders
- **Material costs:** There are a number of work order types that are not expected to have material costs due to the nature of the work (investigations, inspections, resets, etc.). However, the Emergency Maintenance (EM) work order type is consistently subject to material costs. 12 of 239 (5%) of EM work orders that should have had material costs captured within Maximo did not.

Root Cause Analysis: There is inadequate enforcement of data capture procedures and inadequate review processes to validate that work orders have all required data fields populated prior to work order closure. There is insufficient training provided to crews regarding required work order data entry.

For catch basins specifically, crews capture additional data such as percentage full that is utilized to perform asset analysis. Per inquiry with DSO, time to clean a catch basin averages around 6 minutes. This has not been a priority data field for analysis by the team.

Observation 1: Failure to capture work order labor and materials on a consistent basis

Impact Analysis: If labor and materials costs associated with work orders are not captured on a consistent basis, DSO is unable to quantify the true total cost of performing the tasks associated with the work orders, and is therefore unable to accurately capture the true costs of maintaining each asset. This limits Management's ability to monitor trends, assess performance, identify areas of concern for further investigation, and inform priority focus areas for the Authority's asset management program.

Recommendation: Internal Audit recommends:

- Management provide adequate training over all work order data requirements to all personnel involved in data entry and enforce compliance with work order completion requirements.
- DSO revisit Maximo configuration to determine feasibility of requiring labor hours and material costs fields by work order type within the system.
- DSO implement a detective control for a periodic review of Maximo data capture so management can identify trends in missing information and escalate to crews and foremen as necessary.
- Management revisit labor hours requirement for catch basin cleaning and determine whether changes to required data fields need to be communicated.

Observation 1: Failure to capture work order labor and materials on a consistent basis

Management Action Plan:

1. DSO's Catch Basin App currently records zero-hour labor records in the Maximo work order. An upgrade of the application is anticipated to begin this fiscal year. The team will engage IT on an appropriate solution during the upcoming upgrade project.
2. Develop a weekly Labor report to list all DSO work orders in COMP status that have zero labor hours. The report will be grouped by DSO division as well as supervisor.
3. Develop a weekly Material report to list all EM workorders in COMP status that have zero material. The report will be group by DSO division as well as supervisor.
4. Sewer operations will administer a mandatory Maximo Training program to commence 10/26/22. Each staff member will attend no later than January 25, 2023.

Responsible Party: Construction & Repair/Maximo Administrator/DPSO Asset Management Team/DC Water IT

Target Date: January 25, 2023

Observation 2: Inaccuracies in reported KPI data

Risk Rating: High

Observation: Management reports out on the progress of eight DPSO KPIs in the CEO report that is distributed to DC Water's Board monthly. Based on our testing of key performance indicators ("KPIs"), we noted a discrepancy between the actual KPI data monitored by DSO, and the KPI data presented in the monthly CEO report for one metric in June. Specifically:

- The June Catch Basin CSS Area Cleaning/Inspection actual percentage completed was 50%. The amount reported in the September CEO report was 100%.

When departments miss target metrics, a justification is typically provided within the CEO monthly report. However, because this June catch basis cleaning/inspection metric was mis-reported, no justification of missed target was provided within the report out.

Note that the DSO team caught the June discrepancy in August and updated their internal document to reflect the accurate June metric at that time. However, the change to historical data was not flagged for OMAC when submitted and therefore did not make its way to the published CEO monthly report.

Root Cause Analysis: There is inadequate reconciliation of represented metrics to actuals during review of the CEO report materials prior to submission.

Impact Analysis: The risk associated with inaccurate KPI reporting is that the Board and leadership may have less insight into departmental performance and shortfalls. Additionally, tracked KPIs relate to investigation compliance requirements, so leadership can make better-informed resource prioritization decisions when accurate compliance KPI data is reported.

Observation 2: Inaccuracies in reported KPI data

Recommendation: Internal Audit recommends Management implement a quality assurance review of the metrics provided for the monthly CEO report to confirm that the metrics presented to the Board are complete and accurate.

Management Action Plan:

1. Develop a Catch Basin CSS Area Cleaning/Inspection actual percentage report that will be generated from Maximo every month.
2. Develop a QA/QC Standard Operating Procedure to ensure data oversight

Responsible Party: Maximo Administrator/DPSO Assets Management Team

Target Date: November 30th, 2022

Observation 3: Lack of adherence to established work order procedures

Risk Rating: Low

Observation: Based on our testing and discussion with Management and key process owners, Internal Audit noted several instances of noncompliance with established work order procedures. The established work order procedures define the work order flow by work order type. For example:

- There are a number of work order types that do not require Foreman review (i.e. Catch Basins, Public Service Restorations, Event, etc.) However, for the work order types that require Foreman review, Internal Audit noted the following:
 - 94 out of 3,128 (3%) work orders that required Foreman review were reviewed and completed by a Utility Services Worker.
- EM work orders are created as a result of EMERG investigations. 40% of EM work orders do not have a parent work order associated, although the DSO documented process flow is for a child work order to be created following EMERG work order execution.
- DSO work orders do not consistently flow through the process steps defined in their documented work order procedures.

Root Cause Analysis: Management has developed procedures defining work order flow, but established requirements may not have been properly socialized with crews and are not enforced.

Impact Analysis: The risks associated with the lack of adherence to established work order procedures is inconsistent performance of processes and control activities, increased likelihood of re-work, decreased customer satisfaction, and potential adverse impact on regulatory requirements. When child work orders are not linked to parent work orders, crews may have less background information from investigations to inform maintenance work.

Observation 3: Lack of adherence to established work order procedures

Recommendation:

Internal Audit recommends:

- Management revisit and socialize procedures for DSO work order types to provide personnel with a current, clearly defined listing of requirements and expectations for work performed. This should include required fields (e.g. labor hours, material costs) and required linkages (e.g. EM work orders linked to parent work orders).
- DSO revisit Maximo configuration to determine feasibility of updating existing workflows within the system to require supervisory review and approval for the work order types that require Foreman review. The ability to perform this approval should be restricted to only the Foremen and leadership, and should not include Utility Service Workers or other personnel below the Foreman level. All exceptions to the established workflow should either be documented in an approved exceptions listing or documented in each work order.

Management Action Plan:

1. Sewer operations will administer a mandatory Maximo Training program to commence 10/26/22. Each staff member will attend no later than January 25, 2023

Responsible Party: DPSO Asset Management Team

Target Date: October 26th, 2022 – December 07th, 2022

APPENDIX

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Appendix – Rating Definitions

RSM defined observations based on the following risk rating definitions:

Observation Risk Rating Definitions	
Rating	Definition
Low	Observation presents a low risk (i.e., impact on financial statements, internal control environment or business operations) to the organization for the topic reviewed and/or is of low importance to business success/achievement of goals. Action should be taken within 12 months (if related to external financial reporting, must mitigate financial risk within two months unless otherwise agreed upon).
Moderate	Observation presents a moderate risk (i.e., impact on financial statements, internal control environment or business operations) to the organization for the topic reviewed and/or is of moderate importance to business success/achievement of goals. Action should be taken within nine months (if related to external financial reporting, must mitigate financial risk within two months).
High	Observation presents a high risk (i.e., impact on financial statements, internal control environment or business operations) to the organization for the topic reviewed and/or is of high importance to business success/achievement of goals. Action should be taken immediately, but in no case should implementation exceed six months (if related to external financial reporting, must mitigate financial risk within two months).

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