

Countermeasure Title	Countermeasure Description	Potential Order of Magnitude Cost	Annual Risk Reduction	Benefit: Cost Ratio	Path Forward	Timeframe
1. Physical Security Enhancements at Scott J Morse Pump Station	Install cameras and exterior motion sensors at Scott J Morse Pump Station to detect and respond more quickly to potential intruders.	\$ 10,000.00	\$ 9,000.00	18	Obtain cost estimate for work. Review with board to determine if worth the investment.	Q3 2021
2. Condition Assessments on Critical System Assets	Conduct a condition assessment on critical mains and critical valves to identify areas of the distribution system for work order or CIP planning prioritization.	\$ 250,000.00	\$ 220,000.00	18	Pilot project in progress to review technology application on district mains.	Q3 2021
3. Installation of Manhole Smart Covers	Install manhole smart covers throughout system to detect and respond more quickly to sewer system backups.	\$ 250,000.00	\$ 210,000.00	17	Conduct a review of collection system to determine if there are any critical areas where these should be installed.	Q4 2021
4. Fire Mitigation Landscaping at the Scott J Morse Pump Station	Implement landscaping to mitigate fire impacts at the Scott J Morse Pump Station.	\$ 10,000.00	\$ 5,700.00	11	Overland fire risk low. Accept risk without further action.	NA
5. Cybersecurity Enhancements	Consult with Special District Association - offers cyber protection services. Continue training employees on cyber security risks and best practices. During a cyber-attack, disconnect from network connectivity to mitigate system intrusion. Perform cloud backups (makes recovery quicker). [Additional Priority 1 Controls identified in the Cybersecurity Assessment Tool should be implemented as soon as possible].	\$ 10,000.00	\$ 5,200.00	10	Work ongoing. Prioritize additional staff training and controls implementation.	Q4 2021
6. Physical Security Enhancements at District Office Building	Install cameras, implement key cards, always lock front door (buzz people in after identification) at District Office Building. Store employee files in cloud-based system.	\$ 10,000.00	\$ 3,000.00	6	Obtain cost estimate for work. Review with board to determine if worth the investment.	Q3 2021
7. Cloud-Based SCADA Data Implementation	Load all SCADA data into cloud-based system to prevent the permanent loss of data due to physical damage of the system.	\$ 100,000.00	\$ 29,000.00	5	Work ongoing.	Q2 2021
8. Backflow Prevention Program	Implement backflow prevention for single-family residences (joint responsibility).	\$ 100,000.00	\$ 27,000.00	5	Acknowledge this risk is Denver Water's to manage. Encourage robust backflow prevention program	NA
9. Maintenance of Critical Knowledge	Implement an annual exercise of existing cross-training procedures to prevent the loss of critical knowledge among employees.	\$ 1,000.00	\$ 200.00	4	Schedule exercise for end of Q4. Conduct an annual review of job matrix.	Q4 2021

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10. Installation of On-Site Generator at Scott J Morse Pump Station	Install an on-site generator at Scott J Morse Pump Station to provide backup power during a power outage.	\$ 100,000.00	\$ 10,000.00	2	Due to existing secondary feed that can supply adequate fire flows, staff decided not to pursue this item.	NA
11. Physical Security Improvements at Fire Hydrants	Apply locks to fire hydrants to prevent the theft of water.	\$ 100,000.00	\$ 4,500.00	<1	Accept risk due to low occurrence.	NA
12. Increase Backup Power for SCADA System	Install more batteries or batteries with increased storage capacity. Install a generator on-site at District Office building for backup power during a power outage.	\$ 100,000.00	\$ 3,500.00	<1	Accept risk due to low occurrence. Ensure cloud-based systems allow for remote system management.	NA
13. Water Main Flood Erosion Analysis	Conduct a full-scale water main flood erosion analysis of each crossing to determine risk.	\$ 100,000.00	\$ 1,200.00	<1	Ongoing through staff review. Schedule meetings w. DW re: critical connections.	Q2 2021
14. Floodplain Analysis on Critical System Assets	Conduct a floodplain analysis on critical system assets to determine inundation areas and to improve planning and preparation of resources for a flood event.	\$ 100,000.00	\$ 120.00	<1	Continue annual facility/MH inspection program in drainage basins. May schedule a detailed floodplain analysis for future year.	Q4 2021
15. Maintenance of Utility Financial Health	Conduct an annual evaluation of customer base to ensure service population remains stable.	\$ 10,000.00	\$ 10.00	<1	Add annual review of customer class and counts. Add biennial audit of internal controls.	Q4 2021
16. Sedaru Hydraulic Model Evaluations*	Increase the number of evaluations in Sedaru CIP planning package to prevent a failure to replace pipelines at the set replacement rate.	\$ 10,000.00	\$ 3.00	<1	Accept risk. Currently have annual review scheduled. Due to internal processes an additional mid-year review would not impact CIP process.	NA
17. Distribution System Maintenance	Continue conducting training and having contractors follow Denver Water protocols for distribution system maintenance.	\$ 10,000.00	NA	NA	NA	NA
18. Employee Safety Program Training	Continually review and communicate safety program with staff (e.g., field safety, following pandemic illness guidelines) to aid in the prevention of serious injuries and/or fatalities.	\$ 10,000.00	NA	NA	NA	NA
19. CMOM Program	Continue routine cleaning and inspection program to prevent sewer system backups.	\$ 100,000.00	NA	NA	NA	NA
20. Physical Security at Manholes	Continue to keep manhole covers locked to prevent malevolent acts such as intentional blockage of sewer mains.	\$ -	NA	NA	NA	NA

Countermeasure Title	Countermeasure Description	Potential Order of Magnitude Cost	Annual Risk Reduction	Benefit: Cost Ratio	Path Forward	Timeframe
1. Physical Security Enhancements at Hogback Pump Station	Install cameras and exterior motion sensors at Hogback Pump Station to detect and respond more quickly to potential intruders.	\$ 10,000.00	\$ 28,000.00	55	Obtain cost estimate for work. Review with board to determine if worth the investment.	Q3 2021
2. Fire Mitigation Landscaping at the Hogback Pump Station	Implement landscaping to mitigate fire impacts at the Hogback Pump Station.	\$ 10,000.00	\$ 63,000.00	42	Overland fire risk low. Accept risk without further action.	NA
3. Installation of Manhole Smart Covers	Install manhole smart covers throughout system to detect and respond more quickly to sewer system backups.	\$ 250,000.00	\$ 250,000.00	20	Conduct a review of collection system to determine if there are any critical areas where these should be installed.	Q4 2021
4. Contractor Generator Fuel Supply Redundancy	Find a backup fuel vendor or consider installing additional storage tank on-site.	\$ 100,000.00	\$ 97,000.00	19	Contact fuel vendors for additional supply contract.	Q4 2021
5. Condition Assessments on Critical System Assets	Conduct a condition assessment on critical mains and critical valves to identify areas of the distribution system for work order or CIP planning prioritization.	\$ 250,000.00	\$ 180,000.00	14	Pilot project in progress to review technology application on district mains.	Q3 2021
6. Cybersecurity Enhancements	Consult with Special District Association - offers cyber protection services. Continue training employees on cyber security risks and best practices. During a cyber-attack, disconnect from network connectivity to mitigate system intrusion. Perform cloud backups (makes recovery quicker). [Additional Priority 1 Controls identified in the Cybersecurity Assessment Tool should be implemented as soon as possible].	\$ 10,000.00	\$ 5,200.00	10	Work ongoing. Prioritize additional staff training and controls implementation.	Q4 2021
7. Maintenance of Utility Financial Health	Continue to increase to annual fee. Investigate other revenue sources. Annual evaluation of customer base to ensure service population remains stable.	\$ 10,000.00	\$ 3,000.00	6	Financial review process includes annual fee evaluation. Add annual review of customer class and counts. Add biennial audit of internal controls.	Q4 2021
8. Physical Security Enhancements at District Office Building	Install cameras, implement key cards, always lock front door (buzz people in after identification) at District Office Building. Store employee files in cloud-based system.	\$ 10,000.00	\$ 3,000.00	6	Obtain cost estimate for work. Review with board to determine if worth the investment.	Q3 2021
9. Cloud-Based SCADA Data Implementation	Load all SCADA data into cloud-based system to prevent the permanent loss of data due to physical damage of the system.	\$ 100,000.00	\$ 29,000.00	6	Work ongoing.	Q2 2021

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10. Backflow Prevention Program	Implement backflow prevention for single-family residences (joint responsibility).	\$ 100,000.00	\$ 27,000.00	5	Acknowledge this risk is Denver Water's to manage. Encourage robust backflow prevention program	NA
11. Maintenance of Critical Knowledge	Implement an annual exercise of existing cross-training procedures to prevent the loss of critical knowledge among employees.	\$ 1,000.00	\$ 190.00	4	Schedule exercise for end of Q4. Conduct an annual review of job matrix.	Q4 2021
12. Potential Installation of Backup Water Feed Line at the Hogback Pump Station	Conduct hydraulic analysis and fireflow testing. Consider the installation a backup feed at the Hogback Pump Station and/or collaborate on mitigation efforts with Denver Water to prevent a failure to provide adequate fire flow in the distribution system.	\$ 1,000,000.00	\$ 56,000.00	1	Consultant retained and work will begin shortly.	Q3 2021
13. Floodplain Analysis on Critical System Assets	Conduct a floodplain analysis on critical system assets to determine inundation areas and to improve planning and preparation of resources for a flood event.	\$ 100,000.00	\$ 4,900.00	1	Continue annual facility/MH inspection program in drainage basins. May schedule a detailed floodplain analysis for future year.	Q4 2021
14. Physical Security Improvements at Fire Hydrants	Apply locks to fire hydrants to prevent the theft of water.	\$ 100,000.00	\$ 4,500.00	<1	Accept risk due to low occurrence.	NA
15. Increase Backup Power for SCADA System	Install more batteries or batteries with increased storage capacity. Install a generator on-site at District Office building for backup power during a power outage.	\$ 100,000.00	\$ 3,500.00	<1	Accept risk due to low occurrence. Ensure cloud-based systems allow for remote system management.	NA
16. Water Main Flood Erosion Analysis	Conduct a full-scale water main flood erosion analysis of each crossing to determine risk.	\$ 100,000.00	\$ 1,170.00	<1	Ongoing through staff review. Schedule meetings w. DW re: critical connections.	Q2 2021
17. Hydraulic Model Evaluations in Sedaru*	Increase the number of evaluations in Sedaru (work order tracking and CIPP planning) package to prevent a failure to replace pipelines at the mandated replacement rate per contractual obligation.	\$ 10,000.00	\$ 3.00	<1	Accept risk. Currently have annual review scheduled. Due to internal processes an additional mid-year review would not impact CIP process.	NA
18. Distribution System Maintenance	Continue conducting training and having contractors follow Denver Water protocols for distribution system maintenance.	\$ 10,000.00	NA	NA	NA	NA

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19. Employee Safety Program Training	Continually review and communicate safety program with staff (e.g., field safety, following pandemic illness guidelines) to aid in the prevention of serious injuries and/or fatalities.	\$ 10,000.00	NA	NA	NA	NA
20. CMOM Program	Continue routine cleaning and inspection program to prevent sewer system backups.	\$ 100,000.00	NA	NA	NA	NA
21. Physical Security at Manholes	Continue to keep manhole covers locked to prevent malevolent acts such as intentional blockage of sewer mains.	\$ -	NA	NA	NA	NA