COMMONWEALTH of VIRGINIA

DEPARTMENT OF HEALTH

OFFICE OF DRINKING WATER

Richmond Field Office

Karen Shelton, MD
State Health Commissioner

Madison Building
109 Governor St., 6th Floor
Richmond, VA 23219
Phone: 804-864-7409
Fax: 804-864-7520

September 16, 2025

Mr. Scott Morris, Director
City of Richmond Department of Public Utilities
730 East Broad Street, 6th Floor
Richmond, Virginia 23219

RE: City of Richmond, PWSID 4760100

Dear Mr. Morris:

This office has received the memorandum dated September 8, 2025, which provides formal response from the City of Richmond to Appendix A, Paragraph d of the Consent Order dated June 13, 2025. This paragraph states:

"Within 120 days of the effective date of this Order, collaborate with RFO and commit to completing a business operation plan with RFO by submitting to RFO the following items:

a. Capital Improvement Plan (CIP)
b. Updated organizational charts
c. Water Asset Management Plan (AMP) or equivalent documents
d. Approved budget
e. Output from most recent rate model run
f. List of active contracts for water related services"

This letter serves to verify that items a-f have been provided in the memorandum and associated appendices and were provided within 120 days of the June 28, 2025, effective date of the Consent Order.

The documents will be utilized by the Training, Capacity Development, and Outreach Division of the Office of Drinking Water to develop a business operation plan. Members of that division may reach out for clarification or additional information during the development of the plan.

Please feel free to contact me at james.reynolds@vdh.virginia.gov or (757) 406-1252 if you have any questions.

Sincerely,

James Reynolds, PE
Field Director
Richmond Field Office

DEPARTMENT OF PUBLIC UTILITIES

TO: VDH - Office of Drinking Water - Richmond Field Office
FROM: Scott Morris, DBA, P.E.
Director, Department of Public Utilities
DATE: September 8, 2025
RE: Compliance with Consent Order Appendix A, Paragraph d
Business Operation Plan Submission

PURPOSE

This memorandum serves as the City of Richmond's formal response to Appendix A, Paragraph d of the Consent Order dated June 12, 2025, demonstrating our collaboration with the Richmond Field Office (RFO) and commitment to completing a comprehensive business operation plan for the Richmond Waterworks.

COMPLIANCE STATUS

Pursuant to Appendix A, Paragraph d, which requires submission within 120 days of the effective date of the Consent Order (by October 10, 2025), the City hereby submits the following items:

1. Capital Improvement Plan (CIP)
   The Capital Improvement Plan (CIP) for the City of Richmond's Department of Public Utilities (DPU) encompasses substantial investments across gas, water, wastewater, stormwater, and flood control systems to enhance reliability, regulatory compliance, and service delivery. For fiscal year 2026, the plan allocates approximately $505.6 million, with a five-year total (FY 2026-2030) reaching $1.28 billion, funded primarily through utility revenue bonds, general obligation bonds, pay-as-you-go financing, and federal grants. Key initiatives include replacing leak-prone gas pipes under a 40-year program, upgrading water distribution and treatment facilities with an emphasis on lead service line replacements, reducing combined sewer overflows in wastewater systems to meet 2035 mandates, improving stormwater infrastructure to address flooding, and maintaining flood control structures such as levees and dams. These efforts aim to ensure compliance with drinking water standards, effluent quality, and sustainable infrastructure while balancing affordability through modest rate adjustments.

2. Updated Organizational Charts

   Current organizational charts reflecting the restructured Department of Public Utilities are attached, including:

- Five professional engineers in senior leadership roles
- New Department Director position
- Director of Water and Administration
- Senior Deputy Director of Engineering Services
- Senior Deputy Director of Water Operations
- Deputy Director of Water Operations

3. Water Asset Management Plan (AMP)

   The Water Asset Management Plan and equivalent documents are attached, including the December 2020 Water Treatment Plant Condition Assessment and 10-Year Repair and Replacement Plan. This comprehensive assessment documented 4,220 assets at the WTP, identified 187 critical assets, and established a Facility Condition Index (FCI) averaging 5.4% indicating overall fair condition. The plan includes risk-based prioritization of assets requiring repair or replacement through FY2031, with an estimated total replacement value of $303.7 million for all functional WTP assets and $12.4 million identified for the 10-year repair and replacement program. The assessment provides detailed asset hierarchies, condition ratings, and preventative maintenance requirements to support systematic infrastructure management. The entire documents contained withing item 3 should be consider exempt from FOIA due to their critical nature.

4. Approved Budget

   The City's approved Fiscal Year 2026 budget adopted by Richmond City Council in May 2025. The $3.0 billion total budget includes a General Fund of $1.06 billion and a Capital Improvement Plan of $549.6 million for FY2026-2030. The budget includes allocations for:

   - Water treatment plant operations and maintenance - with more than $60 million for water treatment plant improvements, including $38 million designated for FY2026
   - Distribution system improvements - supporting critical infrastructure upgrades identified in system assessments
   - Emergency response capabilities - funding for backup power systems and emergency preparedness equipment
   - Staff training and development programs - resources for operator certification and specialized technical training

   The Department of Public Utilities budget includes approved utility rate increases averaging 5.75% for water services to support these operational and capital needs. This budget demonstrates the City's commitment to addressing water system infrastructure requirements while maintaining fiscal responsibility and sustainable utility operations.

5. Output from Most Recent Rate Model Run

   The City's FY2025-2030 rate model demonstrates the financial planning and rate structure necessary to support water system operations and capital improvements. The model projects annual water rate increases of 5.75% through FY2030, generating total water revenues increasing from $89.0 million in FY2025 to $117.8 million in FY2030. The model supports a $423.9 million water capital improvement program over the six-year period, with 48% equity financing and 52% debt financing. Key financial metrics demonstrate system sustainability with total debt service coverage ratios maintained between 1.40 and 3.34, and operating reserves averaging 228 days of operations and maintenance expenses. The typical residential customer water bill is projected to increase from $41.08 to $54.30 per month over the planning period.

6. List of Active Contracts for Water Related Services

   A comprehensive list of 68 active water-related service contracts is attached, with a total combined value of $421,573,241.00. These contracts include:

   - Major capital projects (Byrd Park Reservoir Rehabilitation - $71.4M)
   - Water facility installation and construction services ($67.8M)
   - Engineering and technical services ($45.5M)
   - Water main repairs and meter services ($24M)
   - Chemical supply agreements (multiple contracts totaling over $20M)
   - Equipment maintenance and repair services
   - SCADA and instrumentation control systems
   - Emergency response and backup power systems
   - Underground utility locating services ($23.8M)
   - Distribution system materials and fittings

CONCLUSION

The City of Richmond affirms its compliance with Appendix A, Paragraph (d) requirements through the submission of all requested business operation plan components and collaboration with RFO as specified in the Consent Order.

Scott Morris

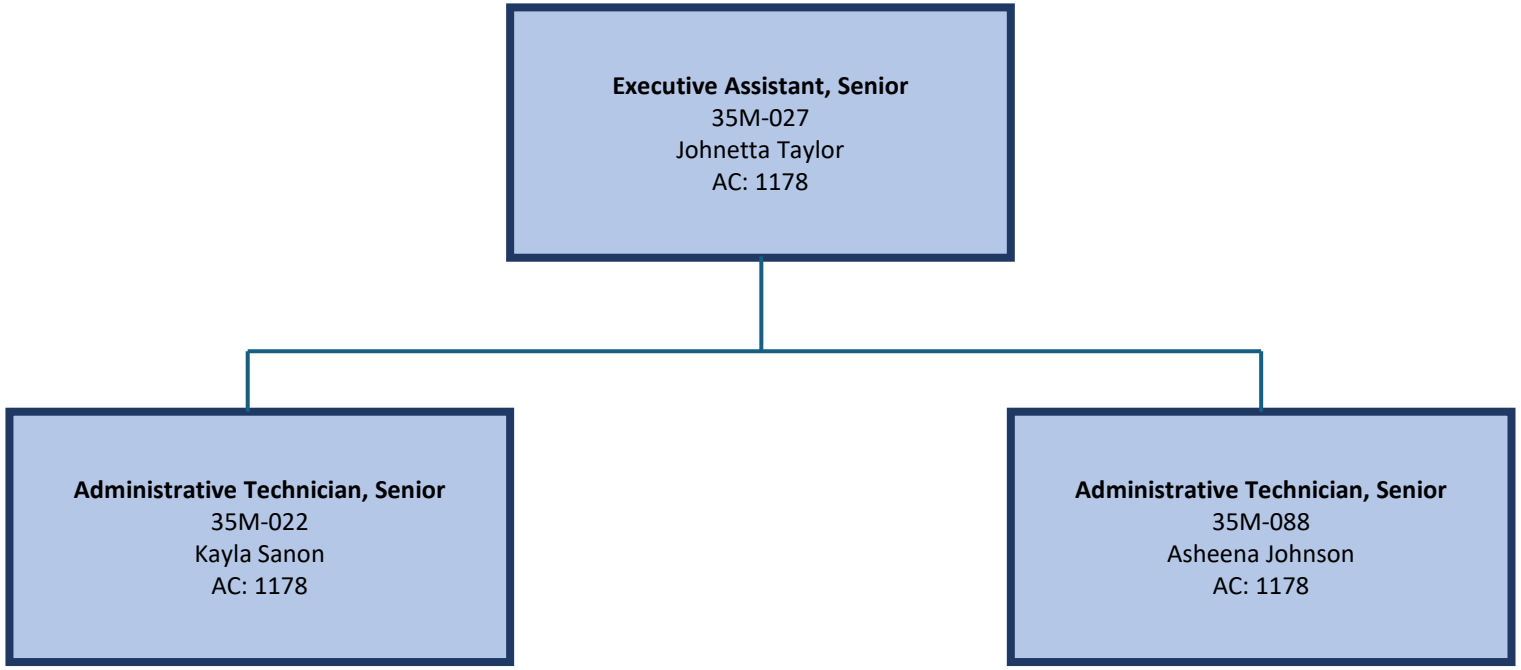
ATTACHMENTS/LINKS:

- Capital Improvement Plan (CIP)
- Updated Organizational Charts
- Water Asset Management Plan (AMP) or equivalent documents
- Approved Budget.
  - https://www.rva.gov/budget-and-strategic-planning/budget-documents
- Output from most recent rate model run
- List of active contracts for water related services

Capital Improvement Plan

Row Labels	Description	Sum of FY25	Sum of FY26	Sum of FY27	Sum of FY28	Sum of FY29	Sum of FY30	Sum of Estimate
Distribution		24,715,000	32,036,000	29,186,200	29,196,980	29,206,900	29,217,100	148,843,180
100258	Water Valve Replacement	125,000	250,000	125,000	125,000	125,000	125,000	750,000
100265	New Water Services (2" and Smaller)	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	7,500,000
100266	Replacement Water Services (Lead)	2,000,000	5,000,000	5,000,000	5,000,000	5,000,000	5,000,000	25,000,000
100269	Install Fire Hydrants#W145O53U	900,000	500,000	500,000	500,000	500,000	500,000	2,500,000
100270	Water Meters	415,000	315,000	324,000	330,480	336,100	342,100	1,647,680
100289	Vault Replacements	400,000	208,000	212,200	216,500	220,800	225,000	1,082,500
TBD		0	2,738,000	0	0	0	0	2,738,000
Various	Water Fire Main Improvements	25,000	25,000	25,000	25,000	25,000	25,000	125,000
Various	Water Mains New/Renewal	17,850,000	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000	100,000,000
Various	Water Services New/Renewal - Customer Requests	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	7,500,000
major		12,579,425	21,592,965	28,583,967	48,000,617	1,257,700	0	99,435,249
100248	Lime Equipment Replacement	310,000	466,233	1,006,852	0	0	0	1,473,085
100250	Haxall Gates Access Bridge	10,000	110,000	265,297	0	0	0	375,297
100254	Substation#1Repc. #H036I91U R3	1,800,000	3,200,000	926,778	0	0	0	4,126,778
100282	Plant Water Sys.U.G, #W703I91U	120,000	396,788	0	0	0	0	396,788
102068	Impounding Structures - Dam & Gate Inspections	50,000	560,000	541,869	0	0	0	1,101,869
103009	Waste Pumping & Control Sys Improvements	25,000	1,300,000	223,988	0	0	0	1,523,988
104009	Kanawha West Canal Improvements	0	100,000	1,500,000	1,994,608	0	0	3,594,608
105317	Raw Water Pump Screens & VFD Replacements	4,000,000	1,103,797	0	0	0	0	1,103,797
106555	Pumping Process Control Project Phase 3B (SCADA DPC)	700,000	1,500,000	200,000	4,751,068	0	0	6,451,068
107171	WTP Roof Rehabilitation	50,000	665,000	0	0	0	0	665,000
107224	WTP Sanitary Sewer Sys Improv.	150,000	25,000	721,839	0	0	0	746,839
107336	Clearwell and Triple Conduit Concrete Restoration	70,000	800,000	3,219,674	0	0	0	4,019,674
107707	WTP Feeder Channel 1B	4,000,000	2,883,988	0	0	0	0	2,883,988
107739	Six Mile Spillway Concrete Restoration	50,000	439,414	0	0	0	0	439,414
107747	Water Plant Sidewalk Restoration	50,000	134,085	0	0	0	0	134,085
107748	Finish Water Flow Meter Replacements	80,000	620,000	0	0	0	0	620,000
107823	WTP Feeder Channel Phase 2	0	10,000	6,000,000	5,700,000	1,257,700	0	12,967,700
107824	WTP Feeder Channel Retaining Wall	0	10,000	1,460,000	270,000	0	0	1,740,000
107904	WTP Filtration System Valve Actuators Replacement and Filter Media Replacement	320,000	50,000	5,000,000	27,106,067	0	0	32,156,067
108176	Water Plant HVAC Upgrades	80,000	1,000,000	800,000	425,274	0	0	2,225,274
108257	Elevator Replacements (2) Plant 2	25,000	100,000	2,875,000	0	0	0	2,975,000
108288	DPU Admin Building	54,425	178,388	0	0	0	0	178,388
108340	Sodium Hydroxide Tanks Replacement	50,000	1,486,000	0	0	0	0	1,486,000
108509	Fluoride Pump Replacement	50,000	100,000	490,663	0	0	0	590,663
108759	Lead and Copper Rule Testing	460,000	450,000	220,707	0	0	0	670,707
TBD		75,000	3,904,272	3,131,300	7,753,600	0	0	14,789,172
Pumping		21,980,000	30,490,000	27,428,595	31,024,917	0	0	88,943,512
105024	(R/He/Ha)Byrd Pk Main PS Impr	50,000	5,000,000	5,000,000	2,778,676	0	0	12,778,676
105927	(Rich) Huguenot PS Generator	600,000	900,000	605,057	0	0	0	1,505,057
106389	Columbus PS Roof Replacement (117)	10,000	290,000	0	0	0	0	290,000
106833	Korah PS 2 Motor Starter	25,000	2,000,000	2,023,538	0	0	0	4,023,538
107226	VFD Replacements - Jahnke Rd PS, J2 & J3, Drum Controller	70,000	200,000	2,500,000	1,923,984	0	0	4,623,984
107227	Trafford Pump Station Upgrade (No WO)	25,000	50,000	300,000	9,625,000	0	0	9,975,000
107314	Byrd Park Reservoir Roof	21,000,000	22,000,000	15,000,000	4,121,695	0	0	41,121,695
108415	VFD Replacements - Korah 3 PS, K3-3, K3-4, K3-5	200,000	50,000	2,000,000	12,575,562	0	0	14,625,562
Transmission		1,391,869	6,205,310	13,705,922	6,157,300	6,300,000	12,817,455	45,185,987
100252	Church Hill Tank(R,H)#H004I86U	0	329,000	89,000	1,657,300	1,400,000	0	3,475,300
100255	Zone 2N Laburnum, #H037I88U R2	250,000	0	0	3,273,300	3,273,300	3,663,517	10,210,117
102773	Dist Master Plan 2014(R/C/H/Ha	0	0	0	0	400,000	0	400,000
103562	Jahnk Rd Tank Rehab (R\C)	50,000	723,350	0	0	0	0	723,350
104649	Zone 2N Hanover-Azalea(Meters)	197,812	0	0	1,226,700	1,226,700	1,372,938	3,826,338
105969	(R/C) JahnkeRd Wide_30" Trans	0	500,000	4,085,037	0	0	0	4,585,037
106575	Henrico - Laburnum Meter SCADA	10,000	201,882	0	0	0	0	201,882
106578	Henrico-ThreeChopt Meter SCADA	15,000	35,000	41,284	0	0	0	76,284
106581	Henrico-Shurm&Carl Meter SCADA	10,000	35,000	32,823	0	0	0	67,823
107088	(Hen)1205 Libbie Wat Met_INV	0	70,000	96,069	0	0	0	166,069
107304	Chesterfield - Jahnke Road Meter SCADA	10,000	1,979,150	0	0	0	0	1,979,150
107305	Chesterfield - Hopkins Road Meter SCADA	10,000	35,000	38,572	0	0	0	73,572
107683	Byrd Park Trans Mains_WAT_INV (Han)	0	35,000	40,655	0	0	0	75,655
108125	Hanover 36" Transmission Main Relocate	839,057	1,549,736	7,972,045	0	0	0	9,521,781
108160	Korah-3 (PCCP w/Cl.IV Wire) Replacement	0	40,000	40,437	0	0	0	80,437
TBD		0	672,192	1,270,000	0	0	7,781,000	9,723,192
Grand Total		60,666,294	90,324,275	98,904,684	114,379,814	36,764,600	42,034,555	382,407,928

Administrative Offices



DEPARTMENT OF PUBLIC UTILITIES

Administration, Innovation & Technology, Finance, & Customer Service Office

Deputy Department Director, Senior
35M-833
Jamie Porter
AC: 1178

Human Capital Services

Senior Policy Advisor
35M-142
Gerald Westry
AC: 1209

Program and Operations Manager
35M-635
JeanNate' Epps

Programs & Operations Supervisor
35M-768
Etosha Walkins

Program and Operations Manager
35M-325
Timothy Hurt

Management Analyst, Principal
35M-519
Roslyn Trent

Chart 1(A)

Innovation & Tech

Deputy Department Director
35M-578
Paul Giglio
AC: 1337

Programs & Operations Supervisor
35M-128
Peter Madzudzo

Programs & Operations Manager
35M-643
Johnathan Snyder

Management Analyst Associate
35M-587
Vianney Herrera

Programs & Operations Manager
35M-654
Maximillian Pop

Programs & Operations Manager
35M-637
Zane Mullins

Chart 1(B)

Financial Ops

Deputy Department Director
35M-079
John Vaughan
AC: 1161

Financial Manager
35M-066
Vacant

Financial Manager
35M-918
Warren Estes

Utilities Fuel Procurement Admin
35M-164
Vacant

Accountant Senior
35M-156
David Young

Accounting Manager
35M-588
Annette McFarland

Accountant Manager
35M-134
Carolyn Turner

Chart 1(C)

CS – Call Center & Project Synergy

Deputy Department Director, Senior
35M-034
Lynnette Lemon
AC: 1096

Program & Operations Supervisor, Senior
35M-057
Lisa Smith
AC: 1097

Customer Service Manager, Senior
35M-110
Arthur Kolluri
AC: 1038

Chart 1(D)

CS – Billing & Exceptions

Customer Service Manager, Senior
35M-064
Lawrence Hall IV
AC: 1097

Programs & Operations Supervisor
35M-060
Rodney Munford
AC: 1097

Management Analyst
35M-909
Vacant

Customer Service Supervisor
35M-112
Yolanda Edwards
AC: 1097

Chart 1(E)

CS – Revenue Recovery

Programs & Operations Manager
35M-590
Johnell Liggans
AC: 1090

Customer Service Supervisor
35M-501
Glenda Kennedy

Customer Service Supervisor
35M-532
Thomas Epps

Chart 1(F)

CS – Budget & Admin

Program & Operations Supervisor, Senior
35M-144
Trina Allen
AC: 1096

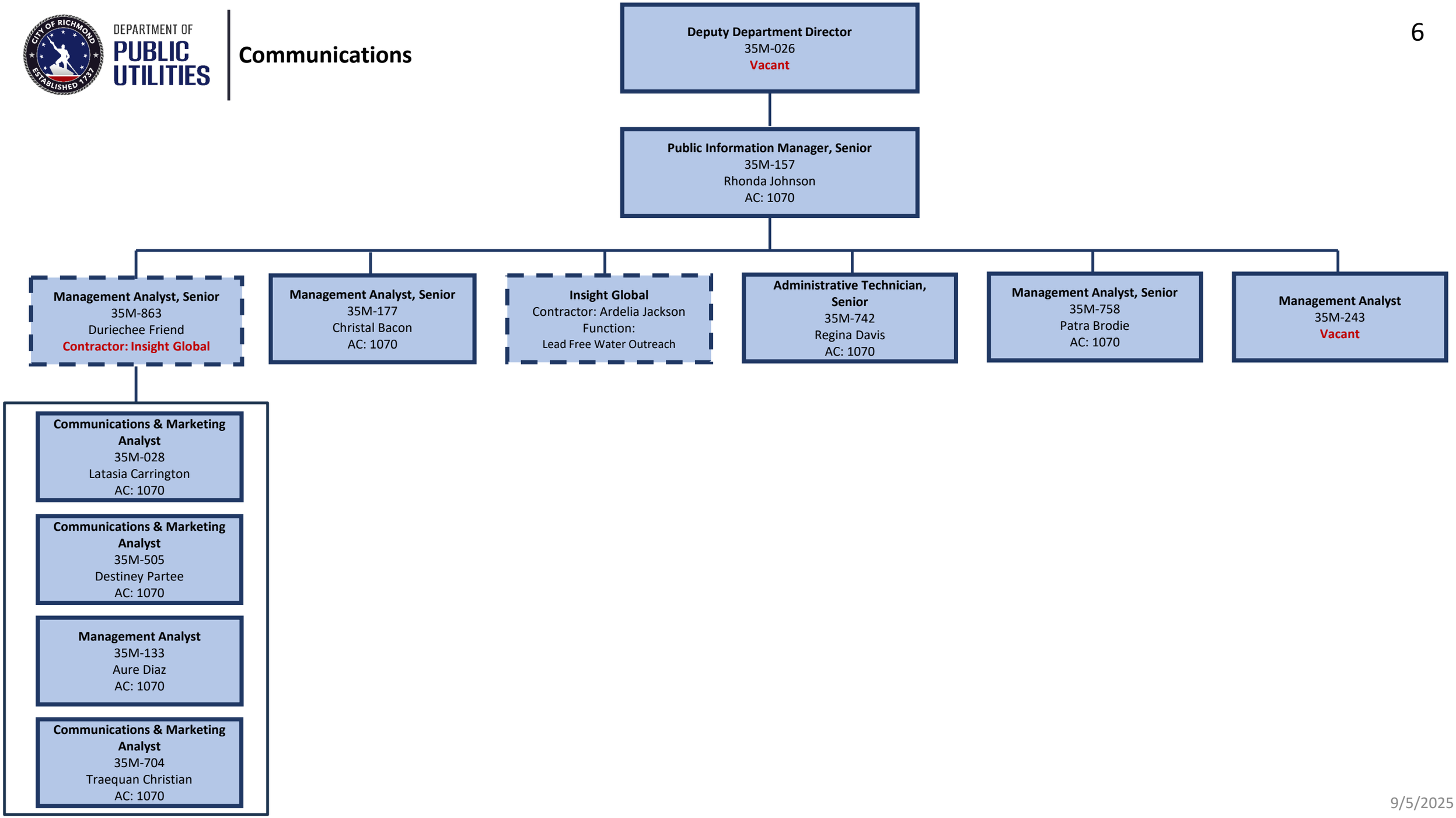
Management Analyst, Associate
35M-049
Dalerie Anderson
AC: 1096

Insight Global
Contractor: Talia Oliver
Manager: Trina Allen
Function: Admin Technician

Chart 1(G)

DEPARTMENT OF PUBLIC UTILITIES

Communications



DEPARTMENT OF PUBLIC UTILITIES

Human Capital Services, Innovation & Technology, Finance, & Customer Service Office

Deputy Department Director, Senior
35M-833
Jamie Porter
AC: 1178

Human Capital Services

Senior Policy Advisor
35M-142
Gerald Westry
AC: 1209

Program and Operations Manager
35M-635
JeanNate' Epps

Programs & Operations Supervisor
35M-768
Etosha Walkins

Program and Operations Manager
35M-325
Timothy Hurt

Management Analyst, Principal
35M-519
Roslyn Trent

Chart 1(A)

Innovation & Tech

Deputy Department Director
35M-578
Paul Giglio
AC: 1337

Programs & Operations Supervisor
35M-128
Peter Madzudzo

Programs & Operations Manager
35M-643
Johnathan Snyder

Management Analyst Associate
35M-587
Vianney Herrera

Programs & Operations Manager
35M-654
Maximillian Pop

Programs & Operations Manager
35M-637
Zane Mullins

Chart 1(B)

Financial Ops

Deputy Department Director
35M-079
John Vaughan
AC: 1161

Financial Manager
35M-066
Vacant

Financial Manager
35M-918
Warren Estes

Utilities Fuel Procurement Admin
35M-164
Vacant

Accountant Senior
35M-156
David Young

Accounting Manager
35M-588
Annette McFarland

Accountant Manager
35M-134
Carolyn Turner

Chart 1(C)

CS – Call Center & Project Synergy

Deputy Department Director, Senior
35M-034
Lynnette Lemon
AC: 1096

Program & Operations Supervisor, Senior
35M-057
Lisa Smith
AC: 1097

Customer Service Manager, Senior
35M-110
Arthur Kolluri
AC: 1038

Chart 1(D)

CS – Billing & Exceptions

Customer Service Manager, Senior
35M-064
Lawrence Hall IV
AC: 1097

Programs & Operations Supervisor
35M-060
Rodney Munford
AC: 1097

Management Analyst
35M-909
Vacant

Customer Service Supervisor
35M-112
Yolanda Edwards
AC: 1097

Chart 1(E)

CS – Revenue Recovery

Programs & Operations Manager
35M-590
Johnell Liggans
AC: 1090

Customer Service Supervisor
35M-501
Glenda Kennedy

Customer Service Supervisor
35M-532
Thomas Epps

Chart 1(F)

CS – Budget & Admin

Program & Operations Supervisor, Senior
35M-144
Trina Allen
AC: 1096

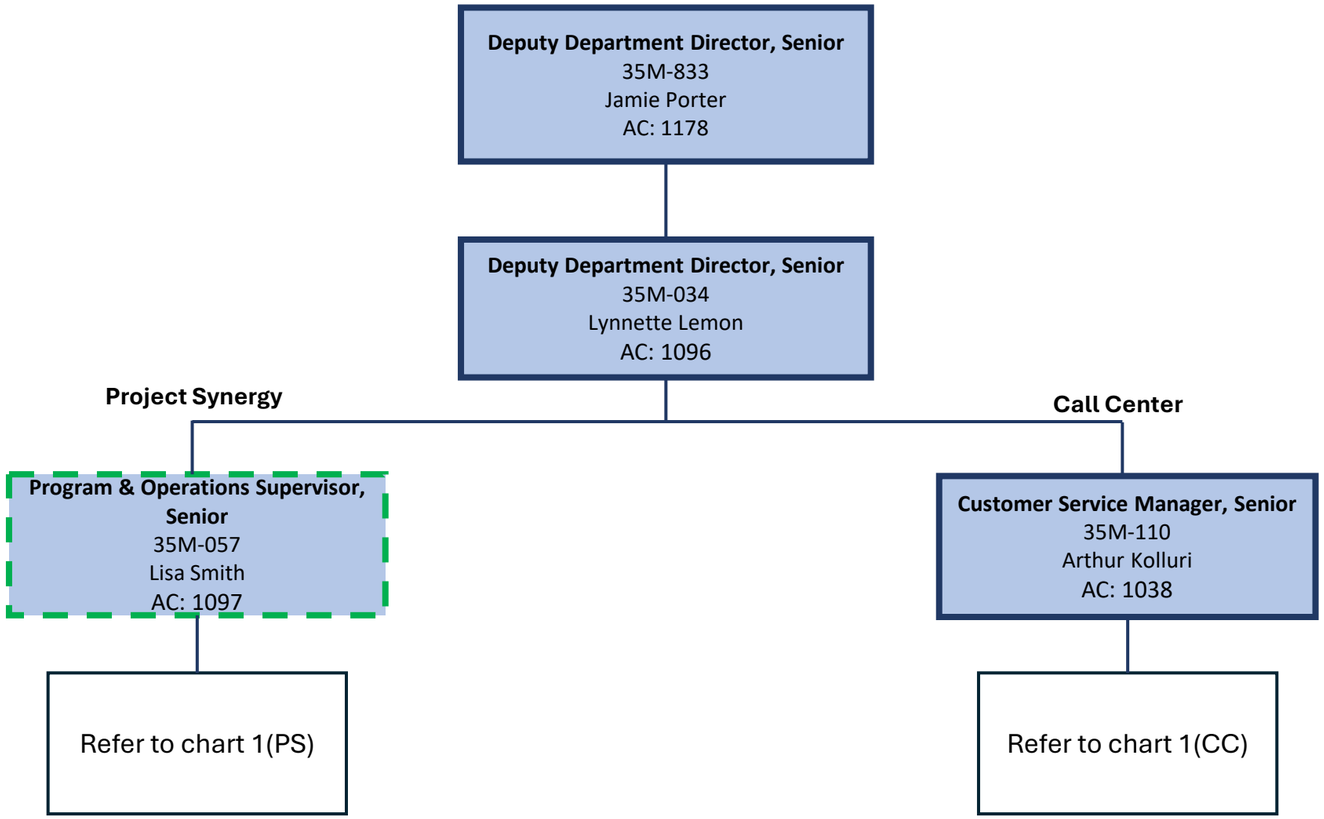
Management Analyst, Associate
35M-049
Dalerie Anderson
AC: 1096

Insight Global
Contractor: Talia Oliver
Manager: Trina Allen
Function: Admin Technician

Chart 1(G)

DEPARTMENT OF PUBLIC UTILITIES

Customer Service – Call Center & Project Synergy



------ = Employee participates in Project Synergy

DEPARTMENT OF PUBLIC UTILITIES

Customer Service – Call Center

Customer Service Manager, Senior
35M-110
Arthur Kolluri
AC: 1038

Insight Global Contractors: 1

Aston Carter Contractors: 1

Ever Rise Contractors: ~100

Programs & Ops Supervisor Senior
35M-867
Vacant

AC: 1038

Customer Service Supervisor
35M-031
Vacant

- **Customer Care Specialist** 35M-044 Porsche Pettaway
- **Customer Care Specialist** 35M-035 Mark Barnes
- **Customer Care Specialist** 35M-868 Ericca McMillian

AC: 1038

Customer Service Supervisor
35M-045
Latoyna Millner

- **Customer Care Specialist** 35M-491 Lisa Cooper-Lewis
- **Customer Care Specialist** 35M-078 Shelby Grasberger
- **Customer Care Specialist** 35M-907 Darrell Williams

AC: 1038

Customer Service Supervisor
35M-363
Sarah Farris-Davis

- **Customer Care Specialist** 35M-036 Ronnie Draper Jr.
- **Customer Care Specialist** 35M-073 Tianna Moseley
- **Customer Care Specialist** 35M-065 Justin Turner
- **Customer Care Specialist** 35M-178 Anthony Spencer
- **Customer Care Specialist** 35M-092 Alisa Massey

AC: 1038

Customer Service Supervisor
35M-249
Brandy Clark

- **Customer Care Specialist** 35M-053 Latoyna Cribbs
- **Customer Care Specialist** 35M-071 Gail Caldwell
- **Customer Care Specialist** 35M-102 Ronald Leitner
- **Customer Care Specialist** 35M-500 Dianna Reese
- **Customer Care Specialist** 35M-056 Sharon Logan
- **Customer Care Specialist** 35M-076 Carl Cooper
- **Customer Care Specialist** 35M-360 Letisha Sheffield

AC: 1038

Customer Service Supervisor
35M-043
Shameka McFarlane
Project Synergy

Resource Planning

Management Analyst, Senior
35M-871
Vacant

- **Management Analyst, Associate** 35M-905 Jamie Queen AC: 1038
- **Management Analyst, Associate** 35M-127 Dashia Oliver AC: 1038
- **Management Analyst (QA)** 35M-040 Vacant

Customer Service Supervisor
35M-052
Vacant

DEPARTMENT OF PUBLIC UTILITIES

Customer Service – Billing & Exceptions

Deputy Department Director, Senior
35M-833
Jamie Porter
AC: 1178

Customer Service Manager, Senior
35M-064
Lawrence Hall IV
AC: 1097

= Employee participates in Project Synergy

Exceptions
AC: 1097

Insight Global
Contractors: 7
Manager: R. Munford
Function: Customer Bill Review

Programs & Operations Supervisor
35M-060
Rodney Munford
AC: 1097
Customer Bill Review

Management Analyst
35M-909
Vacant

Customer Account Investigator
35M-046
Kelly Duke
AC: 1097

Customer Account Investigator
35M-069
Vashti Barrow
AC: 1097

Customer Account Investigator
35M-908
Mechelle Reid
AC: 1097

Customer Account Investigator
35M-086
Nicole Davis
AC: 1097

Management Analyst, Associate
35M-114
Angel Scott
AC: 1097

Management Analyst
35M-032
Lynnette Sherman
AC: 1097

Customer Account Investigator
35M-512
Edith Johnson
AC: 1097

Customer Account Investigator
35M-515
Akeia Clarke
AC: 1097

Management Analyst, Associate
35M-906
Chastity Andrew
AC: 1097

Customer Account Investigator
35M-551
Bryce Poston
AC: 1097

Customer Account Investigator
35M-121
Chemere Harris
AC: 1097

Customer Account Investigator
35M-757
Alfred Walker
AC: 1097

Customer Service Investigator
35M-106
Nicole Stith
AC: 1097

Billing
AC: 1097

Customer Service Supervisor
35M-112
Yolanda Edwards
AC: 1097
Special Bills, Commercial Large Volume, Specialty Billing Situations

Customer Service Specialist, Senior
35M-017
Sonya Tucker-Irby
AC: 1097

Customer Account Investigator
35M-061
Louise Rasnake
AC: 1097

Customer Service Specialist, Senior
35M-091
Britney Allen
AC: 1097

Customer Account Investigator
35M-093
Sharon Tucker
AC: 1097

Customer Service Specialist, Senior
35M-094
Markita Allen
AC: 1097

Customer Service Specialist, Senior
35M-098
Stephanie Robinson
AC: 1097

Customer Service Specialist, Senior
35M-108
Clarissa Henson
AC: 1097

Customer Account Investigator
35M-923
Vacant

Customer Service Specialist, Senior
35M-898
Flora Edmonds
AC: 1097

Customer Service - Revenue Recovery

Deputy Department Director, Senior
35M-833
Jamie Porter
AC:1178

Programs & Operations Manager
35M-590
Johnell Liggans
AC: 1090

= Employee participates in Project Synergy

Office (730 Building) AC: 1090

Customer Service Supervisor
35M-501
Glenda Kennedy
Bankruptcies, Reject Payments, Commercial Deposits, Liens, Energy & Fuel Assistance, Payment Research, Large Balance & Residential Disconnections, Metro Care, Elderly & Disability

Customer Service Specialist, Senior
35M-899
Sandra Walker
Bankruptcies & Liens

Customer Account Investigator
35M-087
Shambria Curlee
In-house Charge-off's

Customer Account Investigator
35M-062
Vanessa Walker
Fuel Assistance, Lockbox Rejects, Residential Delinquency

Customer Account Investigator
35M-107
Beverly Bacote
Lockbox Payments, Res. Disconnections

Customer Account Investigator
35M-096
Nicole Branch
Commercial Accounts – Deposits & Disconnections

Customer Account Investigator
35M-549
Tiffany Turner
Bad Debts, 3rd Pary Collection Attorney

Customer Account Investigator
35M-109
Michelle Tarry
Fuel Assistance & Customer Assistance Programs

Customer Account Investigator
35M-561
LaKisha Parham
Payment Research, Inactive CBR

Field (400 Richmond Hwy) AC: 1090

Customer Service Supervisor
35M-532
Thomas Epps
Fraud, Stolen I.D., Field Audits, Delinquent Disconnections, Meter Reading, Move In & Outs

Customer Account Investigator
35M-095
Maria Fletcher

Customer Account Investigator
35M-507
James Jenkins

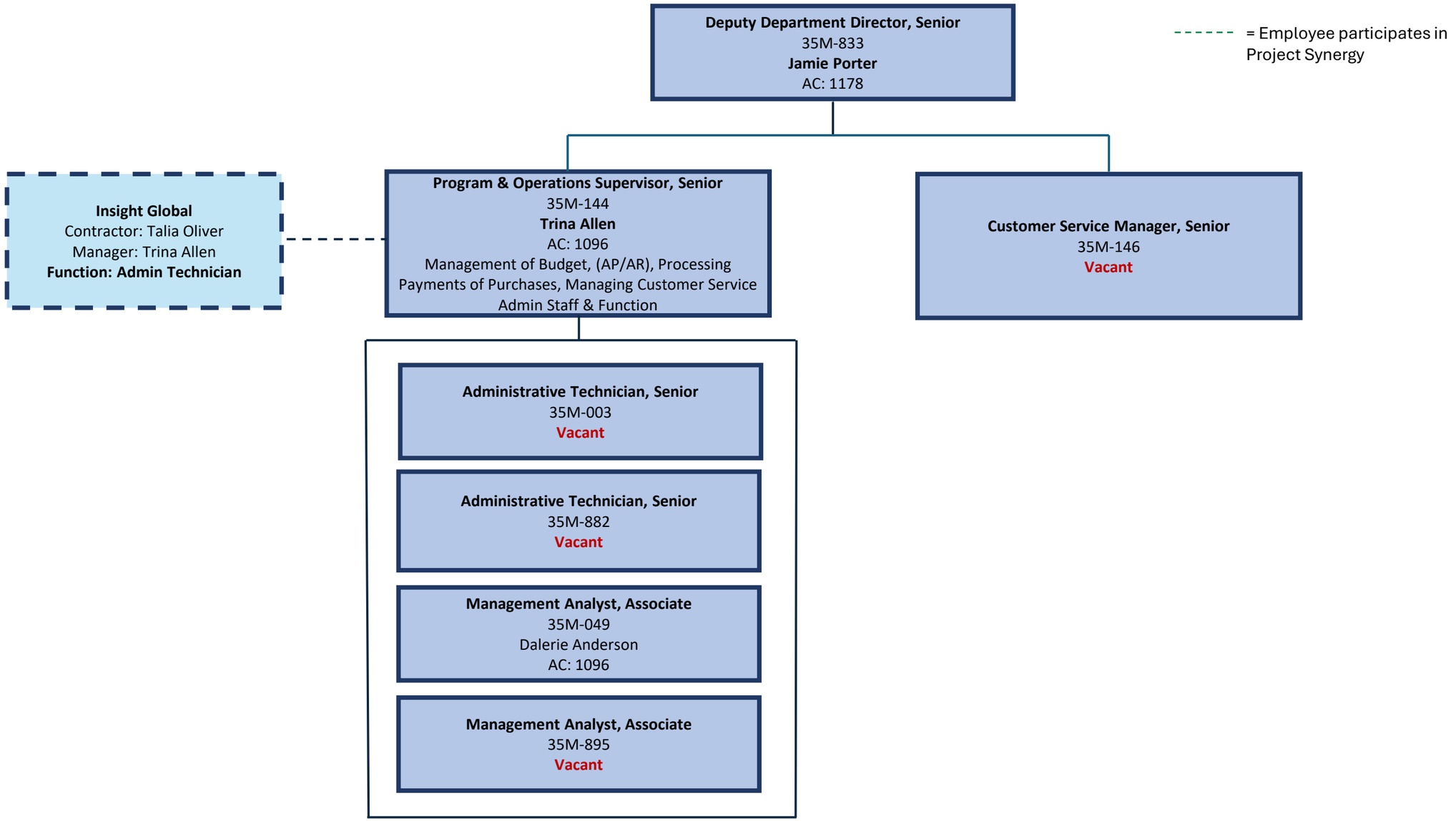
Customer Service Technician
35M-055
Alaiyah Haskins
AC: 1038

Customer Account Investigator
35M-173
Vacant

BerMex
Contractors
Responsibilities of Disconnections and Meter Reading

DEPARTMENT OF PUBLIC UTILITIES

Customer Service - Budget & Administration



DEPARTMENT OF PUBLIC UTILITIES

Customer Service – Project Synergy

Deputy Department Director, Senior
35M-034
Lynnette Lemon
AC: 1097

= Reports to their respective divisional supervisor

Program & Operations Supervisor, Senior
35M-057
Lisa Smith
AC: 1097

Oracle
Contractors: 3
Function:

CIS Quality Assurance
Contractors: 5
Function:

TLA Global Holdings
Contractors: 2
Function:

Critical River
Contractors: 3
Function:

Sure Power
Contractors: 2
Function:

Unidentified
Contractors: 7
Function:

Customer Service Supervisor
35M-866
Rosa Harris
AC: 1097

Customer Care Specialist
35M-862
LaRhonda Robinson
AC: 1097

Customer Account Investigator
35M-706
Whitney Walker
AC: 1097

Customer Service Supervisor
35M-043
Shameka McFarlane
AC: 1097

Customer Service Specialist, Senior
35M-108
Clarissa Henson
AC: 1097

Gas and Water Field Supervisor
35M-089
Ronald Pittman
AC: 1097

Field Operations Coordinator, Supervisor
35M-555
James Powell
AC: 1097

Program and Operations Manager
35M-402
Michelle Woodson
AC: 1458
(Engineering Services – Laura Bendernagel)

Management Analyst, Associate
35M-075
DeMario Webb
AC: 1038
(Customer Service Office – Arthur Kolluri)

Field Operations Coordinator
35M-533
LaDonna Pittman
AC: 1252
(Field Operations – Copellia Harrison)

Deputy Department Director, Senior
35M-047
Laura Bendernagel
AC: 1337, 1458

CIP Water/Wastewater
AC: 1337

Engineering Manager
35M-389
Stephen Morgan

Project Controls

Programs & Ops Supervisor
35M-021
Joseph Mason

Programs & Ops Supervisor
35M-856
Valerie Kirby-Moore

Mechanical

Engineering Principal
35M-444
Vann Davis

Engineer Senior
35M-097
Fabio Villa Gomez

Engineer
35M-633
Victor Rose-Smith

Water Distribution

Engineering Principal
35M-630
Sang Yi

Engineer Principal (Modeling Engineer)
35M-872
Vacant

Engineering Senior
35M-434
Vacant

Engineer
35M-197
Andrew Nguyen

Steven Crowe
Staff Augmentation:
Ty Lin
Engineer Management

Riley Morgan
Staff Augmentation:
GFT
Capital Project Management

Jonathan Wood
Staff Augmentation:
Insight Global
CAD Drafter

Electrical

Engineering Principal
35M-629
Yunije (Vann) Ni

Engineer Senior
35M-638
Janae Wilson

Engineer
35M-639
Anne Herndon

Project Lifecycle for Improvement of DPU's Water Facilities & Services; Technical Design, Analysis, Critical Projects, and Stakeholder Coordination

CIP Combined Sewer Operation
AC: 1337

Deputy Department Director
35M-850
Robert Stone

Engineering Manager
35M-621
Vacant

Programs & Operations Manager
35M-819
Surani Olsen

Engineer Principal
35M-597
Todd Loney

Capital Projects Manager
35M-626
Ricky Hatfield

Management Analyst Associate
35M-901
Kenya Peterson

Kevin Coles
Staff Augmentation:
AECOM
Engineer Management

Byrd Park Reservoir Replacement, Shockoe: Basin Control Building Roof Replacement, Diversion Structure Crest Gate & Trash Rake Replacement; Brown & Brown CSO Regulator Improvements, CSO 5 Solids & Floatable Control, Outfall Improvements, Dock Street Pumping Station Improvements

CIP Sanitary Sewers
AC: 1337

Program & Operations Manager
35M-470
Susan Hamilton

Engineer Principal
35M-617
Vacant

Capital Projects Manager
35M-041
Logyn Mills

Construction Inspector Sr.
35M-038
Andrew Parks

Administrative Technician, Sr.
35M-744
Stella Lewis

Construction Inspector Principal
35M-598
Vernon Clement

Jacobs
Staff Augmentation:
2
Programs & Ops Management

Conveyance, Rehabilitation, and Replacement for Sanitary Sewers & Combined Sewers

CIP Stormwater
AC: 1337

Capital Projects Manager Sr.
35M-077
William (Bill) Boston

Program and Operations Supervisor
35M-619
Jennifer Clarke

Engineer, Principal
35M-216
Jian Xu

Capital Projects Manager
35M-631
Vacant

Engineer Senior
35M-618
Craig Pittman

Capital Projects Manager
35M-767
Timothy Mahanes

Mark (last name)
Staff Augmentation:
Hazen
Capital Project Management

Development & Implementation the City-Wide Rehabilitation, Upgrade of Stormwater Sewers and Associated Facilities, Inspection & Replacement Programs, Stormwater Extensions, Emergency Replacements and Repair; Regulatory Compliance, Inspections, and Maintenance for Impounding Structures

Water Resources
AC: 1410

Program and Operations Manager
35M-331
Jonet' Prevost White

Engineer, Principal
35M-851
Vacant

Engineer, Senior
35M-399
Vacant

Engineer
35M-859
Vacant

Management Analyst, Senior
35M-916
Alishia Wilson

Ty Lin
Staff Augmentation:
8
Plan Review (PT)

Suzanne Herro
Staff Augmentation:
Ty Lin
Programs & Ops Management

Land Disturbing Permit Issuing & Review, Floodplain Program, Chesapeake Bay & Stormwater Programs, NFIP Community Rating System Activities & Public Awareness Management

Development Services
AC: 1458

Programs & Operations Manager
35M-402
Michelle Woodson

Cross-Connection Control

Utilities Tech Cross-Connection Supervisor
35M-247
Lawrence Williams

Utilities Tech Cross-Connection Specialist
35M-018
Alexander Broaddus

Utilities Tech Cross-Connection Specialist
35M-485
Londell Shelton

Administrative Technician Senior
35M-082
Monique Coleman

Permit Intake

Programs & Operations Supervisor
35M-332
Vacant

Administrative Technician Senior
35M-099
Tiffany White

Administrative Technician Senior
35M-707
Crystal Lipscomb

Plan Reviews

Engineer Senior
35M-616
Norris Baker

Engineer Senior
35M-642
Ilsen Gutierrez

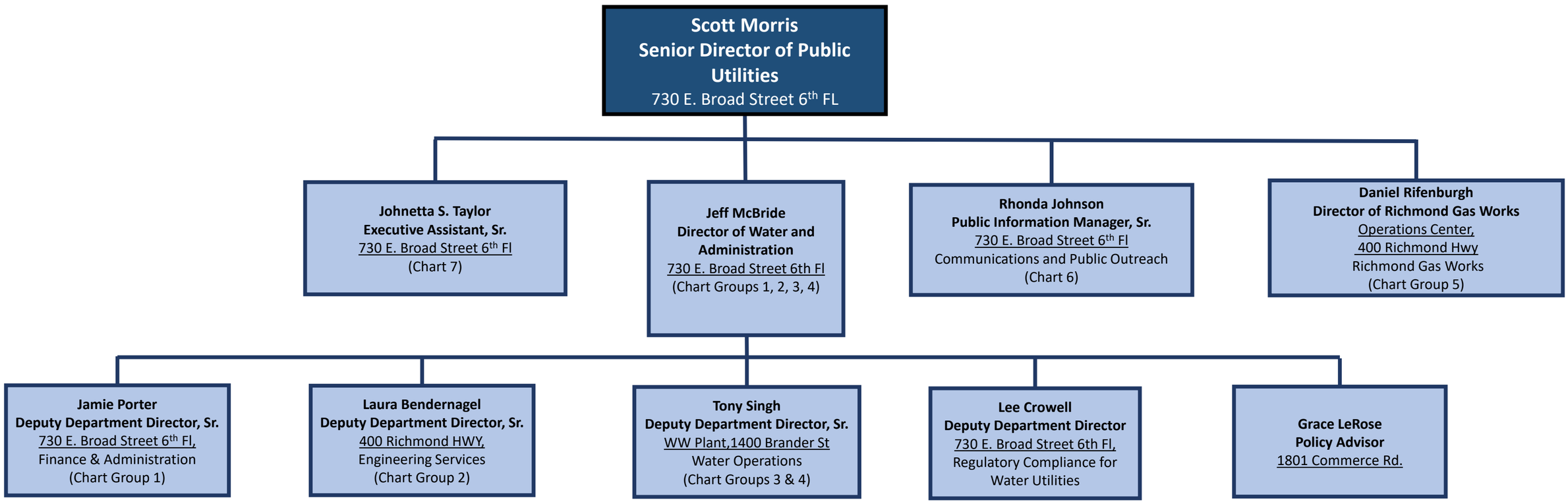
Permit and Plan Review for gas, water, sewer and storm connections, Invoicing/Processing of Utility Connection Fees, Cross -Connection and Control Compliance, Portable Meter Program, Lead Service Line Replacement Grant Program, DPU Lead Service Line Inventory Program, handling of inquiries related to new development such as availability of service, process etc., scheduling of meter installations for residential and commercial water services.

Lead Free Water Program
AC: 1635 & 1636

Programs & Operations Manager
35M-847
Michael Chase
Staff Augmentation

DEPARTMENT OF PUBLIC UTILITIES

DEPARTMENT OF PUBLIC UTILITIES



DEPARTMENT OF PUBLIC UTILITIES

DEPARTMENT OF PUBLIC UTILITIES

Scott Morris
Senior Director of Public Utilities
730 E. Broad Street 6th FL

Johnetta S. Taylor
Executive Assistant, Sr.
730 E. Broad Street 6th Fl
(Chart 7)

Jeff McBride
Director of Water and Administration
730 E. Broad Street 6th Fl
(Chart Groups 1, 2, 3, 4)

Rhonda Johnson
Public Information Manager, Sr.
730 E. Broad Street 6th Fl
Communications and Public Outreach
(Chart 6)

Daniel Rifenburgh
Director of Richmond Gas Works
Operations Center,
400 Richmond Hwy
Richmond Gas Works
(Chart Group 5)

Laura Bendernagel
Deputy Department Director, Sr.
400 Richmond HWY,
Engineering Services
(Chart 2)

Jamie Porter
Deputy Department Director, Sr.
730 E. Broad Street 6th Fl,
Finance & Administration
(Chart Group 1)

Lee Crowell
Deputy Department Director
730 E. Broad Street 6th Fl,
Regulatory Compliance for Water Utilities

Grace LeRose
Policy Advisor
1801 Commerce Rd.

Tony Singh
Deputy Department Director, Sr.
WW Plant,1400 Brander St
Water Operations
(Chart Groups 3 & 4)

Gerald Westry
Senior Policy Advisor
730 E. Broad Street 6th Fl
Organizational Support; Workforce Development Employee & Labor Relations; Recruitment; & Safety

Paul Giglio
Deputy Department Director
730 E. Broad Street 6th Fl,
Asset Management, GIS, Systems and Innovation

John "Billy" Vaughan
Deputy Department Director
730 E. Broad Street 6th Fl
Financial Operations, Fuels Procurement, Disciplinary & Salary Review & DPU Information Technology

Lynnette Lemon
Deputy Department Director, Sr.
730 E. Broad Street 5th Fl
Customer Care Call Center, Office Operations, Billing and Revenue Recovery

Eric Whitehurst
Deputy Department Director
Water Collections, Water Distribution, Stormwater, Floodwall, Water Resources, Field Operations

Michele Maclauchlan
Deputy Department Director
WW Plant,1400 Brander St
Water, Wastewater, Laboratory, Pre-treatment

9/5/2025

DEPARTMENT OF PUBLIC UTILITIES

Storm/Wastewater Collections, Finance & Admin, Drinking Water Distribution, Shockoe & CSO, Field Operations Leadership

Deputy Department Director (Drinking Water Distribution, Collections Systems and Regulatory Affairs)
35M-721
Eric Whitehurst
AC: 1378

Program & Ops Manager (Storm/Wastewater Collections)
35M-838
Howard Glenn
AC: 1409

Refer to chart 3(A)

Program and Operations, Supervisor (Financial & Admin Services)
35M-843
Tiffany Patron-Brown
AC: 1064 & AC: 1409

Management Analyst, Associate
35M-880
Tiffany Carter
AC: 1409

Management Analyst, Associate
35M-019
Carleen “Mia” Hilliard
AC: 1139 & AC:1374

Administrative Technician, Sr.
35M-841
Diamond Giles
AC: 1409

Management Analyst, Senior
35M-554
Vacant

Management Analyst, Senior
35M-876
Paula Giles
AC: 1409

Program & Operations Manager (Drinking Water Distribution)
35M-801
Dupree Jackson
AC: 1378

Refer to chart 3(B)

Program and Operations Supervisor ((Shockoe) & (CSO))
35M-878
Barbara Jackson
AC: 1094 & AC: 1760

Refer to chart 3(C)

Program and Ops Manager (Customer Service-Field Operations)
35M-465
Spencer Murphy
AC: 1155

Refer to chart 3(D)

Program and Operations Supervisor (Employee Consulting)
35M-636
George (Nick) Georges
AC: 1378

DEPARTMENT OF PUBLIC UTILITIES

Customer Service - Field Operations

Program & Ops Manager
35M-465
Spencer Murphy
AC: 1155

Logistics
AC: 1068

Program & Ops Supervisor Sr.
35M-140
Vacant
Customer call response, Dispatching Field Work, Customer Emergency Calls

Field Ops Coordinator Supervisor
35M-472
Copellia Harrison

- **Field Ops Coordinator** 35M-039 **Vacant**
- **Field Ops Coordinator** 35M-048 Julie Adkins
- **Field Ops Coordinator** 35M-063 Branden Trefsgar
- **Field Ops Coordinator** 35M-081 **Vacant**
- **Field Ops Coordinator** 35M-083 Rachelle Knight
- **Field Ops Coordinator** 35M-533 LaDonna Pittman

Field Ops Coordinator Supervisor
35M-489
Ashley Nash

- **Field Ops Coordinator** 35M-058 Joseph Mason
- **Field Ops Coordinator** 35M-054 Gavin Shaler
- **Field Ops Coordinator** 35M-488 Anita Sykes
- **Field Ops Coordinator** 35M-540 Keanna Key

Field Ops Coordinator Supervisor
35M-511
Shamilia Harrison

- **Field Ops Coordinator** 35M-080 Alia Harris
- **Field Ops Coordinator** 35M-496 Rashad Cannon
- **Field Ops Coordinator** 35M-539 Talita Miles
- **Field Ops Coordinator** 35M-547 Katrina Harris

Field Ops Coordinator Supervisor
35M-555
James Powell
AC: 1097
(Project Synergy)

Commercial Account Services
AC: 1068

Commercial Meter Superintendent
35M-521
Robert Tuttle
Commercial Gas & Water Services

- **Commercial Meter Technician** 35M-462 Reginald Ford Jr.
- **Commercial Meter Technician** 35M-461 Jarred Kennedy
- **Commercial Meter Technician** 35M-464 Sylvester Edwards
- **Commercial Meter Technician** 35M-463 Syed Feroze
- **Commercial Meter Technician** 35M-467 Allen Kato
- **Commercial Meter Technician** 35M-466 Charard Harrison
- **Commercial Meter Technician** 35M-531 Jermaine Monroe
- **Commercial Meter Technician** 35M-514 Michael Hughes
- **Commercial Meter Technician** 35M-553 Cameo Cosby
- **Commercial Meter Technician** 35M-535 Otis Henderson
- **Commercial Meter Technician** 35M-530 Michael King

Residential Gas & Water Services
AC: 1155

Program & Ops Supervisor
35M-708
Vacant

Refer to chart 3(FO)

Administrative Technician, Senior
35M-024
Patricia Mosley
AC: 1155

= Employee participates in Project Synergy

DEPARTMENT OF PUBLIC UTILITIES

Customer Service - Field Operations

Program & Operations Supervisor
35M-708
Vacant

Meter Readers
AC: 1155

- **Gas & Water Field Supervisor** 35M-100 — Vacant — Commercial Scale Meter Reading Services
  - Gas & Water Field Specialist, Sr. 35M-300 Jaimal Gayles
  - Gas & Water Field Specialist, Sr. 35M-105 Aaron Liggins
  - Gas & Water Field Specialist, Sr. 35M-477 Linda Demery
  - Gas & Water Field Specialist, Sr. 35M-469 Jeffrey C.
  - Gas & Water Field Specialist, Sr. 35M-510 Hiram Haskins
  - Gas & Water Field Specialist, Sr. 35M-483 Dale Taylor
  - Gas & Water Field Specialist, Sr. 35M-529 Alan Harris
  - Gas & Water Field Specialist, Sr. 35M-522 Othneil Blake
  - Gas & Water Field Specialist, Sr. 35M-544 LaKeya Durant
  - Gas & Water Field Specialist, Sr. 35M-537 Shawn Jones
  - Gas & Water Field Specialist, Sr. 35M-760 Aaron Price
  - Gas & Water Field Specialist, Sr. 35M-550 Michael Hamilton

Field Services
AC: 1155

- **Gas & Water Field Supervisor** 35M-557 Johnny White — Residential Gas & Water Services
  - Gas & Water Field Specialist, Sr. 35M-897 — Vacant
  - Gas & Water Field Specialist, Sr. 35M-541 Sterling Easter
  - Gas & Water Field Specialist, Sr. 35M-490 — Vacant
  - Gas & Water Field Specialist, Sr. 35M-517 Demarkus Dancey
  - Gas & Water Field Specialist, Sr. 35M-493 Danyl Rodgers
  - Gas & Water Field Specialist, Sr. 35M-050 — Vacant
  - Gas & Water Field Specialist, Sr. 351-471 — Vacant

Field Services
AC: 1155

- **Maintenance and Operations Crew Supervisor** 35M-890 Dexter Anderson — Residential Gas & Water Services
  - Gas & Water Field Specialist, Sr. 35M-476 Domonique Wilson
  - Utilities Field Worker 35M-072 Carl Byrd Jr.
  - Gas & Water Field Specialist, Sr. 35M-526 — Vacant
  - Utilities Field Worker 35M-113 — Vacant
  - Gas & Water Field Specialist,Sr. 35M-513 Brent Prescott

Field Services
AC: 1155

- **Gas & Water Field Supervisor** 35M-558 Gene Hite — Residential Gas & Water Services
  - Gas & Water Field Specialist, Sr. 35M-506 Steven Wilkerson
  - Gas & Water Field Specialist, Sr. 35M-523 Wesley Quarles
  - Gas & Water Field Specialist, Sr. 35M-538 — Vacant
  - Gas & Water Field Specialist, Sr. 35M-891 Calvin Jones
  - Gas & Water Field Specialist, Sr. 35M-494 Darryl Stinney
  - Gas & Water Field Specialist, Sr. 35M-524 Frank Martin
  - Gas & Water Field Specialist, Sr. 35M-894 — Vacant

Field Services
AC: 1155

- **Gas & Water Field Supervisor** 35M-560 Jerrell McKnight — Residential Gas & Water Services
  - Gas & Water Field Specialist, Sr. 35M-495 Karl Benjamin
  - Gas & Water Field Specialist, Sr. 35M-534 Darrius Vaughan
  - Gas & Water Field Specialist, Sr. 35M-893 Ahkee Vaughan
  - Gas & Water Field Specialist, Sr. 35M-527 — Vacant
  - Gas & Water Field Specialist, Sr. 35M-542 Desmond Christmas
  - Gas & Water Field Specialist, Sr. 35M-892 Chance Stith

Field Services
AC: 1155

- **Gas & Water Field Supervisor** 35M-468 DeVaune Brown — Residential Gas & Water Services
  - Gas & Water Field Specialist, Sr. 35M-518 Wallace Bell
  - Gas & Water Field Specialist, Sr. 35M-033 Robert Oliver
  - Gas & Water Field Specialist, Sr. 35M-546 Virgil Alston
  - Gas & Water Field Specialist, Sr. 35M-104 Richard Terry
  - Gas & Water Field Specialist, Sr. 35M-211 — Vacant

Field Services
AC: 1155

- **Gas & Water Field Supervisor** 35M-559 Shawn Minns — Residential Gas & Water Services
  - Gas & Water Field Specialist, Sr. 35M-516 Thomas Berry
  - Gas & Water Field Specialist, Sr. 35M-545 Shawn Harris
  - Gas & Water Field Specialist, Sr. 35M-896 Stephen Hughes
  - Gas & Water Field Specialist, Sr. 35M-020 — Vacant
  - Gas & Water Field Specialist, Sr. 35M-509 Eric Ferguson
  - Gas & Water Field Specialist, Sr. 35M-504 Donte Parham

- **Gas & Water Field Supervisor** 35M-074 — Vacant

- **Gas & Water Field Supervisor** 35M-089 Ronald Pittman (Project Synergy)

- **Gas & Water Field Supervisor** 35M-556 Peter Callanan

Meter Reader employees under AC 1155 will be moved to 1267

DEPARTMENT OF PUBLIC UTILITIES

Financial Operations

Deputy Department Director, Senior
35M-833
Jamie Porter
AC: 1178

Deputy Department Director
35M-079
John Vaughan
AC: 1161

AC: 1161

Financial Manager
35M-066
Vacant

Accounting Manager
35M-588
Annette McFarland
Team Function: Capital Project Monitoring (C.W.I.P), Fixed Asset, Inventory, & Property Management

Accountant Principal
35M-0171
Alan Cooke

Management Analyst Associate
35M-129
Linda Green

Management Analyst Associate
35M-355
Brenda Jordan

Accountant Senior
35M-175
Vacant

AC: 1161

Accountant Manager
35M-134
Carolyn Turner
Team Function: General Accounting, Grant Management, C.I.S Financial, Internal & External Audits, Month-End Closing

Accountant Supervisor
35M-449
Thelburt Williams

Accountant Senior
35M-902
Vacant

AC: 1161

Financial Manager
35M-918
Warren Estes
Team Function: Rates, Coordination of Budget for Operations & C.I.P, Cost of Service, Contract Water Billing

Programs & Operations Supervisor
35M-800
Maria Dandridge

Management Analyst Principal
35M-333
Terrance Gray

Management Analyst Principal
35M-499
Vacant

AC: 1161

Utilities Fuel Procurement Admin
35M-164
Vacant

AC: 1161

Accountant Senior
35M-156
David Young
General Ledger and Accounting for Natural Gas

AC: 1178

Procurement Analyst Principal
35M-911
Erick Ramos

= Position reports from the Department of Procurement Services

9/5/2025

DEPARTMENT OF PUBLIC UTILITIES

Human Capital Services

Deputy Department Director, Senior
35M-833
Jamie Porter
AC: 1178

Senior Policy Advisor
35M-142
Gerald Westry
AC: 1209

Human Capital Services AC: 1209

Program and Operations Manager
35M-635
JeanNate' Epps
Workforce Training & Development, Recruitment, Broadband Programs and Performance Evaluation Administration, Data Analytics- Employee Metrics

Workforce Development

Programs & Operations Supervisor Sr.
35M-145
Vacant

Programs & Operations Supervisor (Training)
35M-609
Vacant

Management Analyst, Principal (Training)
35M-262
Bertell Davis

Management Analyst Sr. (Training)
35M-904
Vacant

Management Analyst Associate (Training)
35M-042
Vacant

People Operations

Management Analyst Sr. (Under Reallocation)
35M-159
Vacant

Management Analyst Sr.
35M-165
April Steed

Management Analyst Sr.
35M-037
Ti'Eja Woodson

Management Analyst Sr.
35M-170
Charles Faison

Data Analytics

Management Analyst Associate
35M-172
Jordan Callaham

Management Analyst Associate
35M-114
Angel Scott
AC: 1097

DPU Payroll AC: 1209

Programs & Operations Supervisor
35M-768
Etosha Walkins
Payroll & Timecard Monitoring, Time Corrections & Compliance, Payroll Adjustments, Timecard Submissions

Management Analyst Associate
35M-025
Latoya Epps
Administration, Financial Ops, Communications, Water Plant, Wastewater Collections, Laboratory

Management Analyst Associate
35M-013
Tonay Brown
Customer Service, Pretreatment, Stormwater, Building & Grounds, Richmond Gas Works

Management Analyst Associate
35Temp-23
Vacant

DPU Safety AC: 1634

Program and Operations Manager
35M-325
Timothy Hurt
Safety and Compliance, Risk Management

Program and Operations Supervisor Sr.
35M-656
Vacant

Management Analyst Sr. (Risk Management)
35M-563
Kathy Robertson

Health and Safety Specialist
35M-749
Thomas Harris

Health and Safety Specialist
35M-865
Sarah Henrikson

Policy Development AC: 1209

Management Analyst, Principal
35M-519
Roslyn Trent
DPU S.O.P & Policy Development

DEPARTMENT OF PUBLIC UTILITIES

Innovation & Technology

Deputy Department Director
35M-578
Paul Giglio
AC: 1337
Enterprise Asset Management (EAM), Management Information System (MIS), Geographical Information System (GIS) & Supervisory Control and Data Acquisition (SCADA)

Supervisory Control & Data Acquisition
AC: 1268

Programs & Operations Manager
35M-637
Zane Mullins

Programs & Operations Supervisor, Sr. (Under reallocation)
35M-257
Vacant

Enterprise Asset Management
AC: 1337

Programs & Operations Manager
35M-643
Johnathan Snyder

Geographical Information System
AC: 1118

Programs & Operations Supervisor
35M-128
Peter Madzudzo

GIS Analyst
35M-584
Michael Digaetano

GIS Specialist
35M-580
Jack Marshall

GIS Analyst
35M-139
Sandra Palmer

GIS Specialist
35M-583
Neel Savalia

GIS Specialist
35M-640
Connor Jenkins

GIS Specialist
35M-163
Lucky Lyons

GIS Specialist
35M-586
Robert Pamplin

GIS Specialist
35M-585
Ashante Hills

GIS Specialist
35M-330
Vacant

GIS Analyst
35M-722
Julianne Say

Enterprise Asset Management

Programs & Operations Manager
35M-579
Vacant

Management Information System
AC: 1268

Programs & Operations Manager
35M-654
Maximillian Pop

Programs & Operations Supervisor
35M-710
Huan Phan

Technology Specialist (Agency)
35M-263
Johnathan Parham

Technology Coordinator (Agency)
35M-881
Jonean Howard

Programs & Operations Supervisor
35M-460
Vacant

Business Systems Specialist
35M-116
Sherri Porter
AC: 1267

Insight Global
Contractor: Sean Grimm
Data Analyst (CIS)

Programs & Operations Supervisor Sr.
35M-115
Vacant

Business Systems Analyst
35M-874
Vacant

Technology Specialist (Agency)
35M-030
Valerie Apperson

Technology Coordinator (Agency)
35M-552
Meenakshi Johar

Technology Coordinator (Agency)
35M-158
Frankie Robinson

Enterprise Asset Management
AC: 1337

Management Analyst Associate
35M-587
Vianney Herrera

AC: 1096

Program & Operations Supervisor
35M-154
Madison Smith
Liaison to MIS, Transfers, Onboarding, Offboarding, Payment processing, Contractor & Vendor Relationship Management, and IT Support

Customer Service Technician
35M-873
Ivory Jones

Note: Red Highlighted Activity Codes (AC) are to change to 1268

9/5/2025

DEPARTMENT OF PUBLIC UTILITIES

Storm/Wastewater Collections, Finance & Admin, Drinking Water Distribution, Shockoe & CSO, Field Operations Leadership

Deputy Department Director
(Drinking Water Distribution, Collections Systems and Regulatory Affairs)
35M-721
Eric Whitehurst
AC: 1378

Program & Ops Manager (Storm/Wastewater Collections)
35M-838
Howard Glenn
AC: 1409

Refer to chart 3(A)

Program and Operations Supervisor, Senior (Financial & Admin Services)
35M-843
Tiffany Patron-Brown
AC: 1064 & AC: 1409

Program and Operations Supervisor
35M-843
Vacant

Management Analyst, Associate
35M-880
Tiffany Carter
AC: 1409

Management Analyst, Associate
35M-019
Carleen “Mia” Hilliard
AC: 1139 & AC:1374

Administrative Technician, Sr.
35M-841
Diamond Giles
AC: 1409

Management Analyst, Senior
35M-554
Vacant

Management Analyst, Senior
35M-876
Paula Giles
AC: 1409

Program & Operations Manager (Drinking Water Distribution)
35M-801
Dupree Jackson
AC: 1378

Refer to chart 3(B)

Program and Operations Supervisor ((Shockoe) & (CSO))
35M-878
Barbara Jackson
AC: 1094 & AC: 1760

Refer to chart 3(C)

Program and Ops Manager (Customer Service-Field Operations)
35M-465
Spencer Murphy
AC: 1155

Refer to chart 3(D)

Program and Operations Supervisor (Employee Consulting)
35M-636
George (Nick) Georges
AC: 1378

DEPARTMENT OF PUBLIC UTILITIES

Floodwall, Storm Maintenance & Construction, WWTP Collections

Program & Operations Manager
35M-838
Howard Glenn

Floodwall
AC: 1169

Maintenance & Operations Superintendent
35M-806
Louis Evans
Routine & Emergency Inspections, Maintenance, Repairs of Floodwall & Pump Stations, System Monitoring & Readiness; Cleaning, Repairing, & Maintaining the C.S.S., Stormwater Structures, & Sanitary Sewers

Maintenance & Operations Crew Supervisor, Sr.
35M-475
Vacant

- **Maintenance Specialist** 35M-807 William Booker
- **Maintenance Specialist** 35M-844 Sadiki Stewart
- **Maintenance Specialist** 35M-808 Vacant
- **Maintenance Specialist** 35M-810 Everett Jones
- **Maintenance Specialist, Sr.** 35M-340 Vacant

Stormwater Construction
AC: 1409

Engineer, Principal
35M-835
Berry Wright

Stormwater Maintenance
AC: 1409

Program & Operations Supervisor
35M-839
Darryl Rivers
Routine & Emergency Inspections, Maintenance, Repairs of Floodwall & Pump Stations, System Monitoring & Readiness; Cleaning, Repairing, & Maintaining the C.S.S., Stormwater Structures, & Sanitary Sewers; Emergency Response Support; Infrastructure Preservation & Compliance, Winter Maintenance

Maintenance & Operations Crew Supervisor, Sr.
35M-311
Vacant

Labor Crew Chief
35M-823
Wilford Mayo

- **Equipment Op. Principal** 35M-877 Vacant
- **Equipment Op. Principal** 35M-812 Vacant
- **Equipment Op. Senior** 35M-832 Deangelo Brown
- **Maintenance Worker** 35M-821 Caron Ferguson
- **Equipment Op. Senior** 35M-846 Antonio Adams

Maintenance & Operations Crew Supervisor
35M-815
Vacant

Labor Crew Chief
35M-830
Nathaniel Sumpter

- **Equipment Op. Principal** 35M-772 Vacant
- **Equipment Op. Principal** 35M-825 Ernest Morton
- **Equipment Op. Principal** 35M-829 Vacant
- **Maintenance Worker** 35M-849 Shamsiddin Crews
- **Equipment Op. Principal** 35M-826 Antoine Eaddy
- **Maintenance Worker** 35M-842 Kevin Jones

Maintenance & Operations Crew Supervisor, Sr.
35M-870
Vacant

Labor Crew Chief
35M-811
Jeffrey Jones

- **Equipment Op. Principal** 35M-854 Brandon Johnson
- **Equipment Op. Senior** 35M-840 Steven Ritter
- **Equipment Op. Senior** 35M-853 DaVonn Woolridge
- **Equipment Op. Senior** 35M-724 Raymond White
- **Maintenance Worker** 35M-817 Michael Hicks
- **Maintenance Worker** 35M-836 Charles Payne Jr.

Maintenance & Operations Crew Supervisor
35M-837
Angelo Riccio

Labor Crew Chief
35M-818
Harold Shepperson

- **Equipment Op. Principal** 35M-322 Vacant
- **Equipment Op. Senior** 35M-845 Miguel Ellis
- **Equipment Op. Senior** 35M-827 Christopher J.
- **Maintenance Specialist** 35M-858 Steven Saunders
- **Maintenance Worker** 35M-824 Brandon Morris
- **Maintenance Specialist** 35M-828 Leroy Logan

Maintenance & Operations Superintendent
35M-458
TeDarryl Hite
AC: 1409
1801 Building Maintenance Lead, Contractor & Vendor Project Oversite, Inspection Coordinator, Routine & Emergency Inspections, Maintenance, Repairs of Floodwall & Pump Stations, System Monitoring & Readiness

Wastewater Collections
AC: 1064

Program & Operations Supervisor
35M-762
Percy Wyatt
Routine & Emergency Inspections, Maintenance, Repairs of Floodwall & Pump Stations, System Monitoring & Readiness; Cleaning, Repairing, & Maintaining the C.S.S., Stormwater Structures, & Sanitary Sewers; Emergency Response Support; Infrastructure Preservation & Compliance, Winter Maintenance

Maintenance & Operations Crew Supervisor Sr.
35M-386
Mortimer Robinson
Maintenance Crews

M & O Labor Crew Chief
35M-752
Erik Cox

- **Utility Plant Specialist** 35M-296 Leander Daye
- **Equipment Op. Prin.** 35M-343 Vacant
- **Equipment Op. Prin.** 35M-729 Vacant
- **Equipment Op. Prin.** 35M-813 Joseph Brown Sr.
- **Equipment Op. Prin.** 35M-779 Terrance Willis
- **Equipment Op. Prin.** 35M-773 Vacant
- **Construction Inspector Sr.** 35M-350 Vacant
- **Equipment Op. Sr.** 35M-741 Louis Blakey
- **Equipment Op. Sr.** 35M-723 Leeroy Gordon
- **Equipment Op. Sr.** 35M-315 Terrell Crosson
- **Equipment Op. Sr.** 35M-317 Renard Watson

Maintenance & Operations Crew Supervisor Sr.
35M-442
Leon Melvin
Construction Crews

- **M & O Labor Crew Chief** 35M-138 Lawrence Smith
- **M & O Labor Crew Chief** 35M-785 Robert Chambliss
- **Equipment Op. Prin.** 35M-120 Ubol Silaphath
- **Equipment Op. Prin.** 35M-323 Jamie Gaiters
- **Equipment Op. Prin.** 35M-822 Vacant
- **Equipment Op. Prin.** 35M-324 Vacant
- **Equipment Op. Prin.** 35M-804 Vacant
- **Equipment Op. Sr.** 35M-731 Darryl Davis
- **Utilities Pipeline Tech** 35M-420 Vacant
- **Utilities Pipeline Tech** 35M-745 Vacant
- **Utilities Pipeline Tech** 35M-439 Vacant
- **Utilities Pipeline Tech** 35M-227 Raheem Lightfoot

Maintenance & Operations Superintendent
35M-623
LaDonna Hardy-Wilson
Construction Projects

- **Construction Inspector Principal** 35M-831 Jessie Wilson
- **Construction Inspector Sr.** 35M-595 Donald Currin
- **Construction Inspector Principal** 35M-415 Andre Taylor
- **Construction Inspector Principal** 35M-337 Spotswood Johnson

DEPARTMENT OF PUBLIC UTILITIES

Drinking Water Distribution

Program & Operations Manager
35M-801
Dupree Jackson

Maintenance Repair
AC: 1378

Inspection Field Supervisor
35M-411
William Purdy
Water Main & Service Leak Repair, Valve & Lead Service Replacement, Service Line Deactivations, Meter Box Replacement, Residential & Commercial Installations, Hydrant Replace & Install, Water Sample Collection

Construction Inspection Principal
35M-418
Timothy Tyler

Construction Inspection Principal
35M-431
Antominio Cosby

Construction Inspection Principal
35M-217
Antonio Pamplin

Leak Investigation
AC: 1378

Inspection Field Supervisor
35M-219
Charles Bell
Leak & Hit Line Damage Investigations, 3" & Up Service Taps, Proactive Leak Investigators, Steel Plate Management, 811 Utility Location Deficiencies

Utilities Field Specialist Supervisor
35M-230
Vacant

Utilities Field Specialist
35M-433
Shawn Carter

Utilities Field Specialist
35M-478
Vernon Kizzie

Utilities Field Specialist
35M-427
Lewis Adams

Utilities Field Specialist
35M-753
Vacant

Utilities Field Specialist
35M-314
Jackie Wilson

Utilities Field Specialist
35M-408
Vacant

Admin Staff
AC: 1378

Management Analyst Associate
35M-443
Dominick Schiaffo

Management Analyst Associate
35M-436
Kelan Harris

Business Systems Analyst
35M-417
Anthony Wilkins

Administrative Technician Senior
35M-149
Wanda Brown

Administrative Technician Senior
35M-857
Tawanda Finney

Hydrant & Valve
AC: 1378

Inspection Field Supervisor
35M-900
Richard Allen
Hydrant & Valve

Utilities Field Specialist

Utilities Field Specialist Supervisor
35M-730
Vacant

Utilities Field Specialist
35M-445
Levar Croxton

Utilities Field Specialist
35M-589
Vacant

Utilities Field Specialist Supervisor
35M-237
Lynwood Taylor
Valve Services: Inspections, Exercising, Shutdown, PRV & Altitude, Sample collection

Utilities Field Specialist
35M-437
Calvin Washington

Utilities Field Specialist
35M-422
Jamah Joyner

Utilities Field Specialist Supervisor
35M-218
Darian Collier
Hydrant Services: Flow Tests, Inspections, Repairs, Flushing

Utilities Field Specialist
35M-440
Tierell Davis

Utilities Field Specialist Supervisor
35M-432
Christopher Bryant
Hydrant Services: Flow Tests, Inspections, Repairs, Flushing

Utilities Field Specialist
35M-450
Keith Johnson

Utilities Field Specialist Supervisor
35M-226
Bradley Bundy
Hydrant Services: Flow Tests, Inspections, Repairs, Flushing

Utilities Field Specialist
35M-761
Robert Whitehead

Utilities Field Specialist
35M-187
Vacant

Utilities Field Specialist Supervisor
35M-342
Joseph Rhone
Valve Services: Inspections, Exercising, Shutdown, PRV & Altitude, Sample collection

Utilities Field Specialist
35M-412
Vacant

Utilities Field Specialist
35M-334
Eric Johnson

New Construction
AC: 1378

Inspection Field Supervisor
35M-320
Henry Sigmund
CIP Water Main Replacement, Main Extensions, Water Sample Collection, Development Inspections

Construction Inspection Principal
35M-238
Timothy Stephens

Construction Inspection Principal
35M-425
Charles Crabbe

Construction Inspection Principal
35M-335
Vacant

Construction Inspection Principal
35M-259
Gene Cauthorne

Utilities Field Specialist Supervisor
35M-222
Vacant

Construction Inspection Principal
35M-287
Edward Purdy

Construction Inspection Principal
35M-428
Winston Johnson

Construction Inspection Principal
35M-202
John Taylor

Construction Inspection Principal
35M-231
Karl Brogden

DEPARTMENT OF PUBLIC UTILITIES

Stormwater - CSO/Shockoe

Program and Operations Supervisor
35M-878
Barbara Jackson
AC: 1094, 1760

Shockoe Basin
AC: 1760

Utility Plant Specialist Supervisor
35M-915
Jerry Stevenson
AC: 1094
(Shockoe): Surge Protection, Overflow Control, System Monitoring, Water Quality Esurance, Rainfall Events

Utility Plant Specialist (Shockoe)
35M-733
Germaal Richardson

Plant Operator (Shockoe)
35M-292
Raymond Coleman

Utility Plant Specialist (Shockoe)
35M-816
Justin Crawford

Plant Operator (Shockoe)
35M-190
Cedric Bogans

Utility Plant Specialist (Shockoe)
35M-732
Jennifer Polesko

Utility Plant Specialist (Shockoe)
35M-290
Jerron Fleming

Utility Plant Specialist (Shockoe)
35M-354
Lorenza Hill

Utility Plant Specialist (Shockoe)
35M-834
DeVoe Peoples

Utility Plant Specialist (Shockoe)
35M-288
Craig Jones

Utility Plant Specialist (Shockoe)
35M-302
Raymond Dunston

Utility Plant Specialist (Shockoe)
35M-366
Vacant

Utility Plant Specialist (Shockoe)
35M-356
Marcus Canada

Utility Plant Specialist Supervisor
35M-848
Riccardo Hytower
AC: 1760
(CSO)/(Shockoe): Surge Protection, Overflow Control, System Monitoring, Water Quality Esurance, Rainfall Events, Watershed & Environment Protection

Utility Plant Specialist
35M-275
Clifford Hockaday
AC: 1378

Utility Plant Specialist
35M-291
Alvin Randolph
AC: 1094

CSO
AC: 1094

Utility Plant Specialist Supervisor
35M-270
Ronald Story
AC: 1760
(CSO): Watershed & Environment Protection, Water Quality Esurance, System Monitoring, Rainfall events, Inspection & Maintaining of Pump Stations and Force Main

Utility Plant Specialist (CSO)
35M-274
Steven Blakeney

Utility Plant Specialist (CSO)
35M-199
Rodney Pageas

Utility Plant Specialist (CSO)
35M-023
Richard Archer

Utility Plant Specialist (CSO)
35M-746
Tobias Bryant

Utility Plant Specialist (CSO)
35M-361
Jacobie Jackson

Note: Red highlighted Activity Codes may be subject to change

DEPARTMENT OF PUBLIC UTILITIES

Water Leadership

Deputy Department Director
35M-176
Michele Maclauchlan
AC: 1450, 1139, 1374, 1449

WWTP Operations

Programs & Operations Manager
35M-387
Clifford Williams
AC: 1449

Engineer Principal (Process Engineer)
35M-329
Vacant

Refer to Chart 4(A)

WTP Operations

Programs & Operations Manager
35M-213
Donte Johnson
AC: 1450

Engineer Principal (Process Engineer)
35M-181
Vacant

Refer to Chart 4(B)

Wastewater/ Water Maintenance & Buildings & Grounds

Programs & Operations Manager
35M-765
Kenny Weeks
AC: 1257

Refer to Chart 4(C)

Pretreatment

Environmental Compliance Officer
35M-611
Rodney King
AC: 1374

AC: 1374

Inspection Field Supervisor
35M-820
John Newton

Environmental Compliance Inspector
35M-179
Clifford Gunter

Environmental Compliance Inspector
35M-398
Damon Bryant

Environmental Compliance Inspector
35M-180
Roman Trettel

Environmental Compliance Inspector
35M-435
Vacant

AC: 1410

Inspection Field Supervisor
35M-426
Christopher Grosvenor

Site Inspector
35M-814
Muhammad Nelson

Site Inspector
35M-917
Vacant

Site Inspector
35M-852
Miguel Llanes

Laboratory
AC: 1139

Laboratory Supervisor
35M-362
Avis Purrington

Programs & Operations Manager
35M-118
Felicia Bracey

Laboratory Supervisor
35M-610
Vacant

Chemist
35M-647
Aaron Reese

Chemist
35M-648
Sarah-Ann Taylor

Chemist
35M-649
Vacant

Chemist
35M-644
John Mbonifor

Chemist
35M-641
Trecia D'Costa

Chemist
35M-655
Erik Wyand

Chemist
35M-652
Oliva Jones

Water Quality Analyst
35M-644
Dontrell Goode

Water Quality Analyst
35M-645
Amy Smith

Water Quality Analyst
35M-646
Genesis Clyde

Water Quality Analyst
35M-653
Aaron Labbay

Financial Ops

Programs & Ops Supervisor Senior
35M-389
Annette Logan
AC: 1449

Management Analyst Senior
35M-306
Jahmir Moore
AC: 1257

Management Analyst Senior
35M-615
Shawn Hall-Pair
AC: 1449

Management Analyst Senior
35M-312
Patrice Callaham
AC: 1257

Management Analyst Associate
35M-245
Victor Motley
AC: 1631

Management Analyst Associate
35M-015
Kristen Greene
AC: 1449

Management Analyst Senior
35M-185
Toi Harrison
AC: 1337

Management Analyst Associate
35M-622
Charlene Brown
AC: 1337

Management Analyst Associate
35M-421
Alma Gordon
AC: 1450

Management Analyst Associate
35M-456
Merna Wilson
AC: 1449

DEPARTMENT OF PUBLIC UTILITIES

Wastewater Treatment Plant - Operations

Deputy Department Director
35M-176
Michele Maclauchlan

WWTP Facility Manager
(Programs & Ops Manager)
35M-387
Clifford Williams
AC: 1149

Engineer Principal (Process Engineer)
35M-329
Vacant

Liquid Ops Team
AC: 1449

Plant Operations Supervisor Senior
35M-405
William Wright
Liquid Treatment Process

Plant Operations Supervisor
35M-713
Lisa Galloway

- **Plant Operator** 35M-372 Albert Brown
- **Plant Operator** 35M-357 Brandon Lofton

Plant Operations Supervisor
35M-401
Willie Whitaker

- **Plant Operator** 35M-351 John Harvey
- **Plant Operator** 35M-377 Makeen Abdullaah Salafee
- **Plant Operator** 35M-379 Keondre Spencer

Plant Operations Supervisor
35M-273
Faheem Adbul-Wahhaab

- **Plant Operator** 35M-380 Claudia Ndoumi
- **Plant Operator** 35M-364 Marcus Black
- **Plant Operator** 35M-195 Richard Hatfield

Plant Operations Supervisor
35M-403
Benjamin Young

- **Plant Operator** 35M-378 Jason Hendricks
- **Plant Operator** 35M-498 **Vacant**
- **Plant Operator** 35M-376 Devin Sandridge
- **Plant Operator** 35M-373 William Vick
- **Plant Operator** 35M-283 Lawrence Shambley

Dry Ops Team
AC: 1449

Plant Operations Supervisor Senior
35M-879
Jarvis Koonce
Solids Processing, Site Maintenance

Plant Operations Supervisor
35M-308
Linwood Dabbs

- **Plant Operator** 35M-293 Linwood Dabbs
- **Equipment Operator Sr** 35M-328 Bryon Lambert **AC: 1190**
- **Plant Operator** 35M-388 **Vacant**
- **Maintenance Specialist Sr** 35M-809 Richard Wise **AC: 1033**

9/5/2025

DEPARTMENT OF PUBLIC UTILITIES

Water Treatment Plant Operations

WTP Facility Manager
(Programs & Ops Manager)
35M-213
Donte Johnson
AC: 1450

AC: 1450

Plant Operations Supervisor Senior
35M-004
Leroy Rice
AC: 1450

Plant Operations Supervisor Senior
35M-407
Vacant

Plant Operations Supervisor
35M-397
Charlie Watts
Team Function: Water Sample Collection, System Software 7 Performance Monitoring, Gauge & Valve Reading, Data logging & Reporting

- **Plant Operator** 35M-383 Travis Parker **AC: 1348**
- **Plant Operator** 35M-776 Rembert Wallace
- **Plant Operator** 35M-367 Wyatt Cotner

Plant Operations Supervisor
35M-404
Shaka Smith
Team Function: Water Sample Collection, System Software 7 Performance Monitoring, Gauge & Valve Reading, Data logging & Reporting

- **Plant Operator** 35M-371 **Vacant**
- **Plant Operator** 35M-297 Ronnie Bartholomew
- **Plant Operator** 35M-370 Davis Peltonen
- **Plant Operator** 35M-341 **Vacant**

Plant Operations Supervisor
35M-396
Negel Laguna
Team Function: Water Sample Collection, System Software 7 Performance Monitoring, Gauge & Valve Reading, Data logging & Reporting

- **Plant Operator** 35M-369 Donald Murray
- **Plant Operator** 35M-368 Thomas Marsh
- **Plant Operator** 35M-381 Kevin Coleman **AC: 1348**
- **Plant Operator** 35M-205 **Vacant**

Plant Operations Supervisor
35M-395
Vacant
Team Function: Water Sample Collection, System Software 7 Performance Monitoring, Gauge & Valve Reading, Data logging & Reporting

- **Plant Operator** 35M-348 Floyd Quesenberry **AC: 1348**
- **Plant Operator** 35M-479 Jerry White
- **Plant Operator** 35M-374 Jerry Gouldman
- **Plant Operator** 35M-230 **Vacant**

Plant Operations Supervisor
35M-400
Jermaine Murray
Team Function: Water Sample Collection, System Software 7 Performance Monitoring, Gauge & Valve Reading, Data logging & Reporting

- **Plant Operator** 35M-201 Logan Roach
- **Plant Operator** 35M-775 Victor Fischer
- **Plant Operator** 35M-384 Calvin Dunn
- **Plant Operator** 35M-612 **Vacant**

- **Utilities Plant Specialist** 35M-194 Bernard Spruell **AC: 1252**
- **Maintenance Technician, Sr.** 35M-125 Terrence Robert AC: 1450

9/5/2025

DEPARTMENT OF PUBLIC UTILITIES

WTP, WWTP, Buildings & Grounds

Programs & Operations Manager
35M-765
Kenny Weeks
AC: 1257

WWTP Maintenance
AC: 1257

Programs & Operations Supervisor
35M-225
Christopher Battle

I&C

Utility Plant Specialist Supervisor
35M-261
Vacant

- **Utility Plant Specialist** 35M-260 Kyle Boyce
- **Utility Plant Specialist** 35M-803 John Jones
- **Utility Plant Specialist** 35M-748 Walter Pawlak
- **Utility Plant Specialist** 35M-268 George Boyd
- **Utility Plant Specialist** 35M-206 Victor Gonzalez

Electrical

Utility Plant Specialist Supervisor
35M-256
Douglas Yarhouse

- **Utility Plant Specialist** 35M-250 Osborne Carter
- **Utility Plant Specialist** 35M-743 Jordan Hinton
- **Utility Plant Specialist** 35M-480 Duante White
- **Utility Plant Specialist** 35M-253 Dante Smith
- **Utility Plant Specialist** 35M-214 Daylon Morris
- **Utility Plant Specialist** 35M-204 Vacant

Mechanical

Utility Plant Specialist Supervisor
35M-307
Lynard Pemberton

- **Utility Plant Specialist** 35M-732 Christopher Haines
- **Utility Plant Specialist** 35M-301 Shawn Mason
- **Utility Plant Specialist** 35M-279 Victor Mejia
- **Utility Plant Specialist** 35M-229 Adam Higgins
- **Utility Plant Specialist** 35M-280 Wesley Fox
- **Utility Plant Specialist** 35M-303 Nicholas Hodges
- **Utility Plant Specialist** 35M-339 Vernon Mealy
- **Utility Plant Specialist** 35M-193 Alonzo White
- **Utility Plant Specialist** 35M-736 Michael Spencer
- **Maintenance Technician Senior** 35M-136 Kathrine Larkin

WTP Maintenance
AC: 1257

Programs & Operations Supervisor
35M-628
Arnold Eberly

I&C

Utility Plant Specialist Supervisor
35M-700
Mark Bies

- **Utility Plant Specialist** 35M-266 Michael Mosca
- **Utility Plant Specialist** 35M-267 Alexander Musser
- **Utility Plant Specialist** 35M-788 Charles Grant
- **Utility Plant Specialist** 35M-269 Demario Roache

Electrical

Utility Plant Specialist Supervisor
35M-309
Matthew Brizendine

- **Utility Plant Specialist** 35M-189 Andre Rodriguez
- **Utility Plant Specialist** 35M-212 Christopher Burrus
- **Utility Plant Specialist** 35M-805 Vacant
- **Utility Plant Specialist** 35M-251 Rommy Baassiri
- **Utility Plant Specialist** 35M-240 Vacant
- **Utility Plant Specialist** 35M-879 Justin Parham
- **Utility Plant Specialist** 35M-254 Laura Harris
- **Utility Plant Specialist** 35M-282 Ben Lawrence
- **Utility Plant Specialist** 35M-248 Neel Shakoor

Mechanical

Utility Plant Specialist Supervisor
35M-008
Robert Vargas

- **Utility Plant Specialist** 35M-304 Vacant
- **Utility Plant Specialist** 35M-747 James Gonzalez
- **Utility Plant Specialist** 35M-210 Madhukar Kalva
- **Utility Plant Specialist** 35M-192 Fitzgerald Johnson
- **Utility Plant Specialist** 35M-224 Allen Cotman
- **Utility Plant Specialist** 35M-276 Clarence Heath
- **Utility Plant Specialist** 35M-294 Vacant
- **Utility Plant Specialist** 35M-295 Vacant
- **Utility Plant Specialist** 35M-305 Oral Gardner
- **Utility Plant Specialist** 35M-286 Carton Smith

Buildings & Grounds

Programs & Operations Supervisor
35M-419
Nadder Abed
AC:1190

- **Maintenance Specialist** 35M-750 Forrest Melvin AC: 1033
- **Maintenance Specialist** 35M-200 Jorge Albayero AC: 1033
- **Maintenance Specialist** 35M-614 Shawn Brooks AC:1190
- **Maintenance Specialist** 35M-613 Chris Heath AC 1190
- **Equipment Op. Senior** 35M-327 Lloyd Williams AC: 1190
- **Equipment Op. Senior** 35M-241 Silas Poindexter AC: 1190
- **Custodian** 35M-313 Gloria Mangum AC: 1033

Note: Buildings & Grounds is comprised of two differing ACs, 1033 for Building & 1190 for Grounds

9/5/2025

Water Treatment Plant Condition Assessment

Department of Public Utilities

City of Richmond, VA

December 2020

Technical Memorandum

City of Richmond, Virginia
Department of Public Utilities

Water Treatment Plant
Condition Assessment

Technical Memorandum

December 2020

Whitman, Requardt & Associates, LLP
9030 Stony Point Parkway, Suite 220, Richmond, VA 23235

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Appendices

1 Background and Purpose

The City of Richmond Department of Public Utilities' (City) Water Treatment Plant (WTP) is a conventional plant that has been providing City residents and surrounding municipalities with potable drinking water since the early 1900s. Since its construction, the WTP has undergone countless upgrades and changes as drinking water regulations and technologies evolve, and equipment throughout the WTP has continuously been serviced, repaired and replaced in order to provide uninterrupted and reliable service to customers. One of the largest challenges presented to public utilities is not only managing the countless number of assets attributed to their treatment and distribution system, but also maintaining accurate and current information on each asset to better increase efficiency in establishing work orders and prioritizing and budgeting for repairs and replacements. To do this, each individual asset must be documented in a manner that allows it to be easily identifiable by any person wishing to locate it or retrieve information on it.

The City has an existing asset management program for the WTP and distribution system and existing assets have been previously logged and been available to access within the City's computerized maintenance management system (CMMS) software called Mainsaver. Over time the City has discovered that multiple assets have not been logged into the software and those that have been logged in the software often prove challenging for City staff to locate in order to appropriately establish work orders, update maintenance records, and modify asset information. In order to provide a comprehensive update of the asset management system for the WTP the City has engaged Whitman, Requardt & Associates, LLP (WRA) to perform a comprehensive condition assessment of all assets at the WTP, and update the City's Mainsaver software to reflect the most accurate and current information available.

WRA completed a multi-disciplinary walkthrough of the WTP between September 2019 and January 2020 to identify and log each asset with all available, pertinent information, and assign values attributed to each asset's consequence of failure, probability of failure, and overall asset condition. The purpose of this technical memorandum is to describe the walkthrough and the documentation process used during the walkthrough for determining new and existing assets; how the assessment documents were developed; how criticality and asset information was determined and logged; and to describe the risk analysis and the Facility Condition Index (FCI) that was conducted for the assets and how this can be used and incorporated in the development of a 10-Year Repair and Replacement Plan for the City WTP.

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2 Condition Assessment Guidelines

Prior to performing the multi-disciplinary walkthrough, WRA worked with the City to develop a detailed hierarchy at the WTP that illustrates how each location at the WTP is related to another. In addition to the development of a hierarchy based on locations at the WTP (see Section 3.1), two other hierarchies were developed; one for WTP locations outside of the actual boundaries of the WTP (gates, locks, dams, and canal assets), and one and for WTP process affiliations. Along with the hierarchies, a guideline document was created for the inspection team (and for future use by the City) to use in determining and assigning consequence of failure, probability of failure, and asset condition values for each asset. As subsequently outlined in this Section, before commencing the multi-disciplinary walkthrough, key elements of the condition assessment had to be explicitly defined in order to promote standardization across different disciplines and asset types.

2.1 What is an Asset?

In order to implement a successful condition assessment program, the foremost important question to address is "*what is an asset?"* since there are many different interpretations for what assets can be. In order to define the term "asset" for the purpose of this project, WRA and the City identified an asset as a maintenance-managed item down to a level of practical and cost-effective management. This meaning all items that would be readily maintained at the WTP instead of running to failure prior to replacement, should be considered an asset. Examples of items that would not be considered an asset under this definition for the City WTP include electrical conduit and piping/plumbing and appurtenances under 4-inches in diameter.

2.2 Identifying Critical Assets

Once an asset is identified, it requires a criticality classification. Criticality is synonymous with the consequence of failure (CoF) and establishes which assets at the WTP are most critical for maintaining the functionality of the WTP processes, WTP regulatory compliance, and protection of public health. The numerical classifications for CoF range from 1 through 5, with a classification of 5 being the most critical and 1 being the lowest (see **Appendix A** for list of identifying criteria). At the lowest CoF level, asset failure would cause no impact on processes or level of service, no impact on regulatory compliance, and/or multiple assets are readily available as standby units, to take the place of the failed asset. At the highest CoF level, asset failure would cause total WTP loss of service, no redundant asset is available as a standby unit, water conservation/do not use/boil orders would be enacted, and/or the failure of the asset could lead to loss of life. Although each asset is assigned a value for criticality, only those assets at a level 4 or 5 are considered "critical assets" since the WTP would be subjected to regulatory non-compliance and/or a life safety impact in the event of a CoF level 4 or 5 asset failure.

Appropriately identifying and assigning CoF levels can be a challenge for assets that are not directly associated with a WTP process, but instead are indirectly related and have the ability to impact specific processes. This is most notably relevant for electrical assets. To appropriately review and assign CoF classifications to these type of assets, City WTP staff with a strong understanding of WTP operations and controls accompanied WRA team members during the in-field assessment. For assets that were unable to be assigned a CoF in the field, workshops were held between WRA and the City to review assets and more

accurately understand their impact to the WTP if the asset were to fail. A list of all identified Critical Assets at the WTP can be found in **Appendix F**.

2.3 Identifying Probability of Failure and Asset Condition

In conjunction with assigning criticality classifications WRA team members assigned a probability of failure (PoF) and an asset condition value (AC) to each asset, based on visual observations in the field and WTP staff insight. Although the PoF and AC were recorded independently, the two values are largely proportionate to one another in the sense that higher PoF values typically correlate with higher AC values. Like the CoF, the PoF and AC were assigned on a 1 through 5 scale (see **Appendix A** for list of identifying criteria and descriptions). A PoF value of 5 indicates that the asset is either failing, past its useful life, and/or would require parts that are no longer available, and a PoF value of 1 indicates that the asset is either new, exceeds current requirements, has plenty of spare parts available, and/or requires virtually no maintenance. For the AC, a value of 5 designates that the asset has critical defects and should be replaced, whereas an AC value of 1 was given to assets that visually appear new and show no visible signs of defects.

The PoF and AC are entirely independent of the CoF since they do not relate to the consequences pertaining to an asset's failure. However, the PoF is imperative for quantitatively calculating an asset's risk in order to identify assets (specifically those classified as critical) that require immediate repair or replacement. Although not included in the risk calculation, the AC helps identify possible failure modes and is pivotal for establishing a repair and replacement plan. For any assigned AC value greater than 1, a corresponding fault code (FC) was required to be assigned. Unlike the CoF, PoF, and AC, the FC is a numerical value that directly relates to a visually or audibly observed defect, and a higher value is not indicative of a worse defect. A total of 10 FCs were established for the condition assessment which also can be found in **Appendix A**.

3 Asset Logging and Documentation

3.1 Hierarchy Development

The hierarchy that was developed was created so that each asset (once logged) can be assigned to a specific location (room, vault, etc.) allowing for the asset to be quickly and easily identified. Since it was determined with the City that they wish to have Parent-Child relationships established for all assets, each asset will now have the ability to be documented in a manner that allows it to fold into whatever parent asset or location it is directly related to, and any future assets can be systematically assigned to the appropriate location once this hierarchy is integrated in the City's Mainsaver software.

Two separate location hierarchies were developed, namely the WTP location hierarchy (**Appendix B**), and the Water Supply location hierarchy (**Appendix C**) which encompasses sections of the Kanawha Canal, and the pertinent locks and dams. Both of the location hierarchies were developed in parallel with plans (utilizing existing drawings from around the WTP) so that locations on the hierarchy can be easily matched to their identically-named locations on the plans. The process hierarchy (**Appendix D**) differs from the location hierarchies in that it illustrates how WTP processes relate to one another, allowing for assets to be assigned to a WTP process in addition to a location. The purpose of this is to provide the City with the flexibility to establish and track budgets between specific locations at the WTP and process trains. In reference to Figures 1 & 2 below (taken from the established hierarchies), the "Raw Water Pump Station" at the WTP is the direct parent of each individual pump station, and each individual pump station is then the direct parent of each affiliated floor/room location within that given building. For each of the components within those buildings that are affiliated with the operation of the buildings and enclosed equipment, they would also be assigned to the process "Raw Water Low Lift Pumping and Screening".

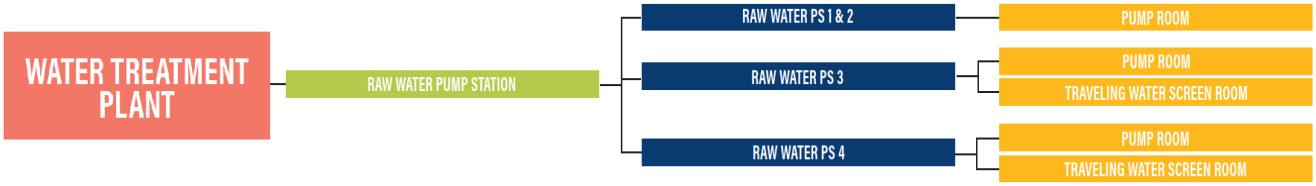

Figure 1: Location Hierarchy Example

Figure 2: Process Hierarchy Example

3.2 Asset Lists

In order to identify which assets at the WTP are already logged within the Mainsaver software, and in order to preserve historical asset information (such as work orders), an initial list was compiled from the City's Mainsaver for all existing assets located at the WTP. This list was used in conjunction with a form developed by WRA to document and log each asset at the WTP during the walkthrough, and to identify assets that were missing from the City's Mainsaver. The Asset Condition Assessment Form was created to provide a simple tool for

data collection that shows what information should be recorded when logging a new asset such as location, manufacturer, model, serial number, etc. The form was not generated for the sole purpose of documenting assets that were found to be missing from the City's Mainsaver during the walkthrough but was created with the intent to be an essential tool to be used by City staff for documenting information of all new assets as they are installed around the WTP in the future. This form is included as **Appendix E**.

3.3 Multi-Disciplinary Walkthrough

In order to document each asset at the WTP, WRA formed a team of inspectors to cover all relevant disciplines of civil, architectural, structural, geotechnical, process mechanical, building mechanical, electrical, and instrumentation & controls. MIN Engineering was subcontracted to perform the building mechanical condition assessment services, and Shah & Associates was subcontracted to perform the electrical and I&C condition assessment work. Throughout the course of a few weeks, the inspection team surveyed the WTP and associated facilities, documenting all new assets ("new" refers to those assets that did not appear in the existing asset log retrieved from Mainsaver and do not necessarily refer to newly installed assets), updating/confirming the information that was shown for existing assets, and performing visual inspections of each asset to determine the asset's CoF, PoF and AC. All of this information was compiled into a master spreadsheet that was used to update the City's Mainsaver software. As part of the data collection services, photos were taken and logged for assets where able.

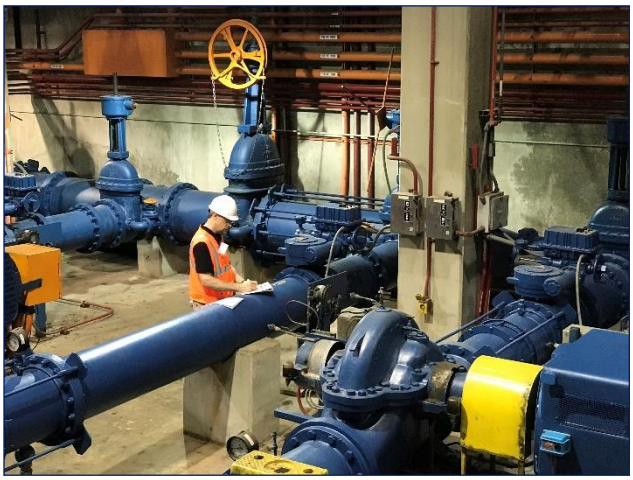

Photo 1: Inspection Team Member

Following data compilation and sorting, three separate workshops were held with City operational and engineering staff to review the information and provide clarifications as presented by each discipline inspection team. The workshops were essential for incorporating the City's input regarding items to be entered as an asset, identifying missing assets, identifying duplicate entries, and filling in missing information that was unable to be determined during the walkthrough. One such key component of these workshops encompassed the review of criticality for assets that were unable to be classified during the evaluation, including the determination and assignment of the appropriate CoF value.

Photo 2: Drone Inspection of Bosher's Dam

4 Condition Assessment Summary

The existing asset list contained a total of 3,148 assets within the "WP" (Water Plant) Work Area within Mainsaver; 306 of which were classified as deactivated and 621 were associated with distribution system assets (pump stations, storage tanks, etc.), and were excluded from the assessment. Additional assets at the WTP that were not cataloged within the "WP" Work Area were included, bringing the total number of existing WTP assets to 2,312. An additional 1,908 assets were identified and documented as "new" assets as a result of the walkthrough, constituting an increase of 82% and bringing the total number of WTP assets up to 4,220. Of the 4,220 assets documented, 187 have been classified as critical assets (as defined under Section 2.2). Summaries of the asset documentation are presented in Tables 1 through 3.

The condition assessment documentation excluded items that would typically be replaced instead of repaired as well as items that would typically be classified as parts. Each asset was assigned a status identifying the level of service being provided by the asset. The status abbreviations and corresponding abbreviations are as follows:

ISF (In Service Full) – assets that are fully operational and in service.

ISL (In Service Limited) – assets that are not fully operational but are in service.

OSI (Out of Service Inactive) – assets that have been removed from service temporarily, not attributed to maintenance or decommissioning, but are fully operational. This status implies that the asset is temporarily inactive and can be placed back into service at any time.

OSM (Out of Service Maintenance) – assets that have been removed from service for either planned maintenance or unplanned maintenance. This status implies that the asset will be returned to service once the maintenance is complete.

OSP (Out of Service Permanent) – decommissioned assets that are no longer in service but are still on City property in the asset's installed location (i.e. wall-mounted disconnect switch with disconnected wiring). This status implies that the asset has been abandoned or is no longer operational. These assets will not be returned to service.

DEA (Deactivated) – decommissioned assets that are no longer in service and are no longer in the asset's installed location, but the asset is still within the City's possession (i.e. chemical metering pump that has been removed from service and placed in a storage room). This status implies that the asset is no longer needed or is no longer operational. These assets will not be returned to service.

REM (Removed) – decommissioned assets that are no longer in service and no longer located on City property or within the City's possession. This status implies that the asset has been discarded.

NEI (Non-Equipment Item) – identifies non-asset locations (i.e. room within a building) for purpose of employing the location hierarchy in Mainsaver. These items are non-maintainable.

Asset Status	No. of Assets	No. of Critical Assets
In Service Full (ISF)	3421	186
In Service Limited (ISL)	42	1
Out of Service Inactive (OSI)	90	0
Out of Service Maintenance (OSM)	31	0
Out of Service Permanent (OSP)	39	0
Deactivated (DEA)	80	0
Removed (REM)	309	0
Non-Asset (NEI)	208	0

Table 1: Condition Assessment Summary by Asset Status

Asset Class	No. of New Assets	No. of Existing Assets	TOTAL	New Critical Assets	Existing Critical Assets	TOTAL
P MECH	504	777	1281	32	55	87
B MECH	91	306	397	1	0	1
INST	48	445	493	0	5	5
CONT	257	287	544	8	3	11
ELEC	452	387	839	4	27	31
SEC	17	8	25	0	0	0
STRUC	129	54	183	36	9	45
BUILD	42	6	48	1	0	1
ARCH	108	0	108	0	0	0
CIVIL	24	4	28	6	0	6
LOC	236	33	269	0	0	0
VEH	0	5	5	0	0	0
TOTAL	1,908	2,312	4,220	88	99	187

Table 2: Condition Assessment Summary by Asset Class
[1]Assets Class abbreviations are further outlined and defined in Section 6.2.

Asset Process	No. of Assets	No. of Critical Assets
WATER SUPPLY	146	23
PRE-SEDIMENTATION	36	2
RAW WATER LOW LIFT PUMPING AND SCREENING	130	6
COAGULATION, FLOCCULATION & SEDIMENTATION	476	14
FILTRATION	813	7
POST FILTRATION PUMPING & TREATMENT	170	22
FINISHED WATER PUMPING	225	42
CHEMICAL FEED AND STORAGE	665	29
RESIDUALS MANAGEMENT	294	1
NON PROCESS	1,032	41

Table 3: Condition Assessment Summary by Asset Process

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5 Risk Analysis

As described in Section 2 with the documentation of each asset's CoF and PoF, a risk score was calculated for each asset by using the equation:

Risk = CoF X PoF

The higher the risk score, the higher the asset's associated risk, corresponding to higher levels of required attention. Although this is an appropriate method for determining risk, the risk scores form a linear relationship which lacks clarity for differentiating between CoF-driven risks and PoF-driven risks as many of the risk scores overlap between categories (See Figure 3 & Table 4). The colors used in Table 4 and Table 5 are indicative of different risk score categories which is further explained in Section 5.2. For example, in using this method a calculated risk of 10 can either be a result of an asset with a CoF and PoF of 5 and 2, or 2 and 5, respectively. In this case, the asset with a CoF of 5 should sensibly carry a higher degree of risk rather than one with a CoF of 2, regardless of the associated PoF. To improve the clarity of the risk analysis, and to further enhance the degree of accuracy in risk score interpretation, the basic risk calculation was modified to better isolate the truly high-risk assets based on higher levels of CoF.

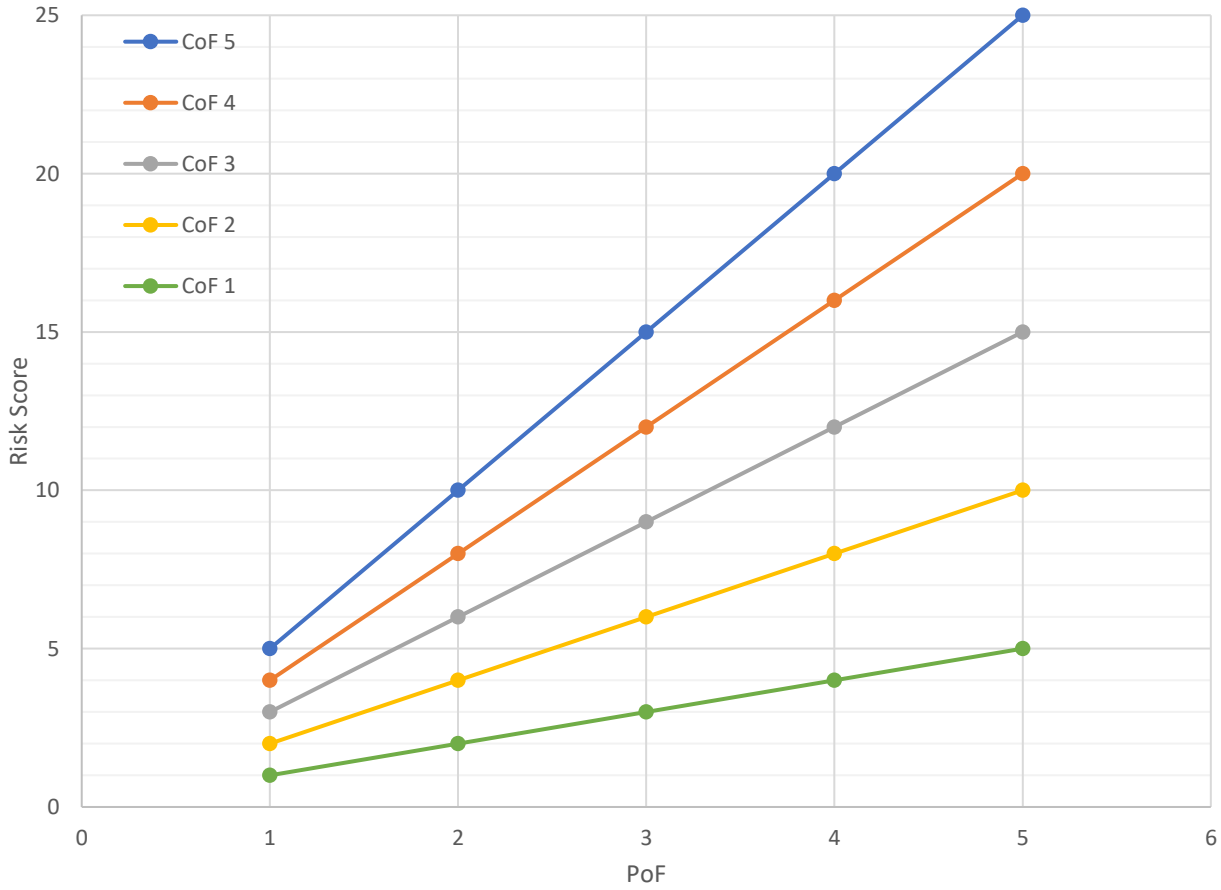

Figure 3: Example of Un-Weighted Risk Score Overlap and Distribution

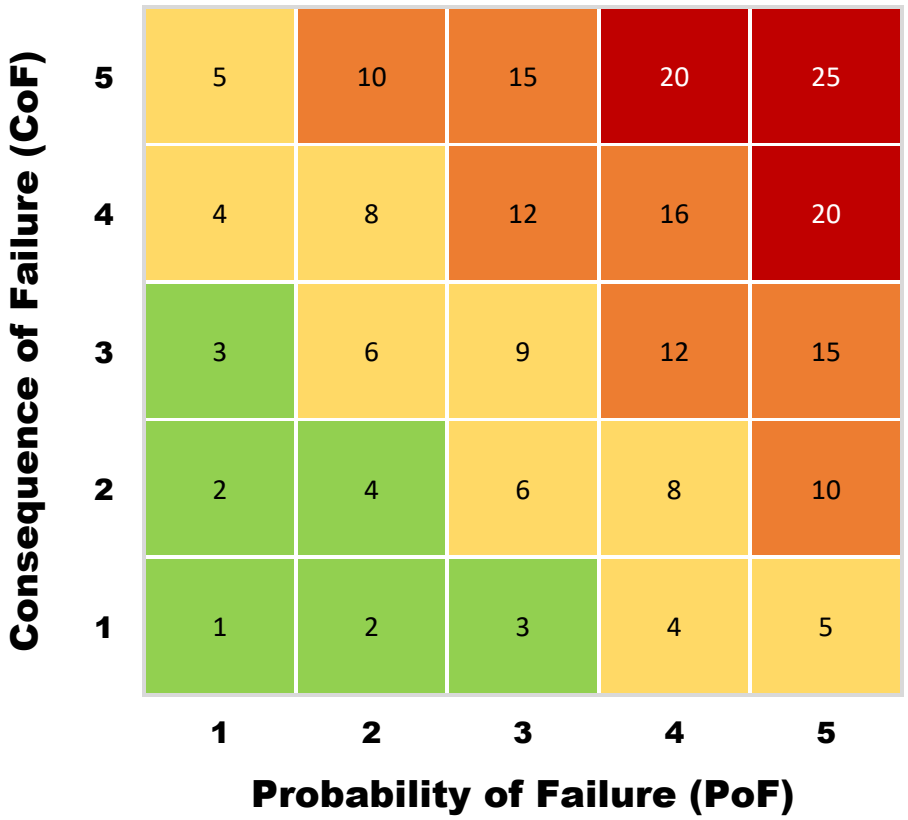

Table 4: Example of Un-Weighted Risk Score Matrix

5.1 Risk Weighting

There are many approaches to calculating risk scores; several of which utilize weighting factors related to an asset's predicted failure mode or, the level of mitigation required in the event of asset failure. For a condition assessment performed on a visual level (such as the one at the WTP), the use of these types of weighting factors would be overly assumptive and would not be appropriately determinable. Additionally, the use of an approach such as Simple Additive Weighting (SAW) would allow for proper distinction between CoF levels, but the resulting values would be subjectively based on the assigned weights, and it assumes that the risk for each level of CoF is linear and maintains the same slope and separation from other levels of criticality. Despite this, the use of a weight in the assessment is appropriate in order to recognize risks based on the asset's criticality.

To maintain the integrity of the traditional risk matrix approach for asset management while simultaneously increasing the accuracy of the results from the condition assessment, an exponential approach to weighting was assumed. At each level of criticality, risk is traditionally visualized as linear in the sense that for each level increase in PoF the risk doubles, and consequentially the slope for risk increases by 50% for each level increase in criticality. Although the slope for risk should increase as criticality increases, with this approach the risk scores at each level of criticality overlap with every other level, blurring the relationship between critical risk and non-critical risk.

By weighting the CoF on an exponential scale it resolves these issues by tiering risk scores in a way that explicitly connects higher risk scores with higher levels of criticality (See Figure 4 and Table 5). The slope for risk continues to increase for each level increase in criticality, but at a steeper slope to account for progressively severe unforeseen/unexpected consequences. Since slight scoring variations are inevitable depending on the individual conducting the assessment, it should be expected that some overlap occurs between successive levels of criticality since an asset with a CoF of 1 and PoF of 5 may not always warrant having a lower risk than an asset with a CoF of 2 and PoF of 1; however, this variance in score assignment does not span the entire CoF spectrum and an asset associated with a non-critical risk (i.e. CoF of 1 and PoF 5) should not be able to be confused with an asset linked to a critical risk (i.e. CoF of 5 and PoF of 1).

To assign the values for the exponential weighting the CoF criterion (1-5) were multiplied by values between 0.25 and 4. This ultimately raised the base risk for each level of criticality and increased the number of unique risk scores from 14 to 23 to allow for a higher level of risk/criticality precision. Ultimately, the highest possible risk score (with exponential weighting) is 100, and the lowest possible risk score is 1.25.

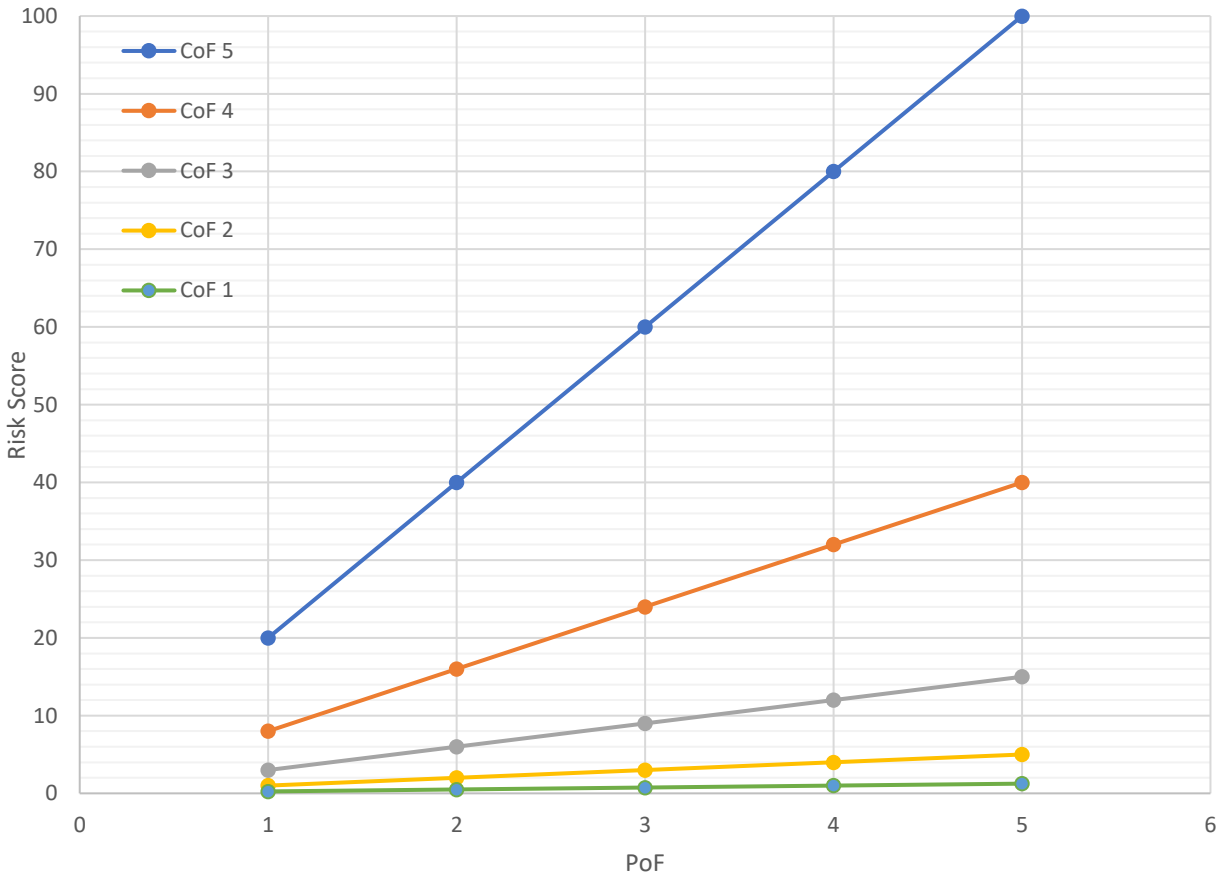

Figure 4: Weighted Risk Score Distributions

Consequence of Failure (CoF)	1	2	3	4	5
5 (4x Weight)	20	40	60	80	100
4 (2x Weight)	8	16	24	32	40
3 (1x Weight)	3	6	9	12	15
2 (0.5x Weight)	1	2	3	4	5
1 (0.25x Weight)	0.25	0.5	0.75	1	1.25
	Probability of Failure (PoF)				

Table 5: Weighted Risk Score Matrix

5.2 Analysis Results

The risk analysis was performed on each asset that was identified as being functionally operational (ISF, ISL, OSI, and OSM) and associated with the WTP. Assets that are known to exist at the WTP but were unable to be located during the walkthrough; assets excluded from the assessment (i.e. vehicles, floodwall, etc.); and assets identified with statuses of NEI, OSP, DEA or REM were excluded from the risk analysis. Of the 4,220 assets documented during the condition assessment, 3,497 were assigned a risk score. As shown in the risk matrix, a color scheme has been incorporated to better visualize the five separate risk categories as shown in Table 6.

Risk Score	Category	Color Scheme
≤1	No Risk	Green
1< to ≤10	Low Risk	Yellow
10< to ≤30	Medium Risk	Orange
30< to ≤99	High Risk	Dark Red
100	Critical Risk	Bright Red

Table 6: Risk Score Categories

In Figure 5, the distribution of weighted risk scores is presented. Of the 3,497 assets, the large majority (63.28%) of the assets have risks scores that place them in the “Low Risk” category, with the second largest majority (29.31%) of the assets falling into the “No Risk” category. The remaining 7.41% of the assets are split up as follows: “Medium Risk” accounts for 6.21%, “High Risk” accounts for 1.14%, and “Critical Risk” accounts for 0.06%.

Based on this methodology for risk score determination, critical assets that have a CoF of 4 are not able to be scored in the “No Risk” category, and critical assets with a CoF of 5 are not able to be scored in either the “No Risk” or “Low Risk” categories. Correspondingly, only critical assets (CoF of 4 or 5) can fall into the “High Risk” and “Critical Risk” categories, and only assets that have both a CoF and PoF of 5 can be classified as a “Critical Risk”.

Although the majority of WTP assets are primarily within the no risk/low risk categories, the 42 assets having risks scored in the “High Risk” and “Critical Risk” categories should be monitored diligently by the City. The two assets classified as “Critical Risks” are those that should be addressed immediately. These assets are the Korah 1 Distribution Process Controller (DPC) and the Korah 2 & 3 DPC – both of which are Bristol Babcock Inc. Series 3330 DPCs. Bristol Babcock Inc. introduced Series 3330 DPCs in the year 1988. These controllers are microprocessor-based controllers that can function as stand-alone units or as nodes of a Bristol Babcock network. The DPC monitors a number of process-related I/Os, maintains and analyzes real-time data, and executes control algorithms based on the software configuration in the controller. The DPC 3330 and its software are considered obsolete from the manufacturer.

Photo 3: Korah 1 DPC (Inside new OIT)

Photo 4: Korah 2 & 3 DPC

The Korah 1 Pump Station DPC 3330-1 (Existing Asset #7428 – Photo 3) and the Korah 2 & 3 DPC (Existing Asset #1271 – Photo 4) are located in their respective pump stations and are used to control each station’s finished water pumps, their discharge valves and their process signals. The Korah 1 DPC is located within a relatively new Operator Interface Terminal (OIT), whereas the Korah 2 & 3 OIT appears to be much older. Due to the critical nature of maintaining finished water pumping, the age of the controller (DPC 3330) being past its useful life and the unavailability of the controller and their parts, they have been assigned CoF and PoF values of 5. Since recent SCADA upgrades at the WTP replaced existing PLC controllers with Modicon M340 PLCs, it may be suitable to upgrade these existing 3330 DPCs with Modicon M340 based PLC controllers in order to match the other SCADA controllers and give the WTP increased reliability and more flexibility for operation and maintenance.

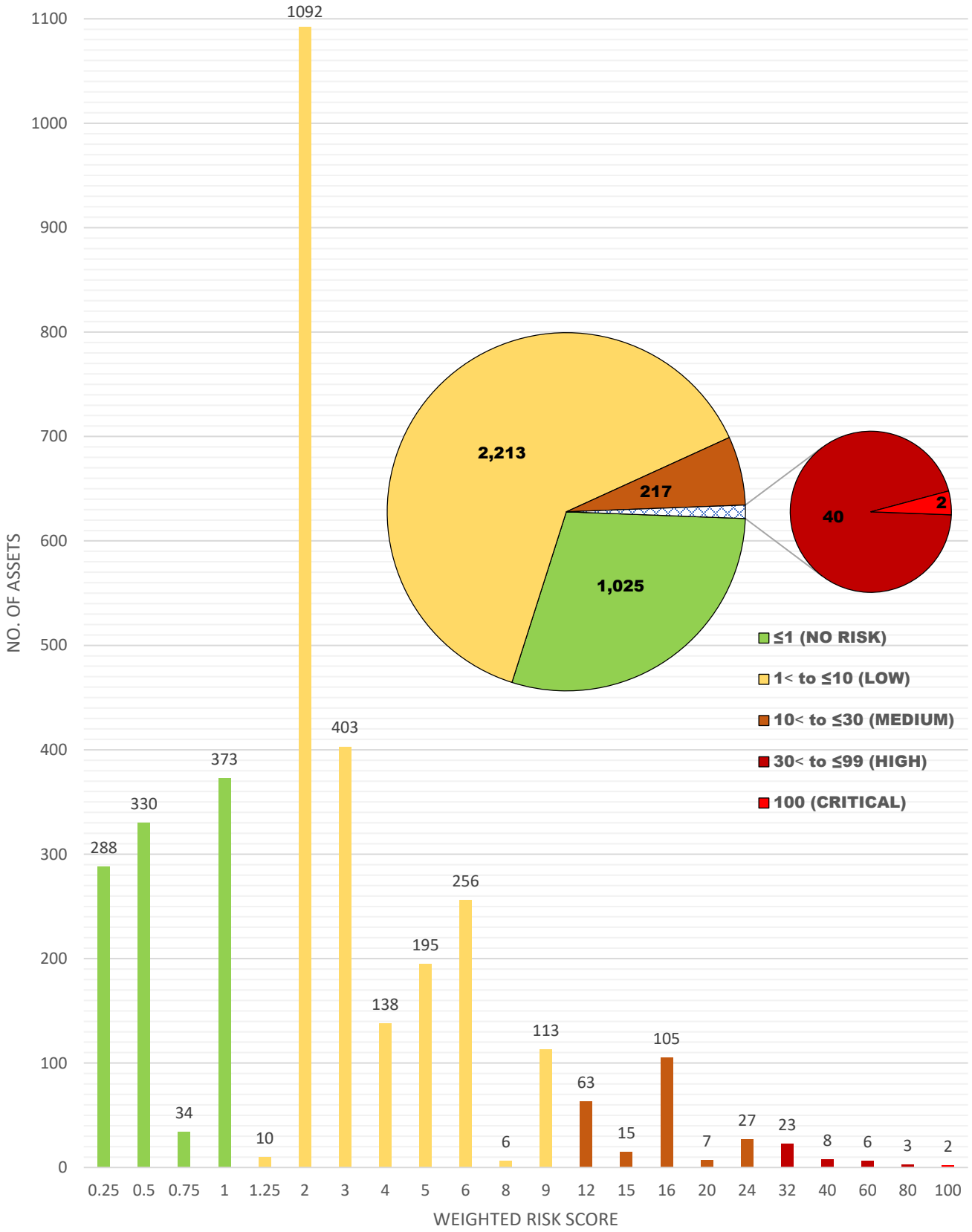

Figure 5: Weighted Risk Score Distribution

5.3 Risk Score Distribution

Table 7 lists the number of assets associated with each level of PoF for each asset class. Figure 6 and Table 8 display the distribution of risk scores for all assets within a particular structure or building.

As shown in Figure 6, the maximum and minimum risk assets associated with each structure or building are illustrated by the circular black markers, separated by a vertical black line which represents the spread of risks associated with all assets for that location. Since the number of assets associated with each location is not constant and varies between 1 documented asset (i.e. Residuals Settling Lagoon), up to 505 documented assets (Plant 2 Corridor), the locations have been separated into two categories within the figure: "blue" bars indicate that the location contains an overall total of less than 5 assets, whereas an "orange" bar indicates that the location contains overall total of more than 5 assets. The purpose of this distinction is to help associate a location's level of risk with respect to the number of assets at that location. Key findings and observations include:

- The 3 Mile Lock Dam & Gates has the highest average probability of failure.
- The Plant 1 Filtered Water Vault has the highest minimum risk score.
- The Feeder Channel has the highest average weighted risk score.
- Korah 1 PS and Korah 2 & 3 PS have the highest maximum risk (due to the DPCs as discussed under Section 5.2) and largest distribution of risks scores.
- Seven (7) of the 57 total buildings, structures, and facilities have an average risk categorized as medium risk. The other 51 have average risks that fall in to the low or no risk category.
- The average PoF for assets at the WTP is 2.31.
- Structural assets have the lowest average PoF at 1.79, and Instrumentation assets have the highest average PoF at 2.92.

	PoF 1	PoF 2	PoF 3	PoF 4	PoF 5	Average
P MECH	105	723	215	70	4	2.23
B MECH	51	217	61	22	3	2.18
INST	51	91	82	59	54	2.92
CONT	112	174	59	27	141	2.83
ELEC	284	301	130	70	23	2.07
SEC	6	13	1	3	0	2.04
STRUC	45	116	7	0	1	1.79
BUILD	7	27	3	6	1	2.25
ARCH	0	108	0	0	0	2.00
CIVIL	6	16	1	1	0	1.88
TOTAL	**667**	**1786**	**559**	**258**	**227**	**2.31**

Table 7: Asset Class PoF Distribution

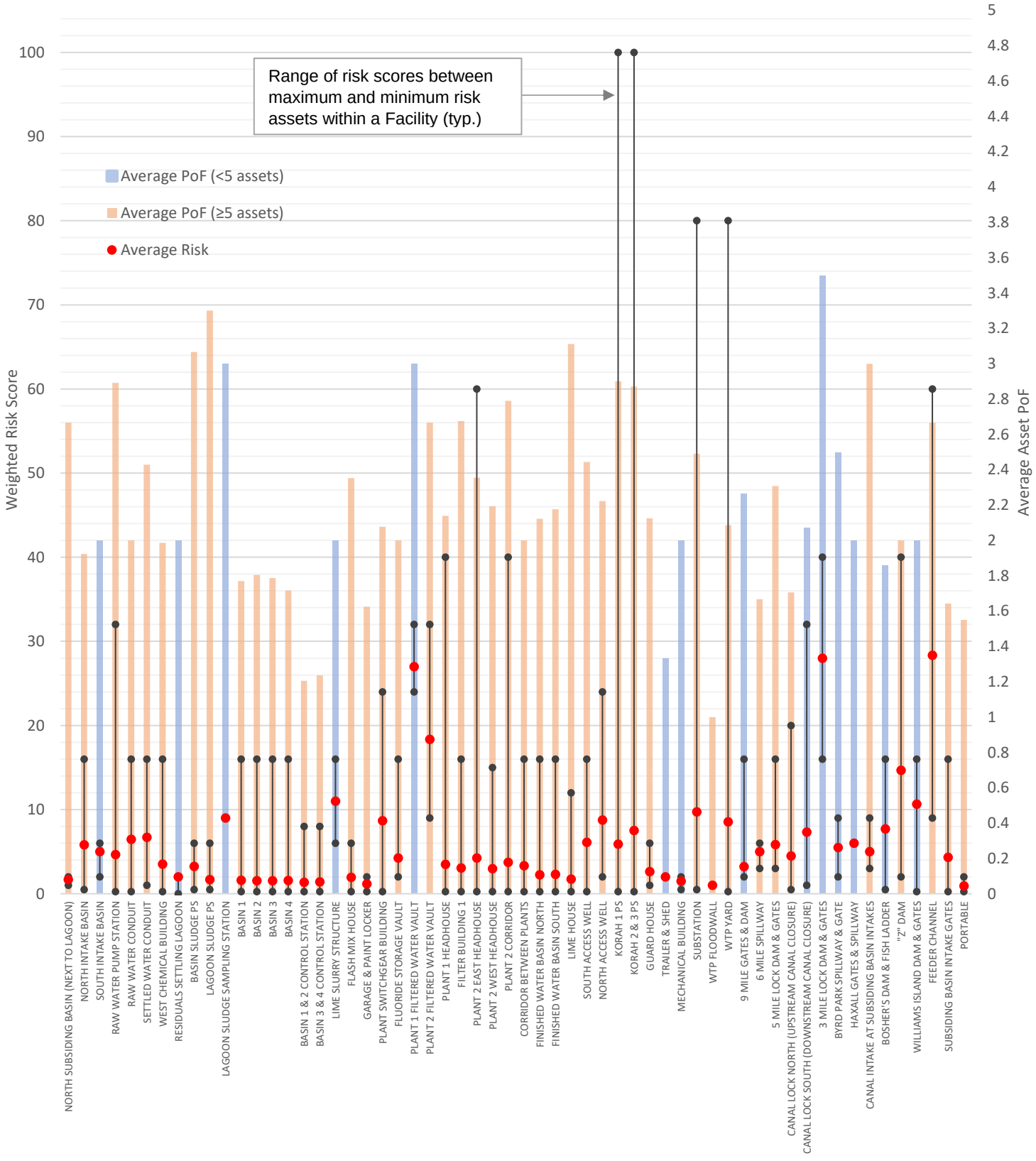

Figure 6: Max, Min, and Average Risk Score Distributions and Average PoF for Assets Within Buildings and Structures

WTP Location/Building/Structure	Min Risk	Max Risk	Average Risk	Average PoF	No. of Assets[1]
FEEDER CHANNEL	9	60	28.3	2.7	3
3 MILE LOCK DAM & GATES	16	40	28.0	3.5	2
PLANT 1 FILTERED WATER VAULT	24	32	27.0	3.0	4
PLANT 2 FILTERED WATER VAULT	9	32	18.3	2.7	6
"Z" DAM	2	40	14.7	2.0	3
LIME SLURRY STRUCTURE	6	16	11.0	2.0	2
WILLIAMS ISLAND DAM & GATES	0.25	16	10.7	2.0	13
SUBSTATION	0.5	80	9.7	2.5	51
LAGOON SLUDGE SAMPLING STATION	9	9	9.0	3.0	1
NORTH ACCESS WELL	2	24	8.8	2.2	8
PLANT SWITCHGEAR BUILDING	0.25	24	8.7	2.1	26
WTP YARD	0.25	80	8.5	2.1	46
BOSHER'S DAM & FISH LADDER	0.5	16	7.7	1.9	7
KORAH 2 & 3 PS	0.25	100	7.5	2.9	187
CANAL LOCK SOUTH (DOWNSTREAM CANAL CLOSURE)	1	32	7.3	2.1	28
SETTLED WATER CONDUIT	1	16	6.7	2.4	28
RAW WATER CONDUIT	0.25	16	6.5	2.0	14
SOUTH ACCESS WELL	0.25	16	6.1	2.4	26
HAXALL GATES & SPILLWAY	6	6	6.0	2.0	1
KORAH 1 PS	0.25	100	5.9	2.9	80
5 MILE LOCK DAM & GATES	3	16	5.8	2.3	13
NORTH INTAKE BASIN	0.5	16	5.8	1.9	13
BYRD PARK SPILLWAY & GATE	2	9	5.5	2.5	2
6 MILE SPILLWAY	3	6	5.0	1.7	3
CANAL INTAKE AT SUBSIDING BASIN INTAKES	3	9	5.0	3.0	3
SOUTH INTAKE BASIN	2	6	5.0	2.0	4
RAW WATER PUMP STATION	0.25	32	4.7	2.9	156
CANAL LOCK NORTH (UPSTREAM CANAL CLOSURE)	0.5	20	4.5	1.7	17
SUBSIDING BASIN INTAKE GATES	0.25	16	4.3	1.6	13
PLANT 2 EAST HEADHOUSE	0.25	60	4.3	2.4	284
FLUORIDE STORAGE VAULT	2	16	4.3	2.0	8
PLANT 2 CORRIDOR	0.25	40	3.7	2.8	505
WEST CHEMICAL BUILDING	0.25	16	3.5	2.0	287
PLANT 1 HEADHOUSE	0.25	40	3.5	2.1	308
CORRIDOR BETWEEN PLANTS	0.25	16	3.3	2.0	10
BASIN SLUDGE PS	0.5	6	3.2	3.1	15
9 MILE GATES & DAM	2	16	3.2	2.3	19
FILTER BUILDING 1	0.25	16	3.0	2.7	308
PLANT 2 WEST HEADHOUSE	0.25	15	3.0	2.2	83
GUARD HOUSE	1	6	2.6	2.1	8
FINISHED WATER BASIN SOUTH	0.25	16	2.3	2.2	34
FINISHED WATER BASIN NORTH	0.25	16	2.2	2.1	41
RESIDUALS SETTLING LAGOON	2	2	2.0	2.0	1
TRAILER & SHED	2	2	2.0	1.3	2
FLASH MIX HOUSE	0.25	6	1.9	2.4	17
LIME HOUSE	0.25	12	1.7	3.1	63
LAGOON SLUDGE PS	0.5	6	1.7	3.3	10
NORTH SUBSIDING BASIN (NEXT TO LAGOON)	1	2	1.7	2.7	6
BASIN 1	0.25	16	1.6	1.8	122
BASIN 4	0.25	16	1.6	1.7	123
BASIN 2	0.25	16	1.5	1.8	123
BASIN 3	0.25	16	1.5	1.8	122
MECHANICAL BUILDING	0.5	2	1.5	2.0	3
BASIN 3 & 4 CONTROL STATION	0.25	8	1.4	1.2	72
BASIN 1 & 2 CONTROL STATION	0.25	8	1.3	1.2	83
GARAGE & PAINT LOCKER	0.25	2	1.2	1.6	8

Table 8: Asset Risk Score Distribution and Average PoF by Location

[1]Assets unassociated directly with a specific building or structure listed within the table have been excluded.

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6 Facility Condition Index (FCI)

6.1 FCI Analysis Overview

A Facility Condition Index (FCI) is an asset management benchmark that compares deferred maintenance and repair costs to current replacement values for assets and their associated building or facility. Low FCI's are preferred since they indicate that the costs associated with repairs are economical in comparison to the replacement costs. The following equation was used for calculating the FCI at the WTP:

$$FCI\ for\ Facility\ or\ Process\ "n" = \frac{\sum Deferred\ Maintenance\ for\ Assets\ in\ "n"}{\sum Current\ Replacement\ Value\ for\ Assets\ in\ "n"}$$

As defined by Facility Management Association (FMA), and as shown in Table 9, there are four tiers of FCI values that are used to associate an FCI value to a qualitative indicator.

	FCI Range
Good	0 to 5%
Fair	5 to 10%
Poor	10 to 30%
Critical	30% <

Table 9: FCI Condition Tiers

In-line with determining the FCI, a Process Condition Index (PCI) has been established for the assets associated with different treatment processes and a Class Condition Index (CCI) has been established for the assets associated with different asset classes. The condition indexes were all determined using the same assumptions and methods.

Although the FCI is a beneficial tool to help asses the relative condition of a building based on deferred maintenance costs, it assumes that an accurate record exists for each asset's historical repair/maintenance costs, and it provides limited insight on an asset's risk in association with its actual condition. The large majority of existing WTP assets, as documented in the City's Mainsaver program at the time of this assessment, did not contain historical cost records (repair/maintenance costs or purchase costs). Additionally, for all newly documented assets collected as part of the assessment, historical cost information was not provided and/or not available. Due to this, in order to determine the FCI, the following assumptions were established and conferred with the City in order to estimate the deferred maintenance costs for individual assets.

1. If no historical maintenance cost records are available for an asset it is assumed that no maintenance has been performed on the asset, and correspondingly all maintenance for that asset has been deferred.
2. The FCI will disregard deactivated, removed, and non-equipment assets, in addition to assets that do not independently have a value outside of the individual components that make up the overall asset (i.e. systems, switchgears, etc.)
3. If the asset records do not include purchase dates for assets, the deferred maintenance start-date is assumed to be the difference between the expected useful life of the asset, minus the remaining useful life.

a. Unless available through any available product warranty or operation manuals, an asset's useful life is estimated and assigned to the "Asset Group" (i.e. Motors, Pumps, etc.).
b. The remaining useful life of an asset is a function of the asset's assigned PoF.
    i. PoF of 1 = 90% life remaining
    ii. PoF of 2 = 70% life remaining
    iii. PoF of 3 = 50% life remaining
    iv. PoF of 4 = 30% life remaining
    v. PoF of 5 = 10% life remaining

6.2 FCI Metrics and Definitions

The following metrics were generated for each applicable asset with regard to the assumptions stated above in Section 6.1:

Remaining Service Life *– The estimated remaining time (in years), that the asset should reliably serve its purpose.*

For example, if an asset has an expected service life of 30 years, and has a record PoF of 4, it is assumed that the remaining service life would equal 9 years (30 years X 0.3).

Expected Service Life *– The estimated total time (in years), that the asset is expected to reliably serve its purpose; otherwise known as Estimated Useful Life.*

Preventative Maintenance Hours *– The estimated annual manhours required by the City to perform preventative maintenance tasks on an asset in order to maximize an asset's design life, and to ensure optimal performance and reliability while doing so.*

These hours were established for each asset based on manufacturer warranty requirements and/or statistical data for similar items, components, and/or manufacturers if no information was explicitly available for the selected asset. If data was unavailable for an asset, the preventative maintenance (PM) hours were estimated using the same methods described under the "Replacement Cost" description. The primary assumption for establishing PM hours was how long it would take for a reasonably-skilled employee in this field to complete the maintenance tasks outlined in the manufacturer's warranty guidelines. The basis for a skilled employee was personnel who have worked in this position for at least 3 years, a general apprenticeship program length. A Performance, Fatigue, and Delay (PFD) allowance was not factored into this determination since the City does not currently assume any additional burden rate factor – the factor that compensates for interruptions the worker has during a shift. If the City wishes to include a burden rate factor, due to the nature of the work and the environment, an elevated 20% factor would be reasonable to use over the standard 15% for PFD. This allows for additional compensation for areas of work that could be difficult to reach, work in, or have other environmental factors involved. All estimated hours are comprehensive for all trades and were determined on an annual basis for each asset.

Estimated Annual Maintenance Cost *– The estimated annual dollars required by the City to perform preventative maintenance tasks on an asset in order to ensure optimal performance and reliability.*

These costs were estimated for each asset by multiplying the asset's preventative maintenance hours by the average employee compensation rate. This compensation rate was determined using an average hourly employee compensation rate for a machine maintenance worker in the state of Virginia, as sourced by the Bureau of Labor Statistics from their 2019 data on Occupational Employment and Wages. A burden rate was not applied to this compensation rate since the City uses un-loaded compensation metrics for budgeting purposes. The hourly rate used for the analysis is $26.27/hour.

Deferred Maintenance Cost *– The total dollars that were not spent on preventative maintenance tasks, based on the required dollars (estimated annual maintenance cost) that should theoretically be budgeted for performing such tasks.*

For example, if an asset has an estimated annual maintenance cost of $500, but only $300 was documented throughout the year as going towards the preventative maintenance for that asset, then the asset's deferred maintenance cost for that year is equal to $200. Having a positive deferred maintenance cost for an asset is indicative that the preventative maintenance tasks for that asset are insufficient, or not entirely being performed.

Replacement Cost *– The total material price in dollars required to replace an asset.*

This was determined in one of three ways, depending on the asset.

1. The first method was to utilize current cost data sourced from the manufacturer. This was done for as many assets as feasible for the analysis. If the exact model was not available, a comparable model (determined by the manufacturer) was used instead.
2. The second method of assigning replacement costs was the incorporation of asset group-specific weighting factors within a linear regression formula. This method was used to estimate costs based on a delineating factor for the asset group along with an independent variable that was calculated from other known replacement costs. An example of a delineating factor used is valve size for the "valves" asset group.
3. The final method of assigning costs was used only if it was not possible to generate a delineating factor for the asset group. In this situation, the average replacement cost across the asset group was applied to the asset.

As used throughout this analysis, the following asset classes are defined below:

STRUC *– Structural assets including items such as building foundations/structural components, basins, dams & locks, vaults, stairs, mezzanines, and berms.*

LOC *– Location assets typically include rooms (i.e. Plant 2 Control Room – an identifier for a specific location within Plant 2 East Headhouse) or facilities (i.e. Plant 1 Building – an identifier for an overarching location that further breaks down and is the highest-level parent asset for all assets within that location).*

1. *LOC assets are further broken down by the Asset Group FACILITY LOC (Facility location assets - rooms) and FACILITY (Facility assets – Plant 1 Building).*

ARCH *– Architectural assets including doors, windows, louvers, ceilings, floors, and wall partitions.*

BUILD *– Building assets (architectural components) including building roofs and overall exterior building architectural components.*

***B MECH** – Building Mechanical assets including items such as HVAC components and non-process mechanical components (sump pumps, eyewash stations, etc.)*

***P MECH** – Process Mechanical assets including any mechanical items that relate directly to any treatment processes at the WTP (filter pumps, process valves & gates, chemical system components, etc.)*

***CONT** – Controls assets associated with control systems (control panels, actuators, logic controllers, etc.).*

***INST** – Instrumentation assets that typically relay data or information to assist with system controls (flow meters, level transducers, pressure gauges, etc.).*

***ELEC** – Electrical assets that include items such as breakers, transformers, motors, switches, VFDs, etc.*

***SEC** – Security assets including access gates, surveillance cameras, card readers, etc.*

***CIVIL** – Civil assets that include comprehensive groups of infrastructure-supporting assets (plant water mains, electrical ductbanks, plant pavement, etc.)*

***VEH** - Vehicles*

6.3 FCI Evaluation Considerations

Of the 103 individual asset groups that were cataloged during the condition assessment, 67 asset groups are associated with in-service assets and were able to be incorporated within the analysis. Each asset was assigned a current replacement cost value, an expected service life value (constant across each asset group), and a preventative maintenance hours value. Using the assumed hourly rate of $26.27/hour for WTP maintenance staff, estimated yearly maintenance costs and deferred maintenance costs were able to be calculated for each asset. The sum of the deferred maintenance costs and the sum of the current replacement costs for all assets located in each respective facility/building associated with the WTP were used to determine each FCI.

Each individual building and structure was assigned a total replacement value (inclusive of the building structure, wall partitions, electrical, and plumbing); buildings, structures and basins on the basis of square feet and dams & locks on the basis of linear foot. Similarly, architectural components associated with each building were individually assigned replacement costs based on the estimated total or estimated square footage of each asset.

6.4 Analysis Results

6.4.1 FCI Results

A total of fifty-two (52) facilities were assigned an FCI: twenty-nine (29) of the facilities were found to be in “Good” condition (FCI 0% to 5%), ten (10) were found to be in “Fair” condition (FCI 5% to 10%), thirteen (13) were found to be in “Poor” condition (FCI 10% to 30%), and none were found to be in “Critical” condition (FCI >30%). The FCI results are shown in Table 10, in order of decreasing FCI value. The assets associated with the Civil class were largely unable to be assigned replacement costs or estimated deferred maintenance costs in a way that would yield accurate results, and as such this class has been excluded in this analysis.

1. The average FCI for assets located outside of the limits of the WTP floodwall is 7.0%. The three highest calculated FCIs outside of the floodwall are for:
    a. Haxall Gates & Spillway at 18.3%
    b. Residuals Settling Lagoon at 17.4%

c. 3 Mile Lock Dam & Gates at 9.7%

2. The average FCI for assets located within the limits of the WTP floodwall is 3.2%. The three highest calculated WTP FCIs within the floodwall are for:
   a. Flash Mix House at 16.4%
   b. WTP Yard (excluding civil assets) at 16.32%
   c. Plant 1 Filtered Water Vault at 15.68%

	Sum of Deferred Maintenance Cost	Sum of Replacement Cost	FCI
HAXALL GATES & SPILLWAY	$25,219.20	$137,500.00	18.34%
RESIDUALS SETTLING LAGOON	$9,000,000.00	$51,702,200.00	17.41%
FLASH MIX HOUSE	$23,415.73	$143,114.17	16.36%
WTP YARD	$40,555.97	$248,436.87	16.32%
PLANT 1 FILTERED WATER VAULT	$8,987.25	$57,334.41	15.68%
KORAH 1 PS	$190,668.28	$1,255,545.09	15.19%
PLANT 2 FILTERED WATER VAULT	$12,700.65	$99,851.04	12.72%
SUBSTATION	$165,097.33	$1,330,936.34	12.40%
BASIN SLUDGE PS	$16,628.91	$137,466.87	12.10%
PLANT SWITCHGEAR BUILDING	$38,955.19	$339,716.26	11.47%
LAGOON SLUDGE PS	$46,626.43	$420,384.33	11.09%
BASIN 1 & 2 CONTROL STATION	$46,372.68	$422,889.64	10.97%
BASIN 3 & 4 CONTROL STATION	$39,245.69	$378,438.33	10.37%
3 MILE LOCK DAM & GATES	$50,438.40	$520,000.00	9.70%
RAW WATER PUMP STATION	$292,795.13	$3,109,343.36	9.42%
9 MILE GATES & DAM	$39,694.49	$510,293.42	7.78%
LIME HOUSE	$63,985.47	$893,403.28	7.16%
SUBSIDING BASIN INTAKE GATES	$35,619.49	$503,482.60	7.07%
NORTH ACCESS WELL	$27,112.17	$419,202.53	6.47%
GARAGE & PAINT LOCKER	$5,793.28	$93,491.67	6.20%
WEST CHEMICAL BUILDING	$203,873.66	$3,311,673.43	6.16%
KORAH 2 & 3 PS	$261,139.14	$4,879,247.76	5.35%
SOUTH ACCESS WELL	$33,756.79	$640,110.68	5.27%
PLANT 2 BUILDING	$991,105.83	$20,520,360.30	4.83%

NORTH SUBSIDING BASIN (NEXT TO LAGOON)	$3,006,241.75	$65,522,580.30	4.59%
PLANT 1 BUILDING	$734,143.72	$17,750,431.25	4.14%
BYRD PARK SPILLWAY & GATE	$43,072.29	$1,122,369.20	3.84%
5 MILE LOCK DAM & GATES	$52,712.84	$1,424,077.40	3.70%
CORRIDOR BETWEEN PLANTS	$7,355.60	$254,630.00	2.89%
SETTLED WATER CONDUIT	$53,952.17	$2,031,700.00	2.66%
6 MILE SPILLWAY	$25,219.20	$1,170,000.00	2.16%
CANAL LOCK SOUTH (DOWNSTREAM CANAL CLOSURE)	$24,960.45	$1,384,795.16	1.80%
BASIN 2	$167,628.94	$9,698,046.36	1.73%
BASIN 3	$160,658.94	$9,696,751.36	1.66%
BASIN 1	$154,226.71	$10,487,513.36	1.47%
CANAL LOCK NORTH (UPSTREAM CANAL CLOSURE)	$14,557.92	$1,044,514.76	1.39%
RAW WATER CONDUIT	$8,385.38	$643,506.22	1.30%
FLUORIDE STORAGE VAULT	$2,164.78	$179,060.25	1.21%
BASIN 4	$124,700.35	$10,494,746.36	1.19%
GUARD HOUSE	$535.39	$53,265.80	1.01%
FINISHED WATER BASIN NORTH	$31,385.94	$4,618,043.70	0.68%
WILLIAMS ISLAND DAM & GATES	$36,707.65	$6,899,905.60	0.53%
"Z" DAM	$30,611.43	$9,167,293.33	0.33%
FINISHED WATER BASIN SOUTH	$31,341.42	$10,891,773.31	0.29%
NORTH INTAKE BASIN	$17,294.97	$6,415,560.00	0.27%
BOSHER'S DAM & FISH LADDER	$31,265.43	$12,262,440.00	0.25%
FEEDER CHANNEL	$52,540.00	$26,650,000.00	0.20%
TRAILER & SHED	$110.62	$78,100.00	0.14%
SOUTH INTAKE BASIN	$605.85	$1,525,100.00	0.04%
LAGOON SLUDGE SAMPLING STATION	$0.00	$6,800.00	0.00%
LIME SLURRY STRUCTURE	$0.00	$116,000.00	0.00%
MECHANICAL BUILDING	$0.00	$60,000.00	0.00%

Table 10: FCI Results Summary

6.4.2 PCI Results

A total of ten (10) process affiliations were assigned a PCI: five (5) were found to be in "Good" condition, four (4) were found to be in "Fair" condition, one (1) was found to be in "Poor" condition, and none were found to be in "Critical" condition. (Assets that are not directly affiliated with any process at the WTP were documented as being affiliated with "Non Process"). The PCI results are shown in Table 11, in order of decreasing PCI value.

The three highest calculated WTP PCIs are for:

1. Residuals Management at 17.3% (excluding the residuals settling lagoon this value decreases to 13.8%).
2. Non Process at 9.7%
3. Chemical Feed and Storage at 8.4%

	Sum of Deferred Maintenance Cost	Sum of Replacement Cost	PCI
RESIDUALS MANAGEMENT	$9,248,150.68	$53,578,877.40	17.26%
NON PROCESS	$896,417.84	$9,242,752.78	9.70%
CHEMICAL FEED AND STORAGE	$448,831.58	$5,377,497.37	8.35%
RAW WATER LOW LIFT PUMPING AND SCREENING	$256,328.94	$3,439,472.57	7.45%
FINISHED WATER PUMPING	$383,230.17	$6,476,343.23	5.92%
POST FILTRATION PUMPING & TREATMENT	$221,987.29	$4,865,571.36	4.56%
PRE-SEDIMENTATION	$3,020,830.46	$67,043,138.63	4.51%
FILTRATION	$896,025.49	$27,136,310.77	3.30%
COAGULATION, FLOCCULATION & SEDIMENTATION	$647,175.12	$41,519,101.70	1.56%
WATER SUPPLY	$472,432.28	$62,761,160.47	0.75%

Table 11: PCI Results Summary

6.4.3 CCI Results

A total of ten (10) classes were assigned a CCI (excluding Civil), however, as discussed in Section 6.2 the individual classes for both structural & location, and building & architectural are largely interrelated and share some common costs. For this reason the "STRUC" and the "LOC" asset classes have been combined, and the "BUILD" and the "ARCH" classes have been combined as part of this analysis. Two (2) classes were found to be in "Good" condition, two (2) were found to be in "Fair" condition, four (4) were found to be in "Poor" condition, and none were found to be in "Critical" condition. The CCI results are shown in Table 12, in order of decreasing CCI value.

The three highest calculated WTP CCIs are for:

1. Electrical at 24.8%.
2. Controls at 22.8%
3. Instrumentation at 21.9%

	Sum of Deferred Maintenance Cost	Sum of Replacement Cost	CCI
ELECTRICAL (ELEC)	$1,543,507.96	$6,219,466.63	24.8%
CONTROLS (CONT)	$467,386.68	$2,052,612.18	22.8%
INSTRUMENTATION (INST)	$185,775.65	$849,046.90	21.9%
BUILDING MECHANICAL (BMECH)	$254,839.34	$2,392,097.51	10.7%
SECURITY (SEC)	$1,690.77	$23,400.00	7.2%
PROCESS MECHANICAL (P MECH)	$1,686,839.14	$30,533,653.19	5.5%
STRUCTURAL (STRUC) [1]	$12,351,370.32	$259,973,093.47	4.8%
ARCHITECTURAL (ARCH) [2]	$0.00	$1,882,812.00	0.0%

Table 12: CCI Results Summary

[1] Structural and Location classes have been combined as "STRUC" for the purpose of this analysis. Both individual classes relate to structural components.

[2] Architectural and Building classes have been combined as "ARCH" for the purpose of this analysis. Both individual classes relate to architectural components.

6.4.4 Condition Index Summary

Based on the results from the FCI analysis, the WTP facilities are generally in fair condition with an average FCI of 5.4%. No WTP facilities were found to have FCI values that indicate a facility is in critical condition. However, particular assets at the WTP significantly impact this value. The two primary outliers are the residuals settling lagoon and the north subsiding basin. Both of these basins have large capital costs that may not be practical given that the basins are not necessarily replaceable, but only maintainable. By ignoring the replacement costs and estimated deferred maintenance costs (based on dredging contract costs) for both of the basins, it provides a higher level of clarity for interpreting the overall condition of WTP facilities. In doing so, the average FCI for WTP facilities decreases to 2.4% and the following condition indexes would change:

- the PCI for Residuals Management would decrease from 17.26% to 13.22%
- the PCI for Pre-Sedimentation would decrease from 4.51% to 0.96%
- and the CCI for Structural would decrease from 4.8% to 0.24%

Individual FCI results are illustrated in Figure 7.

With regard to the analysis results, it is important to recognize that an asset with a high or critical risk score may be located within a facility that has an overall "Good" condition, in relation to the FCI. It should not be assumed that all assets within each facility are in good condition, solely based off the respective facility's FCI. As the City continues to document asset replacement and maintenance costs in the coming years, the accuracy of the facility condition index values will increase and allow for additional clarity in benchmarking each facility's overall condition.

Although the FCI provides valuable insight into the overall condition of a facility, asset replacements should be determined on an individual basis, and the FCI should not be used as the primary determining factor whether to repair or replace assets within a facility. It is important that individual asset criticality and risks be accounted for in order to accurately

determine repair and replacement schedules. Along with the FCI analysis, a 10-Year Repair and Replacement Plan has been developed and is included as **Appendix G**.

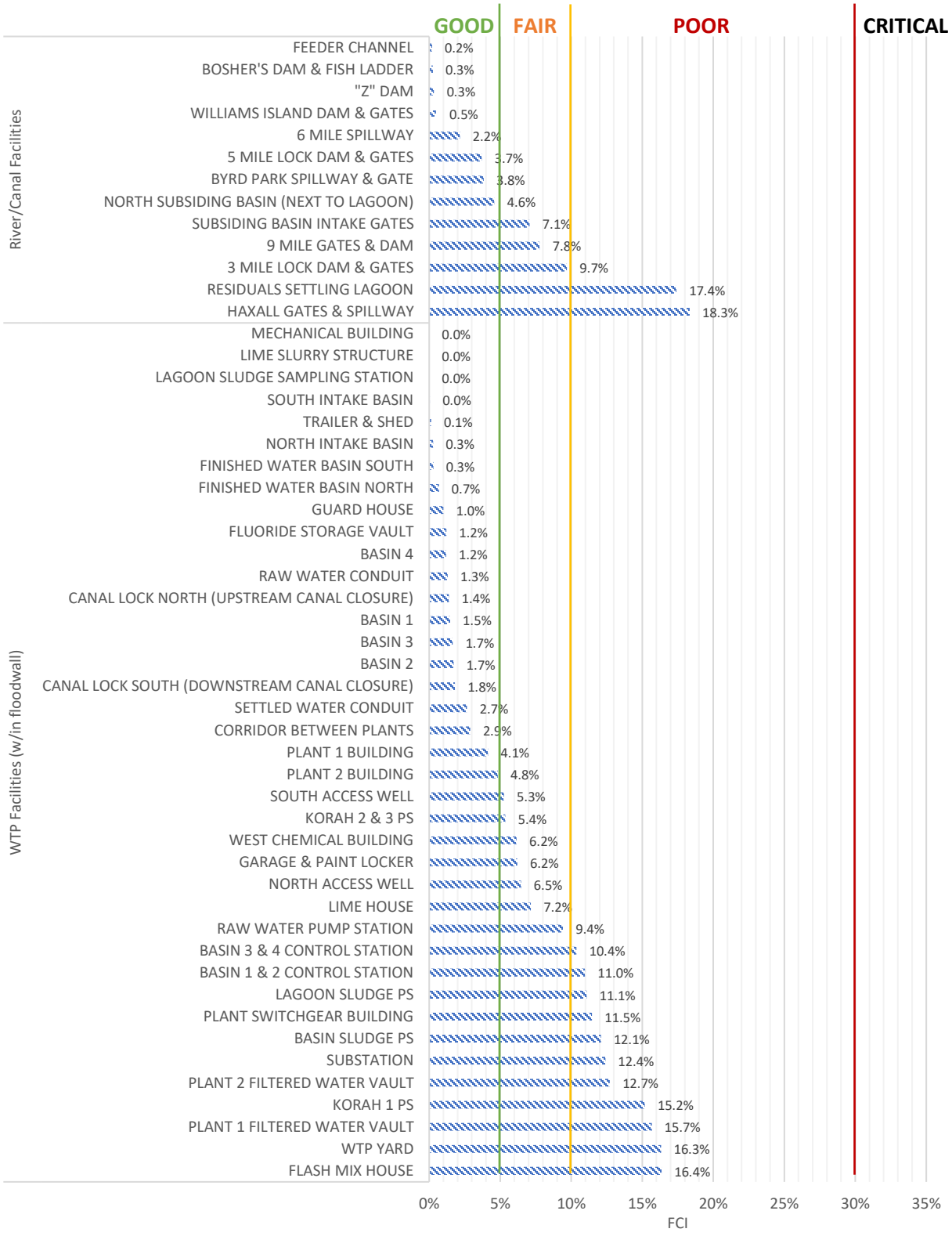

Figure 7: FCI Results Summary

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Appendix A

Condition Assessment Criteria

Probability of Failure (PoF)

Asset Age	New	≤ 25% of Useful Life	≤ 50% of Useful Life	≤ 90% of Useful Life	Past Useful Life
Parts Availability	Stocked on site. Always operational.	Available Locally. Minimal downtime, easy to return to service	Not readily available, must order. Out of service for moderate periods,	Difficult to find/obtain. Extensive downtimes, difficult to return to service.	Parts obsolete/no longer available. Virtually impossible to return to service once down.
Maintenance & Repair Issues	Virtually none. Basic OEM maintenance.	As expected. PM required with few, basic CM. Minor work orders established.	Average. PM needed frequently with minor CM. Work orders common.	Substantial. Mainly CM, close monitoring required for asset. Constant work orders established. Costs starting to outweigh the benefit of maintaining/repairing.	Asset failure imminent. Exhibits recurrent patterns of failure and requires constant monitoring.
Performance	Exceeds current requirements.	Meets current requirements.	Meets requirements but needs Improvement. Becoming increasingly more costly to maintain and operate	Inefficient and becoming ineffective. Struggles to meet requirements	Asset failing. No longer capable of meeting performance requirements.
	1	**2**	**3**	**4**	**5**

Consequence of Failure (CoF)

1	**2**	**3**	**4**	**5**
• Asset failure causes no impact on processes or level of service. • Multiple redundant assets on standby. • Water service available. No regulatory impact. • Asset failure would not lead to injury.	• Asset failure may negatively impact some processes but causes no loss of service. • Multiple redundant assets available, at least one is on standby. • Compliance impact anticipated. • Asset failure would not lead to injury.	• Asset failure negatively impacts other processes and could lead to short term loss of service. • Significant corrective action would be required. Single redundant asset on standby. • Low probability of injury from asset failure.	• Asset failure would cause loss of service for major processes, decreasing WTP regulatory capacity below 132 MGD. • Process recovery would be required. Redundant asset available, but not on standby. • Do not drink order. • High probability of injury from asset failure.	• Asset failure would cause total WTP loss of service. • Asset has no redundancy. • Do not use order. Citation/Consent Order. • Boil water order, water conservation order. • Asset failure could lead to loss of life.

Asset Classes

Asset Class	BUILD *Buildings*	ARCH *Architectural*	STRUCT *Structures*	CIVIL *Civil/Site*	ELEC *Electrical*	P MECH *Process Mech*	B MECH *Building Mech*	SEC *Security/Safety*	CONT *Controls*	INST *Instrumentation*	LOC *Location*	VEH *Vehicle*

Fault Codes (FC)

Fault Code	1 – *Loose*	2 – *Worn/Aged*	3 – *Broken*	4 – *Leaking*	5 – *Missing*	6 – *Dirty*	7 – *Corrosion*	8 – *Sagging*	9 – *Noise/Vibration*	10 – *Unknown*

Structural and Architectural Asset Condition

1	2	3	4	5
New construction, no visible defects	Minor/superficial repairs needed. No cracking, spalling, sagging, corrosion, drainage issues, and/or shifting visible.	Needs some repairs. Some surface cracking, corrosion, drainage issues, shifting, and/or spalling visible. Structure is in fair condition and within useful life	Substantial repairs needed. Significant cracking, sagging, corrosion, drainage issues, shifting, and/or spalling visible. Functional but past useful life	Critical defects visible. Structure cannot be repaired and should be replaced.

Mechanical Asset Condition

1	2	3	4	5
New asset, no visible defects	Minor superficial deterioration and wear/tear. No functional defects, corrosion, and/or leaks. May be slightly outdated, but still meets needs with minimal maintenance.	Needs some repairs. Deterioration evident with defects, corrosion, and/or leaks. Functioning as designed.	Substantial repairs needed. Defects are widespread and the asset no longer meets needs and requires partial replacement.	Critical defects visible. Issues appear beyond repair and asset should be replaced.

Electrical & I&C Asset Condition

1	2	3	4	5
New asset, no visible defects	Minor deterioration. May be slightly outdated, but still meets needs with minimal maintenance.	Needs some repairs. Deterioration evident with defects. Limited flexibility for improvement. System meets requirements and is within useful life.	Substantial repairs needed. Defects are widespread and the asset no longer meets needs and requires partial replacement.	Critical defects visible. Issues appear beyond repair and asset should be replaced.

Civil/Site Asset Condition

1	2	3	4	5
New construction, no apparent defects	Minor cosmetic deterioration such as pavement cracks, damaged signage, etc.	Needs some repairs. Deterioration evident with defects such as signs needing replacement, pavement cracks larger than 2” wide, corroded fire hydrants, etc.	Substantial repairs needed. Defects are widespread Pavement contains potholes, signage, fences, inoperable hydrants, etc. appears outdated/broken and need replacement.	Critical defects visible. Site defects inhibit WTP function including ingress/egress.

Site Security/Safety Asset Condition

1	2	3	4	5
New asset, no apparent defects	Minor cosmetic deterioration. Equipment may be slightly outdated, but meets safety requirements.	Needs some repairs. Deterioration evident with defects. Security finding requiring immediate corrective action.	Substantial repairs needed. Asset requires substantial repairs/maintenance for required level of security. Security breach.	Critical defects visible. Asset is well past its useful life, places the WTP at risk, and should be replaced. Security failure.

Appendix B

WTP Location Hierarchy

CITY OF RICHMOND WATER TREATMENT PLANT LOCATION HIERARCHY

- WATER TREATMENT PLANT
  - NORTH SUBSIDING BASIN
    - RESIDUALS SETTLING LAGOON OVERFLOW INTERCONNECT
  - NORTH INTAKE BASIN
    - CANAL INTAKE
    - RAW WATER INTAKE NORTH
    - BASIN INTERCONNECT
    - NORTH BAR SCREEN
  - SOUTH INTAKE BASIN
    - RAW WATER INTAKE SOUTH
    - SOUTH BAR SCREEN
  - RAW WATER PUMP STATION
    - RAW WATER PS 1 & 2
      - PUMP ROOM
    - RAW WATER PS 3
      - PUMP ROOM
      - TRAVELING WATER SCREEN ROOM
    - RAW WATER PS 4
      - PUMP ROOM
      - TRAVELING WATER SCREEN ROOM
  - RAW WATER CONDUIT
    - RAW WATER CONDUIT NO 1
    - RAW WATER CONDUIT NO 2
  - SETTLED WATER CONDUIT
    - SETTLED WATER CONDUIT NO 1
    - SETTLED WATER CONDUIT NO 2
    - SETTLED WATER CONDUIT NO 3
    - SETTLED WATER CONDUIT NO 4
  - WEST CHEMICAL BUILDING
    - BASEMENT
      - PAC FEED ROOM
      - ALUM TRANSFER PUMP AREA
      - SODIUM HYPOCHLORITE TRANSFER AREA
      - SODIUM HYPOCHLORITE (BULK STORAGE) ROOM
      - ALUMINUM SULFATE (BULK STORAGE) ROOM
      - MEZZANINE
        - MECHANICAL STORAGE ROOM
    - FLOOR 1
      - OPERATOR ROOM
      - BATHROOM
      - JANITOR'S CLOSET
      - STORAGE ROOM
      - POTASSIUM PERMANGANATE ROOM
      - MEZZANINE
        - PAC MIXING ROOM
        - ELECTRICAL ROOM
        - INSTRUMENTATION WORKSHOP
        - SODIUM HYPOCHLORITE (BULK) ELEVATED WALKWAY
        - ALUMINUM SULFATE (BULK) ELEVATED WALKWAY
    - EXTERIOR
  - RESIDUALS SETTLING LAGOON
  - BASIN SLUDGE PS
  - LAGOON SLUDGE PS
  - LAGOON SLUDGE SAMPLING STATION
  - FLOCCULATION & RAPID MIXING CHAMBERS
    - BASIN 1
    - BASIN 2
    - BASIN 3
    - BASIN 4
  - BASIN 1
    - SEDIMENTATION BASIN 1
    - FLOCCULATION & RAPID MIXING CHAMBER 1
  - BASIN 2
    - SEDIMENTATION BASIN 2
    - FLOCCULATION & RAPID MIXING CHAMBER 2
  - BASIN 3
    - SEDIMENTATION BASIN 3
    - FLOCCULATION & RAPID MIXING CHAMBER 3
  - BASIN 4
    - SEDIMENTATION BASIN 4
    - FLOCCULATION & RAPID MIXING CHAMBER 4
  - BASIN 1 & 2 CONTROL STATION
    - FLOCCULATION & RAPID MIX CONTROL ROOM
    - SLUDGE REMOVAL CONTROL ROOM
  - BASIN 3 & 4 CONTROL STATION
    - FLOCCULATION & RAPID MIX CONTROL ROOM
    - SLUDGE REMOVAL CONTROL ROOM
  - LIME SLURRY STRUCTURE
  - FLASH MIX HOUSE
  - TRIPLE CONDUIT
  - GARAGE & PAINT LOCKER
  - PLANT SWITCHGEAR BUILDING
  - FLUORIDE STORAGE VAULT
  - PLANT 1 FILTERED WATER VAULT
  - PLANT 2 FILTERED WATER VAULT
  - PLANT 1 BUILDING
    - PLANT 1 HEADHOUSE
      - BASEMENT
        - AIR COMPRESSOR ROOM
        - FILTERED WATER PUMP GALLERY
        - FLUORIDE FEED AREA
        - MEZZANINE
      - FLOOR 1
        - ELECTRICAL ROOM 1
        - ELECTRICAL ROOM 2
        - ELECTRICAL ROOM 3
        - RESTROOM
        - SUPERINTENDENT OFFICE (FUTURE CONFERENCE ROOM 1)
        - PROGRAM ANALYST OFFICE (FUTURE CONFERENCE ROOM 1)
        - CORRIDOR
        - PLANT 1 CONTROL ROOM
        - POLYMER ROOM
        - CLEARWELL ACCESS ROOM
        - COMPUTER ROOM
        - WOMEN'S RESTROOM
        - MEN'S RESTROOM
        - STORAGE ROOM
        - FRONT OFFICES
          - RECEPTION
          - OFFICE 1 (FUTURE RECEPTION ADD-ON)
          - OFFICE 2 (FUTURE OFFICE 1)
          - OFFICE 3 (FUTURE OFFICE 2)
          - HALL
          - CONFERENCE ROOM (FUTURE OFFICE 3)
      - FLOOR 2
        - VACANT SPACE (FUTURE OFFICES)
          - FUTURE OFFICE 4
          - FUTURE OFFICE 5
          - FUTURE OFFICE 6
          - FUTURE OFFICE 7
          - FUTURE OFFICE 8
          - FUTURE HVAC ROOM
          - FUTURE BREAK ROOM
          - FUTURE CONFERENCE ROOM 2
          - FUTURE FAN ROOM
          - FUTURE MECHANICAL CLOSET
          - FUTURE CORRIDOR
        - ZINC ORTHOPHOSPHATE ROOM
        - STORAGE ROOM
        - FUTURE MEN'S RESTROOM
        - FUTURE WOMEN'S RESTROOM
        - BLOWER ROOM
        - SWTICHGEAR ROOM
    - FILTER BUILDING 1
      - FILTERS 1-10
      - BASEMENT (FILTER PIPE GALLERY)
      - FLOOR 1
  - PLANT 2 BUILDING
    - PLANT 2 EAST HEADHOUSE
      - BASEMENT
        - AERATOR PUMP ROOM
        - MEZZANINE
      - FLOOR 1
        - FOYER
        - ELECTRICAL ROOM
        - PLANT 2 CONTROL ROOM
        - BREAK ROOM
        - CHIEF OFFICE
        - OPERATIONS SUPERINTENDENT OFFICE
        - LABORATORY
        - POLYMER ROOM
      - FLOOR 2
        - FOYER
        - MEZZANINE
        - AMMONIA STORAGE ROOM
        - STORAGE ROOM
        - PARTS STORAGE (FORT KNOX)
      - AMMONIA OFFLOAD STATION
    - PLANT 2 WEST HEADHOUSE
      - BASEMENT
        - WASTEWATER PUMP ROOM
        - BOILER ROOM
        - ABANDONED COAL STORAGE ROOM
      - FLOOR 1
        - HALL
        - FOYER
        - WOMEN'S RESTROOM AND LOCKER
        - MEN'S RESTROOM AND LOCKER
        - ELECTRICAL SUPERVISOR OFFICE
        - MAINTENANCE OFFICE
          - MAINTENANCE OFFICE 1
          - MAINTENANCE OFFICE 2
          - MAINTENANCE OFFICE 3
          - ELECTRICAL STORAGE
          - STORAGE CLOSET
      - FLOOR 2
        - FOYER
        - ELECTRICAL SHOP (FUTURE OFFICES)
          - ELECTRICAL OFFICE 1
          - ELECTRICAL OFFICE 2
          - ELECTRICAL OFFICE 3
          - FUTURE ELECTRICAL ROOM
          - FUTURE CORRIDOR
          - FUTURE MECHANICAL ROOM
          - FUTURE BREAK ROOM
          - FUTURE OFFICE 1
          - FUTURE OFFICE 2
          - FUTURE OFFICE 3
        - MECHANICAL SHOP
          - FUTURE I&C SHOP
    - PLANT 2 CORRIDOR
      - FILTERS 11-22
      - BASEMENT (FILTER PIPE GALLERY)
      - FLOOR 1
      - FLOOR 2
        - ALUMINUM SULFATE STORAGE AREA
        - SODIUM HYPOCHLORITE STORAGE AREA
  - PORTABLE
  - CORRIDOR BETWEEN PLANTS
    - FLOOR 1
    - FLOOR 2
  - FINISHED WATER BASIN NORTH
  - FINISHED WATER BASIN SOUTH
  - LIME HOUSE
    - FLOOR 1
    - FLOOR 2
    - FLOOR 3
  - KORAH 1 PS
    - FLOOR 1
    - BASEMENT
      - FINISHED WATER PUMP AREA
      - SOUTH DRY WELL
  - SOUTH ACCESS WELL
  - NORTH ACCESS WELL
  - KORAH 2 & 3 PS
    - FLOOR 1
      - RESTROOM
      - MEZZANINE
    - BASEMENT
      - MEZZANINE
  - GUARD HOUSE
  - TRAILER & SHED
  - MECHANICAL BUILDING
  - SUBSTATION
    - SWITCHGEAR
  - WTP FLOODWALL
  - WTP YARD
    - ZONE 1
    - ZONE 2
    - ZONE 3
    - ZONE 4
    - ZONE 5

Appendix C

WTP Water Supply Location Hierarchy

CITY OF RICHMOND WATER SUPPLY LOCATION HIERARCHY

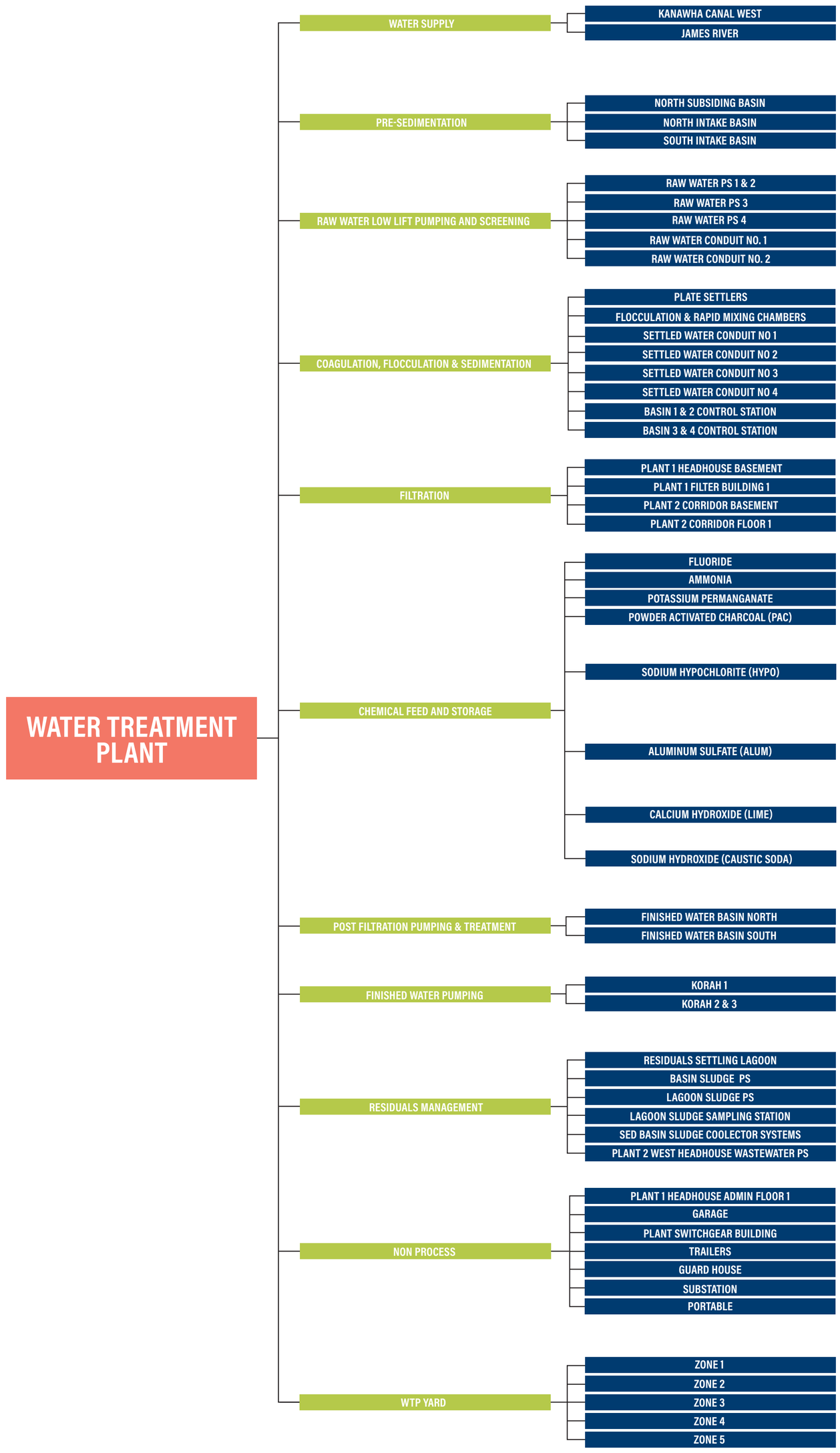
WATER TREATMENT PLANT WATER SUPPLY

- KANAWHA CANAL WEST
  - 9 MILE GATES & DAM
  - 9 MILE TO 6 MILE SECTION
  - 6 MILE SPILLWAY
  - 6 MILE TO 5 MILE SECTION
  - 5 MILE LOCK DAM & GATES
  - 5 MILE TO CANAL LOCK NORTH SECTION
  - CANAL LOCK NORTH
  - CANAL LOCK NORTH TO CANAL LOCK SOUTH SECTION
  - CANAL LOCK SOUTH
  - CANAL LOCK SOUTH TO 3 MILE SECTION
  - 3 MILE LOCK DAM & GATES
  - 3 MILE TO BYRD PARK SPILLWAY SECTION
  - BYRD PARK SPILLWAY
  - BYRD PARK TO HAXALL SECTION
  - HAXALL GATES AND SPILLWAY
  - CANAL INTAKE AT SUBSIDING BASIN INTAKES
- JAMES RIVER
  - BOSHER'S DAM & FISH LADDER
  - "Z" DAM
  - WILLIAMS ISLAND DAM & GATES
  - FEEDER CHANNEL
  - SUBSIDING BASIN INTAKE GATES

Appendix D

WTP Process Hierarchy

CITY OF RICHMOND WATER TREATMENT PLANT PROCESS HIERARCHY



Appendix E

Asset Condition Assessment Form

CITY OF RICHMOND DEPARTMENT OF PUBLIC UTILITIES

ASSET CONDITION ASSESSMENT FORM

Photo ID No. _____

Assessor Name: _____ **Date of Assessment**: _____

Location: _____

Location (ie. Building/structure/Zone) Sub-Location(s) (Floor, Room, Parent Asset, etc.)

Process: _____

Process (ie. Filtration, Finished Water Pumping, etc.)

Asset Description:

Asset Class:

Asset Group:

Manufacturer:

Model Number:

Serial Number:

Manufactured Date:

Acquisition Date:

Estimated Asset Acquisition Cost:

Asset Status:

Refer to the Condition Determination Tables for Scoring Criteria	**Score (1 through 5)** Best ◄——► Worst				
	1	**2**	**3**	**4**	**5**
Consequence of Failure (CoF):	☐	☐	☐	☐	☐
Probability of Failure (PoF):	☐	☐	☐	☐	☐
Asset Condition (AC):	☐	☐	☐	☐	☐

***If Asset Condition (AC) is greater than 1*, Fault Code(s) (FC):**

1 *Loose*	**2** *Worn/Aged*	**3** *Broken*	**4** *Leaking*	**5** *Missing*	**6** *Dirty*	**7** *Corrosion*	**8** *Sagging*	**9** *Noise/Vibration*	**10** *Unknown*
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Comments: _____

Appendix F

Critical Asset List

Location	Sublocation 1	Sublocation 2	Sublocation 3	Sublocation 4	Sublocation 5	Final Sublocation 6	Asset Description	New/Exist Asset	Asset No.	Class	Asset Group	PROCESS	Manufacturer	Manufac Date	Model No.	Serial Number	Status	CoF	PoF	AC	FC
WATER TREATMENT PLANT	KORAH 2 & 3 PS	BASEMENT					CONTROL PROCESS, BRISTOL BABCOCK - PROCESSOR, DPC 3330, K2-3	EXIST	0001271	INST	CONTROL PROCESS	WATER SUPPLY	BRISTOL BABCOCK		DPC 3330		ISF	5	5	5	8
WATER TREATMENT PLANT	KORAH 1 PS	BASEMENT	FINISHED WATER PUMP AREA				CONTROL PROCESS, BRISTOL BABCOCK - PROCESSOR, DPC 3330 K-1	EXIST	0007428	CONT	CONTROL PROCESS	FINISHED WATER PUMPING	BRISTOL BABCOCK		DPC 3330		ISF	5	5	4	7
WATER TREATMENT PLANT	SUBSTATION						TRANSFORMER, GE - XFMR SS-1-4A, 7.5MVA/10MVA, OIL FILLED, 34.5KV-4160V	EXIST	0005404	ELEC	TRANSFORMERS	NON PROCESS	GE	1/1980	L246883		ISL	5	4	4	2, 7, 10
WATER TREATMENT PLANT	KORAH 2 & 3 PS	BASEMENT					VALVE - 8" GATE VALVE (WTP POTABLE CONNECTION)	NEW	0015175	P MECH	VALVES	FINISHED WATER PUMPING		2010			ISF	5	4	2	7
WATER TREATMENT PLANT	WTP YARD	ZONE 2					PLANT PAVEMENT - SIDEWALK OVER CONDUIT	NEW	0016412	CIVIL	PLANT PAVEMENT	NON PROCESS					ISF	5	4	5	2, 6
WATER TREATMENT PLANT	PLANT 2 BUILDING	PLANT 2 EAST HEADHOUSE	FLOOR 2	AMMONIA STORAGE ROOM			TANK, RECO USA - AMMONIA TANK T-AM-1-1 (S/N: U1604710 TK1)	NEW	0015309	P MECH	TANKS	CHEMICAL FEED AND STORAGE	RECO USA	2012		U1604710 TK1	ISF	5	3	1	
WATER TREATMENT PLANT	PLANT 2 BUILDING	PLANT 2 EAST HEADHOUSE	FLOOR 2	AMMONIA STORAGE ROOM			TANK, RECO USA - AMMONIA TANK T-AM-1-2 (S/N: U1604710 TK2)	NEW	0015310	P MECH	TANKS	CHEMICAL FEED AND STORAGE	RECO USA	2012		U1604710 TK2	ISF	5	3	1	
WATER TREATMENT PLANT	PLANT 2 BUILDING	PLANT 2 EAST HEADHOUSE	FLOOR 2	AMMONIA STORAGE ROOM			TANK, RECO USA - AMMONIA TANK T-AM-1-3 (S/N: U1604710 TK3)	NEW	0015311	P MECH	TANKS	CHEMICAL FEED AND STORAGE	RECO USA	2012		U1604710 TK3	ISF	5	3	1	
WATER TREATMENT PLANT	PLANT 2 BUILDING	PLANT 2 EAST HEADHOUSE	FLOOR 2	AMMONIA STORAGE ROOM			SEPARATOR, BELCO - AQUA AMMONIA SCRUBBER TANK T-AM-7-1 (SAME AS T-AM-2-1) (S/N: 36636)	NEW	0015312	P MECH	SEPARATORS	CHEMICAL FEED AND STORAGE	BELCO	2012	PO# 113118, ITEM # 12047002	36636	ISF	5	3	1	
WATER TREATMENT PLANT WATER SUPPLY	JAMES RIVER	FEEDER CHANNEL					DAMS & LOCK - FEEDER CHANNEL WALL	NEW	0015626	STRUC	DAMS & LOCKS	WATER SUPPLY					ISF	5	3	5	2, 4, 6
WATER TREATMENT PLANT	KORAH 2 & 3 PS	BASEMENT					VALVE - 36" MAIN DISCHARGE HEADER GATE KORAH 2 WEST	NEW	0016841	P MECH	VALVES	FINISHED WATER PUMPING					ISF	5	3	2	7
WATER TREATMENT PLANT WATER SUPPLY	JAMES RIVER						DAMS & LOCK - "Z" DAM	EXIST	0011681	STRUC	DAMS & LOCKS	WATER SUPPLY					ISF	5	2	2	6
WATER TREATMENT PLANT	KORAH 2 & 3 PS	FLOOR 1					STRUCTURE - KORAH 2 & 3 PS FLOOR 1 STRUCTURE	NEW	0015994	STRUC	STRUCTURES	FINISHED WATER PUMPING					ISF	5	2	1	
WATER TREATMENT PLANT	WTP YARD						PLANT STORM - STORM DRAINS	NEW	0016569	CIVIL	PLANT STORM	NON PROCESS					ISF	5	2	1	
WATER TREATMENT PLANT WATER SUPPLY	KANAWHA CANAL WEST						FLOODWALL - CANAL LOCK NORTH (UPSTREAM CANAL CLOSURE)	EXIST	0006671	STRUC	FLOODWALL	WATER SUPPLY					ISF	5	1	1	
WATER TREATMENT PLANT WATER SUPPLY	KANAWHA CANAL WEST						FLOODWALL - CANAL LOCK SOUTH (DOWNSTREAM CANAL CLOSURE)	EXIST	0006673	STRUC	FLOODWALL	WATER SUPPLY					ISF	5	1	1	
WATER TREATMENT PLANT	SUBSTATION						GENERATOR, CATERPILLAR INC - 2 MEGAWATT STANDBY #01 (S/N: GSJ00079)	EXIST	0010057	ELEC	GENERATORS	NON PROCESS	CATERPILLAR INC	2005	3516	GSJ00079	ISF	5	1	1	
WATER TREATMENT PLANT	SUBSTATION						GENERATOR, CATERPILLAR INC - 2 MEGAWATT STANDBY #02 (S/N: 8NN01297)	EXIST	0010058	ELEC	GENERATORS	NON PROCESS	CATERPILLAR INC	2006	3516	8NN01297	ISF	5	1	1	
WATER TREATMENT PLANT	KORAH 2 & 3 PS	BASEMENT					STRUCTURE - KORAH 2 & 3 PS BASEMENT STRUCTURE	NEW	0015991	STRUC	STRUCTURES	FINISHED WATER PUMPING					ISF	5	1	1	
WATER TREATMENT PLANT							STRUCTURE - PLANT 1 FILTERED WATER VAULT	NEW	0016178	STRUC	STRUCTURES	POST FILTRATION PUMPING & TREATMENT					ISF	5	1	2	6
WATER TREATMENT PLANT							STRUCTURE - PLANT 2 FILTERED WATER VAULT	NEW	0016202	STRUC	STRUCTURES	POST FILTRATION PUMPING & TREATMENT					ISF	5	1	2	6
WATER TREATMENT PLANT	PLANT 2 BUILDING	PLANT 2 CORRIDOR	FLOOR 1				CONTROL PROCESS, GE - CONTROLLER, WASTE PUMP LEVEL	EXIST	0001356	INST	CONTROL PROCESS	RESIDUALS MANAGEMENT	GE		427A113M01		ISF	4	5	3	7
WATER TREATMENT PLANT	SUBSTATION						BREAKER, GE - SS-1-1A, MAIN SECONDARY 4160V (1200A; S/N: 295A5289-001)	EXIST	0005405	ELEC	BREAKERS	NON PROCESS	GE		TYPE AM-4.16-250-9H	295A5289-001	ISF	4	5	4	2, 7, 10
WATER TREATMENT PLANT WATER SUPPLY	KANAWHA CANAL WEST	3 MILE LOCK DAM & GATES					DAMS & LOCK - 3 MILE LOCK DAM & GATES, UPSTREAM WEIR	NEW	0015023	STRUC	DAMS & LOCKS	WATER SUPPLY					ISF	4	5	4	4, 8
WATER TREATMENT PLANT	KORAH 1 PS	FLOOR 1					BREAKER, ITE - CB, K1A	NEW	0015408	ELEC	BREAKERS	NON PROCESS	ITE				ISF	4	5	5	10
WATER TREATMENT PLANT	PLANT 1 BUILDING	PLANT 1 HEADHOUSE	FACILITY ARCHITECTURE - PLANT 1 HEADHOUSE BUILDING				ROOF - PLANT 1 HEADHOUSE, ROOF OVER SWITCH GEAR	NEW	0016183	BUILD	ROOFS	NON PROCESS					ISF	4	5	5	2, 3, 4
WATER TREATMENT PLANT	RAW WATER PUMP STATION	RAW WATER PS 3	PUMP ROOM				PUMP, CASCADE PUMP - PUMP RW-3 (S/N: 12880)	EXIST	0000974	P MECH	PUMPS	RAW WATER LOW LIFT PUMPING AND SCREENING	CASCADE PUMP		42P	12880	ISF	4	4	4	4, 6
WATER TREATMENT PLANT	RAW WATER PUMP STATION	RAW WATER PS 4	PUMP ROOM				PUMP, CASCADE PUMP - PUMP RW-4 (S/N: 12879)	EXIST	0000975	P MECH	PUMPS	RAW WATER LOW LIFT PUMPING AND SCREENING	CASCADE PUMP		42P	12879	ISF	4	4	4	4, 6
WATER TREATMENT PLANT	KORAH 2 & 3 PS	BASEMENT					VALVE, GA INDUSTRIES - 10" SURGE VALVE #1, K3	EXIST	0001026	P MECH	VALVES	FINISHED WATER PUMPING	GA INDUSTRIES		FIG-X5A-ABCDE		ISF	4	4	3	7
WATER TREATMENT PLANT	PLANT 2 BUILDING	PLANT 2 EAST HEADHOUSE	BASEMENT	AERATOR PUMP ROOM	PUMP, WORTHINGTON - PUMP S-3 (200000GPM; S/N: 80250878/3)		VALVE, HENRY PRATT COMPANY - 24" ISOLATION BUTTERFLY VALVE, PUMP S-3	EXIST	0001040	P MECH	VALVES	POST FILTRATION PUMPING & TREATMENT	HENRY PRATT COMPANY		TRITON XR-70		ISF	4	4	3	6
WATER TREATMENT PLANT	PLANT 1 BUILDING	PLANT 1 HEADHOUSE	BASEMENT	FILTERED WATER PUMP GALLERY			VALVE - 48" PLANT 1 FILTERED WATER SUCTION CONDUIT HEADER (P1/P2 CLEARWELL INTERCONNECT)	EXIST	0001045	P MECH	VALVES	POST FILTRATION PUMPING & TREATMENT		1923			ISF	4	4	3	6, 7
WATER TREATMENT PLANT	KORAH 2 & 3 PS	BASEMENT					VALVE, GA INDUSTRIES - 8" PRV #1	EXIST	0005278	P MECH	VALVES	FINISHED WATER PUMPING	GA INDUSTRIES		4500U		ISF	4	4	3	4, 7
WATER TREATMENT PLANT	SUBSTATION						SWITCHGEAR, S&C ELECTRIC COMPANY - SUBSTATION SS-2 ENCLOSED SWGR, 34.5KV MAIN INCOMING FDR #2 (TRAFFORD)	EXIST	0005402	ELEC	SWITCHGEAR	NON PROCESS	S&C ELECTRIC COMPANY	1992	CDA-724534/1992		ISF	4	4	3	2, 7, 10
WATER TREATMENT PLANT	PLANT 2 BUILDING	PLANT 2 EAST HEADHOUSE	BASEMENT	AERATOR PUMP ROOM	PUMP, WORTHINGTON - PUMP S-4 (200000GPM; S/N: 80250878/1)		VALVE, HENRY PRATT COMPANY - 24" ISOLATION BUTTERFLY VALVE, PUMP S-4	EXIST	0005429	P MECH	VALVES	POST FILTRATION PUMPING & TREATMENT	HENRY PRATT COMPANY		TRITON XR-70		ISF	4	4	3	6
WATER TREATMENT PLANT	KORAH 2 & 3 PS	BASEMENT					VALVE, GA INDUSTRIES - 8" PRV #2	EXIST	0005451	P MECH	VALVES	FINISHED WATER PUMPING	GA INDUSTRIES		4500U		ISF	4	4	3	4, 7
WATER TREATMENT PLANT	KORAH 2 & 3 PS	BASEMENT					VALVE, GA INDUSTRIES - 14" SURGE VALVE #1, K2	EXIST	0005458	P MECH	VALVES	FINISHED WATER PUMPING	GA INDUSTRIES				ISF	4	4	3	4, 7
WATER TREATMENT PLANT	KORAH 2 & 3 PS	BASEMENT					VALVE - 14" SURGE VALVE #2, K2	EXIST	0005488	P MECH	VALVES	FINISHED WATER PUMPING					ISF	4	4	3	4, 7
WATER TREATMENT PLANT	SUBSTATION	SWITCHGEAR, S&C ELECTRIC COMPANY - SUBSTATION SS-2 ENCLOSED SWGR, 34.5KV MAIN INCOMING FDR #2 (TRAFFORD)					SWITCHGEAR, POWERCON CORP - SUBSTATION SS-1 ENCLOSED SWGR, 34.5KV MAIN INCOMING FDR #1 (ACCA)	EXIST	0006286	ELEC	SWITCHGEAR	NON PROCESS	POWERCON CORP	29221			ISF	4	4	4	2, 7, 10
WATER TREATMENT PLANT	SUBSTATION	SWITCHGEAR, S&C ELECTRIC COMPANY - SUBSTATION SS-2 ENCLOSED SWGR, 34.5KV MAIN INCOMING FDR #2 (TRAFFORD)					SWITCH, GE - SS-2-7B, INCOMING MAIN #2 TO SG-6 (S/N: 0347A4238-001-16)	EXIST	0006299	ELEC	SWITCHES	NON PROCESS	GE		VB1.4.16-250-2	0347A4238-001-16	ISF	4	4	3	7, 10
WATER TREATMENT PLANT	KORAH 2 & 3 PS	BASEMENT					VALVE, GA INDUSTRIES - 10" SURGE VALVE #2, K3	EXIST	0006490	P MECH	VALVES	FINISHED WATER PUMPING	GA INDUSTRIES				ISF	4	4	3	4, 7
WATER TREATMENT PLANT	PLANT 2 BUILDING	PLANT 2 CORRIDOR	FLOOR 2	SODIUM HYPOCHLORITE STORAGE AREA			TANK, AUGUSTA FIBERGLASS - HYPO DAY TANK H1	EXIST	0006839	P MECH	TANKS	CHEMICAL FEED AND STORAGE	AUGUSTA FIBERGLASS	5/2006			ISF	4	4	3	4
WATER TREATMENT PLANT	PLANT 2 BUILDING	PLANT 2 CORRIDOR	FLOOR 2	SODIUM HYPOCHLORITE STORAGE AREA			TANK, AUGUSTA FIBERGLASS - HYPO DAY TANK H2	EXIST	0006840	P MECH	TANKS	CHEMICAL FEED AND STORAGE	AUGUSTA FIBERGLASS	5/2006			ISF	4	4	3	4
WATER TREATMENT PLANT	STRUCTURE - PLANT 1 FILTERED WATER VAULT						FLOWMETER, SIEMENS - PRESSURE METER AND TRANSMITTER, FINISHED WATER NORTH FLOW (VENTURI)	EXIST	0012127	INST	FLOWMETERS	POST FILTRATION PUMPING & TREATMENT	SIEMENS		7MF4433-1EA22-1AC6-Z+02		ISF	4	4	2	7
WATER TREATMENT PLANT	STRUCTURE - PLANT 1 FILTERED WATER VAULT						VALVE - 48" PLANT 1 FILTERED WATER ISOLATION VALVE	NEW	0015146	P MECH	VALVES	FINISHED WATER PUMPING					ISF	4	4	4	6, 7
WATER TREATMENT PLANT	STRUCTURE - PLANT 2 FILTERED WATER VAULT						VALVE - 48" PLANT 2 FILTERED WATER ISOLATION VALVE	NEW	0015148	P MECH	VALVES	FINISHED WATER PUMPING					ISF	4	4	4	7
WATER TREATMENT PLANT WATER SUPPLY	KANAWHA CANAL WEST	FLOODWALL - CANAL LOCK SOUTH (DOWNSTREAM CANAL CLOSURE)					TRANSFORMER, GE - XFMR CONTROL POWER, 1KVA	NEW	0015459	CONT	TRANSFORMERS	NON PROCESS	GE		9T5180010		ISF	4	4	4	6
WATER TREATMENT PLANT	KORAH 2 & 3 PS	BASEMENT					VALVE - 24" MAIN DISCHARGE HEADER GATE VALVE (TO 36" MAIN), KORAH 3	NEW	0015487	P MECH	VALVES	FINISHED WATER PUMPING					ISF	4	4	2	7
WATER TREATMENT PLANT WATER SUPPLY	KANAWHA CANAL WEST	FLOODWALL - CANAL LOCK SOUTH (DOWNSTREAM CANAL CLOSURE)					CONTROL PANEL, CUSTOM CONTROL PANEL-NEMA 12 ENCLOSURE - HYDRAULIC SYSTEM CONTROL PANEL	NEW	0015854	CONT	CONTROL PANELS	WATER SUPPLY	CUSTOM CONTROL PANEL-NEMA 12 ENCLOSURE				ISF	4	4	4	2
WATER TREATMENT PLANT	PLANT 1 BUILDING	PLANT 1 HEADHOUSE	BASEMENT	FILTERED WATER PUMP GALLERY	VALVE - 48" PLANT 1 FILTERED WATER SUCTION CONDUIT HEADER (P1/P2 CLEARWELL INTERCONNECT)		ACTUATOR - 48" CLEARWELL INTERCONNECT HEADER HANDWHEEL ACTUATOR	NEW	0016639	P MECH	ACTUATORS	POST FILTRATION PUMPING & TREATMENT		1923			ISF	4	4	3	6, 7
WATER TREATMENT PLANT	NORTH ACCESS WELL						VALVE, RODNEY HUNT - 60" PLANT 1 PWB DISCHARGE FLOW VALVE TO K2-3, #01	EXIST	0000905	P MECH	VALVES	FINISHED WATER PUMPING	RODNEY HUNT				ISF	4	3	3	6, 7
WATER TREATMENT PLANT	NORTH ACCESS WELL						VALVE, RODNEY HUNT - 60" PLANT 1 PWB DISCHARGE FLOW VALVE TO NORTH WELL, #02	EXIST	0000906	P MECH	VALVES	FINISHED WATER PUMPING	RODNEY HUNT				ISF	4	3	3	6, 7

Location	Sublocation 1	Sublocation 2	Sublocation 3	Sublocation 4	Sublocation 5	Final Sublocation 6	Asset Description	New/Exist Asset	Asset No.	Class	Asset Group	PROCESS	Manufacturer	Manufac Date	Model No.	Serial Number	Status	CoF	PoF	AC	FC
WATER TREATMENT PLANT	RAW WATER PUMP STATION	RAW WATER PS 1 & 2	PUMP ROOM				PUMP, CASCADE PUMP - PUMP RW-1 (S/N: 15858)	EXIST	0000972	P MECH	PUMPS	RAW WATER LOW LIFT PUMPING AND SCREENING	CASCADE PUMP		48P	15858	ISF	4	3	4	4, 6
WATER TREATMENT PLANT	RAW WATER PUMP STATION	RAW WATER PS 1 & 2	PUMP ROOM				PUMP, CASCADE PUMP - PUMP RW-2 (S/N: 15859)	EXIST	0000973	P MECH	PUMPS	RAW WATER LOW LIFT PUMPING AND SCREENING	CASCADE PUMP		48P	15859	ISF	4	3	3	4, 6
WATER TREATMENT PLANT	PLANT SWITCHGEAR BUILDING	SWITCHGEAR, GE - SWITCHGEAR 7					ELEC PANEL, GE - SG-7-1A, SG-7 CONTROL POWER PANEL, SWITCHGEAR 7	EXIST	0005414	ELEC	ELEC PANELS	NON PROCESS	GE				ISF	4	3	3	7, 10
WATER TREATMENT PLANT	PLANT 1 BUILDING	PLANT 1 HEADHOUSE	FLOOR 2	BLOWER ROOM			SYSTEMS (BLOWER/COMPRESSORS) - AIR SCOUR SYSTEM	EXIST	0005493	P MECH	SYSTEMS (BLOWER/COMPRESSORS)	FILTRATION					ISF	4	3	2	2
WATER TREATMENT PLANT	PLANT SWITCHGEAR BUILDING	SWITCHGEAR, GE - SWITCHGEAR 7					SWITCH, ASCO - SG-7-5A, ATS CONTROL, SWITCHGEAR 7 (S/N: 4126310012)	EXIST	0006313	ELEC	SWITCHES	NON PROCESS	ASCO		CAT NO : C940215066	4126310012	ISF	4	3	3	2, 9, 10
WATER TREATMENT PLANT	PLANT SWITCHGEAR BUILDING	SWITCHGEAR, GE - SWITCHGEAR 7					TRANSFORMER - SG-7-4B, PTS-CPT XFMR MAIN 1 SERVICE FDR-1, SWITCHGEAR 7	EXIST	0006315	ELEC	TRANSFORMERS	NON PROCESS					ISF	4	3	3	2, 6
WATER TREATMENT PLANT	PLANT SWITCHGEAR BUILDING	SWITCHGEAR, GE - SWITCHGEAR 7					TRANSFORMER - SG-7-7B, PTS-CPT XFMR MAIN 2 SERVICE FDR-2, SWITCHGEAR 7	EXIST	0006317	ELEC	TRANSFORMERS	NON PROCESS					ISF	4	3	3	2, 6
WATER TREATMENT PLANT	PLANT 1 BUILDING	PLANT 1 HEADHOUSE	BASEMENT	FILTERED WATER PUMP GALLERY			VALVE, ALLIS CHALMERS - 42" PLANT 1 FILTERED WATER CONTROL VALVE (DISCHARGE HEADER)	EXIST	0006446	P MECH	VALVES	POST FILTRATION PUMPING & TREATMENT	ALLIS CHALMERS				ISF	4	3	2	6, 7
WATER TREATMENT PLANT	PLANT 1 BUILDING	PLANT 1 HEADHOUSE	BASEMENT	FILTERED WATER PUMP GALLERY			VALVE, HENRY PRATT COMPANY - 24" PLANT 1 MAIN BACKWASH SUPPLY VALVE	EXIST	0007516	P MECH	VALVES	FILTRATION	HENRY PRATT COMPANY				ISF	4	3	2	6, 7
WATER TREATMENT PLANT	PLANT 2 BUILDING	PLANT 2 CORRIDOR	BASEMENT (FILTER PIPE GALLERY)				VALVE - 24" PLANT 2 MAIN BACKWASH SUPPLY VALVE	NEW	0015018	P MECH	VALVES	FILTRATION					ISF	4	3	3	2, 6, 7
WATER TREATMENT PLANT	STRUCTURE - PLANT 2 FILTERED WATER VAULT						VALVE - 48" PLANT 1 /PLANT 2 BYPASS, FILTERED WATER ISOLATION VALVE	NEW	0015147	P MECH	VALVES	FINISHED WATER PUMPING					ISF	4	3	3	7
WATER TREATMENT PLANT	RAW WATER PUMP STATION	RAW WATER PS 1 & 2	PUMP ROOM				ELEC PANEL, SQUARE-D - 480V PANELBOARD	NEW	0015150	ELEC	ELEC PANELS	NON PROCESS	SQUARE-D		CAT# 1865-2MN		ISF	4	3	3	5, 7
WATER TREATMENT PLANT	WTP YARD						PLANT GAS - GAS, MASTER METER	NEW	0015815	CIVIL	PLANT GAS	NON PROCESS					ISF	4	3	3	6
WATER TREATMENT PLANT	KORAH 2 & 3 PS	BASEMENT	PUMP, WORTHINGTON - PUMP K2-1 (9720GPM; S/N: 81858-001)				VALVE, VALMATIC - 20" PUMP K2-1 SUCTION ISOLATION VALVE	NEW	0016585	P MECH	VALVES	FINISHED WATER PUMPING	VALMATIC		2020		ISF	4	3	2	6, 7
WATER TREATMENT PLANT	KORAH 2 & 3 PS	BASEMENT	PUMP, WORTHINGTON - PUMP K2-2 (9720GPM; S/N: 79Z001859-1)				VALVE, VALMATIC - 20" PUMP K2-2 SUCTION ISOLATION VALVE (S/N: M512380)	NEW	0016586	P MECH	VALVES	FINISHED WATER PUMPING	VALMATIC		2020	M512380	ISF	4	3	2	6, 7
WATER TREATMENT PLANT	KORAH 2 & 3 PS	BASEMENT	PUMP, WORTHINGTON - PUMP K2-3 (9720GPM; S/N: 81858-002)				VALVE, VALMATIC - 20" PUMP K2-3 SUCTION ISOLATION VALVE	NEW	0016832	P MECH	VALVES	FINISHED WATER PUMPING	VALMATIC				ISF	4	3	2	6, 7
WATER TREATMENT PLANT	KORAH 2 & 3 PS	BASEMENT	PUMP, WORTHINGTON - PUMP K2-5 (9720GPM)				VALVE, VALMATIC - 20" PUMP K2-5 SUCTION ISOLATION VALVE	NEW	0016833	P MECH	VALVES	FINISHED WATER PUMPING	VALMATIC				ISF	4	3	2	6, 7
WATER TREATMENT PLANT	KORAH 2 & 3 PS	BASEMENT	PUMP, WORTHINGTON - PUMP K3-1 (4860GPM)				VALVE, VALMATIC - 24" PUMP K3-1 SUCTION ISOLATION VALVE	NEW	0016834	P MECH	VALVES	FINISHED WATER PUMPING	VALMATIC				ISF	4	3	2	6, 7
WATER TREATMENT PLANT	KORAH 2 & 3 PS	BASEMENT	PUMP, WORTHINGTON - PUMP K3-2 (4860GPM; S/N: 92TP92358-1)				VALVE, VALMATIC - 24" PUMP K3-2 SUCTION ISOLATION VALVE	NEW	0016835	P MECH	VALVES	FINISHED WATER PUMPING	VALMATIC				ISF	4	3	2	6, 7
WATER TREATMENT PLANT	KORAH 2 & 3 PS	BASEMENT	PUMP, WORTHINGTON - PUMP K3-3 (4860GPM; S/N: 79-20018601-1)				VALVE, VALMATIC - 24" PUMP K3-3 SUCTION ISOLATION VALVE	NEW	0016836	P MECH	VALVES	FINISHED WATER PUMPING	VALMATIC				ISF	4	3	2	6, 7
WATER TREATMENT PLANT	KORAH 2 & 3 PS	BASEMENT	PUMP, WORTHINGTON - PUMP K3-4 (4860GPM; S/N: 20003129)				VALVE, VALMATIC - 24" PUMP K3-4 SUCTION ISOLATION VALVE	NEW	0016837	P MECH	VALVES	FINISHED WATER PUMPING	VALMATIC				ISF	4	3	2	6, 7
WATER TREATMENT PLANT	KORAH 2 & 3 PS	BASEMENT	PUMP, WORTHINGTON - PUMP K3-5 (4860GPM)				VALVE, VALMATIC - 24" PUMP K3-5 SUCTION ISOLATION VALVE	NEW	0016838	P MECH	VALVES	FINISHED WATER PUMPING	VALMATIC				ISF	4	3	2	6, 7
WATER TREATMENT PLANT	KORAH 2 & 3 PS	BASEMENT	PUMP, WORTHINGTON - PUMP K2-4 (9720GPM)				VALVE, VALMATIC - 20" PUMP K2-4 SUCTION ISOLATION VALVE	NEW	0016839	P MECH	VALVES	FINISHED WATER PUMPING	VALMATIC				ISF	4	3	2	6, 7
WATER TREATMENT PLANT	KORAH 2 & 3 PS	BASEMENT					VALVE - 36" HEADER ISOLATION GATE BETWEEN PUMPS K2-4 AND K2-5	NEW	0016842	P MECH	VALVES	FINISHED WATER PUMPING					ISF	4	3	2	7
WATER TREATMENT PLANT	STRUCTURE - PLANT 1 FILTERED WATER VAULT	VALVE - 48" PLANT 1 FILTERED WATER ISOLATION VALVE					ACTUATOR - 48" PLANT 1 FILTERED WATER ISOLATION VALVE ELECTRIC ACTUATOR	NEW	0016897	CONT	ACTUATORS	FINISHED WATER PUMPING					ISF	4	3	4	6, 7
WATER TREATMENT PLANT	SOUTH ACCESS WELL						VALVE, RODNEY HUNT - 72" PLANT 2 PWB DISCHARGE FLOW VALVE TO K2-3, #04	EXIST	0000903	P MECH	VALVES	FINISHED WATER PUMPING	RODNEY HUNT				ISF	4	2	2	6, 7
WATER TREATMENT PLANT	SOUTH ACCESS WELL						VALVE, RODNEY HUNT - 72" PLANT 2 PWB DISCHARGE FLOW VALVE TO SOUTH WELL, #03	EXIST	0000904	P MECH	VALVES	FINISHED WATER PUMPING	RODNEY HUNT				ISF	4	2	2	6, 7
WATER TREATMENT PLANT	PLANT 2 BUILDING	PLANT 2 EAST HEADHOUSE	BASEMENT	AERATOR PUMP ROOM	PUMP, DE LAVAL STEAM TURBINE CO - PUMP S-1 (15000GPM; S/N: 251988)		VALVE, LIMITORQUE - 24" ISOLATION BUTTERFLY VALVE, PUMP S-1	EXIST	0001038	P MECH	VALVES	POST FILTRATION PUMPING & TREATMENT	LIMITORQUE				ISF	4	2	2	6, 7
WATER TREATMENT PLANT	PLANT 2 BUILDING	PLANT 2 EAST HEADHOUSE	BASEMENT	AERATOR PUMP ROOM	PUMP, WORTHINGTON - PUMP S-2 (20000GPM; S/N: 80250878/2)		VALVE, LIMITORQUE - 24" ISOLATION BUTTERFLY VALVE, PUMP S-2	EXIST	0001039	P MECH	VALVES	POST FILTRATION PUMPING & TREATMENT	LIMITORQUE				ISF	4	2	2	6, 7
WATER TREATMENT PLANT	PLANT 1 BUILDING	PLANT 1 HEADHOUSE	BASEMENT	FILTERED WATER PUMP GALLERY	PUMP, ALLIS CHALMERS - PUMP N-1 (11805GPM; S/N: 812-9196)		VALVE, ALLIS CHALMERS - 18" ALLIS-CHALMERS, DISCHARGE, PUMP N-1	EXIST	0001041	P MECH	VALVES	POST FILTRATION PUMPING & TREATMENT	ALLIS CHALMERS				ISF	4	2	2	6, 7
WATER TREATMENT PLANT	PLANT 1 BUILDING	PLANT 1 HEADHOUSE	BASEMENT	FILTERED WATER PUMP GALLERY	PUMP, ALLIS CHALMERS - PUMP N-2 (11805GPM; S/N: 812-9195)		VALVE, ALLIS CHALMERS - 18" ALLIS-CHALMERS, DISCHARGE, PUMP N-2	EXIST	0001042	P MECH	VALVES	POST FILTRATION PUMPING & TREATMENT	ALLIS CHALMERS				ISF	4	2	2	6, 7
WATER TREATMENT PLANT	PLANT 1 BUILDING	PLANT 1 HEADHOUSE	BASEMENT	FILTERED WATER PUMP GALLERY	PUMP, ALLIS CHALMERS - PUMP N-3 (14583GPM; S/N: 812-9198)		VALVE, ALLIS CHALMERS - 20" ALLIS-CHALMERS, DISCHARGE, PUMP N-3	EXIST	0001043	P MECH	VALVES	POST FILTRATION PUMPING & TREATMENT	ALLIS CHALMERS				ISF	4	2	2	6, 7
WATER TREATMENT PLANT	PLANT 1 BUILDING	PLANT 1 HEADHOUSE	BASEMENT	FILTERED WATER PUMP GALLERY	PUMP, ALLIS CHALMERS - PUMP N-4 (14583GPM)		VALVE, ALLIS CHALMERS - 20" ALLIS-CHALMERS, DISCHARGE, PUMP N-4	EXIST	0001044	P MECH	VALVES	POST FILTRATION PUMPING & TREATMENT	ALLIS CHALMERS				ISF	4	2	2	6, 7
WATER TREATMENT PLANT	STRUCTURE - FLUORIDE STORAGE VAULT						TANK - FLUORIDE TANK	EXIST	0001629	P MECH	TANKS	CHEMICAL FEED AND STORAGE					ISF	4	2	1	
WATER TREATMENT PLANT WATER SUPPLY	KANAWHA CANAL WEST						DAMS & LOCK - 9 MILE GATES & DAM	EXIST	0001863	STRUC	DAMS & LOCKS	WATER SUPPLY					ISF	4	2	2	6
WATER TREATMENT PLANT	SUBSTATION	SWITCHGEAR 6 BUILDING	SWITCHGEAR, GE - SWITCHGEAR 6				SWITCH, ASCO - SG-6-6A, ATS CONTROL, SWITCHGEAR 6 (S/N: 412631001)	EXIST	0005397	ELEC	SWITCHES	NON PROCESS	ASCO	1992	C940215066	412631001	ISF	4	2	2	10
WATER TREATMENT PLANT	PLANT SWITCHGEAR BUILDING	SWITCHGEAR, GE - SWITCHGEAR 7					BREAKER, GE - SG-7-2B, WEST CHEM SWBDL XFMR FDR, SWITCHGEAR 7 (S/N: 0347A4239-001-08)	EXIST	0005410	ELEC	BREAKERS	NON PROCESS	GE		TYPE VB14.16-250-2	0347A4239-001-08	ISF	4	2	2	10
WATER TREATMENT PLANT	PLANT SWITCHGEAR BUILDING	SWITCHGEAR, GE - SWITCHGEAR 7					BREAKER, GE - SG-7-3A, DOUGLASDALE PS XFMR FDR, SWITCHGEAR 7	EXIST	0005411	ELEC	BREAKERS	NON PROCESS	GE		TYPE VB14.16-250-2		ISF	4	2	2	10
WATER TREATMENT PLANT	PLANT SWITCHGEAR BUILDING	SWITCHGEAR, GE - SWITCHGEAR 7					CHARGERS BATT, HOPPECKE BATTERIES INC - SG-7-9A, BATTERY CHARGER TRIPPING UNIT, SWITCHGEAR 7 (S/N: 0592142)	EXIST	0005417	ELEC	CHARGERS BATT	NON PROCESS	HOPPECKE BATTERIES INC		HBC48-10	0592142	ISF	4	2	2	10
WATER TREATMENT PLANT	PLANT SWITCHGEAR BUILDING						SWITCHGEAR, GE - SWITCHGEAR 7	EXIST	0005955	ELEC	SWITCHGEAR	NON PROCESS	GE	1992			ISF	4	2	2	10
WATER TREATMENT PLANT	RAW WATER CONDUIT						STRUCTURE - RAW WATER CONDUIT NO 1	EXIST	0006008	STRUC	STRUCTURES	RAW WATER LOW LIFT PUMPING AND SCREENING					ISF	4	2	1	
WATER TREATMENT PLANT	RAW WATER CONDUIT						STRUCTURE - RAW WATER CONDUIT NO 2	EXIST	0006009	STRUC	STRUCTURES	RAW WATER LOW LIFT PUMPING AND SCREENING					ISF	4	2	1	
WATER TREATMENT PLANT	PLANT 1 BUILDING	PLANT 1 HEADHOUSE	FLOOR 2	ZINC ORTHOPHOSPHATE ROOM			SYSTEMS (CHEM FEED) - ZINC ORTHOPHOSPHATE FEED	EXIST	0006090	P MECH	SYSTEMS (CHEM FEED)	CHEMICAL FEED AND STORAGE					ISF	4	2	1	
WATER TREATMENT PLANT	WTP YARD	ZONE 5					TRANSFORMER - DOUGLASDALE PS XFMR, 500KVA (FED FROM SG-7-3A)	EXIST	0006314	ELEC	TRANSFORMERS	NON PROCESS					ISF	4	2	2	10
WATER TREATMENT PLANT	PLANT SWITCHGEAR BUILDING	SWITCHGEAR, GE - SWITCHGEAR 7					BREAKER, GE - SG-7-6B, SPARE BREAKER, SWITCHGEAR 7	EXIST	0006318	ELEC	BREAKERS	NON PROCESS	GE		TYPE VB14.16-250-2		ISF	4	2	2	10
WATER TREATMENT PLANT	PLANT SWITCHGEAR BUILDING	SWITCHGEAR, GE - SWITCHGEAR 7					BREAKER, GE - SG-7-9B, WEST CHEM SWBDR XFMR FDR, SWITCHGEAR 7	EXIST	0006322	ELEC	BREAKERS	NON PROCESS	GE		TYPE VB14.16-250-2		ISF	4	2	2	10
WATER TREATMENT PLANT	PLANT 1 BUILDING	PLANT 1 HEADHOUSE	FLOOR 2	BLOWER ROOM			HVAC, TUTHILL - AIR SCOUR BLOWER 1 (S/N: 1261230308)	EXIST	0006506	P MECH	HVAC	FILTRATION	TUTHILL			1261230308	ISF	4	2	1	
WATER TREATMENT PLANT	PLANT 1 BUILDING	PLANT 1 HEADHOUSE	FLOOR 2	BLOWER ROOM			HVAC, DRESSER ROOTS - AIR SCOUR BLOWER 2 (S/N: RB49474)	EXIST	0006507	P MECH	HVAC	FILTRATION	DRESSER ROOTS		RCS V	RB49474	ISF	4	2	1	
WATER TREATMENT PLANT	WTP YARD	ZONE 4					VALVE, DEZURIK - 48" WATER VALVE ON FLUME TO BYRD PARK PS (S/N: 9498533R001)	EXIST	0006653	P MECH	VALVES	FINISHED WATER PUMPING	DEZURIK			9498533R001	ISF	4	2	2	10
WATER TREATMENT PLANT	NORTH INTAKE BASIN	DAMS & LOCK - CANAL INTAKE					GATE, WATERMAN INDUSTRIES, INC - 60" CANAL INTAKE GATE, SG-7	EXIST	0006655	P MECH	GATES	PRE-SEDIMENTATION	WATERMAN INDUSTRIES, INC		HEAVY DUTY CI		ISF	4	2	3	2, 6
WATER TREATMENT PLANT	NORTH INTAKE BASIN	DAMS & LOCK - CANAL INTAKE					GATE, WATERMAN INDUSTRIES, INC - 60" CANAL INTAKE GATE, SG-8	EXIST	0006656	P MECH	GATES	PRE-SEDIMENTATION	WATERMAN INDUSTRIES, INC		HEAVY DUTY CI		ISF	4	2	3	2, 6

Location	Sublocation 1	Sublocation 2	Sublocation 3	Sublocation 4	Sublocation 5	Final Sublocation 6	Asset Description	New/Exist Asset	Asset No.	Class	Asset Group	PROCESS	Manufacturer	Manufac Date	Model No.	Serial Number	Status	CoF	PoF	AC	FC
WATER TREATMENT PLANT WATER SUPPLY	KANAWHA CANAL WEST	FLOODWALL - CANAL LOCK NORTH (UPSTREAM CANAL CLOSURE)					FLOODWALL - HYDRAULIC GATE, UPSTREAM CANAL MAIN CLOSURE (GATE 16)	EXIST	0006688	P MECH	FLOODWALL	WATER SUPPLY					ISF	4	2	1	
WATER TREATMENT PLANT WATER SUPPLY	KANAWHA CANAL WEST	FLOODWALL - CANAL LOCK SOUTH (DOWNSTREAM CANAL CLOSURE)					FLOODWALL - HYDRAULIC GATE, DOWNSTREAM CANAL MAIN CLOSURE	EXIST	0006689	P MECH	FLOODWALL	WATER SUPPLY					ISF	4	2	1	
WATER TREATMENT PLANT	WEST CHEMICAL BUILDING	BASEMENT	SODIUM HYPOCHLORITE (BULK STORAGE) ROOM				TANK, AUGUSTA FIBERGLASS - SODIUM HYPOCHLORITE TANK SH-1-1 (S/N: T-SH-1-1)	EXIST	0006841	P MECH	TANKS	CHEMICAL FEED AND STORAGE	AUGUSTA FIBERGLASS	6/2006	PO# 10162, JOB # W602292	T-SH-1-1	ISF	4	2	1	
WATER TREATMENT PLANT	WEST CHEMICAL BUILDING	BASEMENT	SODIUM HYPOCHLORITE (BULK STORAGE) ROOM				TANK, AUGUSTA FIBERGLASS - SODIUM HYPOCHLORITE TANK SH-1-2 (S/N: T-SH-1-2)	EXIST	0006842	P MECH	TANKS	CHEMICAL FEED AND STORAGE	AUGUSTA FIBERGLASS	6/2006	PO# 10162, JOB # W602292	T-SH-1-2	ISF	4	2	1	
WATER TREATMENT PLANT	WEST CHEMICAL BUILDING	BASEMENT	SODIUM HYPOCHLORITE (BULK STORAGE) ROOM				TANK, AUGUSTA FIBERGLASS - SODIUM HYPOCHLORITE TANK SH-1-3 (S/N: T-SH-1-3)	EXIST	0006843	P MECH	TANKS	CHEMICAL FEED AND STORAGE	AUGUSTA FIBERGLASS	6/2006	PO# 10162, JOB # W602292	T-SH-1-3	ISF	4	2	1	
WATER TREATMENT PLANT	WEST CHEMICAL BUILDING	BASEMENT	SODIUM HYPOCHLORITE (BULK STORAGE) ROOM				TANK, AUGUSTA FIBERGLASS - SODIUM HYPOCHLORITE TANK SH-1-4 (S/N: T-SH-1-4)	EXIST	0006844	P MECH	TANKS	CHEMICAL FEED AND STORAGE	AUGUSTA FIBERGLASS	6/2006	PO# 10162, JOB # W602292	T-SH-1-4	ISF	4	2	1	
WATER TREATMENT PLANT	WEST CHEMICAL BUILDING	BASEMENT	SODIUM HYPOCHLORITE (BULK STORAGE) ROOM				TANK, AUGUSTA FIBERGLASS - SODIUM HYPOCHLORITE TANK SH-1-5 (S/N: T-SH-1-5)	EXIST	0006845	P MECH	TANKS	CHEMICAL FEED AND STORAGE	AUGUSTA FIBERGLASS	6/2006	PO# 10162, JOB # W602292	T-SH-1-5	ISF	4	2	1	
WATER TREATMENT PLANT	WEST CHEMICAL BUILDING	BASEMENT	SODIUM HYPOCHLORITE (BULK STORAGE) ROOM				TANK, AUGUSTA FIBERGLASS - SODIUM HYPOCHLORITE TANK SH-1-6 (S/N: T-SH-1-6)	EXIST	0006846	P MECH	TANKS	CHEMICAL FEED AND STORAGE	AUGUSTA FIBERGLASS	6/2006	PO# 10162, JOB # W602292	T-SH-1-6	ISF	4	2	1	
WATER TREATMENT PLANT	PLANT 2 BUILDING	PLANT 2 CORRIDOR	FLOOR 2	ALUMINUM SULFATE STORAGE AREA			TANK, AUGUSTA FIBERGLASS - ALUM DAY TANK A-1 (S/N: A-1)	EXIST	0006850	P MECH	TANKS	CHEMICAL FEED AND STORAGE	AUGUSTA FIBERGLASS	5/2006	PO# 10162, JOB # W602292	A-1	ISF	4	2	2	6
WATER TREATMENT PLANT	PLANT 2 BUILDING	PLANT 2 CORRIDOR	FLOOR 2	ALUMINUM SULFATE STORAGE AREA			TANK, AUGUSTA FIBERGLASS - ALUM DAY TANK A-2 (S/N: A-2)	EXIST	0006851	P MECH	TANKS	CHEMICAL FEED AND STORAGE	AUGUSTA FIBERGLASS	5/2006	PO# 10162, JOB # W602292	A-2	ISF	4	2	2	6
WATER TREATMENT PLANT	WEST CHEMICAL BUILDING	BASEMENT	ALUMINUM SULFATE (BULK STORAGE) ROOM				TANK, AUGUSTA FIBERGLASS - ALUM TANK AL-1-6 (S/N: T-AL-1-5)	EXIST	0006852	P MECH	TANKS	CHEMICAL FEED AND STORAGE	AUGUSTA FIBERGLASS	JUNE 2006	PO# 10162, JOB # W602292	T-AL-1-5	ISF	4	2	1	
WATER TREATMENT PLANT	WEST CHEMICAL BUILDING	BASEMENT	ALUMINUM SULFATE (BULK STORAGE) ROOM				TANK, AUGUSTA FIBERGLASS - ALUM TANK AL-1-5 (S/N: T-AL-1-5)	EXIST	0006853	P MECH	TANKS	CHEMICAL FEED AND STORAGE	AUGUSTA FIBERGLASS	JUNE 2006	PO# 10162, JOB # W602292	T-AL-1-5	ISF	4	2	1	
WATER TREATMENT PLANT	WEST CHEMICAL BUILDING	BASEMENT	ALUMINUM SULFATE (BULK STORAGE) ROOM				TANK, AUGUSTA FIBERGLASS - ALUM TANK AL-1-4 (S/N: T-AL-1-4)	EXIST	0006854	P MECH	TANKS	CHEMICAL FEED AND STORAGE	AUGUSTA FIBERGLASS	JUNE 2006	PO# 10162, JOB # W602292	T-AL-1-4	ISF	4	2	1	
WATER TREATMENT PLANT	WEST CHEMICAL BUILDING	BASEMENT	ALUMINUM SULFATE (BULK STORAGE) ROOM				TANK, AUGUSTA FIBERGLASS - ALUM TANK AL-1-3 (S/N: T-AL-1-3)	EXIST	0006855	P MECH	TANKS	CHEMICAL FEED AND STORAGE	AUGUSTA FIBERGLASS	JUNE 2006	PO# 10162, JOB # W602292	T-AL-1-3	ISF	4	2	1	
WATER TREATMENT PLANT	WEST CHEMICAL BUILDING	BASEMENT	ALUMINUM SULFATE (BULK STORAGE) ROOM				TANK, AUGUSTA FIBERGLASS - ALUM TANK AL-1-2 (S/N: T-AL-1-2)	EXIST	0006856	P MECH	TANKS	CHEMICAL FEED AND STORAGE	AUGUSTA FIBERGLASS	JUNE 2006	PO# 10162, JOB # W602292	T-AL-1-2	ISF	4	2	1	
WATER TREATMENT PLANT	WEST CHEMICAL BUILDING	BASEMENT	ALUMINUM SULFATE (BULK STORAGE) ROOM				TANK, AUGUSTA FIBERGLASS - ALUM TANK AL-1-1 (S/N: T-AL-1-1)	EXIST	0006857	P MECH	TANKS	CHEMICAL FEED AND STORAGE	AUGUSTA FIBERGLASS	JUNE 2006	PO# 10162, JOB # W602292	T-AL-1-1	ISF	4	2	1	
WATER TREATMENT PLANT	WEST CHEMICAL BUILDING	EXTERIOR					TRANSFORMER, SQUARE-D - XFMR-L, 750KVA, SWBDL PAD MOUNTED	EXIST	0006883	ELEC	TRANSFORMERS	NON PROCESS	SQUARE-D		F25E7762BY		ISF	4	2	3	7
WATER TREATMENT PLANT	WEST CHEMICAL BUILDING	EXTERIOR					TRANSFORMER, SQUARE-D - XFMR-R, 750KVA, SWBDR PAD MOUNTED	EXIST	0006884	ELEC	TRANSFORMERS	NON PROCESS	SQUARE-D		F25E7762BY		ISF	4	2	3	7
WATER TREATMENT PLANT	KORAH 1 PS	BASEMENT	FINISHED WATER PUMP AREA				VALVE, CLA-VAL - SURGE RELIEF VALVE 1, SRV-1	EXIST	0007406	P MECH	VALVES	FINISHED WATER PUMPING	CLA-VAL				ISF	4	2	2	6, 7
WATER TREATMENT PLANT	KORAH 1 PS	BASEMENT	FINISHED WATER PUMP AREA				VALVE, CLA-VAL - SURGE RELIEF VALVE 2, SRV-2	EXIST	0007407	P MECH	VALVES	FINISHED WATER PUMPING	CLA-VAL				ISF	4	2	2	6, 7
WATER TREATMENT PLANT	WTP YARD	ZONE 5					FLOWMETER, MARSH-MCBIRNEY - FINISHED FLOW (36" TO RESERVOIR) MAGNETIC, FE/FIT-302 (S/N: E-66853)	EXIST	0007419	INST	FLOWMETERS	FINISHED WATER PUMPING	MARSH-MCBIRNEY		MODEL 285	E-66853	ISF	4	2	2	2
WATER TREATMENT PLANT	PLANT 2 BUILDING	PLANT 2 EAST HEADHOUSE	FLOOR 2	AMMONIA STORAGE ROOM			SEPARATOR, SIEMENS - EMERGENCY AMMONIA SCRUBBER #1, M-AM-5-1	EXIST	0011334	P MECH	SEPARATORS	CHEMICAL FEED AND STORAGE	SIEMENS	11/2012	RJ-2000		ISF	4	2	2	6
WATER TREATMENT PLANT	PLANT 2 BUILDING	PLANT 2 EAST HEADHOUSE	FLOOR 2	AMMONIA STORAGE ROOM			SEPARATOR, SIEMENS - EMERGENCY AMMONIA SCRUBBER #2, M-AM-5-2	EXIST	0011335	P MECH	SEPARATORS	CHEMICAL FEED AND STORAGE	SIEMENS	11/2012	RJ-2000		ISF	4	2	2	6
WATER TREATMENT PLANT	PLANT 2 BUILDING						ELEC PANEL, EATON - SWITCHBOARD, PLANT 2 MAIN SERVICE, SUBSTATION 2, NEMA 3R, T2A (S/N: LRM0010203-004)	EXIST	0012082	ELEC	ELEC PANELS	NON PROCESS	EATON		POW-R-LINE C	LRM0010203-004	ISF	4	2	2	10
WATER TREATMENT PLANT	PLANT 2 BUILDING						BREAKER, EATON - SBS-C4N -T2A (4000A; S/N: SBS-C4N3HEA)	EXIST	0012083	ELEC	BREAKERS	NON PROCESS	EATON		MAGNUM SBSC4N	SBS-C4N3HEA	ISF	4	2	2	10
WATER TREATMENT PLANT	PLANT 2 BUILDING						BREAKER, EATON - TRIP UNIT, DIGITRIP, T2A (4000A)	EXIST	0012084	ELEC	BREAKERS	NON PROCESS	EATON		520		ISF	4	2	2	10
WATER TREATMENT PLANT	PLANT 2 BUILDING	PLANT 2 EAST HEADHOUSE	FLOOR 1	ELECTRICAL ROOM			TRANSFORMER, EATON - XFMR T2B, 500KVA, DRY TYPE	EXIST	0012086	ELEC	TRANSFORMERS	NON PROCESS	EATON		V48M28T55CUEE		ISF	4	2	2	10
WATER TREATMENT PLANT	CORRIDOR BETWEEN PLANTS						TRANSFORMER, EATON - XFMR T2A, 2500KVA, OIL-FILLED (FED FROM SG-7-6A)	EXIST	0012088	ELEC	TRANSFORMERS	FINISHED WATER PUMPING	EATON		00018A66X4AA		ISF	4	2	2	10
WATER TREATMENT PLANT	STRUCTURE - PLANT 2 FILTERED WATER VAULT						FLOWMETER, SIEMENS - PRESSURE METER AND TRANSMITTER, FINISHED WATER SOUTH FLOW (VENTURI)	EXIST	0012128	INST	FLOWMETERS	POST FILTRATION PUMPING & TREATMENT	SIEMENS		7MF4433-1EA22-1AC6-Z+02		ISF	4	2	1	
WATER TREATMENT PLANT	WTP YARD	ZONE 3					STRUCTURE - PRIMARY WTP ACCESS BRIDGE (OVER CANAL)	EXIST	0012545	STRUC	STRUCTURES	NON PROCESS					ISF	4	2	1	
WATER TREATMENT PLANT WATER SUPPLY	KANAWHA CANAL WEST						DAMS & LOCK - 5 MILE LOCK DAM & GATES	EXIST	0012667	STRUC	DAMS & LOCKS	WATER SUPPLY					ISF	4	2	2	6, 7
WATER TREATMENT PLANT							CHEM FEED - LIME SLURRY STRUCTURE	EXIST	0012712	STRUC	CHEM FEED	CHEMICAL FEED AND STORAGE					ISF	4	2	1	
WATER TREATMENT PLANT WATER SUPPLY	KANAWHA CANAL WEST	3 MILE LOCK DAM & GATES					DAMS & LOCK - 3 MILE LOCK DAM & GATES, DOWNSTREAM WEIR	NEW	0015022	STRUC	DAMS & LOCKS	WATER SUPPLY					ISF	4	2	2	3
WATER TREATMENT PLANT	PLANT 2 BUILDING	PLANT 2 EAST HEADHOUSE	BASEMENT	AERATOR PUMP ROOM			VALVE - 48" PLANT 2 FILTERED WATER MAINHEADER VALVE	NEW	0015145	P MECH	VALVES	POST FILTRATION PUMPING & TREATMENT					ISF	4	2	2	6, 7
WATER TREATMENT PLANT	WTP YARD	ZONE 4					VALVE - 72" SUCTION MANIFOLD VALVE	NEW	0015174	P MECH	VALVES	FINISHED WATER PUMPING					ISF	4	2	2	10
WATER TREATMENT PLANT	WTP YARD	ZONE 4	VALVE - 72" SUCTION MANIFOLD VALVE				ACTUATOR, LIMITORQUE - 72" SUCTION MANIFOLD VALVE HANDWHEEL ACTUATOR (S/N: 290382)	NEW	0015231	CONT	ACTUATORS	FINISHED WATER PUMPING	LIMITORQUE		YV-72313-H	290382	ISF	4	2	2	10
WATER TREATMENT PLANT	BASIN 1	SEDIMENTATION BASIN 1					STRUCTURE - SEDIMENTATION BASIN 1 STRUCTURE	NEW	0015344	STRUC	STRUCTURES	COAGULATION, FLOCCULATION & SEDIMENTATION					ISF	4	2	1	
WATER TREATMENT PLANT	BASIN 2	SEDIMENTATION BASIN 2					STRUCTURE - SEDIMENTATION BASIN 2 STRUCTURE	NEW	0015349	STRUC	STRUCTURES	COAGULATION, FLOCCULATION & SEDIMENTATION					ISF	4	2	1	
WATER TREATMENT PLANT	BASIN 3	SEDIMENTATION BASIN 3					STRUCTURE - SEDIMENTATION BASIN 3 STRUCTURE	NEW	0015358	STRUC	STRUCTURES	COAGULATION, FLOCCULATION & SEDIMENTATION					ISF	4	2	1	
WATER TREATMENT PLANT	BASIN 4	SEDIMENTATION BASIN 4					STRUCTURE - SEDIMENTATION BASIN 4 STRUCTURE	NEW	0015364	STRUC	STRUCTURES	COAGULATION, FLOCCULATION & SEDIMENTATION					ISF	4	2	1	
WATER TREATMENT PLANT WATER SUPPLY	JAMES RIVER	BOSHER'S DAM & FISH LADDER					DAMS & LOCK - BOSHER'S DAM & FISH LADDER NORTH ABUTMENT	NEW	0015380	STRUC	DAMS & LOCKS	WATER SUPPLY					ISF	4	2	3	2, 6
WATER TREATMENT PLANT WATER SUPPLY	JAMES RIVER	BOSHER'S DAM & FISH LADDER					DAMS & LOCK - BOSHER'S DAM & FISH LADDER SOUTH ABUTMENT	NEW	0015381	STRUC	DAMS & LOCKS	WATER SUPPLY					ISF	4	2	2	6
WATER TREATMENT PLANT WATER SUPPLY	JAMES RIVER	BOSHER'S DAM & FISH LADDER					DAMS & LOCK - BOSHER'S DAM & FISH LADDER SPILLWAY	NEW	0015382	STRUC	DAMS & LOCKS	WATER SUPPLY					ISF	4	2	2	6
WATER TREATMENT PLANT WATER SUPPLY	JAMES RIVER	FEEDER CHANNEL					DAMS & LOCK - FEEDER CHANNEL TAIL	NEW	0015625	STRUC	DAMS & LOCKS	WATER SUPPLY					ISF	4	2	2	6
WATER TREATMENT PLANT	PLANT 1 BUILDING	FILTER BUILDING 1					STRUCTURE - FILTER BUILDING 1 STRUCTURE	NEW	0015738	STRUC	STRUCTURES	FILTRATION					ISF	4	2	3	6
WATER TREATMENT PLANT	FINISHED WATER BASIN NORTH						BASIN - FINISHED WATER BASIN NORTH STRUCTURE	NEW	0015745	STRUC	BASINS	POST FILTRATION PUMPING & TREATMENT					ISF	4	2	2	6
WATER TREATMENT PLANT	FINISHED WATER BASIN SOUTH						BASIN - FINISHED WATER BASIN SOUTH STRUCTURE	NEW	0015747	STRUC	BASINS	POST FILTRATION PUMPING & TREATMENT					ISF	4	2	2	6
WATER TREATMENT PLANT	WEST CHEMICAL BUILDING						SYSTEMS (FIRE) - FIRE PROTECTION	NEW	0015749	B MECH	SYSTEMS (FIRE)	NON PROCESS					ISF	4	2	2	10
WATER TREATMENT PLANT	BASIN 1	FLOCCULATION & RAPID MIXING CHAMBER 1					STRUCTURE - FLOCCULATION BASIN 1 STRUCTURE	NEW	0015757	STRUC	STRUCTURES	COAGULATION, FLOCCULATION & SEDIMENTATION					ISF	4	2	2	6
WATER TREATMENT PLANT	BASIN 2	FLOCCULATION & RAPID MIXING CHAMBER 2					STRUCTURE - FLOCCULATION BASIN 2 STRUCTURE	NEW	0015758	STRUC	STRUCTURES	COAGULATION, FLOCCULATION & SEDIMENTATION					ISF	4	2	2	6
WATER TREATMENT PLANT	BASIN 3	FLOCCULATION & RAPID MIXING CHAMBER 3					STRUCTURE - FLOCCULATION BASIN 3 STRUCTURE	NEW	0015759	STRUC	STRUCTURES	COAGULATION, FLOCCULATION & SEDIMENTATION					ISF	4	2	2	6

Location	Sublocation 1	Sublocation 2	Sublocation 3	Sublocation 4	Sublocation 5	Final Sublocation 6	Asset Description	New/Exist Asset	Asset No.	Class	Asset Group	PROCESS	Manufacturer	Manufac Date	Model No.	Serial Number	Status	CoF	PoF	AC	FC
WATER TREATMENT PLANT	BASIN 4	FLOCCULATION & RAPID MIXING CHAMBER 4					STRUCTURE - FLOCCULATION BASIN 4 STRUCTURE	NEW	0015760	STRUC	STRUCTURES	COAGULATION, FLOCCULATION & SEDIMENTATION					ISF	4	2	2	6
WATER TREATMENT PLANT	WTP YARD						PLANT GAS - GAS VALVES, DRIPS, PIPING	NEW	0015814	CIVIL	PLANT GAS	NON PROCESS					ISF	4	2	3	6
WATER TREATMENT PLANT	SUBSTATION						BREAKER, EATON - GENERATOR G#2 BREAKER (600A; S/N: 70501352)	NEW	0015826	ELEC	BREAKERS	NON PROCESS	EATON		TYPE SOVCP-T20	70501352	ISF	4	2	2	6
WATER TREATMENT PLANT	KORAH 1 PS	FLOOR 1					VALVE, MUELLER - KORAH 1 PRV ISOLATION VALVE	NEW	0015984	P MECH	VALVES	FINISHED WATER PUMPING	MUELLER		250W		ISF	4	2	2	6
WATER TREATMENT PLANT	PLANT 1 BUILDING	PLANT 1 HEADHOUSE	FLOOR 1				STRUCTURE - PLANT 1 HEADHOUSE, FLOOR 1 STRUCTURE	NEW	0016180	STRUC	STRUCTURES	NON PROCESS					ISF	4	2	3	6
WATER TREATMENT PLANT	PLANT 1 BUILDING	PLANT 1 HEADHOUSE	BASEMENT				STRUCTURE - PLANT 1 HEADHOUSE BASEMENT STRUCTURE	NEW	0016185	STRUC	STRUCTURES	POST FILTRATION PUMPING & TREATMENT					ISF	4	2	2	6
WATER TREATMENT PLANT	PLANT 2 BUILDING	PLANT 2 CORRIDOR	FLOOR 1				STRUCTURE - PLANT 2 CORRIDOR FLOOR 1 STRUCTURE	NEW	0016192	STRUC	STRUCTURES	FILTRATION					ISF	4	2	2	6
WATER TREATMENT PLANT	PLANT 2 BUILDING	PLANT 2 EAST HEADHOUSE	FLOOR 1				STRUCTURE - PLANT 2 EAST HEADHOUSE, FLOOR 1 STRUCTURE	NEW	0016196	STRUC	STRUCTURES	NON PROCESS					ISF	4	2	2	6
WATER TREATMENT PLANT	PLANT 2 BUILDING	PLANT 2 EAST HEADHOUSE	BASEMENT				STRUCTURE - PLANT 2 EAST HEADHOUSE BASEMENT STRUCTURE	NEW	0016197	STRUC	STRUCTURES	POST FILTRATION PUMPING & TREATMENT					ISF	4	2	2	6
WATER TREATMENT PLANT	PLANT 2 BUILDING	PLANT 2 EAST HEADHOUSE					STRUCTURE - PLANT 2 EAST HEADHOUSE STRUCTURE	NEW	0016201	STRUC	STRUCTURES	NON PROCESS					ISF	4	2	2	6
WATER TREATMENT PLANT	SETTLED WATER CONDUIT						STRUCTURE - SETTLED WATER CONDUIT NO 1	NEW	0016406	STRUC	STRUCTURES	COAGULATION, FLOCCULATION & SEDIMENTATION					ISF	4	2	1	
WATER TREATMENT PLANT	SETTLED WATER CONDUIT						STRUCTURE - SETTLED WATER CONDUIT NO 2	NEW	0016407	STRUC	STRUCTURES	COAGULATION, FLOCCULATION & SEDIMENTATION					ISF	4	2	1	
WATER TREATMENT PLANT	SETTLED WATER CONDUIT						STRUCTURE - SETTLED WATER CONDUIT NO 3	NEW	0016408	STRUC	STRUCTURES	COAGULATION, FLOCCULATION & SEDIMENTATION					ISF	4	2	1	
WATER TREATMENT PLANT	SETTLED WATER CONDUIT						STRUCTURE - SETTLED WATER CONDUIT NO 4	NEW	0016409	STRUC	STRUCTURES	COAGULATION, FLOCCULATION & SEDIMENTATION					ISF	4	2	1	
WATER TREATMENT PLANT WATER SUPPLY	JAMES RIVER						DAMS & LOCK - SUBSIDING BASIN INTAKE GATES	NEW	0016580	STRUC	DAMS & LOCKS	WATER SUPPLY					ISF	4	2	3	2, 6
WATER TREATMENT PLANT	WTP YARD	ZONE 5					STRUCTURE - VALVE VAULT, ZONE 5 FROM KORAH 1	NEW	0016635	STRUC	STRUCTURES	FINISHED WATER PUMPING					ISF	4	2	2	6
WATER TREATMENT PLANT	WTP YARD						TRANSMISSION MAIN - WATER TRANSMISSION MAINS	NEW	0016651	CIVIL	TRANSMISSION MAINS	FINISHED WATER PUMPING					ISF	4	2	2	6, 7
WATER TREATMENT PLANT	WTP YARD						VALVE - WATER TRANSMISSION VALVES	NEW	0016652	CIVIL	VALVES	FINISHED WATER PUMPING					ISF	4	2	2	6, 7
WATER TREATMENT PLANT WATER SUPPLY	JAMES RIVER	WILLIAMS ISLAND DAM & GATES					DAMS & LOCK - WILLIAMS ISLAND DAM & GATES SOUTH ABUTMENT & FEEDER CHANNEL INTAKE GATES	NEW	0016660	STRUC	DAMS & LOCKS	WATER SUPPLY					ISF	4	2	2	6
WATER TREATMENT PLANT WATER SUPPLY	JAMES RIVER	WILLIAMS ISLAND DAM & GATES					DAMS & LOCK - WILLIAMS ISLAND DAM & GATES SPILLWAY	NEW	0016661	STRUC	DAMS & LOCKS	WATER SUPPLY					ISF	4	2	1	
WATER TREATMENT PLANT WATER SUPPLY	JAMES RIVER	WILLIAMS ISLAND DAM & GATES					GATE - 60" WILLIAMS ISLAND SLUICE GATE 1	NEW	0016662	P MECH	GATES	WATER SUPPLY					ISF	4	2	3	6, 8
WATER TREATMENT PLANT WATER SUPPLY	JAMES RIVER	WILLIAMS ISLAND DAM & GATES					GATE - 60" WILLIAMS ISLAND SLUICE GATE 2	NEW	0016663	P MECH	GATES	WATER SUPPLY					ISF	4	2	2	6
WATER TREATMENT PLANT WATER SUPPLY	JAMES RIVER	WILLIAMS ISLAND DAM & GATES					GATE - 60" WILLIAMS ISLAND SLUICE GATE 3	NEW	0016664	P MECH	GATES	WATER SUPPLY					ISF	4	2	2	6
WATER TREATMENT PLANT WATER SUPPLY	JAMES RIVER	WILLIAMS ISLAND DAM & GATES					GATE - 60" WILLIAMS ISLAND SLUICE GATE 4	NEW	0016665	P MECH	GATES	WATER SUPPLY					ISF	4	2	2	6
WATER TREATMENT PLANT	PLANT 1 BUILDING	PLANT 1 HEADHOUSE	FLOOR 2	ZINC ORTHOPHOSPHATE ROOM			TANK, BELCO - ZINC ORTHOPHOSPHATE TANK T-ZO-1-1 (S/N: 36634)	NEW	0016680	P MECH	TANKS	CHEMICAL FEED AND STORAGE	BELCO	10/2012	PO # 1133-118, ITEM # 12047001	36634	ISF	4	2	1	
WATER TREATMENT PLANT	PLANT 1 BUILDING	PLANT 1 HEADHOUSE	FLOOR 2	ZINC ORTHOPHOSPHATE ROOM			TANK, BELCO - ZINC ORTHOPHOSPHATE TANK T-ZO-1-2 (S/N: 36635)	NEW	0016682	P MECH	TANKS	CHEMICAL FEED AND STORAGE	BELCO	10/2012	PO # 1133-118, ITEM # 12047001	36635	ISF	4	2	1	
WATER TREATMENT PLANT	PLANT 2 BUILDING	PLANT 2 EAST HEADHOUSE	FLOOR 2	AMMONIA STORAGE ROOM			CONTROL PANEL, SIEMENS - EMERGENCY SCRUBBER #1, M-AM-5-1	NEW	0016758	CONT	CONTROL PANELS	CHEMICAL FEED AND STORAGE	SIEMENS				ISF	4	2	2	2
WATER TREATMENT PLANT	PLANT 2 BUILDING	PLANT 2 EAST HEADHOUSE	FLOOR 2	AMMONIA STORAGE ROOM			CONTROL PANEL, SIEMENS - EMERGENCY SCRUBBER #2, M-AM-5-2	NEW	0016759	CONT	CONTROL PANELS	CHEMICAL FEED AND STORAGE	SIEMENS				ISF	4	2	2	2
WATER TREATMENT PLANT	PLANT 1 BUILDING	PLANT 1 HEADHOUSE					TRANSFORMER, EATON - XFMR T1A, 2500KVA, OIL-FILLED (FED FROM SG-7-2A)	EXIST	0012087	ELEC	TRANSFORMERS	NON PROCESS	EATON		00018A66X4AA		ISF	4	1	1	
WATER TREATMENT PLANT	BASIN 3 & 4 CONTROL STATION	FLOCCULATION & RAPID MIX CONTROL ROOM	CONTROL PANEL, S-L CONTROLS - BASIN 3 & 4 INST/ALARM CONTROL CABINET				CONTROL PROCESS, SCHNEIDER ELECTRIC - PLC-03, BASIN 3 & 4 PLC	EXIST	0013905	CONT	CONTROL PROCESS	COAGULATION, FLOCCULATION & SEDIMENTATION	SCHNEIDER ELECTRIC		MODICON M340 - BMXP342020		ISF	4	1	1	
WATER TREATMENT PLANT	BASIN 1 & 2 CONTROL STATION	FLOCCULATION & RAPID MIX CONTROL ROOM	CONTROL PANEL, S-L CONTROLS - BASIN 1 & 2 INST/ALARM CONTROL CABINET				CONTROL PROCESS, SCHNEIDER ELECTRIC - PLC-06, BASIN 1 & 2 PLC	EXIST	0013908	CONT	CONTROL PROCESS	COAGULATION, FLOCCULATION & SEDIMENTATION	SCHNEIDER ELECTRIC		MODICON M340 - BMXP342020		ISF	4	1	1	
WATER TREATMENT PLANT	SUBSTATION						BREAKER, EATON - GENERATOR G#1 BREAKER (600A; S/N: 70501352)	NEW	0015825	ELEC	BREAKERS	NON PROCESS	EATON	2005	TYPE SOVCP-T20	70501352	ISF	4	1	1	
WATER TREATMENT PLANT	PLANT 2 BUILDING	PLANT 2 CORRIDOR	FLOOR 2	CONTROL PANEL, S-L CONTROLS - PANEL CP-2			CONTROL PROCESS, SCHNEIDER ELECTRIC - PLC-13, CP-2	NEW	0016760	CONT	CONTROL PROCESS	POST FILTRATION PUMPING & TREATMENT	SCHNEIDER ELECTRIC		MODICON QUANTUM HOT STANDBY		ISF	4	1	1	
WATER TREATMENT PLANT	PLANT 1 BUILDING	PLANT 1 HEADHOUSE	FLOOR 1	PLANT 1 CONTROL ROOM			CONTROL PROCESS, SCHNEIDER ELECTRIC - PLC-02, PLANT 1 MAIN PLC	NEW	0016765	CONT	CONTROL PROCESS	POST FILTRATION PUMPING & TREATMENT	SCHNEIDER ELECTRIC		MODICON QUANTUM		ISF	4	1	1	

Appendix G

10-Year Repair and Replacement Plan

City of Richmond, Virginia
Department of Public Utilities

Water Treatment Plant
10-Year Repair and Replacement Plan

December 2020

Whitman, Requardt & Associates, LLP
9030 Stony Point Parkway, Suite 220, Richmond, VA 23235

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1 Background and Overview

This 10-Year Repair and Replacement Plan is provided as an Appendix to the City of Richmond (City) Water Treatment Plant (WTP) Condition Assessment project Technical Memorandum. The results documented in this plan were collected and cataloged as part of the WTP Condition Assessment project completed in December 2020. Asset replacement costs and condition determinations were conducted using the information gathered and calculated as part of the Facility Condition Index (FCI) and the risk analyses that were performed along with the condition assessment tasks.

Using this data, it is possible to forecast the needs related towards equipment maintenance and replacement tasks for FY 2021 through 2031. This forecast does not take into account WTP expansion/improvements, or available City budget, and is solely established based on the visual assessment on the condition of assets at the WTP and their associated risks. The intent of this plan is to provide the City with information that can be used to assist in budgeting, planning, and prioritizing WTP asset repair and replacement work.

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2 Plan Development

2.1 Identifying Asset Degradation

Before prioritizing assets for repair or replacement, it should be identified that repairs are corrective maintenance tasks, and are different from preventative maintenance, rehabilitation or replacement tasks. As referenced in the Condition Assessment project's Technical Memorandum, assets have time-based indicators that are used to assume the lifespan (time period in years) of an asset from the moment of the asset's installation or commencement. In reference to the definitions outlined in the 2018 AWWA Asset Management Definitions Guidebook and the 2015 International Infrastructure Management Manual, an asset's lifecycle typically accounts for six (6) primary "life" classifications:

Service Life – Often used interchangeably with useful life, the service life is the estimated total time period that the asset is expected to reliably and effectively serve its purpose.

Useful Life – Often used interchangeably with service life, the useful life is most normally recognized as the estimated total time period that an asset is expected to remain practical or available for use by the owner. This is the minimum of the service, design, physical, and economic life cycle periods. The reason that service life and useful life often relate to the same time period is due to the fact that the service life of an asset is normally assumed to be the minimum time period for any asset's life. The time period from any current day to the end of the useful life is known as the Remaining Useful Life.

Design Life – The assumed total time period that the asset's manufacturer expects the asset to function without rehabilitation. (AWWA, 2018)

Economic Life – The total time period in which an asset (when compared to other alternatives) is the most economical option for achieving specific level-of-service goals.

Physical Life – The total time period in which an asset's physical condition is deemed to be acceptable by the asset's owner.

Maximum Potential Life – The total time period from asset installation until asset replacement, including asset life-cycle extensions through rehabilitation tasks.

In referencing the different asset life definitions, the following key asset management terms can be defined with respect to their contributions to sustaining, maximizing, restoring, or replacing an asset's life:

Unplanned Maintenance – Maintenance that is not predetermined and includes corrective measures to restore an asset's functionality in the short-term; typically emergency work.

Planned Maintenance – Maintenance that is predetermined and includes typical maintenance that is performed while the equipment is still in working condition.

Preventative Maintenance – A form of planned maintenance that is typically enacted based on maintenance manuals or manufacturer recommendations. This form of maintenance is not condition-based and does not extend the life of an asset, but instead is used to sustain an asset's service life and maximize an asset's design life. Preventative maintenance is assumed to be necessary in order to meet the design life for the asset.

Without preventative maintenance, it is assumed that an asset's useful life would be shorter than the design life. (AWWA, 2018; IIMM, 2015)

Corrective Maintenance – Maintenance that is usually performed on an asset in order to rectify an asset's failure and restore the asset to its required level of service. This form of maintenance is not always reactive, but can be both planned or unplanned.

Repairs – A form of corrective maintenance and includes maintenance tasks that are performed in response to an asset's deficiencies, failures or faults, and/or to make up for planned maintenance neglect. Repairs do not elongate an asset's useful life, but instead restore an asset's useful life.

Rehabilitations – Restorative tasks such as rebuilding or upgrading individual asset components to meet new demands or, replacing individual asset components to partially renew overall asset performance. Rehabilitations are typically made in order to extend an asset's useful life beyond the asset's physical life, in order to reach the asset's maximum potential life.

Replacements – Renewal tasks that require full asset replacement with a brand-new asset at the end of the asset's useful life.

Once the asset has been in-service for a few years and is no longer covered by manufacturer warranty, degradation of asset components or performance becomes more likely. A common model that is used to conceptualize equipment degradation is known as the P-F Interval Model.

As shown in Figure 1, the point in an asset's life at which degradation becomes evident (visible defects, decreased performance, higher maintenance costs, etc.) can be interpreted as the point of *potential failure* (point P); however, identifying point P in an asset's lifecycle is often not a simple task without enforcing structured periodic inspections or testing. As the asset continues to operate past point P, the rate of degradation is assumed to increase until the asset's useful life has expired, theoretically known as the point of *functional failure* (point F). If the asset continues to operate past the expiration of its design life (past point F), preventative measures to avert asset failure are mostly unsuccessful and the asset needs to be replaced.

The time between point P and point F is referred to as the P-F interval, and within this interval is where assets are usually located within their lifecycle when they have a remaining useful life of 10 years or less (specifically for assets associated with the WTP), and is notably associated with the time-period in which asset rehabilitation would help extend point F past the design life. The asset condition (AC) values that were defined and assigned during the Condition Assessment project are overlain on the P-F interval model shown in Figure 1 for reference.

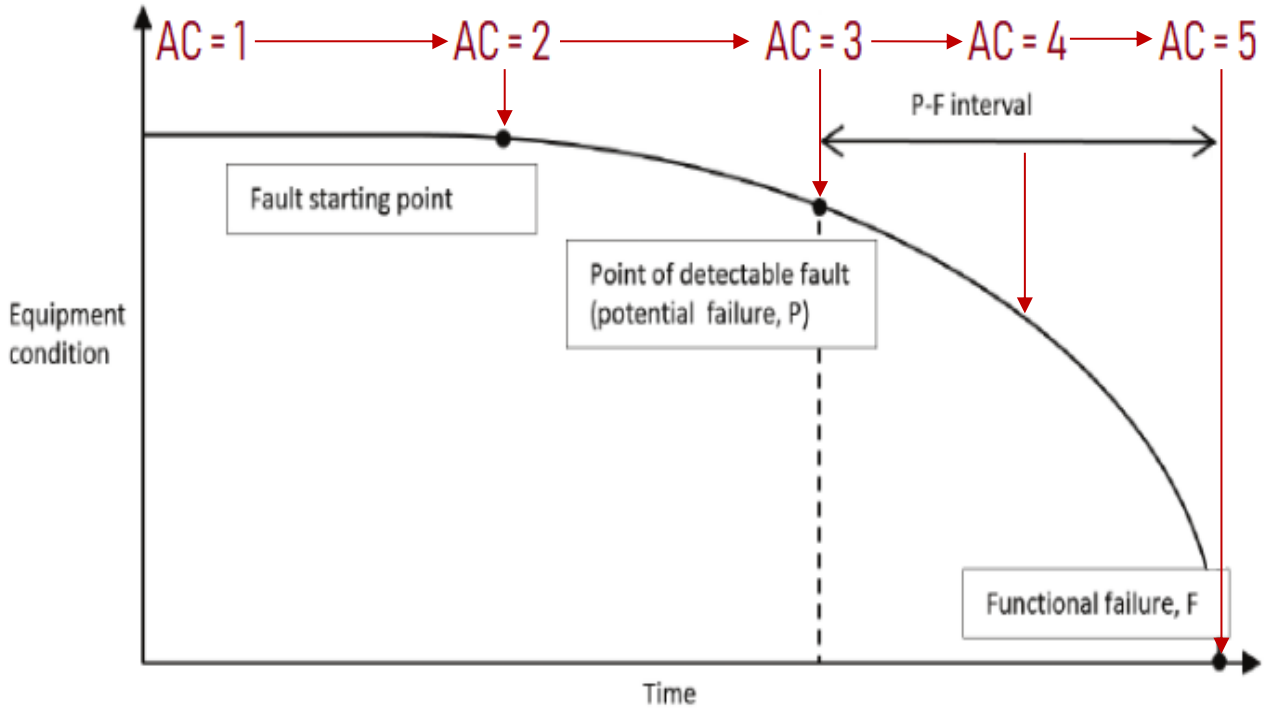

Figure 1: Degradation Curve Example
Source: 'Down Time Terms and Information Used for Assessment of Equipment Reliability and Maintenance Performance' by J. Selvik & E. Ford (2017)

2.2 Ranking of Assets for Repair and Replacement

The two primary criteria used to determine repair and replacement considerations for assets associated with the WTP are the AC (asset condition) and the remaining service life (actual or estimated as determined during the FCI analysis – based on the asset's assigned PoF). In all instances, the remaining service life of the asset is required to be ≤10 years in order to be included in this plan. To differentiate the level of attention required by each asset, the asset condition (AC) values were used to assign assets to one of four replacement groups, as listed below:

Group A – Asset requires immediate replacement within next 1-2 years (FY 2021-2022): *Asset has a remaining useful life of ≤10 years, AC is 5.*

Group B – Asset requires immediate repair and should be replaced within 5 years (FY 2023-2025): *Asset has a remaining useful life of ≤10 years, AC is 4.*

Group C – Asset requires timely repair and should be replaced within 10 years (FY 2026-2030): *Asset has a remaining useful life of ≤10 years, AC is 3.*

Group D – With repairs, asset should be capable of lasting 10 years and should be replaced in 10 years (FY2031): *Asset has a remaining useful life of ≤10 years, AC is less than 3*

An AC of 3 was chosen as the basis for the lowest level of attention since a score of 3 is indicative of the point of potential failure, point P, and is the lowest level at which repairs would most likely start being needed.

Within each group, assets were further sorted based on their calculated level of risk as determined by the risk analysis that was conducted along with the WTP Condition Assessment project. An asset's risk is defined as being equal to the consequence of asset failure (CoF) multiplied by a weighting factor, multiplied by the probability of asset failure (PoF). From the risk analysis, the following levels of risk were established:

Risk Score	Category
≤1	No Risk
1< to ≤10	Low Risk
10< to ≤30	Medium Risk
30< to ≤99	High Risk
100	Critical Risk

Table 1: Risk Score Categories

The higher the asset's risk score, the higher its rank within the replacement group. This ultimately allows for increased precision by prioritizing assets not just by their physical condition and not just by their remaining service life, but also by the asset's criticality to the WTP.

2.3 Results of Determination

A total of 635 assets have been identified as having remaining life of ≤ 10 years, which accounts for 15.0% of the total number of assets associated with the WTP (currently 4,220 following the Condition Assessment). Table 2 shows the distribution of these assets based on their Group (outlined above), and by their asset class. The majority of assets identified for replacement within 10 years are instrumentation assets or controls assets. No architectural (interior – doors, wall partitions, etc) or civil assets were determined to need replacement within 10 years; however, it should be assumed that normal repairs (asphalt patching, interior painting, etc.) should be anticipated during the plan period.

	P MECH	B MECH	INST	CONT	ELEC	SEC	STRUC	BUILD	ARCH	CIVIL	Total
Group A	4	2	20	4	19	0	0	1	0	0	**50**
Group B	19	23	2	4	34	0	1	0	0	0	**83**
Group C	46	35	24	139	33	0	0	0	0	0	**277**
Group D	24	14	116	54	11	4	0	2	0	0	**225**
Total	**93**	**74**	**162**	**201**	**97**	**4**	**1**	**3**	**0**	**0**	**635**

Table 2: Summary of Assets by Class for 10-Year Repair and Replacement

In order to further prioritize certain assets within each Group, we can compare the risk associated with each asset in each Group. A summary of the number of assets associated with each level of risk within each Group is shown in Table 3.

	Group A	Group B	Group C	Group D
No Risk	0	9	26	19
Low Risk	35	46	217	194
Medium Risk	12	20	23	8
High Risk	2	7	11	4
Critical Risk	1	1	0	0

Table 3: Summary of Assets by Risk for 10-Year Repair and Replacement

Of the 635 assets identified for repair or replacement within this plan:

- Two (2) critical-risk assets are identified. Both assets are recommended for immediate repair or replacement.
- Twenty-four (24) high-risk assets are identified. Nine (9) of which are recommended for immediate repair or replacement.
- Sixty-three (63) medium-risk assets are identified. Thirty-two (32) of which are recommended for immediate repair and replacement.
- Four hundred ninety-two (492) low-risk assets are identified. Eighty-one (81) of which are recommended for immediate repair and replacement.
- Fifty-four (54) no-risk assets are identified. None of these assets require immediate replacement, but nine (9) of the assets are recommended for immediate repair.

The eleven (11) critical and high-risk assets that are recommended for immediate repair or replacement (Group A and B assets) are listed in Table 4. Based on the City's available budget and manpower, it should be recognized that it may be in the City's best interest to prioritize higher risk assets in lower replacement groups over lower risk assets in higher replacement groups.

Section 3 includes the full list of all 635 assets. This table includes each individual asset's location, estimated replacement cost in 2020 dollars, risk, and field-identified fault code(s). The table also lists each asset in order of priority, with the highest priority assets at the top and the lowest priority assets at the bottom. Since this plan assumes that all assets will need to be replaced by FY 2031 regardless of the Group, all estimated costs are representative of full asset replacement costs, and do not include estimated repair costs.

A summary of the estimated replacement costs for each asset class and each of the four replacement groups is summarized in Table 5.

Group, Risk	Asset Desc	Asset No.	Replacement Cost [1]	Comments
Group A, Critical	CONTROL PROCESS, BRISTOL BABCOCK - PROCESSOR, DPC 3330, K2-3	0001271	$2,100 [2]	DPC is old and has obsolete parts.
Group A, High	ROOF - PLANT 1 HEADHOUSE, ROOF OVER SWITCH GEAR	0016183	$1,257	Roof in poor physical condition and appears to be leaking.
Group A, High	BREAKER, ITE - CB, K1A	0015408	$11,170	
Group B, Critical	CONTROL PROCESS, BRISTOL BABCOCK - PROCESSOR, DPC 3330 K-1	0007428	$2,100 [2]	Cabinet is corroded, DPC is old and has obsolete parts.
Group B, High	TRANSFORMER, GE - XFMR SS-1-4A, 7.5MVA/10MVA, OIL FILLED, 34.5KV-4160V	0005404	$250,000	Past useful life and corroded
Group B, High	BREAKER, GE - SS-1-1A, MAIN SECONDARY 4160V (1200A; S/N: 295A5289-001)	0005405	$8,251	Past useful life
Group B, High	DAMS & LOCK - 3 MILE LOCK DAM & GATES, UPSTREAM WEIR	0015023	$260,000	Currently the upstream lock is closed to maintain water level using approx. 7' of batter boards. Boards are bowing and in distress. Recommend replacement and quarterly inspection. Tree trimming required.
Group B, High	PUMP, CASCADE PUMP - PUMP RW-4 (S/N: 12879)	0000975	$45,381	Pump is corroded and packing is leaking.
Group B, High	PUMP, CASCADE PUMP - PUMP RW-3 (S/N: 12880)	0000974	$45,381	Pump is corroded and packing is leaking.
Group B, High	VALVE - 48" PLANT 1 FILTERED WATER ISOLATION VALVE	0015146	$42,575	Valve is dirty, corroded, and old
Group B, High	VALVE - 48" PLANT 2 FILTERED WATER ISOLATION VALVE	0015148	$42,575	Valve is corroded and old

Table 4: Top 11 Critical and High Risk Assets Recommended for Immediate Repair or Replacement

[1]Replacement Cost (as defined in the Condition Assessment project's Technical Memorandum) is the estimated total material price in dollars required to replace the asset.

[2]Replacement Cost shown for DPCs does not include additional and incidental tasks that would need to be determined during replacement. Such tasks include the replacement/transfer of I/Os, commissioning, or hardware upgrades. With consideration to these costs, the estimated replacement cost may be closer to $100,000/each.

2.4 Summary of WTP Needs

The priority and cost information that has been compiled as part of this plan should be used to assist in budgeting and prioritizing capital renewal projects in association with the City's existing capital improvements plan.

Since the existing City records largely do not contain maintenance cost information, it is recommended that preventative cost records are diligently accounted for in the coming years in order to track maintenance costs as a percentage of replacement values or costs for each asset. For example, if $1,000 is spent on maintenance for an asset each year, and that asset

has a replacement value of $10,000, the maintenance costs would be 10% ($1,000/$10,000) of the replacement asset value (RAV). At this rate, the total maintenance cost would outweigh the total replacement cost over the course of 10 years. If the asset has a useful life of 15 years, then it could be interpreted that too much is being spent on preventative and/or corrective maintenance for that asset. This benchmark is commonly used in the private industry where 2-4% of RAV is ideal and often expected. Unfortunately, this is not a practical benchmark for the majority of public utilities, but tracking the RAV still provides beneficial data that can be used to identify if an asset is beginning to exhibit premature failure, or if the annual asset maintenance costs are high enough to warrant the asset's rehabilitation or replacement.

The grand total replacement cost identified for all 3,584 functional and in-use assets at the WTP (in service full [ISF], in service limited [ISL], out of service inactive [OSI], and out of service maintenance [OSM] as defined in the Condition Assessment Technical Memorandum), in the James River, and in the Kanawah Canal is estimated at approximately $303.7 million. As estimated during the FCI analysis, and as based on the assigned preventative maintenance hours at an hourly, unburdened maintenance rate of $26.27/hour, the WTP should expect to budget $1.7 million for annual preventative maintenance tasks. This compensation rate was determined using an average hourly employee compensation rate for a machine maintenance worker in the state of Virginia, as sourced by the Bureau of Labor Statistics from their 2019 data on Occupational Employment and Wages. At the time of this analysis, the City's total documented lifetime-to-date maintenance costs within Mainsaver for these assets is equal to $9.43 million.

For assets identified in this repair and replacement plan, the asset class has been assigned a grand total replacement value for each of the four replacement groups (A-D). This data is summarized by asset class and replacement group in Table 5 below. The combined, rounded replacement cost for all 635 assets included within this plan is estimated at $12,374,158.

	Group A	Group B	Group C	Group D	Class Total
P MECH	$36,103	$1,850,774	$6,000,076	$219,882	**$8,106,836**
B MECH	$9,399	$69,628	$173,108	$79,143	**$331,277**
INST	$100,598	$3,700	$103,567	$273,806	**$481,671**
CONT	$8,200	$19,833	$681,870	$322,023	**$1,031,927**
ELEC	$130,179	$1,276,170	$660,883	$77,854	**$2,145,086**
SEC	$0	$0	$0	$6,300	**$6,300**
STRUC	$0	$260,000	$0	$0	**$260,000**
BUILD	$1,257	$0	$0	$9,805	**$11,062**
ARCH	$0	$0	$0	$0	**$0**
CIVIL	$0	$0	$0	$0	**$0**
TOTAL	**$285,736**	**$3,480,105**	**$7,619,504**	**$988,812**	**$12,374,158**

Table 5: Summary of Estimated Replacement Costs by Class and Group

Process mechanical assets that require repair and replacement under this plan account for approximately 66% of the total estimated replacement costs, whereas the total number of process mechanical assets only accounts for approximately 15% of the 635-total assets. Electrical assets follow; accounting for approximately 17% of the total estimated replacement costs and approximately 15% of the total number of assets.

With respect to high-value Facilities at the WTP:

1. Plant 1 and Plant 2 Buildings (see WTP Hierarchy from Condition Assessment project) include the assets that account for the majority of the process mechanical replacement costs. This is largely attributable to the anticipated replacement costs for filter components such as underdrains, integral media support caps, and washwater troughs. These assets will most likely be accounted for in the upcoming filter media, and filter actuators replacement project (anticipated within 2 years).
2. The Raw Water Pump Station and associated assets (excluding raw water pumps) are planned to be replaced/upgraded during the WTP's upcoming pump station upgrades project (anticipated within 2 years).
3. The assets associated with the Lime House are anticipated to be removed, deactivated, or replaced as part of the WTP's lime storage and feed improvements project (anticipated within 4 years).

Figure 2 shows the individual asset class costs and combined replacement costs for each Facility (as outlined in the FCI analysis).

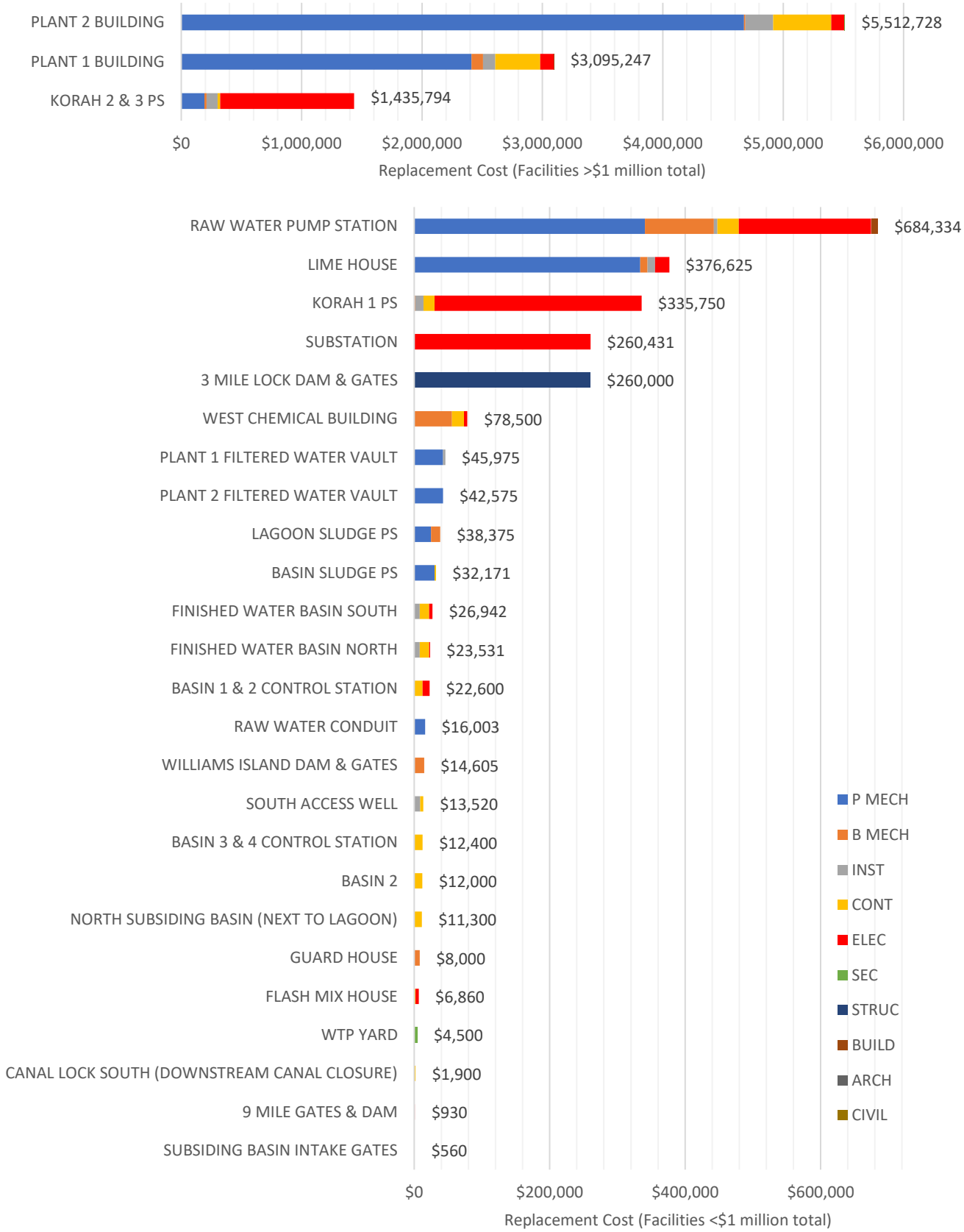

Figure 2: Cumulative 10-Year Replacement Costs by Facility

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3 Comprehensive 10-Year Repair and Replacement Asset List

The following table includes all assets identified for repair and replacement within the next 10 years. The assets are tabulated in order of priority. The primary location (Facility) of each asset is included, but the exact location (building/floor/room) may not be shown.

Location (Facility)	Replace Group	Asset Desc.	Asset No.	Replace Cost	Risk Score	Asset Class	FC
KORAH 2 & 3 PS	Group A	CONTROL PROCESS, BRISTOL BABCOCK - PROCESSOR, DPC 3330, K2-3	0001271	$2,100	100	INST	8
PLANT 1 BUILDING	Group A	ROOF - PLANT 1 HEADHOUSE, ROOF OVER SWITCH GEAR	0016183	$1,300	40	BUILD	2, 3, 4
KORAH 1 PS	Group A	BREAKER, ITE - CB, K1A	0015408	$11,200	40	ELEC	10
KORAH 2 & 3 PS	Group A	FLOWMETER, FISCHER-PORTER - MAGNETIC, K3	0001267	$3,400	15	INST	8
KORAH 2 & 3 PS	Group A	REC, BRISTOL BABCOCK - RECORDER, PRESSURE, K-2	0001365	$2,600	15	INST	8
KORAH 2 & 3 PS	Group A	REC, BRISTOL BABCOCK - RECORDER, PRESSURE, K-3	0001403	$2,400	15	INST	8
KORAH 2 & 3 PS	Group A	REC, BRISTOL BABCOCK - RECORDER, FLOW, K-3 1	0001367	$2,600	15	INST	8
RAW WATER CONDUIT	Group A	VALVE - DISC DRAIN VALVE	0015486	$16,000	15	P MECH	10
PLANT 1 BUILDING	Group A	MOTOR CNTRL CTR, SIEMENS - MCC-1, 480V, 3PH, 3W, 600AMPS (S/N: 011464-50248-01)	0016093	$5,200	12	ELEC	2, 3, 5, 6
KORAH 2 & 3 PS	Group A	ANALYZER, PROMINENT FLUID - FLOURIDE FINISHED WATER NORTH (S/N: 2003003421)	0006546	$16,000	12	INST	8
KORAH 2 & 3 PS	Group A	ANALYZER, PROMINENT FLUID - FLOURIDE FINISHED WATER SOUTH (S/N: 2710025831)	0012971	$14,000	12	INST	8
KORAH 2 & 3 PS	Group A	ANALYZER, PROMINENT FLUID - CL2 FINISHED WATER SOUTH	0001953	$14,000	12	INST	8
KORAH 2 & 3 PS	Group A	ANALYZER, PROMINENT FLUID - CL2 FINISHED WATER NORTH	0001952	$14,000	12	INST	8
KORAH 2 & 3 PS	Group A	METER, ROSEMOUNT - PH, WATER, SOUTH	0006134	$4,100	12	INST	8
KORAH 2 & 3 PS	Group A	METER, ROSEMOUNT - PH, WATER, NORTH	0006133	$4,100	12	INST	8
PLANT 2 BUILDING	Group A	FAN, GREENHECK - EXHAUST FAN (S/N: 88C05817)	0015556	$1,400	5	B MECH	3
RAW WATER PUMP STATION	Group A	HVAC, MODINE - HVAC UNIT, GRADUATE HEAT PUMP, HP-RW-2	0011922	$8,000	5	B MECH	10
KORAH 1 PS	Group A	CONTROL PANEL - RVCP-1	0016385	$2,100	5	CONT	7
KORAH 1 PS	Group A	CONTROL PANEL - RVCP-2	0016386	$2,100	5	CONT	7
KORAH 1 PS	Group A	CONTROL PANEL - K1-1 PUMP INTERFACE PNL	0015976	$2,100	5	CONT	7

KORAH 1 PS	Group A	CONTROL PANEL - K1-2 PUMP INTERFACE PNL	0015977	$2,100	5	CONT	7
KORAH 1 PS	Group A	BREAKER, I.T.E - BREAKER, K1A	0015384	$11,200	5	ELEC	7
KORAH 1 PS	Group A	DISCONNECT, I.T.E - XFMR 2, SECONDARY D/S	0016674	$3,800	5	ELEC	10
KORAH 1 PS	Group A	DISCONNECT - CRANE D/S	0015470	$3,800	5	ELEC	7
KORAH 1 PS	Group A	DISCONNECT, GE - XFMR 1, SECONDARY D/S	0016675	$3,800	5	ELEC	10
KORAH 2 & 3 PS	Group A	DISCONNECT, GE - D/S, TOTAL OF FOUR	0015473	$3,800	5	ELEC	6, 7
KORAH 1 PS	Group A	DISCONNECT, I.T.E - LIME HOUSE FEEDER D/S	0016084	$3,800	5	ELEC	7
RAW WATER PUMP STATION	Group A	ELEC PANEL, WESTINGHOUSE - 120V/208V 3PH EMBEDDED PANEL (S/N: PART # B338548)	0015011	$2,100	5	ELEC	3, 5
KORAH 1 PS	Group A	ELEC PANEL, I.T.E - PNL, K1 (S/N: 7A)	0016282	$2,100	5	ELEC	7
KORAH 2 & 3 PS	Group A	LIGHT - LIGHT FIXTURES #25 MHL #20 T12	0016044	$900	5	ELEC	6, 10
KORAH 1 PS	Group A	STARTER, SQUARE-D - EF, 1 STARTER	0015503	$4,800	5	ELEC	7
KORAH 1 PS	Group A	SWITCH, ASCO - ATS, ASCO	0015314	$400	5	ELEC	7
KORAH 1 PS	Group A	TRANSFORMER, NATIONAL INDUSTRI - XFMR 1, 112.5KVA (S/N: 00524-1)	0016673	$27,100	5	ELEC	10
KORAH 1 PS	Group A	TRANSFORMER, SPANG POWER - XFMR 2, 112.5KVA	0015390	$27,100	5	ELEC	10
PLANT 2 BUILDING	Group A	REC, FOXBORO - RECEIVER, LEVEL, APPLIED WATER	0001172	$2,400	5	INST	2, 5
PLANT 2 BUILDING	Group A	REC, FOXBORO - RECEIVER, LEVEL, CLEARWELL	0001171	$2,400	5	INST	2, 5
PLANT 2 BUILDING	Group A	REC, FOXBORO - RECEIVER, LEVEL, FINISHED WATER BASIN SOUTH, LOW	0001177	$2,400	5	INST	2, 5
PLANT 2 BUILDING	Group A	REC, FOXBORO - RECEIVER, FLOW, RAW WATER, ANALOG	0001174	$2,400	5	INST	2, 5
PLANT 2 BUILDING	Group A	REC, FOXBORO - RECEIVER, LEVEL, RAW WATER	0001173	$2,400	5	INST	2, 5
PLANT 2 BUILDING	Group A	REC, FOXBORO - RECEIVER, FLOW, TOTAL RAW, ANALOG	0001175	$2,400	5	INST	2, 5
PLANT 2 BUILDING	Group A	REC, FOXBORO - RECEIVER, FILTERED, EFFLUENT	0001176	$2,400	5	INST	2, 5
PLANT 2 BUILDING	Group A	REC, FOXBORO - RECEIVER, LEVEL, FINISHED WATER BASIN SOUTH, HIGH	0001170	$2,400	5	INST	2, 5
KORAH 2 & 3 PS	Group A	TRANSMITTER, BRISTOL BABCOCK - FLOW, K-3	0001404	$2,100	5	INST	8
LIME HOUSE	Group A	STARTER, SQUARE-D - BIN ACTIVATOR 1	0016825	$4,800	4	ELEC	6, 7
LIME HOUSE	Group A	STARTER, SQUARE-D - BIN ACTIVATOR 2	0015371	$4,800	4	ELEC	6, 7

LIME HOUSE	Group A	STARTER, SQUARE-D - BIN ACTIVATOR 4 COMBINATION STARTER WITH DISCONNECT	0015373	$4,800	4	ELEC	6, 7
LIME HOUSE	Group A	STARTER, SQUARE-D - BIN ACTIVATOR 3 COMBINATION STARTER	0015372	$4,800	4	ELEC	6, 7
LAGOON SLUDGE PS	Group A	PUMP, FLYGT - LAGOON SLUDGE PUMP 1	0001879	$6,700	1.25	P MECH	6
LAGOON SLUDGE PS	Group A	PUMP, FLYGT - LAGOON SLUDGE PUMP 3	0001881	$6,700	1.25	P MECH	6
LAGOON SLUDGE PS	Group A	PUMP, FLYGT - LAGOON SLUDGE PUMP 2	0001880	$6,700	1.25	P MECH	6
KORAH 1 PS	Group B	CONTROL PROCESS, BRISTOL BABCOCK - PROCESSOR, DPC 3330 K-1	0007428	$2,100	100	CONT	7
SUBSTATION	Group B	TRANSFORMER, GE - XFMR SS-1-4A, 7.5MVA/10MVA, OIL FILLED, 34.5KV-4160V	0005404	$250,000	80	ELEC	2, 7, 10
SUBSTATION	Group B	BREAKER, GE - SS-1-1A, MAIN SECONDARY 4160V (1200A; S/N: 295A5289-001)	0005405	$8,300	40	ELEC	2, 7, 10
3 MILE LOCK DAM & GATES	Group B	DAMS & LOCK - 3 MILE LOCK DAM & GATES, UPSTREAM WEIR	0015023	$260,000	40	STRUC	4, 8
RAW WATER PUMP STATION	Group B	PUMP, CASCADE PUMP - PUMP RW-4 (S/N: 12879)	0000975	$45,400	32	P MECH	4, 6
RAW WATER PUMP STATION	Group B	PUMP, CASCADE PUMP - PUMP RW-3 (S/N: 12880)	0000974	$45,400	32	P MECH	4, 6
PLANT 1 FILTERED WATER VAULT	Group B	VALVE - 48" PLANT 1 FILTERED WATER ISOLATION VALVE	0015146	$42,600	32	P MECH	6, 7
PLANT 2 FILTERED WATER VAULT	Group B	VALVE - 48" PLANT 2 FILTERED WATER ISOLATION VALVE	0015148	$42,600	32	P MECH	7
PLANT 2 BUILDING	Group B	ACTUATOR, AUMA ACTUATORS INC - 24" VALVE, MAIN BACKWASH, PLANT #2	0005615	$6,400	15	CONT	6, 7
PLANT 2 BUILDING	Group B	ELEC PANEL, GE - 208V SWITCHBOARD MSBL-LDP2	0015016	$10,000	15	ELEC	10
PLANT 2 BUILDING	Group B	ELEC PANEL, GE - 480V SWITCHBOARD MSBH-HDP2 (AV LINE SWITCHBOARD)	0015151	$10,000	15	ELEC	10
PLANT 2 BUILDING	Group B	FLOWMETER, MARSH-MCBIRNEY - WASTEWATER FLOWMETER	0006038	$600	15	INST	2
RAW WATER PUMP STATION	Group B	TRANSMITTER, SIEMENS - LEVEL, PRE-SED BASINS	0001576	$3,100	15	INST	7

RAW WATER PUMP STATION	Group B	MOTOR CNTRL CTR, SIEMENS - MCC-1. 480V, 3PH, 600 AMP FED FROM PPA-2 (S/N: 51-1421-80226)	0016094	$5,200	12	ELEC	5
PLANT 1 BUILDING	Group B	STARTER, BENSHAW - SOFT, MOTOR, PUMP N-2	0011880	$4,600	12	ELEC	2, 9, 10
PLANT 1 BUILDING	Group B	STARTER, BENSHAW - SOFT, MOTOR, PUMP N-1	0011879	$4,600	12	ELEC	2, 9, 10
PLANT 2 BUILDING	Group B	FILTER, F.B. LEOPOLD COMPANY - FILTER 21 INTEGRAL MEDIA SUPPORT (IMS) CAP	0015695	$124,000	12	P MECH	10
PLANT 2 BUILDING	Group B	FILTER, F.B. LEOPOLD COMPANY - FILTER 11 INTEGRAL MEDIA SUPPORT (IMS) CAP	0015640	$124,000	12	P MECH	10
PLANT 2 BUILDING	Group B	FILTER, F.B. LEOPOLD COMPANY - FILTER 12 INTEGRAL MEDIA SUPPORT (IMS) CAP	0015645	$124,000	12	P MECH	10
PLANT 2 BUILDING	Group B	FILTER, F.B. LEOPOLD COMPANY - FILTER 20 INTEGRAL MEDIA SUPPORT (IMS) CAP	0015690	$124,000	12	P MECH	10
PLANT 2 BUILDING	Group B	FILTER, F.B. LEOPOLD COMPANY - FILTER 14 INTEGRAL MEDIA SUPPORT (IMS) CAP	0015655	$124,000	12	P MECH	10
PLANT 2 BUILDING	Group B	FILTER, F.B. LEOPOLD COMPANY - FILTER 22 INTEGRAL MEDIA SUPPORT (IMS) CAP	0015700	$124,000	12	P MECH	10
PLANT 2 BUILDING	Group B	FILTER, F.B. LEOPOLD COMPANY - FILTER 15 INTEGRAL MEDIA SUPPORT (IMS) CAP	0015660	$124,000	12	P MECH	10
PLANT 2 BUILDING	Group B	FILTER, F.B. LEOPOLD COMPANY - FILTER 16 INTEGRAL MEDIA SUPPORT (IMS) CAP	0015665	$124,000	12	P MECH	10
PLANT 2 BUILDING	Group B	FILTER, F.B. LEOPOLD COMPANY - FILTER 17 INTEGRAL MEDIA SUPPORT (IMS) CAP	0015670	$124,000	12	P MECH	10
PLANT 2 BUILDING	Group B	FILTER, F.B. LEOPOLD COMPANY - FILTER 18 INTEGRAL MEDIA SUPPORT (IMS) CAP	0015675	$124,000	12	P MECH	10
PLANT 2 BUILDING	Group B	FILTER, F.B. LEOPOLD COMPANY - FILTER 19 INTEGRAL MEDIA SUPPORT (IMS) CAP	0015680	$124,000	12	P MECH	10
PLANT 2 BUILDING	Group B	FILTER, F.B. LEOPOLD COMPANY - FILTER 13 INTEGRAL MEDIA SUPPORT (IMS) CAP	0015650	$124,000	12	P MECH	10
WEST CHEMICAL BUILDING	Group B	FAN, PENN VENTILATION CO. - EXHAUST, EF-4	0006927	$400	9	B MECH	6, 7
WEST CHEMICAL BUILDING	Group B	FAN, PENN VENTILATION CO. - EXHAUST, EF-2	0006925	$400	9	B MECH	6, 7
WEST CHEMICAL BUILDING	Group B	FAN, PENN VENTILATION CO. - EXHAUST, EF-1	0006924	$400	9	B MECH	6, 7

WEST CHEMICAL BUILDING	Group B	FAN, PENN VENTILATION CO. - EXHAUST, EF-3	0006926	$400	9	B MECH	6, 7
WEST CHEMICAL BUILDING	Group B	FAN, PENN VENTILATION CO. - EXHAUST, EF-5	0006928	$1,400	9	B MECH	6, 7
PLANT 2 BUILDING	Group B	VALVE - 16" GATE VALVE FOR PUMP WP-1	0015819	$14,100	9	P MECH	
PLANT 1 BUILDING	Group B	FAN, GREENHECK - EXHAUST	0000844	$1,400	5	B MECH	2, 9, 10
KORAH 2 & 3 PS	Group B	TRANSFORMER, GE - XFMR, 10KVA, DRY TYPE	0016672	$27,100	5	ELEC	10
PLANT 1 BUILDING	Group B	FAN, MASTERVENT - FILTERED AIR SUPPLY #03	0006145	$4,000	4	B MECH	2, 6
LIME HOUSE	Group B	FAN, LOREN COOK COMPANY - EXHAUST EF-2 (S/N: 065S974014-01 / 0001901)	0007425	$1,400	4	B MECH	6, 7
PLANT 1 BUILDING	Group B	FAN, MASTERVENT - FILTERED AIR SUPPLY #04	0006146	$4,000	4	B MECH	2, 6
PLANT 1 BUILDING	Group B	FAN, MASTERVENT - FILTERED AIR SUPPLY #01	0006143	$4,000	4	B MECH	2, 6
PLANT 1 BUILDING	Group B	FAN, MASTERVENT - FILTERED AIR SUPPLY #02	0006144	$4,000	4	B MECH	2, 6
RAW WATER PUMP STATION	Group B	HVAC, CARRIER - AC UNIT, CONDENSING UNIT, COND-RW-1 (S/N: 0703F16603)	0011865	$8,000	4	B MECH	2, 6, 7
LIME HOUSE	Group B	HVAC, ARISTON - HEATER, WATER #01 (S/N: 3605036351001240050666)	0000908	$8,000	4	B MECH	3, 6, 7
PLANT 1 BUILDING	Group B	HVAC, TRANE CORPORATION - AC UNIT, #02	0011907	$8,000	4	B MECH	2
LIME HOUSE	Group B	PLUMBING - GENERAL PLUMBING (FLOOR DRAINS/SINK/DOWN SPOUT)	0015824	$0	4	B MECH	6
PLANT 1 BUILDING	Group B	WATER HEATER, BRADFORD WHITE - WATER HEATER (S/N: CK8377812)	0016649	$4,800	4	B MECH	10
KORAH 2 & 3 PS	Group B	CABINET, GE - GE SUPPLY, STARTER, PUMP K3-4	0005585	$900	4	ELEC	10
KORAH 2 & 3 PS	Group B	CABINET, GE - GE SUPPLY, STARTER, PUMP K2-3	0005579	$900	4	ELEC	10
KORAH 2 & 3 PS	Group B	CABINET, GE - GE SUPPLY, STARTER, PUMP K3-5	0005586	$900	4	ELEC	10
KORAH 2 & 3 PS	Group B	CABINET, GE - GE SUPPLY, STARTER, PUMP K2-2	0005578	$1,300	4	ELEC	10
KORAH 2 & 3 PS	Group B	CABINET, GE - GE SUPPLY, STARTER, PUMP K3-3	0005584	$900	4	ELEC	10
KORAH 2 & 3 PS	Group B	CABINET, GE - GE SUPPLY, STARTER, PUMP K2-1 (S/N: NO TAG)	0005577	$900	4	ELEC	10
KORAH 2 & 3 PS	Group B	CABINET, GE - GE SUPPLY, STARTER, PUMP K3-2	0005583	$900	4	ELEC	10

KORAH 2 & 3 PS	Group B	CHARGERS BATT, SAFT/OLD - CHARGER, SOFT, BATTERY (S/N: 131902)	0011259	$1,500	4	ELEC	10
LIME HOUSE	Group B	LIGHT - LIGHT FIXTURES	0016036	$900	4	ELEC	6
KORAH 2 & 3 PS	Group B	MOTOR CNTRL CTR, GE - MOTOR CONTROL CENTER, MCC-1, IC7700 (S/N: CAT15067705610)	0013014	$7,000	4	ELEC	10
KORAH 1 PS	Group B	MOTOR, US MOTOR - PUMP K1-1 (800HP)	0016125	$102,900	4	ELEC	10
PLANT 2 BUILDING	Group B	MOTOR, DAYTON - TANK MOUNTED VACUUM AIR COMPRESSOR 1 (5HP)	0016823	$1,500	4	ELEC	6, 7
KORAH 2 & 3 PS	Group B	MOTOR, GE - PUMP K3-2 (700HP)	0005588	$90,100	4	ELEC	10
KORAH 2 & 3 PS	Group B	MOTOR, GE - PUMP K3-5 (700HP; S/N: KR8410727)	0005337	$90,100	4	ELEC	10
PLANT 2 BUILDING	Group B	MOTOR, US ELECTRIC MOTORS - TANK MOUNTED VACUUM AIR COMPRESSOR 2 (4.7HP)	0015267	$1,500	4	ELEC	6, 7
KORAH 1 PS	Group B	MOTOR, US MOTOR - PUMP K1-2 (800HP)	0016126	$102,900	4	ELEC	10
KORAH 2 & 3 PS	Group B	MOTOR, GE - PUMP K3-4 (700HP; S/N: KR8410726)	0005336	$90,100	4	ELEC	10
KORAH 2 & 3 PS	Group B	MOTOR, GE - PUMP K3-3 (700HP; S/N: KR8410725)	0005335	$90,100	4	ELEC	10
KORAH 2 & 3 PS	Group B	MOTOR, GE - K2-3 (900HP; S/N: KR8410723)	0005332	$115,600	4	ELEC	10
KORAH 2 & 3 PS	Group B	MOTOR, GE - K2-2 (900HP; S/N: KR8410724)	0005331	$115,600	4	ELEC	10
KORAH 2 & 3 PS	Group B	MOTOR, GE - K2-1 (900HP; S/N: KR8410722)	0005330	$115,600	4	ELEC	10
PLANT 1 BUILDING	Group B	HVAC, TOSHIBA - HEAT PUMP, P1 SERVER HEAT PUMP, HP-P1-3 (S/N: 40440017)	0014016	$4,100	3	B MECH	2, 9, 10
PLANT 1 BUILDING	Group B	HVAC, TOSHIBA - AIR HANDLING UNIT, CEILING CASSETTE, AHU-P1-3	0014017	$8,000	3	B MECH	2, 9, 10
RAW WATER PUMP STATION	Group B	STARTER, GE - SPRAY WATER PUMP STARTERS 3B	0016902	$4,800	3	ELEC	5, 7
RAW WATER PUMP STATION	Group B	STARTER, GE - SPRAY WATER PUMP STARTER 4B	0016901	$4,800	3	ELEC	10
RAW WATER PUMP STATION	Group B	STARTER, GE - SPRAY WATER PUMP STARTERS 3A	0016345	$4,800	3	ELEC	5, 7
RAW WATER PUMP STATION	Group B	STARTER, GE - SPRAY WATER PUMP STARTER 4A	0016344	$4,800	3	ELEC	10
PLANT 1 BUILDING	Group B	FILTER - FILTER 10 WASHWATER TROUGHS (14)	0015636	$170,500	3	P MECH	2, 4, 8

NORTH SUBSIDING BASIN (NEXT TO LAGOON)	Group B	ACTUATOR, RODNEY HUNT - RESIDUALS SETTLING LAGOON/INTAKE INTERCONNECT SLUICE GATE 2 ACTUATOR	0016379	$5,700	1	CONT	2, 7
NORTH SUBSIDING BASIN (NEXT TO LAGOON)	Group B	ACTUATOR, RODNEY HUNT - RESIDUALS SETTLING LAGOON/INTAKE INTERCONNECT SLUICE GATE 1 ACTUATOR	0016377	$5,700	1	CONT	2, 7
LAGOON SLUDGE PS	Group B	MIXER, EPIC INTERNATIONAL - FLOATING SLUDGE MIXER	0005279	$2,300	1	P MECH	7
KORAH 2 & 3 PS	Group B	FAN, INDUSTRIAL AIR - ROOF EXHAUST FAN, EF-2 (S/N: 55036/9C-468)	0000853	$1,400	0.75	B MECH	7
KORAH 2 & 3 PS	Group B	FAN, INDUSTRIAL AIR - ROOF EXHAUST FAN, EF-3 (S/N: 55036/9C-468)	0000854	$1,400	0.75	B MECH	2, 7
KORAH 2 & 3 PS	Group B	FAN, INDUSTRIAL AIR - ROOF EXHAUST FAN, EF-5 (S/N: 55036/9C-468)	0000856	$1,400	0.75	B MECH	7
KORAH 2 & 3 PS	Group B	FAN, INDUSTRIAL AIR - ROOF EXHAUST FAN, EF-4 (S/N: 55036/9C-468)	0000855	$1,400	0.75	B MECH	7
KORAH 2 & 3 PS	Group B	FAN, INDUSTRIAL AIR - ROOF EXHAUST FAN, EF-1 (S/N: 55036/9C-468)	0000852	$1,400	0.75	B MECH	7
RAW WATER PUMP STATION	Group B	STARTER, GE - SCREEN #3 STARTER	0016396	$4,800	0.75	ELEC	2, 10
PLANT 2 BUILDING	Group C	CONTROL PROCESS, GE - CONTROLLER, WASTE PUMP LEVEL	0001356	$2,100	40	INST	7
PLANT 1 BUILDING	Group C	ACTUATOR - 48" CLEARWELL INTERCONNECT HEADER HANDWHEEL ACTUATOR	0016639	$5,700	32	P MECH	6, 7
KORAH 2 & 3 PS	Group C	VALVE - 14" SURGE VALVE #2, K2	0005488	$12,300	32	P MECH	4, 7
PLANT 2 BUILDING	Group C	VALVE, HENRY PRATT COMPANY - 24" ISOLATION BUTTERFLY VALVE, PUMP S-3	0001040	$13,100	32	P MECH	6
KORAH 2 & 3 PS	Group C	VALVE, GA INDUSTRIES - 14" SURGE VALVE #1, K2	0005458	$12,300	32	P MECH	4, 7
PLANT 1 BUILDING	Group C	VALVE - 48" PLANT 1 FILTERED WATER SUCTION CONDUIT HEADER (P1/P2 CLEARWELL INTERCONNECT)	0001045	$42,600	32	P MECH	
KORAH 2 & 3 PS	Group C	VALVE, GA INDUSTRIES - 10" SURGE VALVE #2, K3	0006490	$8,700	32	P MECH	4, 7
KORAH 2 & 3 PS	Group C	VALVE, GA INDUSTRIES - 8" PRV #1	0005278	$6,900	32	P MECH	4, 7
PLANT 2 BUILDING	Group C	VALVE, HENRY PRATT COMPANY - 24" ISOLATION BUTTERFLY VALVE, PUMP S-4	0005429	$13,100	32	P MECH	6

KORAH 2 & 3 PS	Group C	VALVE, GA INDUSTRIES - 8" PRV #2	0005451	$6,900	32	P MECH	
KORAH 2 & 3 PS	Group C	VALVE, GA INDUSTRIES - 10" SURGE VALVE #1, K3	0001026	$8,700	32	P MECH	7
CANAL LOCK SOUTH (DOWNSTREAM CANAL CLOSURE)	Group C	CONTROL PROCESS, SOLA ELECTRIC - MICRO COMPUTER VOLTAGE REGULATOR	0016638	$1,900	15	CONT	6
PLANT 2 BUILDING	Group C	TRANSMITTER, SIEMENS - WASTE PUMP LEVEL SENSORS	0015143	$2,100	15	INST	7
PLANT 2 BUILDING	Group C	TRANSMITTER, SIEMENS - LEVEL, CLEARWELL, PLANT #2	0001226	$2,100	15	INST	7
PLANT 1 BUILDING	Group C	BACKFLOW PREVENTER, AMES FIRE & WATERWORKS - 6" BACKFLOW PREVENTER (S/N: MK-5143)	0011928	$6,700	12	B MECH	7
PLANT 1 BUILDING	Group C	BACKFLOW PREVENTER, WATTS - 6" BACKFLOW PREVENTER (S/N: 244761)	0000798	$6,700	12	B MECH	7
WEST CHEMICAL BUILDING	Group C	ACTUATOR, EIM CONTROLS - FCV-PP-1-1	0006627	$5,700	12	CONT	10
PLANT 2 BUILDING	Group C	ACTUATOR, LIMITORQUE - 48" PLANT 2 FILTERED WATER MAINHEADER VALVE	0006039	$11,400	12	CONT	6, 7
WEST CHEMICAL BUILDING	Group C	ACTUATOR, EIM CONTROLS - FCV-PP-1-2	0006628	$5,700	12	CONT	10
PLANT 2 BUILDING	Group C	MOTOR CNTRL CTR, MOTOR CONTROL CENTER, BENSHAW - PUMP S-4	0005504	$5,200	12	ELEC	10
PLANT 2 BUILDING	Group C	MOTOR, US MOTORS - PUMP, PUMP S-4 (350HP; S/N: ID: Y12Y0680632B-1)	0005446	$28,400	12	ELEC	10
PLANT 2 BUILDING	Group C	MOTOR, US MOTORS - PUMP S-3 (350HP; S/N: Y12Y0680632R-2)	0005445	$28,400	12	ELEC	10
RAW WATER PUMP STATION	Group C	CLIMBING SCREEN, FMC CORPORATION LINK-BELT - TRAVELING WATER SCREEN 4	0001017	$250,000	12	P MECH	3, 6, 7
PLANT 1 BUILDING	Group C	FILTER, F.B. LEOPOLD COMPANY - FILTER 3 UNDERDRAIN	0015705	$217,000	12	P MECH	10
PLANT 1 BUILDING	Group C	FILTER, F.B. LEOPOLD COMPANY - FILTER 2 UNDERDRAIN	0015685	$217,000	12	P MECH	10
PLANT 1 BUILDING	Group C	FILTER, F.B. LEOPOLD COMPANY - FILTER 7 UNDERDRAIN	0015725	$217,000	12	P MECH	10
PLANT 1 BUILDING	Group C	FILTER, F.B. LEOPOLD COMPANY - FILTER 1 UNDERDRAIN	0015630	$217,000	12	P MECH	10
PLANT 1 BUILDING	Group C	FILTER, F.B. LEOPOLD COMPANY - FILTER 10 UNDERDRAIN	0015635	$217,000	12	P MECH	10
PLANT 1 BUILDING	Group C	FILTER, F.B. LEOPOLD COMPANY - FILTER 5 UNDERDRAIN	0015715	$217,000	12	P MECH	10

PLANT 1 BUILDING	Group C	FILTER, F.B. LEOPOLD COMPANY - FILTER 9 UNDERDRAIN	0015735	$217,000	12	P MECH	10
PLANT 1 BUILDING	Group C	FILTER, F.B. LEOPOLD COMPANY - FILTER 4 UNDERDRAIN	0015710	$217,000	12	P MECH	10
PLANT 1 BUILDING	Group C	FILTER, F.B. LEOPOLD COMPANY - FILTER 6 UNDERDRAIN	0015720	$217,000	12	P MECH	10
PLANT 1 BUILDING	Group C	FILTER, F.B. LEOPOLD COMPANY - FILTER 8 UNDERDRAIN	0015730	$217,000	12	P MECH	10
LIME HOUSE	Group C	GATE - 60"X60" SLUICE GATE #2 (P2, SOUTH WELL)	0000894	$13,800	12	P MECH	6, 7
WEST CHEMICAL BUILDING	Group C	CRANE - CHAIN HOIST CRANE (1TON)	0015409	$13,700	9	B MECH	6
WEST CHEMICAL BUILDING	Group C	FAN, ENGINEERED AIR - PACKAGE UNIT, ROOFTOP, RTU-1	0006885	$1,400	9	B MECH	6, 7
WEST CHEMICAL BUILDING	Group C	FAN, ENGINEERED AIR - PACKAGE UNIT, ROOFTOP, RTU-2	0006886	$1,400	9	B MECH	6, 7
WEST CHEMICAL BUILDING	Group C	FAN, ENGINEERED AIR - PACKAGE UNIT, ROOFTOP, RTU-4	0006888	$1,400	9	B MECH	6, 7
WEST CHEMICAL BUILDING	Group C	FAN, ENGINEERED AIR - PACKAGE UNIT, ROOFTOP, RTU-3	0006887	$1,400	9	B MECH	6, 7
SUBSTATION	Group C	BATTERY, CROWN BATTERY - SG-6-11B, SWITCHGEAR 6	0006312	$700	9	ELEC	10
SUBSTATION	Group C	CHARGERS BATT, HOPPECKE BATTERIES INC - SG-6-11A, SWITCHGEAR 6 (S/N: 592143)	0005400	$1,500	9	ELEC	10
PLANT 2 BUILDING	Group C	FILTER, F.B. LEOPOLD COMPANY - FILTER 17 UNDERDRAIN	0006943	$217,000	9	P MECH	10
PLANT 2 BUILDING	Group C	FILTER, F.B. LEOPOLD COMPANY - FILTER 16 UNDERDRAIN	0006942	$217,000	9	P MECH	10
PLANT 2 BUILDING	Group C	FILTER, F.B. LEOPOLD COMPANY - FILTER 15 UNDERDRAIN	0006941	$217,000	9	P MECH	10
PLANT 2 BUILDING	Group C	FILTER, F.B. LEOPOLD COMPANY - FILTER 18 UNDERDRAIN	0006944	$217,000	9	P MECH	10
PLANT 2 BUILDING	Group C	FILTER, F.B. LEOPOLD COMPANY - FILTER 12 UNDERDRAIN	0006938	$217,000	9	P MECH	10
PLANT 2 BUILDING	Group C	FILTER, F.B. LEOPOLD COMPANY - FILTER 19 UNDERDRAIN	0006945	$217,000	9	P MECH	10
PLANT 2 BUILDING	Group C	FILTER, F.B. LEOPOLD COMPANY - FILTER 14 UNDERDRAIN	0006940	$217,000	9	P MECH	10
PLANT 2 BUILDING	Group C	FILTER, F.B. LEOPOLD COMPANY - FILTER 20 UNDERDRAIN	0006946	$217,000	9	P MECH	10
PLANT 2 BUILDING	Group C	FILTER, F.B. LEOPOLD COMPANY - FILTER 11 UNDERDRAIN	0006937	$217,000	9	P MECH	10
PLANT 2 BUILDING	Group C	FILTER, F.B. LEOPOLD COMPANY - FILTER 21 UNDERDRAIN	0006947	$217,000	9	P MECH	10
PLANT 2 BUILDING	Group C	FILTER, F.B. LEOPOLD COMPANY - FILTER 22 UNDERDRAIN	0006948	$217,000	9	P MECH	10

PLANT 2 BUILDING	Group C	FILTER, F.B. LEOPOLD COMPANY - FILTER 13 UNDERDRAIN	0006939	$217,000	9	P MECH	10
9 MILE GATES & DAM	Group C	CABINET - MAIN BREAKER CABINET	0016088	$900	6	ELEC	7
PLANT 2 BUILDING	Group C	ACTUATOR, EIM CONTROLS - AIR SCOUR, FILTER 21	0006770	$5,300	5	CONT	2, 7
PLANT 2 BUILDING	Group C	ACTUATOR - VALVE, DRAIN, FILTER 15	0015199	$6,400	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR - VALVE, BWS, FILTER 11	0015183	$6,400	5	CONT	7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, EFFLUENT, FILTER 1	0006097	$4,800	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR - VALVE, REWASH, FILTER 19	0015215	$3,100	5	CONT	7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - INFLUENT GATE, FILTER 2	0006099	$5,900	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR, EIM CONTROLS - EFFLUENT RATE CONTROL, FILTER 17	0006778	$4,800	5	CONT	2, 7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, BWS, FILTER 2	0006100	$5,900	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR - VALVE, BWS, FILTER 19	0015191	$6,400	5	CONT	7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, REWASH, FILTER 2	0006101	$3,100	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR - VALVE, REWASH, FILTER 11	0015207	$3,100	5	CONT	7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - EFFLUENT RATE CONTROL, FILTER 2	0006102	$4,800	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR, EIM CONTROLS - AIR SCOUR, FILTER 17	0006766	$5,300	5	CONT	2, 7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, EFFLUENT, FILTER 2	0006103	$4,800	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR, EIM CONTROLS - EFFLUENT RATE CONTROL, FILTER 13	0006774	$4,800	5	CONT	2, 7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, BWW, FILTER 2	0006104	$5,900	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR, EIM CONTROLS - EFFLUENT RATE CONTROL, FILTER 21	0006782	$4,800	5	CONT	2, 7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - INFLUENT GATE, FILTER 4 (S/N: L688582)	0006105	$5,900	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR - VALVE, BWS, FILTER 15	0015187	$6,400	5	CONT	7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, EFFLUENT, FILTER 4	0006106	$4,800	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR - VALVE, DRAIN, FILTER 11	0015195	$6,400	5	CONT	7

PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, BWS, FILTER 4	0006107	$5,900	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR - VALVE, DRAIN, FILTER 19	0015203	$6,400	5	CONT	7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, BWW, FILTER 4	0006108	$5,900	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR - VALVE, REWASH, FILTER 15	0015211	$3,100	5	CONT	7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, REWASH, FILTER 4	0006109	$3,100	5	CONT	7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, REWASH, FILTER 1	0006095	$3,100	5	CONT	7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - EFFLUENT RATE CONTROL, FILTER 4	0006110	$4,800	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR, EIM CONTROLS - AIR SCOUR, FILTER 19	0006768	$5,300	5	CONT	2, 7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - INFLUENT GATE, FILTER 3 (S/N: L688584)	0006111	$5,900	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR, EIM CONTROLS - EFFLUENT RATE CONTROL, FILTER 11	0006772	$4,800	5	CONT	2, 7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, BWS, FILTER 3	0006112	$5,900	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR, EIM CONTROLS - EFFLUENT RATE CONTROL, FILTER 15	0006776	$4,800	5	CONT	2, 7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, BWW, FILTER 3	0006113	$5,900	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR, EIM CONTROLS - EFFLUENT RATE CONTROL, FILTER 19	0006780	$4,800	5	CONT	2, 7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, REWASH, FILTER 3	0006114	$3,100	5	CONT	7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - EFFLUENT RATE CONTROL, FILTER 3	0006115	$4,800	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR - VALVE, BWS, FILTER 13	0015185	$6,400	5	CONT	7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, EFFLUENT, FILTER 3	0006116	$4,800	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR - VALVE, BWS, FILTER 17	0015189	$6,400	5	CONT	7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - INFLUENT GATE, FILTER 5 (S/N: L688583)	0006117	$5,900	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR - VALVE, BWS, FILTER 21	0015193	$6,400	5	CONT	7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, BWS, FILTER 5	0006118	$5,900	5	CONT	7

PLANT 2 BUILDING	Group C	ACTUATOR - VALVE, DRAIN, FILTER 13	0015197	$6,400	5	CONT	7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, BWW, FILTER 5	0006119	$5,900	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR - VALVE, DRAIN, FILTER 17	0015201	$6,400	5	CONT	7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, REWASH, FILTER 5	0006120	$3,100	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR - VALVE, DRAIN, FILTER 21	0015205	$6,400	5	CONT	7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - EFFLUENT RATE CONTROL, FILTER 5	0006121	$4,800	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR - VALVE, REWASH, FILTER 13	0015209	$3,100	5	CONT	7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - INFLUENT GATE, FILTER 1	0006093	$5,900	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR - VALVE, REWASH, FILTER 17	0015213	$3,100	5	CONT	7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, BWS, FILTER 1	0006094	$5,900	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR - VALVE, REWASH, FILTER 21	0015217	$3,100	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR, EIM CONTROLS - AIR SCOUR, FILTER 13	0006762	$5,300	5	CONT	2, 7
PLANT 2 BUILDING	Group C	ACTUATOR, EIM CONTROLS - AIR SCOUR, FILTER 15	0006764	$5,300	5	CONT	2, 7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, EFFLUENT, FILTER 5	0006122	$4,800	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR, EIM CONTROLS - AIR SCOUR, FILTER 12	0006761	$5,300	5	CONT	2, 7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - INFLUENT GATE, FILTER 6 (S/N: L688580)	0006123	$5,900	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR, EIM CONTROLS - AIR SCOUR, FILTER 14	0006763	$5,300	5	CONT	2, 7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, BWS, FILTER 6	0006124	$5,900	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR, EIM CONTROLS - AIR SCOUR, FILTER 16	0006765	$5,300	5	CONT	2, 7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, BWW, FILTER 6	0006125	$5,900	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR, EIM CONTROLS - AIR SCOUR, FILTER 18	0006767	$5,300	5	CONT	2, 7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, REWASH, FILTER 6	0006126	$3,100	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR, EIM CONTROLS - AIR SCOUR, FILTER 20	0006769	$5,300	5	CONT	2, 7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - EFFLUENT RATE CONTROL, FILTER 6	0006127	$4,800	5	CONT	7

PLANT 2 BUILDING	Group C	ACTUATOR, EIM CONTROLS - AIR SCOUR, FILTER 22	0006771	$5,300	5	CONT	2, 7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, EFFLUENT, FILTER 6	0006128	$4,800	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR, EIM CONTROLS - EFFLUENT RATE CONTROL, FILTER 12	0006773	$4,800	5	CONT	2, 7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - INFLUENT GATE, FILTER 9 (S/N: L688581)	0006135	$5,900	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR, EIM CONTROLS - EFFLUENT RATE CONTROL, FILTER 14	0006775	$4,800	5	CONT	2, 7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, BWS, FILTER 9	0006136	$5,900	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR, EIM CONTROLS - EFFLUENT RATE CONTROL, FILTER 16	0006777	$4,800	5	CONT	2, 7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, BWW, FILTER 9	0006137	$5,900	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR, EIM CONTROLS - EFFLUENT RATE CONTROL, FILTER 18	0006779	$4,800	5	CONT	2, 7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, REWASH, FILTER 9	0006138	$3,100	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR, EIM CONTROLS - EFFLUENT RATE CONTROL, FILTER 20	0006781	$4,800	5	CONT	2, 7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - EFFLUENT RATE CONTROL, FILTER 9	0006139	$4,800	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR, EIM CONTROLS - EFFLUENT RATE CONTROL, FILTER 22	0006783	$4,800	5	CONT	2, 7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, EFFLUENT, FILTER 9	0006140	$4,800	5	CONT	7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - INFLUENT GATE, FILTER 7 (S/N: L688576)	0006160	$5,900	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR - VALVE, BWS, FILTER 12	0015184	$6,400	5	CONT	7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, BWS, FILTER 7	0006161	$5,900	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR - VALVE, BWS, FILTER 14	0015186	$6,400	5	CONT	7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, BWW, FILTER 7	0006162	$5,900	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR - VALVE, BWS, FILTER 16	0015188	$6,400	5	CONT	7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, REWASH, FILTER 7	0006163	$3,100	5	CONT	7

PLANT 2 BUILDING	Group C	ACTUATOR - VALVE, BWS, FILTER 18	0015190	$6,400	5	CONT	7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - EFFLUENT RATE CONTROL, FILTER 7	0006164	$4,800	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR - VALVE, BWS, FILTER 20	0015192	$6,400	5	CONT	7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, EFFLUENT, FILTER 7	0006165	$4,800	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR - VALVE, BWS, FILTER 22	0015194	$6,400	5	CONT	2
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - INFLUENT GATE, FILTER 8 (S/N: L688577)	0006166	$5,900	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR - VALVE, DRAIN, FILTER 12	0015196	$6,400	5	CONT	7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, BWS, FILTER 8	0006167	$5,900	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR - VALVE, DRAIN, FILTER 14	0015198	$6,400	5	CONT	7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, BWW, FILTER 8	0006168	$5,900	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR - VALVE, DRAIN, FILTER 16	0015200	$6,400	5	CONT	7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, REWASH, FILTER 8	0006169	$3,100	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR - VALVE, DRAIN, FILTER 18	0015202	$6,400	5	CONT	7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - EFFLUENT RATE CONTROL, FILTER 8	0006170	$4,800	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR - VALVE, DRAIN, FILTER 20	0015204	$6,400	5	CONT	7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, EFFLUENT, FILTER 8	0006171	$4,800	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR - VALVE, DRAIN, FILTER 22	0015206	$6,400	5	CONT	7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - INFLUENT GATE, FILTER 10 (S/N: L688585)	0006172	$5,900	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR - VALVE, REWASH, FILTER 12	0015208	$3,100	5	CONT	7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, BWS, FILTER 10	0006173	$5,900	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR - VALVE, REWASH, FILTER 14	0015210	$3,100	5	CONT	7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, BWW, FILTER 10	0006174	$5,900	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR - VALVE, REWASH, FILTER 16	0015212	$3,100	5	CONT	7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, REWASH, FILTER 10	0006175	$3,100	5	CONT	7

PLANT 2 BUILDING	Group C	ACTUATOR - VALVE, REWASH, FILTER 18	0015214	$3,100	5	CONT	7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - EFFLUENT RATE CONTROL, FILTER 10	0006176	$4,800	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR - VALVE, REWASH, FILTER 20	0015216	$3,100	5	CONT	7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, EFFLUENT, FILTER 10	0006177	$4,800	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR - VALVE, REWASH, FILTER 22	0015218	$3,100	5	CONT	7
PLANT 1 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, BWW, FILTER 1	0006337	$6,400	5	CONT	7
PLANT 2 BUILDING	Group C	ACTUATOR, EIM CONTROLS - AIR SCOUR, FILTER 11	0006760	$5,300	5	CONT	2, 7
PLANT 1 BUILDING	Group C	CONTROL PANEL, CUSTOM CONTROL PANEL - PANEL, SUMP CONTROL TANK	0001633	$2,100	5	CONT	6
RAW WATER PUMP STATION	Group C	INDICATOR, FISCHER-PORTER - TRANSMITTER, INDICATING RAW WATER LEVEL, SOUTH BASIN	0016603	$1,100	5	CONT	7
RAW WATER PUMP STATION	Group C	METER, HACH - TURBIDITY RAW WATER #02 (RWPS #4)	0007781	$4,100	5	CONT	7
RAW WATER PUMP STATION	Group C	METER, ROSEMOUNT - PH, RAW WATER #1	0005349	$4,100	5	CONT	7
RAW WATER PUMP STATION	Group C	METER, ROSEMOUNT - PH, RAW WATER #2	0005350	$4,100	5	CONT	7
RAW WATER PUMP STATION	Group C	TRANSMITTER, FISCHER-PORTER - UTRASONIC LEVEL, RAW WATER PUMP #03	0006411	$2,100	5	CONT	7
RAW WATER PUMP STATION	Group C	TRANSMITTER, MAGNETROL - WET WELL LEVEL RWPS #02	0007031	$1,700	5	CONT	7
RAW WATER PUMP STATION	Group C	TRANSMITTER, MAGNETROL - WET WELL LEVEL RWPS #01	0007030	$1,700	5	CONT	7
RAW WATER PUMP STATION	Group C	TRANSMITTER, FISCHER-PORTER - UTRASONIC LEVEL, RAW WATER PUMP #04	0006412	$2,100	5	CONT	7
RAW WATER PUMP STATION	Group C	TRANSMITTER, SIEMENS - INDICATING RAW WATER LEVEL, NORTH BASIN	0011658	$3,100	5	CONT	7
RAW WATER PUMP STATION	Group C	TRANSMITTER, MAGNETROL - UTRASONIC LEVEL, RAW WATER #1	0006499	$1,700	5	CONT	7
RAW WATER PUMP STATION	Group C	TRANSMITTER, MAGNETROL - UTRASONIC LEVEL, RAW WATER #2	0006500	$1,700	5	CONT	7

PLANT 2 BUILDING	Group C	FLOWMETER, ABB INC - METER, FILTER 19 16" EFFLUENT FLOW, FE-132-09	0006735	$6,200	5	INST	2, 7
PLANT 2 BUILDING	Group C	FLOWMETER, ABB INC - PLANT 2 30" BACKWASH SUPPLY FLOW, FE-245	0006742	$7,800	5	INST	2, 7
PLANT 2 BUILDING	Group C	FLOWMETER, ABB INC - METER, FILTER 21 16" EFFLUENT FLOW, FE-132-11	0006737	$6,200	5	INST	2, 7
PLANT 2 BUILDING	Group C	FLOWMETER, ABB INC - METER, FILTER 13 16" EFFLUENT FLOW, FE-132-03	0006729	$6,200	5	INST	2, 7
PLANT 2 BUILDING	Group C	FLOWMETER, ABB INC - METER, FILTER 18 16" EFFLUENT FLOW, FE-132-08	0006734	$6,200	5	INST	2, 7
PLANT 2 BUILDING	Group C	FLOWMETER, ABB INC - METER, FILTER 14 16" EFFLUENT FLOW, FE-132-04	0006730	$6,200	5	INST	2, 7
PLANT 2 BUILDING	Group C	FLOWMETER, ABB INC - METER, FILTER 20 16" EFFLUENT FLOW, FE-132-10	0006736	$6,200	5	INST	2, 7
PLANT 2 BUILDING	Group C	FLOWMETER, ABB INC - METER, FILTER 15 16" EFFLUENT FLOW, FE-132-05	0006731	$6,200	5	INST	2, 7
PLANT 2 BUILDING	Group C	FLOWMETER, ABB INC - METER, FILTER 22 16" EFFLUENT FLOW, FE-132-12	0006738	$6,200	5	INST	2, 7
PLANT 2 BUILDING	Group C	FLOWMETER, ABB INC - METER, FILTER 11 16" EFFLUENT FLOW, FE-132-01	0006727	$6,200	5	INST	2, 7
PLANT 2 BUILDING	Group C	FLOWMETER, ABB INC - METER, FILTER 12 16" EFFLUENT FLOW, FE-132-02	0006728	$6,200	5	INST	2, 7
PLANT 2 BUILDING	Group C	FLOWMETER, ABB INC - METER, FILTER 17 16" EFFLUENT FLOW, FE-132-07	0006733	$6,200	5	INST	2, 7
PLANT 2 BUILDING	Group C	FLOWMETER, ABB INC - METER, FILTER 16 16" EFFLUENT FLOW, FE-132-06	0006732	$6,200	5	INST	2, 7
WEST CHEMICAL BUILDING	Group C	HVAC, MID ATLANTIC CONTROL CORPORATION - HVAC CONTROL SYSTEM	0015847	$8,000	4	B MECH	10
PLANT 1 BUILDING	Group C	HVAC, TRANE CORPORATION - AIR HANDLING UNIT, #01, AHU-P1-1	0011906	$8,000	4	B MECH	2
RAW WATER PUMP STATION	Group C	HVAC, CARRIER - AIR HANDLING UNIT, AHU-RW-1	0011918	$8,000	4	B MECH	6
GUARD HOUSE	Group C	HVAC, FRIEDRICH - AC UNIT, PACKAGED TERMINAL AIR CONDITIONER, HEATING/COOLING	0012664	$8,000	4	B MECH	2

PLANT 2 BUILDING	Group C	SAFETY, GUARDIAN - SHOWER, AM STORAGE SAFETY SHOWER AND EYEWASH STATION	0012392	$1,100	4	B MECH	3
PLANT 2 BUILDING	Group C	SAFETY, GUARDIAN - SHOWER, AM OFFLOAD SAFETY SHOWER AND EYEWASH STATION	0012176	$1,100	4	B MECH	3
PLANT 2 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, S-2	0005431	$5,900	4	CONT	6, 7
PLANT 2 BUILDING	Group C	ACTUATOR, LIMITORQUE - VALVE, S-3	0005430	$5,900	4	CONT	6, 7
WEST CHEMICAL BUILDING	Group C	HVAC - AIR DISTRIBUTION DUCTWORK / AIR DEVICES 1	0015239	$8,000	3	B MECH	10
PLANT 1 BUILDING	Group C	HVAC, GREENHECK - FAN, EXHAUST (S/N: 91J04360)	0012559	$8,000	3	B MECH	2, 6
WEST CHEMICAL BUILDING	Group C	HVAC - AIR DISTRIBUTION DUCTWORK / AIR DEVICES 2	0015238	$8,000	3	B MECH	10
WEST CHEMICAL BUILDING	Group C	PLUMBING, HAWS CORP. - WATER COOLER	0016648	$1,200	3	B MECH	3, 10
PLANT 1 BUILDING	Group C	PLUMBING, HALSEY TAYLOR - WATER COOLER	0016647	$1,200	3	B MECH	3, 10
WEST CHEMICAL BUILDING	Group C	SAFETY - SMOKE DUCT DETECTOR	0016510	$1,100	3	B MECH	10
PLANT 1 BUILDING	Group C	SAFETY, GUARDIAN - SHOWER, ZOP FEEDE SAFETY SHOWER AND EYEWASH STATION	0012391	$1,100	3	B MECH	10
PLANT 1 BUILDING	Group C	SAFETY, PENTAIR THERMAL - SHOWER, ZOP OFFLOAD SAFETY SHOWER AND EYEWASH STATION	0012390	$1,100	3	B MECH	10
LIME HOUSE	Group C	SAFETY, HAWS CORPORATION - EMERGENCY EYEWASH STATION	0006088	$1,100	3	B MECH	6
PLANT 1 BUILDING	Group C	SAFETY, SPEAKMAN COMPANY - SHOWER, FL FEED SAFETY SHOWER AND EYEWASH STATION	0006081	$1,100	3	B MECH	10
PLANT 1 BUILDING	Group C	SAFETY, BRADLEY CORP. - SHOWER, SAFETY SHOWER AND EYEWASH STATION (NEAR N-4)	0006080	$1,100	3	B MECH	10
PLANT 1 BUILDING	Group C	SAFETY, HAWS CORP. - EYEWASH, HAWS CORPORATION, EMERGENCY STATION	0006085	$1,100	3	B MECH	10
WEST CHEMICAL BUILDING	Group C	SAFETY, HAWS CORP. - SHOWER, PC FEED SAFETY SHOWER AND EYEWASH STATION	0012387	$1,100	3	B MECH	7
BASIN SLUDGE PS	Group C	TRANSMITTER - BASIN SLUDGE WET WELL LEVEL	0016907	$2,100	3	CONT	2, 7, 10
KORAH 2 & 3 PS	Group C	CABINET, CH - SUPPLY, STARTER, PUMP K3-1 (S/N: 96-CR242598)	0005582	$900	3	ELEC	10
KORAH 2 & 3 PS	Group C	CABINET, CH - SUPPLY, STARTER, PUMP K2-5 (S/N: 97-LY463S1B)	0005581	$900	3	ELEC	10

KORAH 2 & 3 PS	Group C	CABINET, CH - SUPPLY, STARTER, PUMP K2-4 (S/N: 97-LY463S1B)	0005580	$900	3	ELEC	10
FINISHED WATER BASIN NORTH	Group C	FAN - EXHAUST FAN STARTER. MS-NB-1.	0015568	$1,400	3	ELEC	7
RAW WATER PUMP STATION	Group C	FAN - EXHAUST FAN CONTROL PANEL	0015567	$1,400	3	ELEC	7
RAW WATER PUMP STATION	Group C	MOTOR, GE - SPRAY WATER PUMP 4B (40HP; S/N: 445262)	0007011	$6,000	3	ELEC	10
PLANT 1 BUILDING	Group C	MOTOR, BROOK HANSON - LIQUID RING VACUUM PUMP & COMPRESSOR 1 (5.5HP)	0016820	$1,600	3	ELEC	6, 7
PLANT 1 BUILDING	Group C	MOTOR, CONTINENTAL - PUMP N-2 (150HP; S/N: H61721)	0005448	$21,000	3	ELEC	2, 6
PLANT 2 BUILDING	Group C	MOTOR, WESTINGHOUSE ELEC. CORP. - WASTE WATER, PUMP WP-1 (50HP; S/N: 7703)	0005962	$7,200	3	ELEC	2, 6, 7
KORAH 2 & 3 PS	Group C	MOTOR, TOSHIBA - K2-4 (900HP; S/N: A11696)	0005333	$130,000	3	ELEC	10
PLANT 2 BUILDING	Group C	MOTOR, WESTINGHOUSE ELEC. CORP. - WASTE WATER, PUMP WP-2 (50HP; S/N: 7703)	0005963	$7,200	3	ELEC	2, 6, 7
PLANT 1 BUILDING	Group C	MOTOR, CONTINENTAL - PUMP N-1 (150HP; S/N: 461722)	0005447	$21,000	3	ELEC	2, 6
PLANT 2 BUILDING	Group C	MOTOR, WESTINGHOUSE ELEC. CORP. - WASTE WATER, PUMP WP-3 (50HP; S/N: 7703)	0005964	$7,200	3	ELEC	2, 6, 7
KORAH 2 & 3 PS	Group C	MOTOR, TOSHIBA - TOSHIBA-PUMP K3-1 (700HP; S/N: A11699)	0005587	$90,100	3	ELEC	10
RAW WATER PUMP STATION	Group C	MOTOR, GE - SPRAY WATER PUMP 3A (40HP; S/N: 7267)	0007008	$6,000	3	ELEC	10
KORAH 2 & 3 PS	Group C	MOTOR, TOSHIBA - K2-5 (900HP; S/N: A11695)	0005334	$130,000	3	ELEC	10
RAW WATER PUMP STATION	Group C	MOTOR, GE - SPRAY WATER PUMP 3B (40HP; S/N: 474147)	0007009	$6,000	3	ELEC	10
PLANT 1 BUILDING	Group C	MOTOR, CONTINENTAL - PUMP N-4 (200HP; S/N: H61724)	0005745	$28,000	3	ELEC	2, 6
RAW WATER PUMP STATION	Group C	MOTOR, GE - SPRAY WATER PUMP 4A (40HP; S/N: 7268)	0007010	$6,000	3	ELEC	10
PLANT 1 BUILDING	Group C	MOTOR, CONTINENTAL - PUMP N-3 (200HP; S/N: H61723)	0005744	$26,400	3	ELEC	2, 6
FINISHED WATER BASIN SOUTH	Group C	STARTER - MS-SB-1 STARTER FOR EXHAUST FAN ON ROOF	0016128	$4,800	3	ELEC	7
PLANT 2 BUILDING	Group C	FILTER - FILTER 14 WASHWATER TROUGHS (14)	0015656	$170,500	3	P MECH	2, 3, 6

PLANT 2 BUILDING	Group C	FILTER - FILTER 11 WASHWATER TROUGHS (14)	0015641	$170,500	3	P MECH	2, 3, 6
PLANT 2 BUILDING	Group C	FILTER - FILTER 13 WASHWATER TROUGHS (14)	0015651	$170,500	3	P MECH	2, 6, 8
RAW WATER PUMP STATION	Group C	TRANSFORMER, ACME - XFMR #1, 10 KVA, ENCAPSULATED DISTRIBUTION XFMR, 480V PRI/240V SECOND	0015003	$27,100	1.25	ELEC	2, 10
RAW WATER PUMP STATION	Group C	TRANSFORMER, ACME - XFMR #2, 10 KVA, ENCAPSULATED DISTRIBUTION XFMR, 480V PRI/240V SECOND	0016830	$27,100	1.25	ELEC	2, 10
RAW WATER PUMP STATION	Group C	TRANSFORMER, ACME - XFMR #3, 10 KVA, ENCAPSULATED DISTRIBUTION XFMR, 480V PRI/240V SECOND	0016829	$27,100	1.25	ELEC	2, 10
PLANT 2 BUILDING	Group C	REC, BRISTOL BABCOCK - RECORDER, FLOW, K-2 1	0001366	$2,600	1.25	INST	
PLANT 2 BUILDING	Group C	REC, RECORDER, BRISTOL BABCOCK - FLOW, K-3 2	0002126	$2,400	1.25	INST	
PLANT 2 BUILDING	Group C	REC, BRISTOL BABCOCK - RECORDER, PRESSURE, K-2 2	0001368	$2,600	1.25	INST	
PLANT 2 BUILDING	Group C	REC, BRISTOL BABCOCK - RECORDER, PRESSURE, K-3 1	0001370	$2,600	1.25	INST	
LIME HOUSE	Group C	CABINET - LIME ACTIVATOR	0005595	$900	1	ELEC	6
LIME HOUSE	Group C	CHEM FEED, MERRICK INDUSTRIES, INC. - INDICATOR, LIMEHOPPER WEIGHT #04	0001933	$1,200	1	INST	6
LIME HOUSE	Group C	CHEM FEED, MERRICK INDUSTRIES, INC. - INDICATOR, LIMEHOPPER WEIGHT #03	0001932	$1,200	1	INST	6
LIME HOUSE	Group C	CHEM FEED, MERRICK INDUSTRIES, INC. - INDICATOR, LIMEHOPPER WEIGHT #01	0001930	$1,200	1	INST	6
LIME HOUSE	Group C	CHEM FEED, MERRICK INDUSTRIES, INC. - INDICATOR, LIMEHOPPER WEIGHT #02	0001931	$1,200	1	INST	6
LIME HOUSE	Group C	CHEM FEED - LIME BIN ACTIVATOR 4	0016077	$5,000	1	P MECH	6
LIME HOUSE	Group C	CHEM FEED - LIME BIN ACTIVATOR 2	0016075	$5,000	1	P MECH	6
LIME HOUSE	Group C	CHEM FEED - LIME BIN ACTIVATOR 1	0016074	$5,000	1	P MECH	6
LIME HOUSE	Group C	CHEM FEED, MERRICK INDUSTRIES, INC. - LIME SLAKER 2	0000916	$75,000	1	P MECH	6
LIME HOUSE	Group C	CHEM FEED - LIME BIN ACTIVATOR 3	0016076	$5,000	1	P MECH	6
LIME HOUSE	Group C	CHEM FEED, MERRICK INDUSTRIES, INC. - LIME SLAKER 3	0000917	$75,000	1	P MECH	6
LIME HOUSE	Group C	CHEM FEED, MERRICK INDUSTRIES, INC. - LIME SLAKER 1	0000915	$75,000	1	P MECH	6

LIME HOUSE	Group C	CHEM FEED, MERRICK INDUSTRIES, INC. - LIME SLAKER 4	0000918	$75,000	1	P MECH	6
RAW WATER PUMP STATION	Group C	CRANE, HANDLING SYSTEMS - JIB CRANE, NORTH (2TON)	0006014	$6,900	0.75	B MECH	7
RAW WATER PUMP STATION	Group C	CRANE, HANDLING SYSTEMS - JIB CRANE, SOUTH (2TON)	0006015	$13,700	0.75	B MECH	7
LAGOON SLUDGE PS	Group C	CRANE, THERN - DAVIT CRANE & WINCH	0016766	$13,700	0.75	B MECH	6
RAW WATER PUMP STATION	Group C	CRANE, ACCO - JIB CRANE HOIST, NORTH	0015019	$13,700	0.75	B MECH	7
RAW WATER PUMP STATION	Group C	CRANE, ACCO - JIB CRANE HOIST, SOUTH	0015020	$13,700	0.75	B MECH	7
KORAH 2 & 3 PS	Group C	FAN - INTAKE IF-5	0000861	$1,400	0.75	B MECH	6, 7
KORAH 2 & 3 PS	Group C	FAN - INTAKE IF-4	0000860	$1,400	0.75	B MECH	5, 6, 7
KORAH 2 & 3 PS	Group C	FAN - INTAKE IF-1	0000857	$1,400	0.75	B MECH	3, 5, 6, 7
KORAH 2 & 3 PS	Group C	WATER HEATER, ARISTON - ELECTRIC DOMESTIC WATER HEATER (S/N: 360503635100126005281)	0015521	$4,800	0.75	B MECH	
FLASH MIX HOUSE	Group C	CONTROL PANEL, CUSTOM ENCLOSURE - SUMP PUMP CONTROL PANEL	0016587	$2,100	0.75	CONT	2, 6, 7
FLASH MIX HOUSE	Group C	STARTER, CROUSE HINDS - STARTER	0016558	$4,800	0.75	ELEC	2, 6, 7
RAW WATER PUMP STATION	Group C	STARTER, GE - SCREEN #4 STARTER	0016397	$4,800	0.75	ELEC	2, 10
SUBSIDING BASIN INTAKE GATES	Group C	CABINET, WIEGMANN - WALL MOUNT ENCLOSURE	0016641	$600	0.25	P MECH	6, 7
KORAH 2 & 3 PS	Group D	VALVE - 8" GATE VALVE (WTP POTABLE CONNECTION)	0015175	$6,900	80	P MECH	7
PLANT 2 BUILDING	Group D	SEPARATOR, BELCO - AQUA AMMONIA SCRUBBER TANK T-AM-7-1 (SAME AS T-AM-2-1) (S/N: 36636)	0015312	$15,000	60	P MECH	
PLANT 1 FILTERED WATER VAULT	Group D	FLOWMETER, SIEMENS - PRESSURE METER AND TRANSMITTER, FINISHED WATER NORTH FLOW (VENTURI)	0012127	$3,400	32	INST	7
KORAH 2 & 3 PS	Group D	VALVE - 24" MAIN DISCHARGE HEADER GATE VALVE (TO 36" MAIN), KORAH 3	0015487	$16,000	32	P MECH	7

PLANT 2 BUILDING	Group D	TRANSMITTER, ROSEMOUNT - PRESSURE, ELECTRONIC, PIT-FW-1-2	0011367	$2,100	15	INST	
RAW WATER PUMP STATION	Group D	TRANSMITTER, FISCHER-PORTER - TRANSMITTER, LEVEL, PRESED	0001222	$2,100	15	INST	7
SOUTH ACCESS WELL	Group D	ACTUATOR, EIM CONTROLS - TRANSFER VALVE TANK 2 (S/N: 046747A.02)	0001656	$2,300	12	CONT	6
SOUTH ACCESS WELL	Group D	ACTUATOR, EIM CONTROLS - TRANSFER VALVE TANK 1 (S/N: 046747A.01)	0001655	$2,300	12	CONT	6
SOUTH ACCESS WELL	Group D	INDICATOR, PRECISION DIGITAL - LEVEL, TANK 1 NAOH	0001650	$400	12	INST	6
SOUTH ACCESS WELL	Group D	INDICATOR, PRECISION DIGITAL - LEVEL, TANK 2 NAOH	0001651	$400	12	INST	6
SOUTH ACCESS WELL	Group D	METER, MAGNETROL - TANK 2 SODIUM HYDROXIDE LEVEL TRANSDUCER, LE-651-2	0001645	$4,100	12	INST	6
SOUTH ACCESS WELL	Group D	METER, MAGNETROL - TANK 1 SODIUM HYDROXIDE LEVEL TRANSDUCER, LE-651-1	0001644	$4,100	12	INST	6
RAW WATER PUMP STATION	Group D	CRANE - A-FRAME	0015233	$13,700	9	B MECH	6
PLANT 2 BUILDING	Group D	COMPUTER OPERT, CIM - OIT, CP-AM	0016755	$5,100	9	CONT	6
PLANT 2 BUILDING	Group D	COMPUTER OPERT - PLANT 2 CONTROL WORKSTATION	0016746	$5,100	6	CONT	
PLANT 1 BUILDING	Group D	COMPUTER OPERT - PLANT 1 CONTROL WORKSTATION	0016745	$5,100	6	CONT	
KORAH 1 PS	Group D	CABINET, CITY OF RICHMOND - MOTOR, CUSTOM	0005596	$900	6	ELEC	
RAW WATER PUMP STATION	Group D	MOTOR, GE - PUMP RW-2 (200HP)	0016821	$26,400	6	ELEC	6
RAW WATER PUMP STATION	Group D	MOTOR, GE - PUMP RW-1 (200HP; S/N: WSH283003335)	0016822	$26,400	6	ELEC	6
KORAH 2 & 3 PS	Group D	ACTUATOR, EIM CONTROLS - VALVE ACTUATOR K2-4 (S/N: 42163A02)	0011256	$5,600	5	CONT	6
KORAH 2 & 3 PS	Group D	ACTUATOR, EIM CONTROLS - VALVE ACTUATOR K2-5 (S/N: 42163A01)	0011257	$5,600	5	CONT	6
RAW WATER PUMP STATION	Group D	METER, HACH - TURBIDITY RAW WATER #02	0007782	$4,100	5	CONT	
KORAH 2 & 3 PS	Group D	ELEC PANEL, GE - PNL, PB	0016284	$2,100	5	ELEC	10
KORAH 2 & 3 PS	Group D	ELEC PANEL, GE - PNL, PA	0016283	$2,100	5	ELEC	10

KORAH 2 & 3 PS	Group D	CABINET, CITY OF RICHMOND - CONTROL ISLAND, NEW KORAH	0005589	$900	5	INST	7
PLANT 2 BUILDING	Group D	INDICATOR, VORNE INDUSTRIES - LEVEL, CLEARWELL #2	0006395	$1,100	5	INST	2
PLANT 1 BUILDING	Group D	INDICATOR, VORNE INDUSTRIES - PLANT 1 WASHWATER FLOW, ANALOG	0006179	$1,100	5	INST	2
PLANT 2 BUILDING	Group D	ROTAMETER, FISCHER-PORTER - FILTER 18	0006217	$700	5	INST	2
PLANT 2 BUILDING	Group D	ROTAMETER, FISCHER-PORTER - FILTER 22	0006221	$700	5	INST	2
PLANT 2 BUILDING	Group D	ROTAMETER, FISCHER-PORTER - FILTER 20	0006219	$700	5	INST	2
PLANT 2 BUILDING	Group D	ROTAMETER, FISCHER-PORTER - FILTER 12	0006211	$700	5	INST	2
PLANT 2 BUILDING	Group D	ROTAMETER, FISCHER-PORTER - FILTER 17	0006216	$700	5	INST	2
PLANT 2 BUILDING	Group D	ROTAMETER, FISCHER-PORTER - FILTER 13	0006212	$700	5	INST	2
PLANT 2 BUILDING	Group D	ROTAMETER, FISCHER-PORTER - FILTER 19	0006218	$700	5	INST	2
PLANT 2 BUILDING	Group D	ROTAMETER, FISCHER-PORTER - FILTER 14	0006213	$700	5	INST	2
PLANT 2 BUILDING	Group D	ROTAMETER, FISCHER-PORTER - FILTER 21	0006220	$700	5	INST	2
PLANT 2 BUILDING	Group D	ROTAMETER, FISCHER-PORTER - FILTER 15	0006214	$700	5	INST	2
PLANT 2 BUILDING	Group D	ROTAMETER, FISCHER-PORTER - FILTER 11	0006210	$700	5	INST	2
PLANT 2 BUILDING	Group D	ROTAMETER, FISCHER-PORTER - FILTER 16	0006215	$700	5	INST	2
KORAH 2 & 3 PS	Group D	TRANSMITTER, ROSEMOUNT - PRESSURE, K-2	0006048	$2,100	5	INST	7
RAW WATER PUMP STATION	Group D	HVAC, QMARK - HEATER, ELECTRIC UNIT HEATER, RW4-SCRRM-UH1	0012713	$8,000	4	B MECH	2, 3, 6
RAW WATER PUMP STATION	Group D	HVAC, QMARK - HEATER, ELECTRIC UNIT HEATER, RW3	0015842	$8,000	4	B MECH	2, 3, 6
RAW WATER PUMP STATION	Group D	ROOF - RAW WATER PS 4 ROOF	0016369	$4,900	4	BUILD	2, 3
RAW WATER PUMP STATION	Group D	ROOF - RAW WATER PS 3 ROOF	0016365	$4,900	4	BUILD	2, 3
FINISHED WATER BASIN NORTH	Group D	ACTUATOR, EIM CONTROLS - 30" P1 FWB INFLUENT VALVE	0011993	$5,000	4	CONT	2
FINISHED WATER BASIN SOUTH	Group D	ACTUATOR, EIM CONTROLS - 30" P2 FWB INFLUENT VALVE	0011992	$5,000	4	CONT	2

FINISHED WATER BASIN SOUTH	Group D	ACTUATOR, EIM CONTROLS - 36" P2 FWB INFLUENT VALVE	0011990	$8,900	4	CONT	2
FINISHED WATER BASIN NORTH	Group D	ACTUATOR, EIM CONTROLS - 36" P1 FWB INFLUENT VALVE	0011991	$8,900	4	CONT	2
PLANT 2 BUILDING	Group D	ANALYZER, PROMINENT FLUID - CL2 WEST CLEARWELL	0006130	$14,000	4	INST	
PLANT 2 BUILDING	Group D	ANALYZER, PROMINENT FLUID - CL2 EAST CLEARWELL	0006129	$14,000	4	INST	
KORAH 1 PS	Group D	INDICATOR, SIEMENS - SENSOR, LEVEL SENSOR	0011656	$3,100	4	INST	6
PLANT 2 BUILDING	Group D	METER, HACH - TURBIDITY FILTER 11, AE-131-01	0007766	$400	4	INST	6
PLANT 2 BUILDING	Group D	METER, HACH - TURBIDITY FILTER 22, AE-131-12	0007777	$400	4	INST	6
PLANT 2 BUILDING	Group D	METER, HACH - TURBIDITY FILTER 20, AE-131-10	0007775	$400	4	INST	6
PLANT 2 BUILDING	Group D	METER, HACH - TURBIDITY FILTER 12, AE-131-02	0007767	$400	4	INST	6
KORAH 2 & 3 PS	Group D	METER, HACH - TURBIDITY FINISHED WATER SOUTH	0007779	$500	4	INST	6
PLANT 2 BUILDING	Group D	METER, HACH - TURBIDITY FILTER 13, AE-131-03	0007768	$400	4	INST	6
PLANT 2 BUILDING	Group D	METER, HACH - TURBIDITY FILTER 19, AE-131-09	0007774	$400	4	INST	6
PLANT 2 BUILDING	Group D	METER, HACH - TURBIDITY FILTER 14, AE-131-04	0007769	$400	4	INST	6
PLANT 2 BUILDING	Group D	METER, HACH - TURBIDITY FILTER 21, AE-131-11	0007776	$400	4	INST	6
PLANT 2 BUILDING	Group D	METER, HACH - TURBIDITY FILTER 15, AE-131-05	0007770	$400	4	INST	6
KORAH 2 & 3 PS	Group D	METER, HACH - TURBIDITY-NORTH (AIT-416)	0007778	$4,100	4	INST	6, 7
KORAH 1 PS	Group D	METER, ROSEMOUNT - PH, NORTH, OLD KORAH #1	0009293	$4,100	4	INST	7
KORAH 1 PS	Group D	METER, ROSEMOUNT - PH, SOUTH, OLD KORAH #1	0009234	$4,100	4	INST	7
PLANT 2 BUILDING	Group D	METER, HACH - TURBIDITY FILTER 17, AE-131-07	0007772	$400	4	INST	6
PLANT 2 BUILDING	Group D	METER, HACH - TURBIDITY FILTER 18, AE-131-08	0007773	$400	4	INST	6
PLANT 2 BUILDING	Group D	METER, HACH - TURBIDITY FILTER 16, AE-131-06	0007771	$400	4	INST	6
FINISHED WATER BASIN SOUTH	Group D	TRANSMITTER, SIEMENS - LEVEL, ULTRASONIC TRANSDUCER, LE-FW-3-2-2	0012006	$2,100	4	INST	2
FINISHED WATER BASIN NORTH	Group D	TRANSMITTER, SIEMENS - LEVEL, ULTRASONIC TRANSDUCER, LE-FW-3-1-1	0011662	$2,100	4	INST	2

FINISHED WATER BASIN NORTH	Group D	TRANSMITTER, SIEMENS - LEVEL, ULTRASONIC, LIT-FW-3-1-2	0012016	$2,000	4	INST	2
FINISHED WATER BASIN SOUTH	Group D	TRANSMITTER, SIEMENS - LEVEL, ULTRASONIC, LIT-FW-3-2-1	0012017	$2,000	4	INST	2
FINISHED WATER BASIN SOUTH	Group D	TRANSMITTER, SIEMENS - LEVEL, ULTRASONIC TRANSDUCER, LE-FW-3-2-1	0012005	$2,100	4	INST	2
LIME HOUSE	Group D	TRANSMITTER, SIEMENS - LEVEL TRANSMITTER 1	0016011	$2,100	4	INST	
FINISHED WATER BASIN NORTH	Group D	TRANSMITTER, SIEMENS - LEVEL, ULTRASONIC, LIT-FW-3-1-1	0012015	$2,000	4	INST	2
LIME HOUSE	Group D	TRANSMITTER, SIEMENS - SOUTH ACCESS WELL SUMP LEVEL	0016867	$2,100	4	INST	2
FINISHED WATER BASIN NORTH	Group D	TRANSMITTER, SIEMENS - LEVEL, ULTRASONIC TRANSDUCER, LE-FW-3-1-2	0011661	$2,100	4	INST	2
FINISHED WATER BASIN SOUTH	Group D	TRANSMITTER, SIEMENS - LEVEL, ULTRASONIC, LIT-FW-3-2-2	0012018	$2,000	4	INST	2
PLANT 1 BUILDING	Group D	TRANSMITTER, SIEMENS - DIFFERENTIAL FLOWMETER, RAW WATER, FOR VENTURI #3	0006393	$2,100	4	INST	7
PLANT 1 BUILDING	Group D	TRANSMITTER, SIEMENS - DIFFERENTIAL FLOWMETER, RAW WATER, FOR VENTURI #4	0006394	$2,100	4	INST	7
LIME HOUSE	Group D	TRANSMITTER, SIEMENS - NORTH ACCESS WELL SUMP LEVEL	0016012	$2,100	4	INST	2
BASIN SLUDGE PS	Group D	PUMP, FLYGT - BASIN SLUDGE PUMP 2, BP-2 (95GPM)	0001893	$10,000	4	P MECH	6, 7
BASIN SLUDGE PS	Group D	PUMP, FLYGT - BASIN SLUDGE PUMP 1, BP-1 (95GPM)	0001892	$10,000	4	P MECH	6, 7
BASIN SLUDGE PS	Group D	PUMP, FLYGT - BASIN SLUDGE PUMP 3, BP-3 (95GPM)	0001894	$10,000	4	P MECH	6, 7
KORAH 2 & 3 PS	Group D	VALVE - 30" MAIN DISCHARGE HEADER GATE KORAH 2 EAST	0015840	$16,000	4	P MECH	7
KORAH 2 & 3 PS	Group D	VALVE - 20" PUMP K2-5 CONTROL VALVE	0016332	$17,600	4	P MECH	7
KORAH 2 & 3 PS	Group D	VALVE - 20" PUMP K2-3 CONTROL VALVE	0016328	$17,600	4	P MECH	7
PLANT 2 BUILDING	Group D	VALVE, NIL-COR - 2" COMPOSITE FLANGED VALVE FV-AM-1-1	0011310	$1,600	4	P MECH	
PLANT 2 BUILDING	Group D	VALVE, NIL-COR - 2" COMPOSITE FLANGED VALVE FV-AM-7-1 (SCRUBBER)	0011322	$1,600	4	P MECH	
KORAH 2 & 3 PS	Group D	VALVE - 16" PUMP K3-3 CONTROL VALVE	0016337	$14,100	4	P MECH	7

PLANT 2 BUILDING	Group D	VALVE, NIL-COR - 2" COMPOSITE FLANGED VALVE FV-AM-1-2	0011312	$1,600	4	P MECH	
KORAH 2 & 3 PS	Group D	VALVE - 24" HEADER ISOLATION GATE BETWEEN PUMPS K3-3 AND K3-4	0015841	$16,000	4	P MECH	7
PLANT 2 BUILDING	Group D	VALVE, NIL-COR - 2" COMPOSITE FLANGED VALVE FV-AM-1-3	0011314	$1,600	4	P MECH	
KORAH 2 & 3 PS	Group D	VALVE - 20" PUMP K2-4 CONTROL VALVE	0016330	$17,600	4	P MECH	7
PLANT 2 BUILDING	Group D	VALVE - 4" AMMONIA OFFLOADING DRAIN VALVE	0015307	$3,400	4	P MECH	6, 7
KORAH 2 & 3 PS	Group D	VALVE - 16" PUMP K3-1 CONTROL VALVE (S/N: 72089)	0016333	$14,100	4	P MECH	7
PLANT 2 BUILDING	Group D	VALVE, NIL-COR - 2" COMPOSITE FLANGED VALVE FV-AM-2-2	0011318	$1,600	4	P MECH	
PLANT 2 BUILDING	Group D	VALVE, NIL-COR - 2" COMPOSITE FLANGED VALVE FV-AM-2-1	0011316	$1,600	4	P MECH	
PLANT 2 BUILDING	Group D	VALVE, NIL-COR - 2" COMPOSITE FLANGED VALVE FV-AM-2-3	0011320	$1,600	4	P MECH	
WTP YARD	Group D	SECURITY, HYSECURITY - GATE CONTROLLER, PLANT ENTRY GATE	0012379	$1,500	4	SEC	
WTP YARD	Group D	SECURITY, HYSECURITY - GATE CONTROLLER, EAST GATE	0012381	$1,500	4	SEC	
WTP YARD	Group D	SECURITY, HYSECURITY - GATE CONTROLLER, BRIDGE GATE	0012380	$1,500	4	SEC	
PLANT 1 BUILDING	Group D	FAN, GREENHECK - EXHAUST, EF-2 (S/N: 91JO4361)	0000843	$1,400	3	B MECH	10
WEST CHEMICAL BUILDING	Group D	FAN, S & P SOLER & PALAU - S&P, EXHAUST, EF-7, EF-WC-7 (S/N: SN660230-1)	0012999	$1,400	3	B MECH	10
KORAH 1 PS	Group D	FAN, LOREN COOK COMPANY - EXHAUST EF-1 (S/N: 065S974014-01/0000701)	0000839	$1,400	3	B MECH	6
PLANT 1 BUILDING	Group D	HVAC, MANITOWOC - ICE MACHINE, MANITOWAC, PLANT #1 CORRIDOR	0012919	$8,000	3	B MECH	10
PLANT 1 BUILDING	Group D	HVAC, TRANE CORPORATION - AC UNIT, #02, AHU-P1-2	0011905	$8,000	3	B MECH	10
WEST CHEMICAL BUILDING	Group D	WATER HEATER, STATE WATER HEATERS - ELECTRIC, WATER	0007449	$4,800	3	B MECH	10
BASIN 2	Group D	ANALYZER, PROMINENT FLUID - CL2 EFFLUENT	0006330	$12,000	3	CONT	
PLANT 2 BUILDING	Group D	ANALYZER, PROMINENT FLUID - CL2 EFFLUENT (BASIN 2)	0006328	$12,000	3	CONT	
PLANT 2 BUILDING	Group D	COMPUTER OPERT, SCHNEIDER ELECTRIC - OIT, CP-2	0016753	$6,200	3	CONT	
PLANT 2 BUILDING	Group D	COMPUTER OPERT, SCHNEIDER ELECTRIC - OIT, FILTERED WATER PUMP CONTROL PANEL (HMI-16-1)	0015740	$6,200	3	CONT	

PLANT 2 BUILDING	Group D	COMPUTER OPERT, SCHNEIDER ELECTRIC - OIT, PLC-16 FILTERED WATER PUMPS	0016754	$6,200	3	CONT	
PLANT 1 BUILDING	Group D	ANALYZER, PROMINENT FLUID - CL2 EFFLUENT (BASIN 3)	0006327	$12,000	3	INST	
PLANT 1 BUILDING	Group D	ANALYZER, PROMINENT FLUID - CL2 SOUTH BY-PASS	0001955	$12,000	3	INST	
PLANT 1 BUILDING	Group D	ANALYZER, PROMINENT FLUID - CL2 NORTH BY-PASS	0001954	$12,000	3	INST	
PLANT 2 BUILDING	Group D	DETECTION GA, SENSIDYNE - KIT, REMOTE MOUNT SENSOR, AE-AM-5	0011416	$2,400	3	INST	
PLANT 2 BUILDING	Group D	DETECTION GA, SENSIDYNE - MONITOR, AMMONIA GAS, ASH-AM-5	0011414	$2,600	3	INST	
PLANT 2 BUILDING	Group D	REC, ASHCROFT INC - GAUGE, PRESSURE, PI-AM-3-2	0011377	$2,400	3	INST	
PLANT 2 BUILDING	Group D	REC, ASHCROFT INC - GAUGE, PRESSURE, PI-AM-3-4	0011379	$2,400	3	INST	
PLANT 2 BUILDING	Group D	REC, ASHCROFT INC - GAUGE, PRESSURE, PI-AM-3-3	0011378	$2,400	3	INST	
PLANT 2 BUILDING	Group D	REC, ASHCROFT INC - GAUGE, PRESSURE, PI-AM-3-6	0011381	$2,400	3	INST	
PLANT 2 BUILDING	Group D	REC, ASHCROFT INC - GAUGE, PRESSURE, PI-AM-3-5	0011380	$2,400	3	INST	
PLANT 2 BUILDING	Group D	REC, ASHCROFT INC - GAUGE, PRESSURE, PI-AM-3-1	0011376	$2,400	3	INST	
PLANT 2 BUILDING	Group D	REC, ASHCROFT INC - GAUGE, PRESSURE, PI-FW-1-2	0011389	$2,400	3	INST	
PLANT 1 BUILDING	Group D	TRANSMITTER, SIEMENS - ROF, FILTER 3	0001161	$2,700	3	INST	2
PLANT 2 BUILDING	Group D	TRANSMITTER, ISE-MAGTECH - MAGNETIC LEVEL, LT-AM-1-2	0011360	$2,100	3	INST	
PLANT 2 BUILDING	Group D	TRANSMITTER, SIEMENS - TRANSMITTER, LOH, FILTER 11, PDT-130-01	0001190	$2,700	3	INST	2
PLANT 2 BUILDING	Group D	TRANSMITTER, SIEMENS - TRANSMITTER, LOH, FILTER 12, PDT-130-02	0001191	$2,700	3	INST	2
PLANT 2 BUILDING	Group D	TRANSMITTER, ROSEMOUNT - MAGNETIC FLOW, FIT-AM-9-1 (NORTH BASIN)	0011372	$2,100	3	INST	
PLANT 2 BUILDING	Group D	TRANSMITTER, SIEMENS - TRANSMITTER, LOH, FILTER 13, PDT-130-03	0001192	$2,700	3	INST	2
PLANT 1 BUILDING	Group D	TRANSMITTER, SIEMENS - ROF, FILTER 7	0001165	$2,700	3	INST	2
PLANT 2 BUILDING	Group D	TRANSMITTER, SIEMENS - TRANSMITTER, LOH, FILTER 14, PDT-130-04	0001193	$2,700	3	INST	2
PLANT 1 BUILDING	Group D	TRANSMITTER, SIEMENS - LOH, FILTER 10	0001158	$2,700	3	INST	2

PLANT 2 BUILDING	Group D	TRANSMITTER, SIEMENS - TRANSMITTER, LOH, FILTER 15, PDT-130-05	0001194	$2,700	3	INST	2
PLANT 1 BUILDING	Group D	TRANSMITTER, ROSEMOUNT - PRESSURE, BACKWASH SUPPLY METER, PIT-FW-1-1-1	0011366	$2,100	3	INST	6
PLANT 2 BUILDING	Group D	TRANSMITTER, SIEMENS - TRANSMITTER, LOH, FILTER 16, PDT-130-06	0001195	$2,700	3	INST	2
PLANT 2 BUILDING	Group D	TRANSMITTER, SENSIDYNE - SENSOR, AMMONIA GAS, AE-AM-5	0011415	$2,100	3	INST	6
PLANT 2 BUILDING	Group D	TRANSMITTER, SIEMENS - TRANSMITTER, LOH, FILTER 17, PDT-130-07	0001196	$2,700	3	INST	2
PLANT 1 BUILDING	Group D	TRANSMITTER, SIEMENS - ROF, FILTER 5	0001163	$2,700	3	INST	2
PLANT 2 BUILDING	Group D	TRANSMITTER, SIEMENS - TRANSMITTER, LOH, FILTER 18, PDT-130-08	0001197	$2,700	3	INST	2
PLANT 1 BUILDING	Group D	TRANSMITTER, SIEMENS - ROF, FILTER 9	0001167	$2,700	3	INST	2
PLANT 2 BUILDING	Group D	TRANSMITTER, SIEMENS - TRANSMITTER, LOH, FILTER 19, PDT-130-09	0001198	$2,700	3	INST	2
PLANT 1 BUILDING	Group D	TRANSMITTER, SIEMENS - LOH, FILTER 9	0001157	$2,700	3	INST	2
PLANT 1 BUILDING	Group D	TRANSMITTER, SIEMENS - LOH, FILTER 2	0001150	$2,700	3	INST	2
PLANT 2 BUILDING	Group D	TRANSMITTER, ISE-MAGTECH - MAGNETIC LEVEL, LT-AM-1-1	0011359	$2,100	3	INST	
PLANT 1 BUILDING	Group D	TRANSMITTER, SIEMENS - LOH, FILTER 3	0001151	$2,700	3	INST	2
PLANT 2 BUILDING	Group D	TRANSMITTER, ISE-MAGTECH - MAGNETIC LEVEL, LT-AM-1-3	0011361	$2,100	3	INST	
PLANT 2 BUILDING	Group D	TRANSMITTER, SIEMENS - TRANSMITTER, LOH, FILTER 22, PDT-130-12	0001201	$2,700	3	INST	2
PLANT 1 BUILDING	Group D	TRANSMITTER, SIEMENS - ROF, FILTER 1	0001159	$2,700	3	INST	2
PLANT 1 BUILDING	Group D	TRANSMITTER, SIEMENS - LOH, FILTER 4	0001152	$2,700	3	INST	
PLANT 2 BUILDING	Group D	TRANSMITTER, ROSEMOUNT - MAGNETIC FLOW, FIT-AM-9-2 (SOUTH BASIN)	0011373	$2,100	3	INST	
PLANT 1 BUILDING	Group D	TRANSMITTER, SIEMENS - LOH, FILTER 5	0001153	$2,700	3	INST	2
PLANT 1 BUILDING	Group D	TRANSMITTER, SIEMENS - ROF, FILTER 2	0001160	$2,700	3	INST	2
PLANT 1 BUILDING	Group D	TRANSMITTER, ROSEMOUNT - FLOW, WASH WATER, PLANT #1	0001349	$2,100	3	INST	7
PLANT 1 BUILDING	Group D	TRANSMITTER, SIEMENS - ROF, FILTER 4	0001162	$2,700	3	INST	2

PLANT 1 BUILDING	Group D	TRANSMITTER, ROSEMOUNT - LEVEL, CLEARWELL, PLANT #1	0001350	$2,100	3	INST	
PLANT 1 BUILDING	Group D	TRANSMITTER, SIEMENS - ROF, FILTER 6	0001164	$2,700	3	INST	2
PLANT 1 BUILDING	Group D	TRANSMITTER, SIEMENS - LOH, FILTER 6	0001154	$2,700	3	INST	2
PLANT 1 BUILDING	Group D	TRANSMITTER, SIEMENS - ROF, FILTER 8	0001166	$2,700	3	INST	2
PLANT 1 BUILDING	Group D	TRANSMITTER, SIEMENS - LOH, FILTER 7	0001155	$2,700	3	INST	2
PLANT 1 BUILDING	Group D	TRANSMITTER, SIEMENS - ROF, FILTER 10	0001168	$2,700	3	INST	2
KORAH 2 & 3 PS	Group D	TRANSMITTER, ROSEMOUNT - PRESSURE, K-3 (S/N: 1737894)	0006047	$2,100	3	INST	7
PLANT 1 BUILDING	Group D	TRANSMITTER, SIEMENS - LOH, FILTER 8	0001156	$2,700	3	INST	2
PLANT 2 BUILDING	Group D	TRANSMITTER, SIEMENS - TRANSMITTER, LOH, FILTER 20, PDT-130-10	0001199	$2,700	3	INST	2
PLANT 1 BUILDING	Group D	TRANSMITTER, SIEMENS - LOH, FILTER 1	0001149	$2,700	3	INST	2
PLANT 2 BUILDING	Group D	TRANSMITTER, SIEMENS - TRANSMITTER, LOH, FILTER 21, PDT-130-11	0001200	$2,700	3	INST	2
PLANT 2 BUILDING	Group D	SEAL, ZAVODA - PRESSURE, PE-AM-3-4	0011393	$300	3	INST	
PLANT 2 BUILDING	Group D	SEAL, ZAVODA - PRESSURE, PE-AM-3-6	0011395	$300	3	INST	
PLANT 2 BUILDING	Group D	SEAL, ZAVODA - PRESSURE, PE-AM-3-5	0011394	$300	3	INST	
PLANT 2 BUILDING	Group D	SEAL, ZAVODA - PRESSURE, PE-AM-3-2	0011391	$300	3	INST	
PLANT 2 BUILDING	Group D	SEAL, ZAVODA - PRESSURE, PE-AM-3-1	0011390	$300	3	INST	
PLANT 2 BUILDING	Group D	SEAL, ZAVODA - PRESSURE, PE-AM-3-3	0011392	$300	3	INST	
PLANT 2 BUILDING	Group D	SECURITY, JOHNSON CONTROLS - PANEL, JOHNSON CONTROL, SECURITY SYSTEM CONTROLLER	0016173	$1,800	3	SEC	6
PORTABLE	Group D	TOOL, RIDGID - JETTER, PRESSURE (KORAH 1)	0007422	$0	2	B MECH	
PLANT 2 BUILDING	Group D	CABINET, HYDROMATIC PUMP - HYDROMATIC SEWAGE EJECTOR	0005593	$900	2	CONT	6
PLANT 1 BUILDING	Group D	COMPUTER OPERT, SCHNEIDER ELECTRIC - FILTER 9 CABINET OIT	0015733	$6,200	2	CONT	
PLANT 2 BUILDING	Group D	COMPUTER OPERT, SYNOLOGY - SERVER RACK STATION, PLANT 2 CONTROL ROOM	0016749	$5,100	2	CONT	
PLANT 2 BUILDING	Group D	COMPUTER OPERT, SCHNEIDER ELECTRIC - FILTER 12 CABINET OIT	0015643	$6,200	2	CONT	
PLANT 2 BUILDING	Group D	COMPUTER OPERT, SCHNEIDER ELECTRIC - FILTER 16 CABINET OIT	0015663	$6,200	2	CONT	

PLANT 1 BUILDING	Group D	COMPUTER OPERT, SCHNEIDER ELECTRIC - FILTER 7 CABINET OIT	0015723	$6,200	2	CONT	
PLANT 2 BUILDING	Group D	COMPUTER OPERT, SCHNEIDER ELECTRIC - FILTER 17 CABINET OIT	0015668	$6,200	2	CONT	
PLANT 2 BUILDING	Group D	COMPUTER OPERT, SAMSUNG - HMI MONITOR (S/N: 07D03CSK500036M)	0015843	$5,100	2	CONT	
PLANT 2 BUILDING	Group D	COMPUTER OPERT, SCHNEIDER ELECTRIC - FILTER 18 CABINET OIT	0015673	$6,200	2	CONT	
PLANT 2 BUILDING	Group D	COMPUTER OPERT, TRIPP-LITE - SERVER KVM SWITCH 8 PORT CONSOLE, PLANT 2 CONTROL ROOM	0016747	$5,100	2	CONT	
PLANT 2 BUILDING	Group D	COMPUTER OPERT, SCHNEIDER ELECTRIC - FILTER 19 CABINE OIT	0015678	$6,200	2	CONT	
PLANT 2 BUILDING	Group D	COMPUTER OPERT, SCHNEIDER ELECTRIC - FILTER 15 CABINET OIT	0015658	$6,200	2	CONT	
PLANT 1 BUILDING	Group D	COMPUTER OPERT, SCHNEIDER ELECTRIC - FILTER 2 CABINET OIT	0015683	$6,200	2	CONT	
PLANT 1 BUILDING	Group D	COMPUTER OPERT, SCHNEIDER ELECTRIC - FILTER 1 CABINET OIT	0015628	$6,200	2	CONT	
PLANT 2 BUILDING	Group D	COMPUTER OPERT, SCHNEIDER ELECTRIC - FILTER 20 CABINET OIT	0015688	$6,200	2	CONT	
PLANT 2 BUILDING	Group D	COMPUTER OPERT, SCHNEIDER ELECTRIC - FILTER 11 CABINET OIT	0015638	$6,200	2	CONT	
PLANT 2 BUILDING	Group D	COMPUTER OPERT, SCHNEIDER ELECTRIC - FILTER 21 CABINET OIT	0015693	$6,200	2	CONT	
PLANT 2 BUILDING	Group D	COMPUTER OPERT, DELL - PLANT 2 CONTROL ROOM SERVER	0016404	$4,000	2	CONT	
PLANT 2 BUILDING	Group D	COMPUTER OPERT, SCHNEIDER ELECTRIC - FILTER 22 CABINET OIT	0015698	$6,200	2	CONT	
PLANT 2 BUILDING	Group D	COMPUTER OPERT, SCHNEIDER ELECTRIC - FILTER 13 CABINET OIT	0015648	$6,200	2	CONT	
PLANT 1 BUILDING	Group D	COMPUTER OPERT, SCHNEIDER ELECTRIC - FILTER 10 CABINET OIT	0015633	$6,200	2	CONT	
PLANT 2 BUILDING	Group D	COMPUTER OPERT, CISCO - SERVER CISCO SWITCH, PLANT 2 CONTROL ROOM	0016748	$5,100	2	CONT	
KORAH 1 PS	Group D	COMPUTER OPERT, SCHNEIDER ELECTRIC - OIT, KORAH PS 1 CAUSTIC FEED CONTROL, HMI-10-1	0016757	$6,200	2	CONT	
PLANT 2 BUILDING	Group D	COMPUTER OPERT, SCHNEIDER ELECTRIC - FILTER 14 CABINET OIT	0015653	$6,200	2	CONT	
PLANT 1 BUILDING	Group D	COMPUTER OPERT, SCHNEIDER ELECTRIC - FILTER 5 CABINET OIT	0015713	$6,200	2	CONT	
PLANT 1 BUILDING	Group D	COMPUTER OPERT, SCHNEIDER ELECTRIC - FILTER 6 CABINET OIT	0015718	$6,200	2	CONT	
PLANT 1 BUILDING	Group D	COMPUTER OPERT, SCHNEIDER ELECTRIC - FILTER 3 CABINET OIT	0015703	$6,200	2	CONT	
PLANT 1 BUILDING	Group D	COMPUTER OPERT, SCHNEIDER ELECTRIC - FILTER 4 CABINET OIT	0015708	$6,200	2	CONT	

PLANT 1 BUILDING	Group D	COMPUTER OPERT, SCHNEIDER ELECTRIC - FILTER 8 CABINET OIT	0015728	$6,200	2	CONT	
WEST CHEMICAL BUILDING	Group D	COMPUTER OPERT, SQUARE-D - CIRCUIT MONITOR	0015419	$5,100	2	ELEC	10
PORTABLE	Group D	TOOL, AIR CYCLE CORPORATION - BULB EATER, CFL PREMIUM BULB EATER, W/COMBO KIT	0012154	$0	2	ELEC	
PLANT 1 BUILDING	Group D	VALVE - 24" BWW VALVE FV-322-9	0005995	$21,200	2	P MECH	6, 7
BASIN 3 & 4 CONTROL STATION	Group D	COMPUTER OPERT, SCHNEIDER ELECTRIC - OIT, PLANT 1, SLUDGE COLLECTION CONTROL	0015973	$6,200	1	CONT	
BASIN 1 & 2 CONTROL STATION	Group D	COMPUTER OPERT, SCHNEIDER ELECTRIC - OIT, PLANT 2, BASINS 1 & 2, HMI-6-1	0016750	$6,200	1	CONT	
BASIN 3 & 4 CONTROL STATION	Group D	COMPUTER OPERT, SCHNEIDER ELECTRIC - OIT, PLANT 1, BASINS 3 & 4, HMI-3-1	0016751	$6,200	1	CONT	
BASIN 1 & 2 CONTROL STATION	Group D	COMPUTER OPERT, SCHNEIDER ELECTRIC - OIT, PLANT 2, SLUDGE COLLECTION CONTROL	0015974	$6,200	1	CONT	
BASIN 1 & 2 CONTROL STATION	Group D	COMPUTER OPERT, SQUARE-D - MONITORING UNIT FOR MAIN 2	0016118	$5,100	1	ELEC	
BASIN 1 & 2 CONTROL STATION	Group D	COMPUTER OPERT, SQUARE-D - MONITORING UNIT FOR MAIN 1	0016117	$5,100	1	ELEC	
KORAH 2 & 3 PS	Group D	FAN - INTAKE IF-2	0000858	$1,400	0.75	B MECH	6, 7
KORAH 2 & 3 PS	Group D	FAN - INTAKE IF-3	0000859	$1,400	0.75	B MECH	6, 7
PLANT 2 BUILDING	Group D	HVAC, DAYTON - IN-WALL ELECTRIC HEATER	0015969	$8,000	0.75	B MECH	6
PLANT 2 BUILDING	Group D	STARTER, GE - STARTER/DS FOR VENT UNIT #3	0016561	$4,800	0.75	ELEC	5, 6
LAGOON SLUDGE PS	Group D	MIXER, FLYGT - SLUDGE MIXER #4	0005280	$2,300	0.75	P MECH	7
WILLIAMS ISLAND DAM & GATES	Group D	CRANE, THERN INC. - CRANE HOIST (S/N: 5009-47726)	0015471	$13,700	0.25	B MECH	
WEST CHEMICAL BUILDING	Group D	COMPUTER OPERT, SCHNEIDER ELECTRIC - OIT, CP-1	0016752	$6,200	0.25	CONT	
PLANT 1 BUILDING	Group D	COMPUTER OPERT, SCHNEIDER ELECTRIC - OIT, CP-ZO	0016756	$6,200	0.25	CONT	
KORAH 2 & 3 PS	Group D	COMPUTER OPERT, AUTOMATION DIRECT - OIT LOCAL OPERATOR WORKSTATION-KORAH 2-3 (S/N: EA-AC)	0016140	$5,100	0.25	CONT	
KORAH 2 & 3 PS	Group D	COMPUTER OPERT, SCHNEIDER ELECTRIC - OIT, FINAL EFFLUENT	0015844	$6,200	0.25	CONT	

		WATER QUALITY KORAH 2-3 (HMI4-1) (S/N: 125178CO15136)					
PORTABLE	Group D	TOOL, MEGGER - TESTER, PHASING TESTER, 4.16 TO 34.5KV, MDL# 510836-1	0013023	$0	0.25	ELEC	
KORAH 1 PS	Group D	CABINET - CAUSTIC FLOW METER DCSCR-652-5	0001643	$900	0.25	INST	
WILLIAMS ISLAND DAM & GATES	Group D	CABINET - WALL MOUNT ENCLOSURE	0016642	$900	0.25	P MECH	6

Table 6: 10-Year Repair and Replacement Comprehensive Data List
[1]Replacement Costs are rounded to the nearest $100, and are estimates based on 2020 dollars. All replacement costs were estimated and assigned during the FCI analysis, using the FCI methodology as outlined within the Condition Assessment Technical Memorandum.

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9030 Stony Point Parkway, Suite 220, Richmond, VA 23235

Whitman, Requardt & Associates, LLP
Engineers · Architects · Environmental Planners Est. 1915

Output from the Most Recent Rate Model

COMBINED	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	Total
Revenues and Expenses							
Revenue							
Customer Sales	$ 313,018,785	$ 337,050,687	$ 359,039,990	$ 382,663,336	$ 408,049,772	$ 435,349,381	
County Sales	12,529,526	14,824,693	15,269,434	15,727,517	16,008,676	16,685,323	
Purchased Gas Recovery	71,500,000	73,600,000	75,800,000	78,100,000	80,400,000	82,800,000	
Other	7,422,835	7,747,995	7,967,180	8,192,941	8,425,474	8,664,984	
Total Revenue	$ 404,471,146	$ 433,223,375	$ 458,076,604	$ 484,683,794	$ 512,883,922	$ 543,499,688	
Expenses							
Operating Expenses							
Purchased Gas Cost	$ 71,500,000	$ 73,600,000	$ 75,800,000	$ 78,100,000	$ 80,400,000	$ 82,800,000	
Operations and Maintenance	206,392,134	228,867,030	235,733,041	242,805,032	250,089,183	257,591,859	
Stores (Gain) or Loss	-	-	-	-	-	-	
Depreciation	77,311,381	85,035,423	93,137,100	101,333,420	108,665,043	114,397,919	
Subtotal: Operating Expenses	$ 355,203,515	$ 387,502,453	$ 404,670,140	$ 422,238,452	$ 439,154,227	$ 454,789,779	
Payment-in-Lieu of Taxes							
Income Tax	$ -	$ -	$ -	$ -	$ -	$ -	
Gross Receipts	5,067,759	5,328,606	5,087,233	5,673,231	6,397,734	6,718,284	
Real Estate & Per. Prop.	16,817,932	18,482,722	20,109,283	21,727,252	23,202,586	24,325,718	
Subtotal: Payment-in-Lieu of Taxes	$ 21,885,691	$ 23,811,328	$ 25,196,515	$ 27,400,483	$ 29,600,320	$ 31,044,002	
Other Expenses/(Revenue)							
Grants & Contributions	$ (26,098,537)	$ (26,781,758)	$ (51,245,505)	$ (35,050,840)	$ (12,471,992)	$ (11,233,048)	
Interest & Other Debt Costs	36,424,132	38,964,172	43,649,234	51,505,327	56,056,473	68,372,363	
Interest Income	(17,265,203)	(12,679,395)	(8,290,290)	(5,926,829)	(6,021,862)	(6,210,319)	
Subtotal: Other Expenses/(Revenue)	$ (6,939,609)	$ (496,982)	$ (15,886,562)	$ 10,527,658	$ 37,562,618	$ 50,928,996	
Total Expenses	$ 370,149,598	$ 410,816,798	$ 413,980,094	$ 460,166,593	$ 506,317,164	$ 536,762,776	
Net Income	$ 34,321,548	$ 22,406,576	$ 44,096,510	$ 24,517,201	$ 6,566,758	$ 6,736,911	
Net Income (Without CIA)	$ 8,223,011	$ (4,375,182)	$ (7,148,995)	$ (10,533,640)	$ (5,905,235)	$ (4,496,137)	
Capital Improvement Plan							
Capital Expenditures	$ 299,600,468	$ 318,477,268	$ 318,401,513	$ 319,880,985	$ 248,943,434	$ 188,482,747	$ 1,699,383,598
Funding Sources							
Grant Funding	$ 75,109,234	$ 90,713,796	$ 91,128,596	$ 24,922,000	$ 25,639,400	$ 14,607,047	$ 322,892,953
Construction Fund (Prior Bond Proceeds)	98,067,084	1,049,927	-	-	-	-	164,547,249
Rate Financed Capital	35,500,000	31,000,000	32,000,000	32,000,000	37,500,000	37,500,000	224,567,658
Capital Reserve Fund	30,398,005	67,500,000	43,943,769	27,749,104	5,170,256	3,931,312	193,338,511
SRF Loans	42,161,189	26,237,006	-	-	-	-	73,522,925
Revenue Bonds	-	59,127,035	92,774,592	187,707,670	149,761,207	107,698,643	489,370,504
GO Bonds	18,364,956	42,849,504	58,554,556	47,502,210	30,872,571	24,745,746	231,143,797
Total Funding Sources	$ 299,600,468	$ 318,477,268	$ 318,401,513	$ 319,880,985	$ 248,943,434	$ 188,482,747	$ 1,699,383,598
Capital Structure ($)							
Equity	$ 141,007,238	$ 189,213,796	$ 167,072,365	$ 84,671,104	$ 68,309,656	$ 56,038,359	$ 740,799,122
Debt	158,593,230	129,263,472	151,329,148	235,209,881	180,633,778	132,444,388	958,584,476
Total	$ 299,600,468	$ 318,477,268	$ 318,401,513	$ 319,880,985	$ 248,943,434	$ 188,482,747	$ 1,699,383,598
Capital Structure (%)							
Equity	47%	59%	52%	26%	27%	30%	44%
Debt	53%	41%	48%	74%	73%	70%	56%
Total	100%	100%	100%	100%	100%	100%	100%

COMBINED	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30
Financial Metrics						
All Utilities						
Operating Reserve - Days O&M (3)	162	145	142	143	149	157
Operating Reserve - Days O&M (4)	140	127	125	126	131	139
Operating Reserve ($)	$ 91,816,155	$ 90,828,734	$ 91,464,058	$ 94,964,288	$ 101,827,809	$ 110,659,247
Capital Reserve - % of 3-Year Average CIP	36.5%	23.5%	27.9%	32.7%	34.6%	33.2%
Capital Reserve ($)	$ 116,352,405	$ 69,432,427	$ 70,532,427	$ 71,632,427	$ 72,732,427	$ 73,832,427
Total Reserves ($)	$ 208,168,560	$ 160,261,161	$ 161,996,486	$ 166,596,715	$ 174,560,236	$ 184,491,674
Gas, Water, and Wastewater Only						
Senior Debt Service Coverage	1.97	1.88	2.13	1.83	1.60	1.48
Total Debt Service Coverage (1)	1.96	1.76	2.01	1.74	1.52	1.41
Total Debt Service Coverage (2)	1.60	1.42	1.40	1.36	1.40	1.32
Operating Reserve - Days O&M (3)	176	165	166	173	184	196
Operating Reserve - Days O&M (4)	157	144	143	150	161	172
Operating Reserve ($)	$ 88,468,630	$ 90,429,070	$ 93,764,945	$ 100,255,291	$ 109,837,432	$ 120,607,596
Capital Reserve - % of 3-Year Average CIP	43%	28%	33%	38%	41%	39%
Capital Reserve ($)	$ 116,152,405	$ 69,032,427	$ 69,932,427	$ 70,832,427	$ 71,732,427	$ 72,632,427
Total Reserves ($)	$ 204,621,036	$ 159,461,497	$ 163,697,372	$ 171,087,718	$ 181,569,859	$ 193,240,024

(1) Includes Cash Capital Contributions
(2) Excludes Cash Capital Contributions
(3) Excludes Purchased Gas
(4) Excludes Purchased Gas, and includes Non-Income Tax PILOT

Annual Rate Increases						
Gas		5.25%	5.25%	5.25%	5.25%	5.25%
Water		5.75%	5.75%	5.75%	5.75%	5.75%
Wastewater		6.00%	6.00%	6.00%	6.00%	6.00%
Stormwater		17.50%	17.50%	17.50%	17.50%	17.50%
Typical Customer Bill*						
Gas	$92.96	$97.10	$101.43	$105.95	$110.66	$115.63
Water	$41.08	$43.44	$45.93	$48.56	$51.35	$54.30
Wastewater	$75.84	$80.38	$85.19	$90.29	$95.70	$101.43
Stormwater	$5.92	$6.96	$8.18	$9.61	$11.29	$13.27
Total Typical Customer Bill (With Purchased Gas)	$215.80	$227.88	$240.73	$254.41	$269.00	$284.62
Change ($)		*$ 12.08*	*$ 12.85*	*$ 13.68*	*$ 14.59*	*$ 15.63*
Change (%)		*5.6%*	*5.6%*	*5.7%*	*5.7%*	*5.8%*
Gas (No PGC)	$63.14	$66.44	$69.86	$73.47	$77.27	$81.26
Total Typical Customer Bill (Without Purchased Gas)	$185.98	$197.22	$209.16	$221.93	$235.61	$250.25
Change ($)		*$ 11.24*	*$ 11.94*	*$ 12.77*	*$ 13.68*	*$ 14.65*
Change (%)		*6.0%*	*6.1%*	*6.1%*	*6.2%*	*6.2%*

*Assumes 70 Ccf for gas per month, 6 Ccf for water and wastewater per month, and residential Tier 2 for stormwater.

PILOT/Dividend Payments						
Income Tax	$ -	$ -	$ -	$ -	$ -	$ -
Gross Receipts	5,067,759	5,328,606	5,087,233	5,673,231	6,397,734	6,718,284
Real Estate & Per. Prop.	16,817,932	18,482,722	20,109,283	21,727,252	23,202,586	24,325,718
Subtotal PILOT	$ 21,885,691	$ 23,811,328	$ 25,196,515	$ 27,400,483	$ 29,600,320	$ 31,044,002
Dividend	$ 11,562,247	$ 7,663,901	$ 5,989,358	$ 3,904,507	$ 3,379,259	$ 2,676,937
Total PILOT and Dividend	$ 33,447,938	$ 31,475,229	$ 31,185,874	$ 31,304,990	$ 32,979,579	$ 33,720,939

GAS	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	Total
Revenues and Expenses							
Revenue							
Customer Sales							
Residential	$ 61,893,139	$ 65,450,233	$ 69,170,668	$ 73,116,123	$ 77,289,704	$ 81,694,545	
Commercial	26,940,244	28,463,080	30,086,191	31,779,362	33,576,562	35,479,318	
Industrial	9,318,099	9,763,233	10,302,391	10,858,216	11,430,957	12,010,040	
Municipal	889,758	940,431	993,191	1,049,674	1,109,934	1,174,022	
Transportation	63,329	66,242	69,905	73,630	77,416	81,266	
Flexible/Interruptible	296,296	297,778	299,266	300,763	302,267	303,778	
Other	169,376	179,159	189,508	200,454	212,033	224,281	
Subtotal Customer Sales	$ 99,570,240	$ 105,160,156	$ 111,111,121	$ 117,378,222	$ 123,998,873	$ 130,967,250	
Purchased Gas Recovery	$ 71,500,000	$ 73,600,000	$ 75,800,000	$ 78,100,000	$ 80,400,000	$ 82,800,000	
Other	2,457,384	2,531,106	2,607,039	2,685,250	2,765,808	2,848,782	
Total Revenue	$ 173,527,625	$ 181,291,262	$ 189,518,160	$ 198,163,472	$ 207,164,681	$ 216,616,031	
Expenses							
Operating Expenses							
Purchased Gas Cost	$ 71,500,000	$ 73,600,000	$ 75,800,000	$ 78,100,000	$ 80,400,000	$ 82,800,000	
Operation and Maintenance	68,951,184	72,510,170	74,685,475	76,926,039	79,233,820	81,610,835	
Stores (Gain) or Loss	-	-	-	-	-	-	
Depreciation	26,558,900	27,881,400	29,369,500	30,988,400	32,746,300	34,470,600	
Total Operating Expenses	$ 167,010,084	$ 173,991,570	$ 179,854,975	$ 186,014,439	$ 192,380,120	$ 198,881,435	
Payment-in-Lieu of Taxes							
Income Tax	$ -	$ -	$ -	$ -	$ -	$ -	
Gross Receipts	1,479,000	1,486,500	1,493,800	1,501,400	1,508,900	1,516,300	
Real Estate & Per. Prop.	4,950,799	5,197,324	5,474,718	5,776,495	6,104,182	6,425,606	
Subtotal: Payment-in-Lieu of Taxes	$ 6,429,799	$ 6,683,824	$ 6,968,518	$ 7,277,895	$ 7,613,082	$ 7,941,906	
Other Expenses/(Revenue)							
Grants & Contributions	$ (900,000)	$ (900,000)	$ (900,000)	$ (900,000)	$ (900,000)	$ (900,000)	
Interest & Other Debt Costs	10,893,945	11,007,110	11,529,479	12,097,124	12,138,504	14,476,677	
Interest Income	(1,112,408)	(1,140,821)	(694,209)	(632,502)	(784,340)	(1,017,619)	
Subtotal: Other Expenses/(Revenue)	$ 8,881,537	$ 8,966,289	$ 9,935,270	$ 10,564,622	$ 10,454,164	$ 12,559,059	
Total Expenses	$ 182,321,420	$ 189,641,683	$ 196,758,764	$ 203,856,956	$ 210,447,366	$ 219,382,399	
Net Income	$ (8,793,796)	$ (8,350,421)	$ (7,240,604)	$ (5,693,484)	$ (3,282,685)	$ (2,766,368)	
Net Income (Without CIA)	$ (9,693,796)	$ (9,250,421)	$ (8,140,604)	$ (6,593,484)	$ (4,182,685)	$ (3,666,368)	
Capital Improvement Plan							
Capital Expenditures	$ 36,798,458	$ 45,856,463	$ 47,151,855	$ 54,027,427	$ 55,844,617	$ 51,919,636	$ 291,598,455
Funding Sources							
Grant Funding	$ 14,658,080	$ 20,005,600	$ 20,420,400	$ 24,922,000	$ 25,639,400	$ 14,607,047	$ 120,252,527
Construction Fund (Prior Bond Proceeds)	22,140,378	1,049,927	-	-	-	-	23,190,305
Rate Financed Capital	-	4,500,000	4,500,000	4,500,000	5,000,000	5,000,000	23,500,000
Capital Reserve Fund	-	-	-	-	-	-	-
Revenue Bonds	-	20,300,936	22,231,455	24,605,427	25,205,217	32,312,590	124,655,624
Total Funding Sources	$ 36,798,458	$ 45,856,463	$ 47,151,855	$ 54,027,427	$ 55,844,617	$ 51,919,636	$ 291,598,455
Equity	$ 14,658,080	$ 24,505,600	$ 24,920,400	$ 29,422,000	$ 30,639,400	$ 19,607,047	$ 143,752,527
Debt	22,140,378	21,350,863	22,231,455	24,605,427	25,205,217	32,312,590	147,845,929
Total	$ 36,798,458	$ 45,856,463	$ 47,151,855	$ 54,027,427	$ 55,844,617	$ 51,919,636	$ 291,598,455
Capital Structure (%)							
Equity	40%	53%	53%	54%	55%	38%	49%
Debt	60%	47%	47%	46%	45%	62%	51%
Total	100%	100%	100%	100%	100%	100%	100%
Financial Metrics							
Senior Debt Service Coverage	1.26	1.31	1.34	1.41	1.51	1.47	
Total Debt Service Coverage	1.25	1.28	1.31	1.38	1.49	1.45	
Operating Reserve - Days O&M (1)	21	28	41	65	102	140	
Operating Reserve - Days O&M (2)	19	25	37	60	93	128	
Operating Reserve ($)	$ 4,042,960	$ 5,471,602	$ 8,370,168	$ 13,794,133	$ 22,122,095	$ 31,413,175	
Capital Reserve - % of 3-Year Average CIP	2%	3%	5%	7%	8%	10%	
Capital Reserve ($)	$ 900,000	$ 1,800,000	$ 2,700,000	$ 3,600,000	$ 4,500,000	$ 5,400,000	

(1) Excludes Purchased Gas

(2) Excludes Purchased Gas, and includes Non-Income Tax PILOT

WATER	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	Total
Revenues and Expenses							
Revenue							
Customer Sales							
Residential	$ 30,356,711	$ 32,100,473	$ 33,940,533	$ 35,889,081	$ 37,948,388	$ 40,127,270	
Commercial	31,055,333	32,837,047	34,719,580	36,714,440	38,822,368	41,049,628	
Industrial	3,476,025	3,675,447	3,886,180	4,109,506	4,345,478	4,594,766	
Municipal	2,044,722	2,162,045	2,286,030	2,417,386	2,556,209	2,702,890	
State and Federal	7,646,343	8,084,996	8,548,516	9,039,749	9,558,796	10,107,135	
Fire Protection	1,684,426	1,781,207	1,883,496	1,991,648	2,106,092	2,227,085	
Subtotal Customer Sales	$ 76,263,561	$ 80,641,213	$ 85,264,336	$ 90,161,810	$ 95,337,330	$ 100,808,773	
County Sales	$ 11,430,253	$ 13,692,442	$ 14,103,215	$ 14,526,311	$ 14,771,434	$ 15,410,964	
Other	1,329,461	1,369,345	1,410,425	1,452,738	1,496,320	1,541,210	
Total Revenue	$ 89,023,275	$ 95,703,000	$ 100,777,976	$ 106,140,859	$ 111,605,085	$ 117,760,947	
Expenses							
Operating Expenses							
Operation and Maintenance	$ 55,322,797	$ 66,271,865	$ 68,260,021	$ 70,307,822	$ 72,417,057	$ 74,589,569	
Stores (Gain) or Loss	-	-	-	-	-	-	
Deprecation	19,315,383	21,193,061	23,130,356	25,383,455	27,084,892	28,041,110	
Total Operating Expenses	$ 74,638,180	$ 87,464,926	$ 91,390,377	$ 95,691,277	$ 99,501,949	$ 102,630,679	
Payment-in-Lieu of Taxes							
Income Tax	$ -	$ -	$ -	$ -	$ -	$ -	
Gross Receipts	1,354,620	1,474,550	1,086,774	1,517,925	2,078,787	2,226,683	
Real Estate & Per. Prop.	5,111,553	5,608,455	6,121,134	6,717,386	7,167,648	7,420,698	
Subtotal: Payment-in-Lieu of Taxes	$ 6,466,173	$ 7,083,005	$ 7,207,908	$ 8,235,311	$ 9,246,435	$ 9,647,381	
Other Expenses/(Revenue)							
Grants & Contributions	$ (23,748,537)	$ (24,431,758)	$ (48,895,505)	$ (32,700,840)	$ (10,121,992)	$ (8,883,048)	
Interest & Other Debt Costs	10,080,932	10,618,125	11,877,945	13,947,869	14,947,178	17,035,306	
Interest Income	(6,170,899)	(4,712,189)	(3,016,442)	(2,207,259)	(2,220,918)	(2,245,633)	
Subtotal: Other Expenses/(Revenue)	$ (19,838,504)	$ (18,525,823)	$ (40,034,003)	$ (20,960,230)	$ 2,604,268	$ 5,906,624	
Total Expenses	$ 61,265,849	$ 76,022,108	$ 58,564,282	$ 82,966,358	$ 111,352,653	$ 118,184,685	
Net Income	$ 27,757,426	$ 19,680,892	$ 42,213,694	$ 23,174,501	$ 252,433	$ (423,737)	
Net Income (Without CIA)	$ 4,008,889	$ (4,750,867)	$ (6,681,811)	$ (9,526,339)	$ (9,869,560)	$ (9,306,786)	
Capital Improvement Plan							
Capital Expenditures	$ 80,886,566	$ 75,586,612	$ 85,854,615	$ 101,903,616	$ 39,882,848	$ 39,801,977	$ 423,916,233
Funding Sources							
Grant Funding	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Construction Fund (Prior Bond Proceeds)	35,738,561	-	-	-	-	-	35,738,561
Rate Financed Capital	16,000,000	11,000,000	10,000,000	9,000,000	9,000,000	9,000,000	64,000,000
Capital Reserve Fund	29,148,005	32,500,000	42,693,769	26,499,104	3,920,256	2,681,312	137,442,446
SRF Loans	-	-	-	-	-	-	-
Revenue Bonds	-	32,086,612	33,160,846	66,404,512	26,962,592	28,120,665	186,735,226
Total Funding Sources	$ 80,886,566	$ 75,586,612	$ 85,854,615	$ 101,903,616	$ 39,882,848	$ 39,801,977	$ 423,916,233
Capital Structure ($)							
Equity	$ 45,148,005	$ 43,500,000	$ 52,693,769	$ 35,499,104	$ 12,920,256	$ 11,681,312	$ 201,442,446
Debt	35,738,561	32,086,612	33,160,846	66,404,512	26,962,592	28,120,665	222,473,788
Total	$ 80,886,566	$ 75,586,612	$ 85,854,615	$ 101,903,616	$ 39,882,848	$ 39,801,977	$ 423,916,233
Capital Structure (%)							
Equity	56%	58%	61%	35%	32%	29%	48%
Debt	44%	42%	39%	65%	68%	71%	52%
Total	100%	100%	100%	100%	100%	100%	100%
Financial Metrics							
Senior Debt Service Coverage	2.96	2.53	3.39	2.41	1.50	1.41	
Total Debt Service Coverage (1)	2.94	2.49	3.34	2.37	1.49	1.40	
Total Debt Service Coverage (2)	1.72	1.31	1.22	1.13	1.13	1.12	
Operating Reserve - Days O&M (3)	270	227	221	219	217	216	
Operating Reserve - Days O&M (4)	228	201	197	196	192	191	
Operating Reserve ($)	$ 40,923,713	$ 41,194,741	$ 41,402,315	$ 42,105,324	$ 43,050,022	$ 44,150,207	
Capital Reserve - % of 3-Year Average CIP	43%	31%	38%	58%	57%	55%	
Capital Reserve ($)	$ 37,542,887	$ 23,272,909	$ 23,272,909	$ 23,272,909	$ 23,272,909	$ 23,272,909	

(1) Includes Cash Capital Contributions
(2) Excludes Cash Capital Contributions
(3) Excludes Non-Income Tax PILOT
(4) Includes Non-Income Tax PILOT

WASTEWATER	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	Total
Revenues and Expenses							
Revenue							
Customer Sales							
Residential	$ 38,461,933	$ 40,761,501	$ 43,202,149	$ 45,786,654	$ 48,529,527	$ 51,433,546	
Commercial	49,561,909	52,531,052	55,681,229	59,017,945	62,557,630	66,306,101	
Industrial	4,157,537	4,406,633	4,670,912	4,950,854	5,247,822	5,562,301	
Municipal	2,952,428	3,129,328	3,317,000	3,515,802	3,726,684	3,950,021	
State and Federal	12,211,112	12,942,707	13,718,908	14,541,098	15,413,303	16,336,929	
Fire Protection	-	-	-	-	-	-	
Subtotal Customer Sales	$ 107,344,919	$ 113,771,221	$ 120,590,199	$ 127,812,354	$ 135,474,967	$ 143,588,897	
County Sales	$ 1,099,273	$ 1,132,251	$ 1,166,219	$ 1,201,205	$ 1,237,241	$ 1,274,359	
Other	3,306,530	3,518,084	3,620,255	3,725,492	3,833,886	3,945,532	
Total Revenue	$ 111,750,722	$ 118,421,556	$ 125,376,673	$ 132,739,052	$ 140,546,095	$ 148,808,788	
Expenses							
Operating Expenses							
Operation and Maintenance	$ 58,808,202	$ 61,018,825	$ 62,849,390	$ 64,734,871	$ 66,676,918	$ 68,677,225	
Stores (Gain) or Loss	-	-	-	-	-	-	
Deprecation	25,260,364	28,705,510	31,833,293	34,525,285	37,132,936	39,184,472	
Total Operating Expenses	$ 84,068,566	$ 89,724,335	$ 94,682,683	$ 99,260,157	$ 103,809,853	$ 107,861,697	
Payment-in-Lieu of Taxes							
Income Tax	$ -	$ -	$ -	$ -	$ -	$ -	
Gross Receipts	2,234,139	2,367,556	2,506,658	2,653,906	2,810,047	2,975,301	
Real Estate & Per. Prop.	6,755,580	7,676,942	8,513,430	9,233,371	9,930,756	10,479,414	
Subtotal: Payment-in-Lieu of Taxes	$ 8,989,719	$ 10,044,498	$ 11,020,089	$ 11,887,277	$ 12,740,802	$ 13,454,715	
Other Expenses/(Revenue)							
Grants & Contributions	$ (1,250,000)	$ (1,250,000)	$ (1,250,000)	$ (1,250,000)	$ (1,250,000)	$ (1,250,000)	
Interest & Other Debt Costs	12,544,518	12,300,571	12,907,834	15,769,082	17,619,446	24,421,948	
Interest Income	(9,807,719)	(6,662,872)	(4,498,129)	(3,100,587)	(3,109,483)	(3,119,576)	
Subtotal: Other Expenses/(Revenue)	$ 1,486,799	$ 4,387,699	$ 7,159,704	$ 11,418,496	$ 13,259,963	$ 20,052,372	
Total Expenses	$ 94,545,084	$ 104,156,532	$ 112,862,475	$ 122,565,929	$ 129,810,619	$ 141,368,784	
Net Income	$ 17,205,638	$ 14,265,024	$ 12,514,197	$ 10,173,123	$ 10,735,476	$ 7,440,004	
Net Income (Without CIA)	$ 15,955,638	$ 13,015,024	$ 11,264,197	$ 8,923,123	$ 9,485,476	$ 6,190,004	
Capital Improvement Plan							
Capital Expenditures	$ 153,550,488	$ 152,684,690	$ 125,340,487	$ 113,947,731	$ 117,843,399	$ 64,515,388	$ 727,882,183
Funding Sources							
Grant Funding	$ 51,951,154	$ 70,708,196	$ 70,708,196	$ -	$ -	$ -	$ 193,367,546
Construction Fund (Prior Bond Proceeds)	40,188,145	-	-	-	-	-	40,188,145
Rate Financed Capital	18,000,000	14,000,000	16,000,000	16,000,000	19,000,000	16,000,000	99,000,000
Capital Reserve Fund	1,250,000	35,000,000	1,250,000	1,250,000	1,250,000	1,250,000	41,250,000
SRF Loans	42,161,189	26,237,006	-	-	-	-	68,398,195
Revenue Bonds	-	6,739,488	37,382,291	96,697,731	97,593,399	47,265,388	285,678,297
Total Funding Sources	$ 153,550,488	$ 152,684,690	$ 125,340,487	$ 113,947,731	$ 117,843,399	$ 64,515,388	$ 727,882,183
Capital Structure ($)							
Equity	$ 71,201,154	$ 119,708,196	$ 87,958,196	$ 17,250,000	$ 20,250,000	$ 17,250,000	$ 333,617,546
Debt	82,349,334	32,976,494	37,382,291	96,697,731	97,593,399	47,265,388	394,264,637
Total	$ 153,550,488	$ 152,684,690	$ 125,340,487	$ 113,947,731	$ 117,843,399	$ 64,515,388	$ 727,882,183
Capital Structure (%)							
Equity	46%	78%	70%	15%	17%	27%	46%
Debt	54%	22%	30%	85%	83%	73%	54%
Total	100%	100%	100%	100%	100%	100%	100%
Financial Metrics							
Senior Debt Service Coverage	1.87	1.88	1.85	1.73	1.74	1.52	
Total Debt Service Coverage	1.87	1.65	1.64	1.55	1.57	1.40	
Operating Reserve - Days O&M (1)	270	262	255	250	245	239	
Operating Reserve - Days O&M (2)	214	206	204	201	197	194	
Operating Reserve ($)	$ 43,501,958	$ 43,762,726	$ 43,992,463	$ 44,355,833	$ 44,665,315	$ 45,044,214	
Capital Reserve - % of 3-Year Average CIP	30%	51%	45%	48%	54%	48%	
Capital Reserve ($)	$ 77,709,518	$ 43,959,518	$ 43,959,518	$ 43,959,518	$ 43,959,518	$ 43,959,518	

(1) Excludes Non-Income Tax PILOT
(2) Includes Non-Income Tax PILOT

ELECTRIC	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	Total
Revenues and Expenses							
Revenue							
Customer Sales	$ 12,284,781	$ 16,839,359	$ 17,819,777	$ 18,820,580	$ 19,764,519	$ 20,645,638	
Other	-	-	-	-	-	-	
Total Revenue	$ 12,284,781	$ 16,839,359	$ 17,819,777	$ 18,820,580	$ 19,764,519	$ 20,645,638	
Expenses							
Operating Expenses							
Operation and Maintenance	$ 10,558,627	$ 14,754,110	$ 15,196,733	$ 15,652,635	$ 16,122,214	$ 16,605,881	
Stores (Gain) or Loss	-	-	-	-	-	-	
Deprecation	2,010,878	2,142,868	2,336,052	2,539,798	2,715,644	2,863,627	
Total Operating Expenses	$ 12,569,505	$ 16,896,977	$ 17,532,785	$ 18,192,433	$ 18,837,858	$ 19,469,508	
Payment-in-Lieu of Taxes							
Income Tax	$ -	$ -	$ -	$ -	$ -	$ -	
Gross Receipts	-	-	-	-	-	-	
Real Estate & Per. Prop.	-	-	-	-	-	-	
Subtotal: Payment-in-Lieu of Taxes	$ -	$ -	$ -	$ -	$ -	$ -	
Other Expenses/(Revenue)							
Grants & Contributions	$ (200,000)	$ (200,000)	$ (200,000)	$ (200,000)	$ (200,000)	$ (200,000)	
Interest & Other Debt Costs	34,226	189,883	447,340	718,407	936,403	1,102,705	
Interest Income	(118,948)	(47,498)	39,656	109,745	190,263	273,432	
Subtotal: Other Expenses/(Revenue)	$ (284,722)	$ (57,615)	$ 286,996	$ 628,152	$ 926,667	$ 1,176,137	
Total Expenses	$ 12,284,783	$ 16,839,362	$ 17,819,781	$ 18,820,585	$ 19,764,525	$ 20,645,645	
Net Income	$ (2)	$ (3)	$ (4)	$ (5)	$ (6)	$ (7)	
Net Income (Without CIA)	$ (200,002)	$ (200,003)	$ (200,004)	$ (200,005)	$ (200,006)	$ (200,007)	
Capital Improvement Plan							
Capital Expenditures	$ 2,941,092	$ 6,658,184	$ 7,391,583	$ 7,426,319	$ 5,362,443	$ 5,400,013	$ 35,179,635
Funding Sources							
Grant Funding	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Construction Fund (Prior Bond Proceeds)	-	-	-	-	-	-	-
Rate Financed Capital	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	1,500,000	9,000,000
Capital Reserve Fund	-	-	-	-	-	-	-
GO Bonds	1,441,092	5,158,184	5,891,583	5,926,319	3,862,443	3,900,013	26,179,635
Revenue Bonds	-	-	-	-	-	-	-
Total Funding Sources	$ 2,941,092	$ 6,658,184	$ 7,391,583	$ 7,426,319	$ 5,362,443	$ 5,400,013	$ 35,179,635
Capital Structure ($)							
Equity	$ 1,500,000	$ 1,500,000	$ 1,500,000	$ 1,500,000	$ 1,500,000	$ 1,500,000	$ 9,000,000
Debt	1,441,092	5,158,184	5,891,583	5,926,319	3,862,443	3,900,013	26,179,635
Total	$ 2,941,092	$ 6,658,184	$ 7,391,583	$ 7,426,319	$ 5,362,443	$ 5,400,013	$ 35,179,635
Capital Structure (%)							
Equity	51%	23%	20%	20%	28%	28%	26%
Debt	49%	77%	80%	80%	72%	72%	74%
Total	100%	100%	100%	100%	100%	100%	100%
Financial Metrics							
Senior Debt Service Coverage	n/a	n/a	n/a	n/a	n/a	n/a	
Total Debt Service Coverage	40.51	8.39	4.28	3.13	2.68	2.46	
Operating Reserve - Days O&M	1	(68)	(134)	(198)	(261)	(322)	
Operating Reserve ($)	$ 22,523	$ (2,737,493)	$ (5,578,831)	$ (8,505,396)	$ (11,523,430)	$ (14,636,740)	
Capital Reserve - % of 3-Year Average CIP	3%	6%	10%	14%	18%	22%	
Capital Reserve ($)	$ 200,000	$ 400,000	$ 600,000	$ 800,000	$ 1,000,000	$ 1,200,000	

STORMWATER	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	Total
Revenues and Expenses							
Revenue							
Customer Sales							
Residential	$ 7,943,013	$ 9,335,866	$ 10,971,270	$ 12,888,544	$ 15,143,145	$ 17,795,743	
Non-Residential	9,612,271	11,302,871	13,283,289	15,601,826	18,330,938	21,543,079	
Subtotal Customer Sales	$ 17,555,284	$ 20,638,737	$ 24,254,559	$ 28,490,371	$ 33,474,083	$ 39,338,822	
Other	329,460	329,460	329,460	329,460	329,460	329,460	
Total Revenue	$ 17,884,744	$ 20,968,197	$ 24,584,019	$ 28,819,831	$ 33,803,543	$ 39,668,282	
Expenses							
Operating Expenses							
Operation and Maintenance	$ 12,751,324	$ 14,312,060	$ 14,741,422	$ 15,183,664	$ 15,639,174	$ 16,108,350	
Stores (Gain) or Loss	-	-	-	-	-	-	
Deprecation	4,165,857	5,112,585	6,467,899	7,896,482	8,985,272	9,838,110	
Total Operating Expenses	$ 16,917,181	$ 19,424,645	$ 21,209,321	$ 23,080,146	$ 24,624,447	$ 25,946,460	
Payment-in-Lieu of Taxes							
Income Tax	$ -	$ -	$ -	$ -	$ -	$ -	
Gross Receipts	-	-	-	-	-	-	
Real Estate & Per. Prop.	-	-	-	-	-	-	
Subtotal: Payment-in-Lieu of Taxes	$ -	$ -	$ -	$ -	$ -	$ -	
Other Expenses/(Revenue)							
Grants & Contributions	$ -	$ -	$ -	$ -	$ -	$ -	
Interest & Other Debt Costs	2,870,511	4,848,483	6,886,636	8,972,845	10,414,941	11,335,726	
Interest Income	(55,229)	(116,015)	(121,165)	(96,227)	(97,385)	(100,923)	
Subtotal: Other Expenses/(Revenue)	$ 2,815,282	$ 4,732,468	$ 6,765,471	$ 8,876,618	$ 10,317,556	$ 11,234,803	
Total Expenses	$ 19,732,462	$ 24,157,112	$ 27,974,792	$ 31,956,765	$ 34,942,002	$ 37,181,263	
Net Income	$ (1,847,719)	$ (3,188,916)	$ (3,390,773)	$ (3,136,934)	$ (1,138,459)	$ 2,487,020	
Net Income (Without CIA)	$ (1,847,719)	$ (3,188,916)	$ (3,390,773)	$ (3,136,934)	$ (1,138,459)	$ 2,487,020	
Capital Improvement Plan							
Capital Expenditures	$ 25,423,864	$ 37,691,320	$ 52,662,973	$ 42,575,892	$ 30,010,127	$ 26,845,732	$ 215,209,908
Funding Sources							
Grant Funding	$ 8,500,000	$ -	$ -	$ -	$ -	$ -	$ 8,500,000
Construction Fund (Prior Bond Proceeds)	-	-	-	-	-	-	-
Rate Financed Capital	-	-	-	1,000,000	3,000,000	6,000,000	10,000,000
Capital Reserve Fund	-	-	-	-	-	-	-
GO Bonds	16,923,864	37,691,320	52,662,973	41,575,892	27,010,127	20,845,732	196,709,908
Revenue Bonds	-	-	-	-	-	-	-
Total Funding Sources	$ 25,423,864	$ 37,691,320	$ 52,662,973	$ 42,575,892	$ 30,010,127	$ 26,845,732	$ 215,209,908
Capital Structure ($)							
Equity	$ 8,500,000	$ -	$ -	$ 1,000,000	$ 3,000,000	$ 6,000,000	$ 18,500,000
Debt	16,923,864	37,691,320	52,662,973	41,575,892	27,010,127	20,845,732	196,709,908
Total	$ 25,423,864	$ 37,691,320	$ 52,662,973	$ 42,575,892	$ 30,010,127	$ 26,845,732	$ 215,209,908
Capital Structure (%)							
Equity	33%	0%	0%	2%	10%	22%	9%
Debt	67%	100%	100%	98%	90%	78%	91%
Total	100%	100%	100%	100%	100%	100%	100%
Financial Metrics							
Senior Debt Service Coverage	n/a	n/a	n/a	n/a	n/a	n/a	
Total Debt Service Coverage	1.30	0.97	1.02	1.07	1.22	1.44	
Operating Reserve - Days O&M	95	80	81	77	82	106	
Operating Reserve ($)	$ 3,325,001	$ 3,137,157	$ 3,277,944	$ 3,214,394	$ 3,513,807	$ 4,688,391	
Capital Reserve - % of 3-Year Average CIP	0%	0%	0%	0%	0%	0%	
Capital Reserve ($)	$ -	$ -	$ -	$ -	$ -	$ -	

List of Active Contracts for Water Related Services

Contract #	Contractor	Agreement Total	General Description
20000009920	AUTOMATIC CONTROLS	$732,877	Actuators & Parts for Flood Wall System
23000002397	STEMMLE PLUMBING REPAIR	$3,000,000	Annual Plumbing Services
22000010577	WARWICK PLUMBING & HEATING	$4,000,000	Annual Plumbing Services
24000012525	UNIVAR SOLUTIONS USA INC	$315,430	Aqua Ammonia Chemical
23000011429	FERGUSON ENTERPRISES INC	$1,600,000	Armorcast Water Boxes and Lids
24000008119	TIDEWATER UTILITY CONSTRUCTION	$18,748,175	ARPA Chapel Drive Drainage Improvement Project
23000001046	CROWDER CONSTRUCTORS INC	$71,390,438	Byrd Park Reservoir Rehabilitation
25000008013	UNIVAR SOLUTIONS USA INC	$350,000	CHEMICAL FLUOROSILICIC ACID
25000008699	BERMEX, INC.	$2,475,000	City of Water Meter Replacement Program
23000007297	DAVIS & GREEN, INC.	$4,000,000	City Wide Electrical Services
21000004497	METRON-FARNIER LLC	$575,000	Commercial Cold Water Meters
21000005662	POLYTEC INC	$2,785,000	Commercial water tank chemicals in bulk
21000001237	ARCADIS U S INC	$20,000,000	Construction Management & Inspection Services
21000001237	ARCADIS U S INC	$20,000,000	Construction Management & Inspection Services
23000011428	FORTILINE INC	$2,000,000	Coopersetters, Resetters & Brass Fittings
23000011427	FERGUSON ENTERPRISES INC	$500,000	Coopersetters, Resetters & Brass Fittings
20000012970	FERGUSON ENTERPRISES INC	$3,270,319	Domestic Plumbing Fittings, Pipes, and Accessories
24000010541	CONSOLIDATED PIPE AND SUPPLY	$4,500,000	Ductile-Iron Water Pipe & Fittings
24000010543	FERGUSON ENTERPRISES INC	$4,500,000	Ductile-Iron Water Pipe & Fittings
24000010542	FORTILINE INC	$4,500,000	Ductile-Iron Water Pipe & Fittings
24000010547	L-B WATER SERVICE INC	$2,000,000	Ductile-Iron Water Pipe & Fittings
23000012088	BEST REPAIR COMPANY INC	$1,102,500	Electric Motor Testing, Preventative Maintenance, and Repair Services
23000012089	ATLASELEKTRO LLC	$3,102,500	Electric Motor Testing, Preventative Maintenance, and Repair Services
21000007200	UNITED RENTALS	$2,000,000	Equipment Rental
20000013803	FERGUSON ENTERPRISES INC	$1,024,849	Fire Hydrants, Extension Kits and Repair Kits
20000013805	FORTILINE INC	$1,859,945	Fire Hydrants, Extension Kits and Repair Kits
22000004260	UNIVAR SOLUTIONS USA INC	$330,000	Furnish and deliver Potassium Permanganate Chemical
21000011807	FORTILINE INC	$560,000	Gas and Water Clamps and Sleeves
21000011850	FROEHLING AND ROBERTSON INC	$549,999	Geotechnical Testing and Inspection Services
24000000095	AMERICAN CONTRACTING & ENVIRONMENT	$1,406,775	Huguenot PS VFD, Generator & DPC Replacement
23000012093	ELECTRIC POWER SYSTEMS INTERNATIONAL	$3,000,000	Industrial Power Systems and Equipment Annual Service, Repair and Maintenance Contract
23000012093	ELECTRIC POWER SYSTEMS INTERNATIONAL	$3,000,000	Industrial Power Systems and Equipment Annual Service, Repair and Maintenance Contract
23000004756	INNOMOTICS LLC	$217,625	Innomotics, LLC - Technical Services Agreement.
20000012750	Mastec North America Inc	$67,778,789	Installation of New Water Facilities
20000012750	MASTEC NORTH AMERICA INC	$67,778,789	Installation of New Water Facilities
25000009352	HAMPTON ROADS AUTOMATION	$750,000	Instrumentation And Control (I&C) System Maintenance And Repair
25000006600	IFS ULTIMO AMERICAS INC	$71,698	JB Systems dba Mainsaver Software) DPU Wastewater & Water Treatment Plants
23000011100	BRENNTAG MID SOUTH	$2,136,320	Liquid Zinc Orthophosphate Chemical
24000010610	BERMEX, INC.	$1,171,202	Meter Services. Privatization of Delinquent Cuts and Meter Services
20000003711	CONSOLIDATED PIPE AND SUPPLY	$640,000	Natural Gas Service Fittings
20000002002	CONSOLIDATED PIPE AND SUPPLY	$19,642,928	Polyethylene Pipe and Fittings
21000005873	SCHNEIDER ELECTRIC SYSTEMS USA INC	$886,488	Preventative maintenance, repairs, parts, and monitoring/control services
20000009922	WOOD EQUIPMENT SERVICE CO.	$250,000	Pump Systems and Spare Parts
24000007355	MC DEAN INC	$1,929,400	Pumping Process Control and DPC Replacement and provide replacement of the SCADA system servers and
24000003606	INNOMOTICS LLC	$515,317	Repairs, components, and configuration of Power Cells
21000010103	FERGUSON US HOLDINGS INC	$1,287,877	Resilient Seated Gate Valves, Tapping Valves, Altitude Valves and Pressure Reducing Valves
21000010110	FORTILINE INC	$1,724,002	Resilient Seated Gate Valves, Tapping Valves, Altitude Valves, and Pressure Reducing Valves
23000007018	SOUTHWOOD BUILDING SYSTEMS INC	$10,635,362	Richmond Water Treatment Plant Water Screening Facilities
19000020729	MC DEAN INC	$688,888	SCADA Instrumentation & Control, System Maintenance and Repair
19000020729	MC DEAN INC	$688,888	SCADA Instrumentation & Control, System Maintenance and Repair/ Renewal #1.
25000009351	E-MERGE SYSTEMS LLC	$1,250,000	SCADA, Instrumentation And Control (I&C) System Maintenance And Repair
21000013883	UNIVAR SOLUTIONS USA INC	$1,255,000	Sodium Hydroxide
23000011309	BRENNTAG MID SOUTH	$9,200,000	Sodium Hypochlorite Chemical
20000010637	HACH COMPANY	$800,000	Spare Parts & Equipment for Monitoring Equipment
22000003560	FERGUSON US HOLDINGS INC	$335,770	Stainless Steel Tapping Sleeves with Mechanical Joint Outlet
22000002674	CONSOLIDATED PIPE AND SUPPLY	$512,434	Steel Fittings
22000004620	CONSOLIDATED PIPE AND SUPPLY	$4,033,041	Steel Pipe
22000006519	WHITMAN REQUARDT AND ASSOC	$15,486,816	Stormwater Utiliity Engineering Services
23000002974	CHEMTRADE CHEMICALS US LLC	$6,700,000	Sulfate for Aluminum Chemical
25000008040	PD BROOKS TRAFFIC CONTROL	$5,000,000	Traffic Control Devices
25000003821	THE DAVEY TREE EXPERT COMPANY	$500,000	Tree Pruning
25000004024	THE DAVEY TREE EXPERT COMPANY	$2,000,000	Tree Removal
24000006710	BENCHMARK VA LLC SUBSURFACE UTL SERVI	$23,800,000	Underground Utility Locating Services
24000003584	INNOMOTICS LLC	$367,185	Upgrade of NXGII to NXG PRO+
25000007994	FERGUSON ENTERPRISES INC	$400,000	Water and Gas Boxes
24000005968	MASTEC NORTH AMERICA INC	$24,000,000	Water Leak Repairs and Mains, and Meter Services
24000005968	Mastec North America Inc	$24,000,000	Water leak repairs and water meter installations
25000008699	Bermex, Inc.	$2,475,000	Water Meter Replacement Program
23000003551	CROWDER CONSTRUCTORS INC	$6,100,624	Water Treatment Plant Substation 1 Replacement
22000006521	Gannett Fleming Inc	$5,687,668	Water Utility Engineering Services
22000006670	GREELEY AND HANSEN LLC	$16,300,000	Water Utility Engineering Services
22000006668	RUMMEL KLEPPER AND KAHL LLP	$8,000,000	Water Utility Engineering Services
22000006519	WHITMAN REQUARDT AND ASSOC	$15,486,816	Water Utility Engineering Services
22000006521	GANNETT FLEMING INC	$5,687,668	Water Utility Engineering Services

22000006670	GREELEY AND HANSEN LLC	$16,300,000	Water Utility Engineering Services
22000006668	RUMMEL KLEPPER AND KAHL LLP	$8,000,000	Water Utility Engineering Services
21000005573	WEST END MACHINE AND WELDING	$8,040,000	Welding, Fabricating and Machine
21000005570	C & L MACHINE AND WELDING INC	$5,300,000	Welding, Fabricating and Machine Services
25000009351	E-MERGE SYSTEMS LLC	$1,250,000	WTP & WWTP SCADA, Instrumentation And Control (I&C) System Maintenance And Repair