COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

ELECTRONIC APPLICATION OF NORTHERN KENTUCKY WATER DISTRICT FOR AN ADJUSTMENT OF RATES; ISSUANCE OF BONDS; FINANCING; AND TARIFF REVISIONS	)))	**CASE NO. 2022-00161**

RESPONSE TO COMMISSION STAFF'S FIRST REQUEST FOR INFORMATION

Comes now the Northern Kentucky Water District ("NKWD") and submits its responses to the Commission Staff's First Request for Information dated July 13, 2022.

RESPECTFULLY SUBMITTED:

Tom Edge (KBA #95534)
General Counsel
Manager of Legal, Compliance, and Regulatory Affairs
Northern Kentucky Water District
2835 Crescent Springs Rd.
Erlanger, KY 41018
Phone - 859-578-5457
Fax - 859-426-2770
Email: tedge@nkywater.org
Counsel for Northern Kentucky Water District

CERTIFICATE OF SERVICE

In accordance with 807 KAR 5:001, Section 8, I certify that this document was submitted electronically to the Public Service Commission on August 3, 2022 and that there are currently no parties that the Public Service Commission has excused from participation by electronic means in this proceeding.

Tom Edge, Esq. (KBA #95534)

AFFIDAVIT OF LINDSEY RECHTIN

COMMONWEALTH OF KENTUCKY)
)SS
COUNTY OF KENTON)

Comes now affiant, Lindsey Rechtin, after being first sworn, deposes, and states that she is the President and CEO for the Northern Kentucky Water District, that she is authorized to submit these Responses on behalf of Northern Kentucky Water District, and that the information contained in the Responses is true and correct to the best of her knowledge and belief, except as to those matters that are based on information provided to her and, as to those, she believes that information to be true and correct.

Lindsey Rechtin

This instrument was acknowledged, signed and declared by Lindsey Rechtin to be her act and deed the 3rd day of August 2022.

Notary Public, Kentucky at Large
Notary ID Number: KYNP17828
My Commission Expires: December 21, 2024

AFFIDAVIT OF STACEY KAMPSEN

COMMONWEALTH OF KENTUCKY)
)SS
COUNTY OF KENTON)

Comes now affiant, Stacey Kampsen after being first sworn, deposes, and states that she is the Finance Manager for the Northern Kentucky Water District, that she is authorized to submit these Responses on behalf of Northern Kentucky Water District, and that the information contained in the Responses is true and correct to the best of her knowledge and belief, except as to those matters that are based on information provided to her and, as to those, she believes that information to be true and correct.

Stacey Kampsen

Stacey Kampsen

This instrument was acknowledged, signed and declared by Stacey Kampsen to be her act and deed the 3rd day of August 2022.

Notary Public, Kentucky at Large
Notary ID Number: KYNP17828
My Commission Expires: December 21, 2024

AFFIDAVIT OF AMY STOFFER

COMMONWEALTH OF KENTUCKY)
)SS
COUNTY OF KENTON)

Comes now affiant, Amy Stoffer after being first sworn, deposes, and states that she is the Vice President of Engineering, Production and Water Quality for the Northern Kentucky Water District, that she is authorized to submit these Responses on behalf of Northern Kentucky Water District, and that the information contained in the Responses is true and correct to the best of her knowledge and belief, except as to those matters that are based on information provided to her and, as to those, she believes that information to be true and correct.

Amy Stoffer

This instrument was acknowledged, signed and declared by Amy Stoffer to be her act and deed the 3rd day of August 2022.

Stephen J. Broering
Notary Public, ID KYNP45820
State at Large, Kentucky
My Commission Expires on March 2, 2026

Notary Public, Kentucky at Large
Notary ID Number: KYNP 45820
My Commission Expires: MARCH 2, 2026

AFFIDAVIT OF KIM CLEMONS

COMMONWEALTH OF KENTUCKY)
)SS
COUNTY OF KENTON)

Comes now affiant, Kim Clemons after being first sworn, deposes, and states that she is the Director of Human Resources, Safety, Facilities and Fleet for the Northern Kentucky Water District, that she is authorized to submit these Responses on behalf of Northern Kentucky Water District, and that the information contained in the Responses is true and correct to the best of her knowledge and belief, except as to those matters that are based on information provided to her and, as to those, she believes that information to be true and correct.

Kim Clemons

Kim Clemons

This instrument was acknowledged, signed and declared by Kim Clemons to be her act and deed the 3rd day of August 2022.

Notary Public, Kentucky at Large
Notary ID Number: KYNP17828
My Commission Expires: December 21, 2024

AFFIDAVIT OF BARRY MILLER

COMMONWEALTH OF KENTUCKY)
)SS
COUNTY OF KENTON)

Comes now affiant, Barry Miller, after being first sworn, deposes, and states that he is the Acting Manager for Distribution & Customer Service for the Northern Kentucky Water District, that he is authorized to submit this Response on behalf of Northern Kentucky Water District, and that the information contained in the Response is true and correct to the best of his knowledge and belief, except as to those matters that are based on information provided to her and, as to those, he believes that information to be true and correct.

Barry Miller
Barry Miller

This instrument was acknowledged, signed and declared by Barry Miller to be his act and deed the 3rd day of August 2022.

Notary Public, Kentucky at Large
Notary ID Number: KYNP17828
My Commission Expires: December 21, 2024

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Stacey Kampsen / Amy Stoffer

Q.1. Provide the following expense account data:

a. Schedules, in comparative form, showing the operating expense account balance for the test year and each of the three most recent calendar years for each account or subaccount included in the utility's annual report. Show the percentage of increase or decrease of each year over the prior year.

b. A listing, with descriptions, of all activities, initiatives or programs undertaken or continued by the utility since its last general rate case for the purpose of minimizing costs or improving the efficiency of its operations or maintenance activities. Include all quantifiable realized and projected savings.

A.1. a. NKWD submits Exhibit 1-1.

b. The District takes the responsibility of being good stewards of the assets very seriously and strives daily to use the rate payer's revenues to the best of our ability. As such, we continue to promote the following activities to maximize revenue dollars:

Management

- Analyze each position as it comes open due to retirement or other separation to assure it is necessary before filling it.

- Dispose of vacant property that is no longer needed. Since the last general rate case, NKWD has disposed of two properties. One property was sold to the City of Highland Heights for $63,100 and another property was sold to the Kenton County School District for $3,000. By selling the property to the Kenton County School District, the District saved the expense of removing an out of service standpipe tower structure on the property. The Kenton County School District paid $85,000 to demolish the structure.

Finance

- Case No. 2021-00373, NKWD refinanced $29,310,000 of revenue bonds which will result in debt service savings of over $3,149,288 over the life of the issue (6 years);

- Case No. 2020-00284, NKWD refinanced $24,076,000 of revenue bonds which will result in debt service saving of over $5,828,770 over the life of the issue (15 years)

Procurement

- Work in collaboration with other agencies to jointly bid materials and services and utilize online reverse auction bidding of chemicals to obtain the best pricing.

- Use state procurement contracts to reduce the cost of telecommunication and cellular services.

- Coordinate water main replacement with street paving improvements to reduce the cost of pavement restoration. Between January 1, 2019 to July 1, 2022, NKWD has engaged in 28 such projects and estimates a total savings of $1,253,000.

- Implement electronic bid software to facilitate and streamline bidding process.

- Negotiate construction change orders facilitated by project photographic documentation to lower the overall cost of construction.

Operations

- Continue the off-peak pumping program (described in attachment) to help control electric costs that are a substantial portion of our operations costs.

- Utilize the granular activated carbon in our water treatment process for the longest period possible per contactor to get the maximum usage while addressing water quality concerns and disinfection by-product standards.

- Review usage through pipes used for fire protection systems and work with customers to find leaks in the fire system that contribute to non-revenue water. Utilize leak detection vendor to identify and locate leaks help alleviate non-revenue water through the repair of non-surfacing leaks.

- Replace indoor and outdoor lighting fixtures with new fixtures using significantly lower wattage to reduce power consumption.

- Replace pumps and motors with new equipment that are sized appropriately for current system conditions and install variable frequency drives to reduce power consumption.

- Evaluate chemicals through routine jar testing to determine appropriate chemical dosages and look for ways to lower chemical costs such as buying chemicals in larger volumes.

- Optimize use of UV treatment trains to save power and extend bulb life during lower demand winter months.

- Conduct routine inspections, testing, and maintenance of equipment to identify recommended repairs to extend the life of the equipment or to identify timely replacement of equipment and facilities, all of which are important for reliable and efficient operations. Examples include pump vibration testing, underwater dive inspections, high voltage equipment inspection, water storage tank inspections and cleaning, and building roof and HVAC equipment inspections.

- As approved in Case No. 2021-00192, NKWD recently entered into a special agreement with Duke Energy to allow continuous pumping at the District's Ohio River Pump Station #1 (ORPS1) at a rate that is also cost and revenue-neutral compared to off-peak pumping but allows the District to run pumps for much longer periods with fewer starts. In the first three months of operation under the new agreement pump starts have been reduced approximately 70% (83 starts vs. 280 expected) compared to pumping only during the off-peak windows in Duke's tariff. Reducing pump start and stop cycles is expected to reduce pump operations and maintenance costs and extend the useful lifespan of these assets. Please note that for the NKWD's other pump station, NKWD continues to use an off-peak pumping program to help control electric costs that are a substantial portion of our operations costs.

See also Application, Exhibit Q3, Prefiled Testimony of Stacey Kampsen at 3-4 (Bates Stamped NKWD 00955-00956)

EXHIBIT 1-1

Exhibit 1-1
Northern Kentucky Water District
Case No. 2022-00161
Expense Accounts
For Years Ending December 31, 2018 - December 31, 2021

Account No.	Account Description	2018	2019	2019 vs. 2018 Variance in Dollars	2019 vs. 2018 Variance as Percent	2020	2020 vs. 2019 Variance in Dollars	2020 vs. 2019 Variance as Percent	2021	2021 vs. 2020 Variance in Dollars	2021 vs. 2020 Variance as Percent
601	Salaries & Wages - Employees	7,985,937	9,122,236	1,136,299	14.23%	9,188,895	66,659	0.73%	9,652,419	463,524	5.04%
603	Salaries & Wages - Officers	36,000	36,000	-	-	33,600	(2,400)	(6.67)%	36,000	2,400	7.14%
604	Employee Pensions & Benefits	4,880,886	5,423,579	542,693	11.12%	5,326,551	(97,028)	(1.79)%	5,762,130	435,579	8.18%
610	Purchased Water	-	-	-	-	-	-	-	-	-	-
615	Purchased Power	2,469,239	2,597,913	128,674	5.21%	2,471,869	(126,044)	(4.85)%	2,647,748	175,879	7.12%
616	Fuel for Power Production	96,297	120,764	24,467	25.41%	113,743	(7,021)	(5.81)%	126,678	12,935	11.37%
618	Chemicals	2,237,457	2,664,632	427,175	19.09%	2,573,311	(91,321)	(3.43)%	2,819,593	246,282	9.57%
620	Materials & Supplies	2,131,233	2,375,356	244,123	11.45%	2,413,627	38,271	1.61%	2,051,609	(362,018)	(15.00)%
631	Contractual Services - Engineering	48,496	170	(48,326)	(99.65)%	10,598	10,428	6134.12%	73,454	62,856	593.09%
632	Contractual Services - Accounting	19,800	19,300	(500)	(2.53)%	23,170	3,870	20.05%	22,160	(1,010)	(4.36)%
633	Contractual Services - Legal	109,914	35,719	(74,195)	(67.50)%	20,635	(15,084)	(42.23)%	19,860	(775)	(3.76)%
634	Contractual Services - Mgt. Fees	3,935	3,400	(535)	(13.60)%	10,538	7,138	209.94%	35,473	24,935	236.62%
635	Contractual Services - Water Testing	3,813,790	3,810,280	(3,510)	(0.09)%	4,051,837	241,557	6.34%	3,993,039	(58,798)	(1.45)%
636	Contractual Services - Other	-	-	-	-	-	-	-	-	-	-
641	Rental of Bldg./Real Property	-	-	-	-	-	-	-	-	-	-
642	Rental of Equipment	12,123	31,618	19,495	160.81%	29,927	(1,691)	(5.35)%	27,966	(1,961)	(6.55)%
650	Transportation Expenses	570,761	605,498	34,737	6.09%	506,319	(99,179)	(16.38)%	628,480	122,161	24.13%
656	Insurance - Vehicles	60,514	72,929	12,415	20.52%	74,561	1,632	2.24%	61,478	(13,083)	(17.55)%
657	Insurance - General Liability	402,367	435,016	32,649	8.11%	523,374	88,358	20.31%	489,108	(34,266)	(6.55)%
658	Insurance - Workers Compensation	51,413	56,461	5,048	9.82%	71,128	14,667	25.98%	72,639	1,511	2.12%
659	Insurance - Other	50,197	50,019	(178)	(0.35)%	50,707	688	1.38%	52,124	1,417	2.79%
660	Advertising Expenses	13,121	18,787	5,666	43.18%	18,849	62	0.33%	10,757	(8,092)	(42.93)%
666	Regulatory Commission Expense -	-	-	-	-		-	-		-	-
	Amortization of Rate Case Expenses	-	24,248	24,248	-	32,331	8,083	33.33%	32,331	-	-
667	Regulatory Commission Expense - Other	129,683	108,184	(21,499)	(16.58)%	111,266	3,082	2.85%	117,920	6,654	5.98%
668	Water Resource Conservation	-	-	-	-	-	-	-	-	-	-
670	Bad Debt Expense	372,140	424,805	52,665	14.15%	355,158	(69,647)	(16.40)%	382,985	27,827	7.84%
675	Miscellaneous Expenses	43,797	53,045	9,248	21.12%	42,702	(10,343)	(19.50)%	38,281	(4,421)	(10.35)%
699	Taxes	589,986	648,930	58,944	9.99%	651,853	2,923	0.45%	811,423	159,570	24.48%

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Stacey Kampsen

Q.2. Provide, in the format provided in Schedule A, schedules showing a comparison of the balance in the revenue accounts for each month of the test year to the same month of the immediately preceding 12-month period for each revenue account or subaccount included in the utility's chart of accounts. Include appropriate footnotes to show the month each rate change was approved and the month the full impact of the change was recorded in the accounts.

A.2. NKWD submits the attached Exhibit 2-1.

EXHIBIT 2-1

Exhibit 2-1
Northern Kentucky Water District
Case No. 2022-00161
Comparison of Revenue Account Balances
For the 12 months Ended December 31, 2021
With the 12 months Ended December 31, 2020
"000 Omitted"

461-0100-000	Income - Residential Water Sales [1]	January	February	March	April	May	June	July	August	September	October	November	December	Total
Test Period (2021)		2,978	2,379	3,609	2,818	2,314	3,740	2,961	2,488	4,181	3,188	2,490	3,771	36,917
Previous 12 Months (2020)		2,768	2,248	3,339	2,671	2,312	3,599	3,163	2,645	4,464	3,269	2,559	4,543	37,580
Increase		210	131	270	147	2	141	-	-	-	-	-	-	-
(Decrease)		-	-	-	-	-	-	(202)	(157)	(283)	(81)	(69)	(772)	(663)

461-0101-000	Income - Commercial Water Sales [1]	January	February	March	April	May	June	July	August	September	October	November	December	Total
Test Period (2021)		460	329	826	435	347	919	548	437	1,287	646	457	1,060	7,749
Previous 12 Months (2020)		504	368	858	443	324	740	454	363	1,257	607	435	1,213	7,565
Increase		-	-	-	-	23	179	94	74	30	39	22	-	184
(Decrease)		(44)	(39)	(32)	(8)	-	-	-	-	-	-	-	(153)	-

461-0102-000	Income - Industrial Water Sales [1]	January	February	March	April	May	June	July	August	September	October	November	December	Total
Test Period (2021)		150	252	461	155	218	567	163	358	668	183	275	586	4,034
Previous 12 Months (2020)		138	294	682	136	261	662	143	298	832	168	299	784	4,697
Increase		12	-	-	19	-	-	20	60	-	15	-	-	-
(Decrease)		-	(42)	(221)	-	(43)	(95)	-	-	(164)	-	(24)	(198)	(663)

461-0103-000	Income - Public Authority Water Sales [1]	January	February	March	April	May	June	July	August	September	October	November	December	Total

Test Period (2021)	144	111	181	153	104	255	228	195	247	265	148	210	2,243
Previous 12 Months (2020)	191	125	193	164	113	186	161	169	223	244	150	234	2,153
Increase	-	-	-	-	-	69	67	26	24	21	-	-	90
(Decrease)	(47)	(14)	(12)	(11)	(9)	-	-	-	-	-	(2)	(24)	-

461-0009-000	Water Sales - Multi Family [1]	January	February	March	April	May	June	July	August	September	October	November	December	Total
Test Period (2021)		1	-	-	-	-	-	-	1	-	-	1	-	3
Previous 12 Months (2020)		-	1	-	-	1	2	-	1	2	-	-	-	6
Increase		1	-	-	-	-	-	-	-	-	-	1	-	-
(Decrease)		-	(1)	-	-	(1)	(2)	-	-	(2)	-	-	-	(3)

461-0104-000	Income - Multi Family Water Sales [1]	January	February	March	April	May	June	July	August	September	October	November	December	Total
Test Period (2021)		483	465	533	462	459	507	476	504	511	480	500	523	5,904
Previous 12 Months (2020)		437	398	492	442	387	489	504	483	536	505	519	632	5,824
Increase		46	67	41	20	72	18	-	21	-	-	-	-	80
(Decrease)		-	-	-	-	-	-	(28)	-	(25)	(25)	(19)	(109)	-
		46	67	41	20	72	18	(28)	21	(25)	(25)	(19)	(109)	80

461-0011-000	Water Sales - Bulk Loading [1]	January	February	March	April	May	June	July	August	September	October	November	December	Total
Test Period (2021)		6	5	4	6	6	6	5	8	6	4	5	5	67
Previous 12 Months (2020)		3	3	5	5	5	10	9	6	8	7	3	7	72
Increase		3	2	-	1	1	-	-	2	-	-	2	-	-
(Decrease)		-	-	(1)	-	-	(4)	(4)	-	(2)	(3)	-	(2)	(5)

474-0001-000	Water Sales - MISC/Hydrants Mtrs. [1]	January	February	March	April	May	June	July	August	September	October	November	December	Total
Test Period (2021)		2	3	1	5	7	5	6	8	3	1	2	1	43
Previous 12 Months (2020)		-	1	6	1	2	1	12	5	6	5	3	3	45
Increase		2	2	-	4	5	4	-	3	-	-	-	-	-
(Decrease)		-	-	(5)	-	-	-	(6)	-	(3)	(4)	(1)	(2)	(2)

466-0001-000	Income - Resale Water Sales [1]	January	February	March	April	May	June	July	August	September	October	November	December	Total
Test Period (2021)		150	159	167	142	155	197	175	199	202	168	158	152	2,023
Previous 12 Months (2020)		124	118	133	136	126	180	174	170	176	171	141	178	1,826
Increase		26	41	34	6	29	17	1	29	26	-	17	-	197
(Decrease)		-	-	-	-	-	-	-	-	-	(3)	-	(26)	-

470-0001-000	Income - Penalties	January	February	March	April	May	June	July	August	September	October	November	December	Total
Test Period (2021)		-	-	-	10	20	79	102	34	76	27	17	77	442
Previous 12 Months (2020)		155	52	32	(1)	(1)	-	-	-	-	-	-	-	237
Increase		-	-	-	11	21	79	102	34	76	27	17	77	205
(Decrease)		(155)	(52)	(32)	-	-	-	-	-	-	-	-	-	-

472-0001-000	Rent From Water Property	January	February	March	April	May	June	July	August	September	October	November	December	Total
Test Period (2021)		33	26	30	25	27	29	37	23	39	30	33	51	383
Previous 12 Months (2020)		28	31	29	198	33	29	34	33	37	31	30	36	549
Increase		5	-	1	-	-	-	3	-	2	-	3	15	-
(Decrease)		-	(5)	-	(173)	(6)	-	-	(10)	-	(1)	-	-	(166)

471-0001-000	Meter Tests	January	February	March	April	May	June	July	August	September	October	November	December	Total
Test Period (2021)		-	-	-	-	-	-	-	-	-	-	-	-	-
Previous 12 Months (2020)		-	-	-	-	-	-	-	-	-	-	-	-	-
Increase		-	-	-	-	-	-	-	-	-	-	-	-	-
(Decrease)		-	-	-	-	-	-	-	-	-	-	-	-	-

471-0002-000	Income - Turn on Fees	January	February	March	April	May	June	July	August	September	October	November	December	Total
Test Period (2021)		-	-	22	17	16	19	21	25	18	8	6	2	154
Previous 12 Months (2020)		20	45	34	-	-	15	-	-	-	-	-	-	115
Increase		-	-	-	17	16	4	21	25	18	8	6	2	39
(Decrease)		(20)	(45)	(12)	-	-	-	-	-	-	-	-	-	-

474-0002-000	Income - Returned Check Charges	January	February	March	April	May	June	July	August	September	October	November	December	Total

Test Period (2021)	1	1	1	1	1	1	-	1	1	1	2	1	9
Previous 12 Months (2020)	1	1	1	1	1	1	1	1	1	1	1	1	11
Increase	-	-	-	-	-	-	-	-	-	-	1	-	-
(Decrease)	-	-	-	-	-	-	(1)	-	-	-	-	-	(2)

474-0008-000 LAB Test Fees	January	February	March	April	May	June	July	August	September	October	November	December	Total
Test Period (2021)	-	-	-	7	-	-	7	-	-	-	10	6	30
Previous 12 Months (2020)	-	3	-	-	6	-	5	-	3	-	-	13	31
Increase	-	-	-	7	-	-	2	-	-	-	10	-	-
(Decrease)	-	(3)	-	-	(6)	-	-	-	(3)	-	-	(7)	(1)

474-0009-000 Commission On Sales Tax	January	February	March	April	May	June	July	August	September	October	November	December	Total
Test Period (2021)	-	-	-	-	-	-	-	-	-	-	-	-	1
Previous 12 Months (2020)	-	-	-	-	-	-	-	-	-	-	-	-	1
Increase	-	-	-	-	-	-	-	-	-	-	-	-	-
(Decrease)	-	-	-	-	-	-	-	-	-	-	-	-	-

474-0010-000 Material Sold	January	February	March	April	May	June	July	August	September	October	November	December	Total
Test Period (2021)	-	-	3	2	3	18	6	-	16	12	5	7	73
Previous 12 Months (2020)	4	-	4	3	4	3	-	3	16	-	1	3	41
Increase	-	-	-	-	-	15	6	-	-	12	4	4	32
(Decrease)	(4)	-	(1)	(1)	(1)	-	-	(3)	-	-	-	-	-

[1] Phase 2 rates approved in PSC Case # 2018-00291 effective March 26, 2020; full impact of rates July 2020

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Stacey Kampsen

Q.3. Provide the utility's cash account balances at the beginning of the most recent calendar year and at the end of each month through the date of this request.

A.3. NKWD submits the attached Exhibit 3-1.

Northern Kentucky Water District

EXHIBIT 3-1

Exhibit 3-1
Northern Kentucky Water District
Case No. 2022-00161
Cash Accounts
January 1, 2021 - June 30, 2022

Account No.	Account Description	January 1, 2021	January 2021	February 2021	March 2021	April 2021	May 2021	June 2021	July 2021	August 2021
131-0001-000	Cash - O & M Reserve	638,881.56	139,389.73	140,233.85	695,265.82	715,713.89	138,786.55	138,817.59	139,134.24	139,164.37
131-0005-000	Cash - Dental Benefit Checking	2,422.87	24,976.44	19,917.71	19,922.21	19,926.30	3,876.31	16,069.66	22,473.06	37,478.50
131-0008-000	Cash - Sub District A	6,525.07	7,830.13	7,830.19	7,830.26	7,830.26	7,830.26	7,830.46	7,830.46	7,830.46
131-0009-000	Cash - Sub District B	2,737.67	3,217.76	3,217.85	3,217.95	3,218.02	3,218.09	3,218.23	3,218.30	3,218.38
131-0010-000	Cash - Sub District R	3,940.21	4,705.27	4,705.32	4,705.39	4,705.41	4,705.43	4,705.58	4,705.60	4,705.63
131-0011-000	Cash - Sub District RL	15,361.17	18,527.73	18,888.02	18,888.34	18,888.51	18,888.67	18,889.31	18,889.48	18,889.66
131-0012-000	Cash - Sub District C	4,604.97	6,335.23	6,335.48	6,335.78	6,336.01	6,336.23	6,336.61	6,336.84	6,337.09
131-0013-000	Cash on Hand	1,133.00	1,133.00	1,133.00	1,133.00	1,133.00	1,133.00	1,133.00	1,133.00	1,133.00
131-0015-000	Cash - Sub-District F	30.94	30.95	30.96	30.97	30.98	30.99	31.00	31.01	31.02
131-0016-000	Cash - Sub-District G	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00
131-0020-000	Cash	(2,759.60)	(2,759.60)	(2,759.60)	(2,727.62)	(2,631.27)	(2,631.27)	(2,631.27)	(2,631.27)	(2,631.27)
131-0020-001	Cash - Heritage Bank O&M	17,829,553.26	19,833,070.75	19,464,649.77	20,702,600.40	16,779,820.37	16,761,777.30	15,573,025.16	16,957,533.34	17,245,546.55
131-0020-002	Cash - Heritage ICS - O&M	21,431,129.01	21,434,170.10	21,436,718.36	21,441,780.53	21,446,186.81	21,450,740.92	21,455,149.04	21,459,705.05	21,464,262.03
132-0027-000	Ban 2011 Cash	364,787.95	364,860.41	364,930.39	365,012.88	365,087.89	365,157.91	365,240.45	365,315.51	365,395.59
132-0029-000	Cash - BAN 2017	346,863.77	309,928.21	196,614.95	190,342.40	153,468.05	44,844.55	44,204.69	44,213.78	44,223.47
132-0053-000	Cash - BAN 2021A	-	-	-	506,177.40	506,421.19	506,518.32	506,632.82	506,736.93	506,848.01
132-0053-001	Cash - Heritage ICS - BAN 2021A	-	-	-	24,002,353.50	24,007,285.98	24,012,383.94	24,017,318.48	24,022,418.57	24,027,519.74
132-0054-000	Capitalized Interest BAN 2021A	-	-	-	126,767.77	126,768.18	126,769.13	126,769.76	126,770.17	92,572.15
132-0001-000	Cash - Bond Prin & Int.	13,775,019.08	1,475,994.06	3,025,814.75	4,626,520.66	6,227,493.33	7,787,699.28	8,208,537.20	7,005,407.83	8,583,900.35
132-0001-002	Cash - Heritage ICS - Bond P&I	6,770,682.31	6,771,643.08	6,772,448.17	6,774,047.48	6,775,439.55	6,776,831.90	6,778,224.54	6,779,663.90	6,781,103.57
131-0030-001	Cash - Heritage Bank IR&R	1,180,077.27	31,972.79	734,251.62	338,712.03	5,035,232.15	4,738,299.13	5,763,271.56	5,298,778.29	4,338,615.15
131-0030-002	Cash - Heritage ICS - IR&R	1,172.24	1,172.48	1,172.67	1,172.91	1,173.15	1,173.39	1,173.63	1,173.87	1,174.11
131-0030-003	Cash - IR&R Subaccount	-	2,042,281.34	2,042,673.05	2,043,134.80	2,043,554.66	2,043,946.61	2,044,408.65	2,044,828.78	2,045,277.01
131-0031-000	Cash Grant/Loan Clearing	1,049.59	1,049.80	1,050.00	1,050.24	1,050.46	1,050.66	1,400.90	1,051.13	1,051.36

Exhibit 3-1
Northern Kentucky Water Distric
Case No. 2022-00161
Cash Accounts
January 1, 2021 - June 30, 2022

Account No.	Account Description	September 2021	October 2021	November 2021	December 2021	January 2022	February 2022	March 2022	April 2022	May 2022	June 2022
131-0001-000	Cash - O & M Reserve	639,192.62	139,602.06	140,729.02	138,511.61	140,371.65	144,898.26	144,941.75	144,996.55	145,109.29	153,043.28
131-0005-000	Cash - Dental Benefit Checking	23,157.73	(13,086.95)	52,775.02	31,631.86	43,634.61	43,642.98	45,566.76	30,183.70	12,975.21	31,897.41
131-0008-000	Cash - Sub District A	7,830.63	7,830.63	7,830.63	7,830.83	96,135.90	96,136.32	96,137.06	96,137.06	96,137.06	96,139.49
131-0009-000	Cash - Sub District B	3,218.53	3,218.60	3,218.68	3,218.83	35,698.92	35,699.14	35,699.53	35,699.67	35,699.95	35,701.25
131-0010-000	Cash - Sub District R	4,705.76	4,705.78	4,705.81	4,705.95	56,471.03	56,471.31	56,471.79	56,471.84	56,471.94	56,473.51
131-0011-000	Cash - Sub District RL	18,890.25	18,890.42	18,890.60	18,891.23	107,057.82	115,058.57	115,419.69	115,420.02	115,420.70	115,424.54
131-0012-000	Cash - Sub District C	6,337.44	6,337.67	6,337.92	6,338.29	181,068.58	181,069.61	181,071.35	181,071.81	181,072.74	181,078.58
131-0013-000	Cash on Hand	1,133.00	1,133.00	1,133.00	1,133.00	1,133.00	1,133.00	1,133.00	1,133.00	1,133.00	1,133.00
131-0015-000	Cash - Sub-District F	31.03	31.04	31.05	31.06	31.07	31.08	31.09	31.10	31.13	31.17
131-0016-000	Cash - Sub-District G	21.00	21.00	21.00	21.00	21.00	21.00	21.01	21.02	21.04	21.06
131-0020-000	Cash	(2,407.82)	(2,323.97)	(2,323.97)	(65.25)	(65.25)	(65.25)	(65.25)	(65.25)	(65.25)	(65.25)
131-0020-001	Cash - Heritage Bank O&M	16,941,660.21	16,994,506.04	19,063,088.31	6,011,060.08	8,505,192.43	8,517,760.70	8,226,094.60	9,410,055.99	9,489,946.29	9,249,076.25
131-0020-002	Cash - Heritage ICS - O&M	21,468,672.93	21,473,231.82	21,477,644.57	36,484,876.82	34,492,555.91	34,499,171.53	34,510,042.78	34,524,227.81	34,551,668.56	34,590,737.96
132-0027-000	Ban 2011 Cash	365,470.68	365,543.28	365,623.41	365,701.05	365,778.71	365,848.87	365,964.15	366,109.56	366,405.57	366,819.88
132-0029-000	Cash - BAN 2017	44,232.56	44,241.35	44,251.05	44,260.45	39,112.42	39,120.91	39,133.24	39,148.79	39,180.44	39,224.74
132-0053-000	Cash - BAN 2021A	506,952.17	2,259,218.75	2,148,765.41	1,646,937.90	1,165,769.11	1,034,199.61	143,863.23	1,251,180.87	1,001,267.10	989,697.81
132-0053-001	Cash - Heritage ICS - BAN 2021A	24,032,457.39	22,037,314.11	22,041,842.77	15,265,975.26	15,269,217.00	15,272,145.61	15,276,958.11	13,282,716.95	13,293,274.40	13,308,305.81
132-0054-000	Capitalized Interest BAN 2021A	92,573.04	92,573.89	92,574.77	92,575.61	92,576.49	46,292.98	46,293.30	46,293.74	46,298.08	46,314.26
132-0001-000	Cash - Bond Prin & Int.	10,185,741.05	11,787,786.36	13,390,457.93	3,812,012.21	3,539,746.50	5,039,364.96	6,591,186.52	8,143,996.55	9,700,623.72	10,082,902.52
132-0001-002	Cash - Heritage ICS - Bond P&I	6,782,497.09	6,783,937.36	6,785,331.46	16,788,553.30	4,791,707.39	4,792,626.43	4,794,136.66	4,796,107.24	4,799,919.31	4,805,346.83
131-0030-001	Cash - Heritage Bank IR&R	3,608,725.33	2,992,148.89	2,346,412.49	2,155,230.81	1,823,208.60	1,830,708.12	1,605,464.67	871,205.10	1,442,960.11	816,231.94
131-0030-002	Cash - Heritage ICS - IR&R	1,174.35	1,174.59	1,174.83	6,781,723.19	6,783,163.29	6,784,464.29	6,786,602.19	6,789,391.76	4,793,637.14	4,799,057.56
131-0030-003	Cash - IR&R Subaccount	2,045,697.31	2,046,103.69	1,889,034.94	1,801,620.65	1,796,502.96	1,517,272.19	1,304,115.13	1,143,750.81	1,111,925.65	1,075,971.04
131-0031-000	Cash Grant/Loan Clearing	1,051.58	1,051.79	43,374.56	1,066.45	52,468.44	1,077.10	1,077.44	1,077.87	1,078.74	1,079.96

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Stacey Kampsen

Q.4. Provide the following monthly account balances and a calculation of the average (13-month) account balances for the 12 months preceding the test year:

a. Plant in service (Account No. 101);

b. Plant purchased or sold (Account No. 102);

c. Property held for future use (Account No. 105);

d. Completed construction not classified (Account No. 106);

e. Construction work in progress (Account No. 107);

f. Depreciation reserve (Account No. 108);

g. Materials and supplies (include all accounts and subaccounts);

h. Computation and development of minimum cash requirements;

i. Balance in accounts payable applicable to amounts included in utility plant in service (if actual is indeterminable, provide a reasonable estimate);

j. Balance in accounts payable applicable to amounts included in plant under construction (if actual is indeterminable, provide a reasonable estimate); and

k. Balance in accounts payable applicable to prepayments by major category or subaccount.

A.4. NKWD submits the attached Exhibit 4-1.

Northern Kentucky Water District

EXHIBIT 4-1

Northern Kentucky Water District
Case No. 2022-00161
Monthly Account Balances
12 months preceding the test year (Calendar Year 2020)

Account	January 1, 2020	January 2020	February 2020	March 2020	April 2020	May 2020	June 2020	July 2020	August 2020	September 2020	October 2020	November 2020	December 2020	13-Month Average
(a) Plant in service (101)	498,697,584	499,170,268	499,293,851	499,627,894	499,857,693	499,876,137	502,430,184	502,570,638	502,671,846	502,828,839	502,936,046	503,171,335	511,857,624	501,922,303
(b) Plant purchased or sold (104)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(c) Property held for future use (103)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(d) Completed construction not classified (106)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(e) Construction work in progress (105)	13,054,988	13,941,751	14,095,059	14,399,050	14,714,478	15,130,064	13,265,383	14,240,998	15,189,725	15,693,736	15,775,977	16,504,006	9,356,503	14,258,594
(f) Depreciation reserve (108)	169,551,350	170,541,350	171,531,350	172,521,350	173,511,350	174,516,350	175,247,309	176,252,309	177,257,309	178,262,309	179,267,309	180,272,309	180,786,263	175,347,555
(g) Materials and supplies (151)	1,667,269	1,565,918	1,731,711	1,802,471	1,776,322	1,758,204	1,673,366	1,741,480	1,693,076	1,710,950	1,784,064	1,727,317	1,854,835	1,729,768
(h) Computation and development of minimum cash requirements[1]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
(i) Balance in accounts payable applicable to amounts included in utility plant in service (if actual is indeterminable, provide a reasonable estimate)[2]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
(j) Balance in accounts payable applicable to amounts included in plant under construction (if actual is indeterminable, provide a reasonable estimate)[2]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
(k) Balance in accounts payable applicable to prepayments by major category or subaccount[2]	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

[1]NKWD does not have minimum cash requirements related to the aforementioned accounts.

[2]NKWD records are not maintained in a format to determine the actual amount or reasonably estimate the balances in accounts payable for the accounts requested.

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Stacey Kampsen

Q.5. Provide a detailed analysis of expenses for professional services during the test year, as shown in Schedule B, and all workpapers supporting the analysis. At a minimum, the workpapers should show the payee, dollar amount, reference (i.e., voucher no., etc.), account charged, hourly rates and time charged to the company according to each invoice, and a description of the services provided.

A.5. NKWD submits the attached Exhibit 5-1 which includes Schedule B below and workpapers.

Schedule B
Northern Kentucky Water District
Case No. 2022-00161
Analysis of Professional Services Expenses
For the 12 months Ended December 31, 2021

Line No.	Item (a)	Rate Case (b)	Annual Audit (C)	Other (d)	Total (e)
1	Legal			$ 17,144.00	$ 17,144.00
2	Engineering			$ 28,331.49	$ 28,331.49
3	Accounting		$ 20,415.00	$ 1,745.00	$ 22,160.00
4	Other				$ -
5	Total	$ -	$ 20,415.00	$ 47,220.49	$ 67,635.49

Northern Kentucky Water District

EXHIBIT 5-1

Schedule B
Northern Kentucky Water District
Case No. 2022-00161
Analysis of Professional Services Expenses[1]
For the 12 months Ended December 31, 2021

Line No.	Item (a)	Rate Case (b)	Annual Audit (C)	Other (d)	Total (e)
1	Legal			$ 17,144.00	$ 17,144.00
2	Engineering			$ 28,331.49	$ 28,331.49
3	Accounting		$ 20,415.00	$ 1,745.00	$ 22,160.00
4	Other				$ -
5	Total	$ -	$ 20,415.00	$ 47,220.49	$ 67,635.49

[1] Professional services included in Operating and Maintenance Expense for the test year. Excludes professional services such as engineering incurred on projects which are held in construction in progress until the asset is ready for use and transferred to the appropriate capital asset account.

Line No.	Item (a)	Rate Case (b)	Annual Audit (C)	Other (d)	Total (e)	Payee	Reference (Invoice or Voucher No.)	Account Charged	Hourly Rates	Time Charged	Description of Services
1a	Legal			$ 825.00	$ 825.00	Stites & Harbison PLLC Attorneys	1518011	633-8000-079 Contractual Services - Legal	$ 330.00	2.50	Contract Dispute
1b	Legal			$ 1,056.00	$ 1,056.00	Stites & Harbison PLLC Attorneys	1522822	633-8000-079 Contractual Services - Legal	$ 330.00	3.20	Contract Dispute
1c	Legal			$ 33.00	$ 33.00	Stites & Harbison PLLC Attorneys	1527441	633-8000-079 Contractual Services - Legal	$ 330.00	0.10	Contract Dispute
1d	Legal			$ 5,500.00	$ 5,500.00	John N. Hughes, PSC	041521	633-8000-079 Contractual Services - Legal	N/A	N/A	PSC Case No. 2021-00047
1e	Legal			$ 600.00	$ 600.00	Lisa Keaton	99213425	633-8000-079 Contractual Services - Legal	N/A	N/A	Consulting/Research for Property Acquistion
1f	Legal			$ 500.00	$ 500.00	Lisa Keaton	99215739	633-8000-079 Contractual Services - Legal	N/A	N/A	Consulting/Research for Property Acquistion
1g	Legal			$ 836.00	$ 836.00	Frost Brown Todd LLC	210225947	633-8000-079 Contractual Services - Legal	$ 190.00	4.40	Litigation services; Kenton County Case #07-CI-1682 (Sales Tax Appeal) and Campbell Case #17-CI-646 (Property Dispute/NKWD Easement)
1h	Legal			$ 500.00	$ 500.00	Lisa Keaton	99216027	633-8000-079 Contractual Services - Legal	N/A	N/A	Consulting/Research for Property Acquistion
1i	Legal			$ 5,500.00	$ 5,500.00	John N. Hughes, PSC	093021	633-8000-079 Contractual Services - Legal	N/A	N/A	PSC Case No. 2021-00095
1j	Legal			$ 292.50	$ 292.50	Goldenberg Schneider, LPA	16649	633-8000-079 Contractual Services - Legal	$ 195.00	1.50	Envirnomental Permitting Legal Services
1k	Legal			$ 897.00	$ 897.00	Goldenberg Schneider, LPA	16767	633-8000-079 Contractual Services - Legal	$ 195.00	4.60	Envirnomental Permitting Legal Services
1l	Legal			$ 604.50	$ 604.50	Goldenberg Schneider, LPA	16781	633-8000-079 Contractual Services - Legal	$ 195.00	3.10	Envirnomental Permitting Legal Services
TOTAL	Legal			$ 17,144.00	$ 17,144.00						

Line No.	Item (a)	Rate Case (b)	Annual Audit (C)	Other (d)	Total (e)	Payee	Reference (Invoice or Voucher No.)	Account Charged	Hourly Rates	Time Charged	Description of Services
2a	Engineering			$ 915.00	$ 915.00	Geotechnology	142673	631-5000-030 Contractual - Engineering	$160; $175	5.25	Geotechnical Consulting
2b	Engineering			$ 15,943.29	$ 15,943.29	Burgess & Niple	974983	635-8000-079 Contractual Other - Misc	$210.80; $120.45	76.00	Antenna inventory; North Reservoir Drainage at FTTP; Antenna & Equipment review

2c	Engineering			$ 5,006.70	$ 5,006.70	Burgess & Niple	980251	635-8000-079 Contractual Other - Misc	$210.80; $126.65	17.00	Antenna & Equipment Review
2d	Engineering			$ 3,017.70	$ 3,017.70	Burgess & Niple	991398	635-8000-079 Contractual Other - Misc	$210.80	14.00	Antenna & Equipment Review
2e	Engineering			$ 3,448.80	$ 3,448.80	Burgess & Niple	1004897	635-8000-079 Contractual Other - Misc	$210.80	16.00	Antenna & Equipment Review
TOTAL	Engineering			$ 28,331.49	$ 28,331.49						

Antenna & Equipment review is related to Rental Income received from leasing space on water towers. The revenue generated from this is included in Other Revenues.

Line No.	Item (a)	Rate Case (b)	Annual Audit (C)	Other (d)	Total (e)	Payee	Reference (Invoice or Voucher No.)	Account Charged	Hourly Rates	Time Charged	Description of Services
3a	Accounting		$ 1,080.00		$ 1,080.00	VonLehman CPA & Advisory Firm	206378	632-8000-074 Contract Service Accounting/Audit	N/A	N/A	Audit - December 31, 2020
3b	Accounting		$ 13,875.00		$ 13,875.00	VonLehman CPA & Advisory Firm	207984	632-8000-074 Contract Service Accounting/Audit	N/A	N/A	Audit - December 31, 2020
3c	Accounting		$ 3,950.00		$ 3,950.00	VonLehman CPA & Advisory Firm	209212	632-8000-074 Contract Service Accounting/Audit	N/A	N/A	Audit - December 31, 2020
3d	Accounting			$ 995.00	$ 995.00	VonLehman CPA & Advisory Firm	210892	632-8000-074 Contract Service Accounting/Audit	N/A	N/A	Employee Benefit Plan income tax return - December 31, 2020
3e	Accounting			$ 750.00	$ 750.00	VonLehman CPA & Advisory Firm	214011	632-8000-074 Contract Service Accounting/Audit	N/A	N/A	Assistance with GASB 87 lease implementation
3f	Accounting		$ 1,510.00		$ 1,510.00	VonLehman CPA & Advisory Firm	214549	632-8000-074 Contract Service Accounting/Audit	N/A	N/A	Audit Planning - December 31, 2021
TOTAL	Accounting		$ 20,415.00	$ 1,745.00	$ 22,160.00						

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Stacey Kampsen

Q.6. Provide the following information:

a. A detailed analysis of charges booked for advertising expenditures during the test year. Include a complete breakdown of Account No. 660 – Advertising Expenses, and any other advertising expenditures included in any other expense accounts, as shown in Schedule C1. The analysis should specify the purpose of the expenditure and the expected benefit to be derived.

b. An analysis of Account No. 675 – Miscellaneous General Expenses for the test year. Include a complete breakdown of this account as shown in Schedule C2 and provide detailed workpapers supporting this analysis. At a minimum, the analysis should show the date, vendor, reference (i.e., voucher no., etc.), dollar amount, and brief description of each expenditure of $500 or more, provided that lesser items are grouped by classes as shown in Schedule C2.

c. An analysis of Accounts No. 433 and 434 – Extraordinary Income and Extraordinary Deductions for the test year. Include a complete breakdown of this account as shown in Schedule C3, and provide detailed workpapers supporting this analysis. At a minimum, the analysis should show the date, vendor, reference (i.e., voucher no., etc.), dollar amount, and a brief description of each expenditure of $500 or more, provided that lesser items are grouped by classes as shown in Schedule C3.

A.6. NKWD submits the attached Exhibit 6-1, which is a completed Schedule C1, and Exhibit 6-2, which is a completed Schedule C2.

For Schedule C1, the amount in the other column of Newspaper advertising is to run advertisements as required for various statutory requirements including compliance with KRS 424.260 to request bids involving an expenditure of more than thirty thousand dollars.

For Schedule C3, NKWD does not have any Extraordinary Income or Extraordinary Deductions for the test year.

Northern Kentucky Water District

EXHIBIT 6-1

Exhibit 6-1
Schedule C1
Northern Kentucky Water District
Case No. 2022-00161
Analysis of Advertising Expenses (Including Account No. 660)
For the 12 Months Ended December 31, 2021

Line No.	Item (a)	Sales or Promotional Advertising (b)	Institutional Advertising (c)	Conservation Advertising (d)	Rate Case (e)	Other (f)	Total (g)
1	Newspaper					10,757	10,757
2	Magazines and Other						-
3	Television						-
4	Radio						-
5	Direct Mail						-
6	Sales Aids						-
7	Total						-
8	Amount Assigned to Kentucky Jurisdictional						-

Northern Kentucky Water District

EXHIBIT 6-2

Exhibit 6-2
Schedule C2
Northern Kentucky Water District
Case No. 2022-00161
Analysis of Miscellaneous Expenses (Account No. 675)
For the 12 Months Ended December 31, 2021

Line No.	Item (a)	Amount (b)
1	Industry Association Dues	-
2	Stockholder and Debt Service Expenses	-
3	Institutional Advertiseing	-
4	Conservation Advertising	-
5	Rate Department Load Studies	-
6	Director's Fees and Expenses	919
7	Dues & Subscriptions	-
8	Miscellaneous	5,934
9	Total	6,853
10	Amount Assigned to KY Jurisdictional	-

Line No.	Item (a)	Amount (b)	Date	Vendor	Reference (Invoice or Voucher No.)	Description of Expenditure
6a	Director's Fees & Expenses	$ 827.96	multiple	Cincinnati Bell	multiple	Monthly Telephone Charges
6b	Director's Fees & Expenses	$ 90.70	multiple	Trophy Awards	multiple	Office Supplies
TOTAL	Director's Fees & Expenses	$ 918.66				

Line No.	Item (a)	Amount (b)	Date	Vendor	Reference (Invoice or Voucher No.)	Description of Expenditure
8a	Miscellaneous	$ 222.76	multiple	Federal Express	multiple	Transportation Charges
8b	Miscellaneous	$ 51.50	04/01/21	Campbell County Clerk	Visa	Courthouse Fee
8c	Miscellaneous	$ 95.94	07/09/21	Custom Trophy/Active Edge	46486	Uniforms
8d	Miscellaneous	$ 5,425.00	multiple	multiple	multiple	County 911 Fees
8e	Miscellaneous	$ 11.46	multiple	Apple	Visa	Apple Charges

8f	Miscellaneous	$ 115.45	12/31/21	N/A	N/A	Year-End Adjusting Entry for Vision Insurance
8g	Miscellaneous	$ 12.14	multiple	multiple	multiple	Cash Drawer Over/Under
TOTAL	Miscellaneous	$ 5,934.25				

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Stacey Kampsen and Amy Stoffer

Q.7. Provide an analysis of the utility's expenses for research and development activities for the test year and the three most recent calendar years. The analysis should include the following:

a. The basis of fees paid to research organizations and the utility's portion of the total revenue of each organization. Where the contribution is monthly, provide the current rate and the effective date.

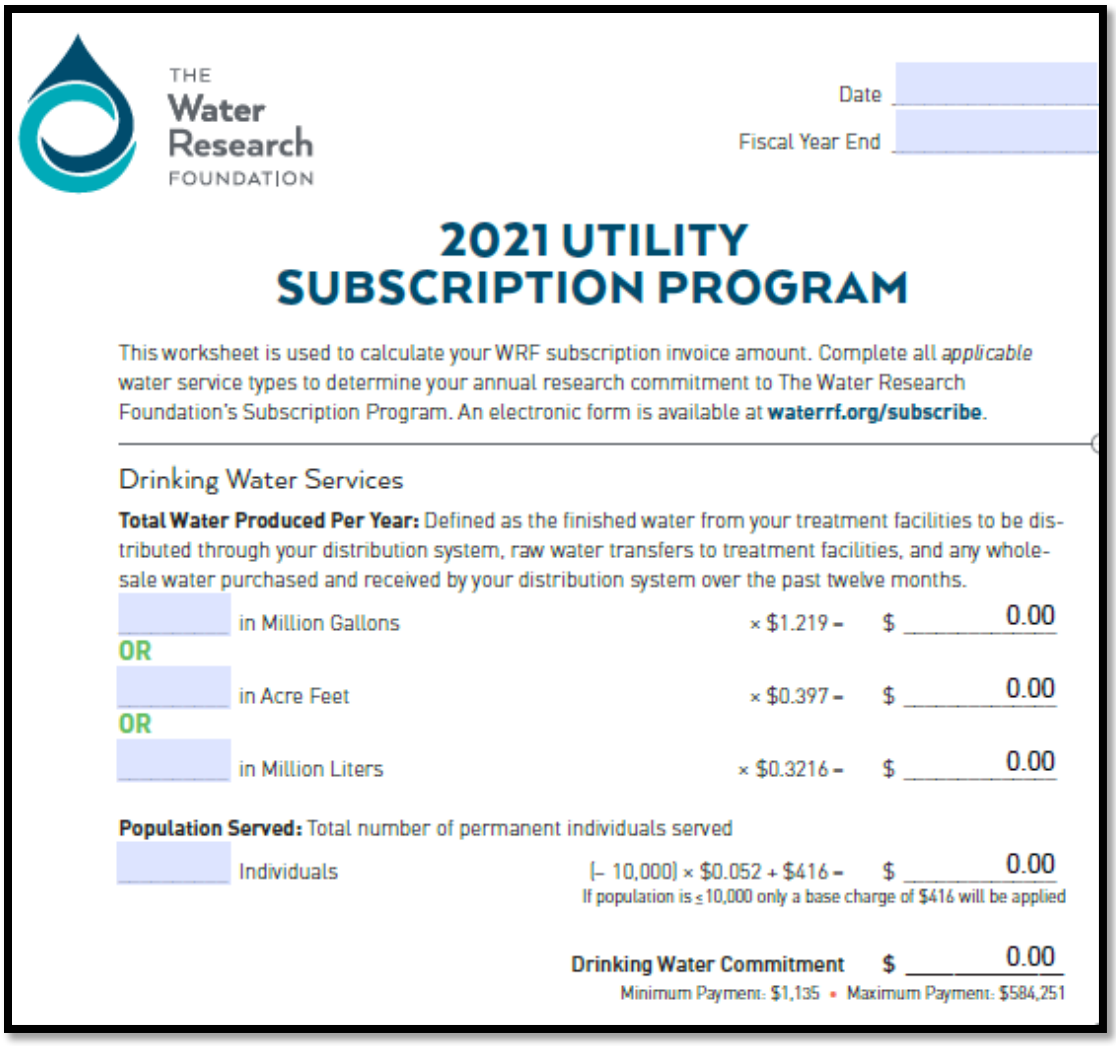
b. Details of the research activities conducted by each organization.

c. Details of services and other benefits provided to the utility by each organization.

d. Annual expenditures of each organization with a basic description of the nature of costs incurred by the organization.

e. Details of the expected benefits to the utility.

A.7. NKWD participates as a member in the Water Research Foundation (www.waterrf.org) and paid an annual subscriber fee of $27,473 in 2021 (test year), $27,473 in 2020, $26,647.20 in 2019, and $25,908.53 in 2018. NKWD's investment is pooled with approximately 1,200 subscribers. The basis of the 2021 test year subscriber fee is shown below:



THE Water Research FOUNDATION

Date _____

Fiscal Year End _____

2021 UTILITY SUBSCRIPTION PROGRAM

This worksheet is used to calculate your WRF subscription invoice amount. Complete all *applicable* water service types to determine your annual research commitment to The Water Research Foundation's Subscription Program. An electronic form is available at **waterrf.org/subscribe**.

Drinking Water Services

Total Water Produced Per Year: Defined as the finished water from your treatment facilities to be distributed through your distribution system, raw water transfers to treatment facilities, and any wholesale water purchased and received by your distribution system over the past twelve months.

_____ in Million Gallons × $1.219 = $ 0.00

OR

_____ in Acre Feet × $0.397 = $ 0.00

OR

_____ in Million Liters × $0.3216 = $ 0.00

Population Served: Total number of permanent individuals served

_____ Individuals (– 10,000) × $0.052 + $416 = $ 0.00

If population is ≤ 10,000 only a base charge of $416 will be applied

Drinking Water Commitment $ 0.00

Minimum Payment: $1,135 • Maximum Payment: $584,251

The Water Research Foundation is a non-profit organization that engages exclusively in activities designed to initiate, supervise, coordinate, promote, and finance research important to the application of technology and the operation and management of water utilities. The Water Research Foundation maintains a huge library of applied research from more than 2,300 completed projects valued at $700 million, and includes access to research reports, case studies, guidance manuals, tools, presentations and webcasts, and a database of more than 140 innovative technologies. The Water Research Foundation research provides extensive knowledge and specific recommendations on a variety of topics, including but not limited to:

• Infrastructure/Asset Management	• Public Communication
• Utility Management and Finance	• Constituents of Emerging Concern
• Lead Service Line Replacement	• Disinfection Byproducts
• Green Infrastructure/Energy Management	• Climate Change
• Intelligent Water Networks	• Residuals Management
• Cyanotoxins	• Distribution Systems
• Resiliency	• Security and Emergency Response

This research is important for ensuring water quality and improving water service to the public. By participating in period surveys, the District can help guide the research towards our areas of highest priority. Subscribers also have access to interim project reports, which can allow implementation of solutions sooner. These solutions are helpful in responding to the expanding and evolving array of operational and regulatory compliance challenges.

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Lindsey Rechtin

Q.8. Provide the following information for the most recent calendar year concerning all affiliate-related activities not identified in response to Item 7:

a. Provide the names of affiliates that provided some form of service to the utility and the type of service the utility received from each affiliate.

b. Provide the names of affiliates to whom the utility provided some form of service and the type of service the utility provided to each affiliate.

c. Identify the service agreement with each affiliate, state whether the service agreement has been previously filed with the Commission, and identify the proceeding in which it was filed. Provide each service agreement that has not been previously filed with the Commission.

A.8. NKWD is not affiliated with any other entities and does not have any affiliates.

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Lindsey Rechtin

Q.9. Describe the utility's lobbying activities and provide a schedule showing the name, salary, and job title of each individual whose job function involves lobbying on the local, state, or national level.

A.9. NKWD does not engage in any lobbying activities or have any registered as lobbyists with the Kentucky Legislative Ethics Commission.

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Stacey Kampsen

Q.10. Provide the following information concerning the costs for the preparation of this case:

a. A detailed schedule of expenses incurred to date for the following categories:

(1) Accounting;

(2) Engineering;

(3) Legal;

(4) Consultants; and

(5) Other Expenses (Identify separately).

b. For each category identified in Item 10.a., the schedule should include the date of each transaction, check number or other document reference, the vendor, the hours worked, the rates per hour, amount, a description of the services performed, and the account number in which the expenditure was recorded. Provide copies of contracts or other documentation that support charges incurred in the preparation of this case. Identify any costs incurred for this case that occurred during the test year.

c. An itemized estimate of the total cost to be incurred for this case. Expenses should be broken down into the same categories as identified in Item 10.a., with an estimate of the hours to be worked and the rates per hour. Include a detailed explanation of how the estimate was determined, along with all supporting workpapers and calculations.

d. Provide monthly updates of the actual costs incurred in conjunction with this rate case, reported in the manner requested in Items 10.a. and 10.b., and a cumulative total of cost incurred to date for each category. Updates will be due when the utility files its monthly financial statements with the Commission, through the month of the public hearing.

A.10. NKWD submits as following for costs incurred to date:

Accounting						
Invoice Date	Reference Number	Hours Worked	Hourly Rate	Total Amount	Description of Services Provided	Account # Expenditure Recorded
7/14/2022	220460	-	-	$1,600.00	Pro Forma Financial Statements	186-0013-000

Consultant – Stoll Keenon Ogden (Actual)*						
Invoice Date	Reference Number	Hours Worked	Hourly Rate	Total Amount	Description of Services Provided	Account # Expenditure Recorded
3/07/2022	973855	2.0	$300/hr	$600.00	Advice on Regulatory Asset	633-8000-070
5/06/2022	977898	2.5	$300/hr	$750.00	Advice to NKWD Questions and tasks to complete prior to filing application	633-8000-070
7/11/2022	981901	4.6	$300/hr	$1,380.00	Review of Application Documents	633-8000-070

**NKWD does not intend to ask for an adjustment to recover any legal consultation services costs.*

Consultant – Gannett Fleming Valuation and Rate Consultants, LLC (Actual)						
Invoice Date	Reference Number	Hours Worked	Hourly Rate	Total Amount	Description of Services Provided	Account # Expenditure Recorded
5/25/2022	8934	46	$125; $175; $250	$9,387.50	Cost of Service Study	186-0013-000
6/14/2022	9790	6.5	$125; $175; $250	$1,337.50	Cost of Service Study	186-0013-000
7/15/2022	10993	17	$125; $175; $250	$3,275.00	Cost of Service Study	186-0013-000

Other Expenses – Newspaper Advertising						
Invoice Date	Reference Number	Hours Worked	Hourly Rate	Total Amount	Description of Services Provided	Account # Expenditure Recorded
	GCI0910636	-	-	$11,297.79	Legal Advertisements	

NKWD submits Exhibit 10-1 which provides the supporting documentation for these charges. None of the charges were incurred during the test year.

As to estimates of further charges, the expenses occurred will be highly dependent on the specific issues raised and whether a hearing is required. NKWD estimates expending an additional $2,000 in future expense with Gannett Fleming Valuation and Rate Consultants, LLC based on charges incurred during the last rate case. NKWD estimates expending an additional $15,000 for 50 hours in future expense with Stoll Keenon Ogden in outside legal consultations regarding the rate case. NKWD estimates expending an additional $869.48 in future newspaper advertisements based on advertisements ran in NKWD's last rate case ($66.13 for Notice of Hearing and $803.35 for phase 2 rate increase notice).

EXHIBIT 10-1

VonLehman
CPA & ADVISORY FIRM

810 Wright's Summit Parkway
Suite 300
Fort Wright, KY 41011
(859) 331-3300
www.vlcpa.com

Northern Kentucky Water District
2835 Crescent Springs Road
Erlanger, KY 41018

Payment is Due 15 Days from:
7/14/2022

PLEASE SEND TO NEW REMITTANCE ADDRESS:
VonLehman & Company Inc.
PO Box 706410
Cincinnati, OH 45270-6410

Date: 7/14/2022
Invoice Number: 220460
Client Number: 015077.001

For professional services rendered in connection with the following:

Finalize the audit of the Northern Kentucky Water District's financial statements for the year ended December 31, 2021.	$3,250.00
Finalize the compilation of the Northern Kentucky Water District's pro forma financial statements for the year ended December 31, 2021.	$1,600.00
Amount Due	$4,850.00

Stacey Kampsen

Would you like to receive your invoice by email? Notify us at billing@vlcpa.com

Would you like to pay your invoice online? Visit https://vlcpa.com/tools

Thank you for your business.

STOLL · KEENON · OGDEN
PLLC
500 West Jefferson Street
Suite 2000
Louisville, Kentucky 40202-2828
502 333-6000
Tax ID # 61-0421389
March 7, 2022

Northern Kentucky Water District
Email bill to: tedge@nkywater.org

INVOICE NO.: 973855
SKO File No.: 118742/172458

PAYMENT REMITTANCE

Payments via regular mail:

STOLL · KEENON · OGDEN PLLC
P.O. Box 11969
Lexington, Kentucky 40579-1969

Payments via ACH or EFT:

Stoll Keenon Ogden PLLC IOLTA Account
Fifth Third Bank, Cincinnati OH
ABA/Bank Routing Number: [redacted]
Account Number: [redacted]

Please reference your account and invoice numbers.
Email remittance to payments@skofirm.com

Re: 2022 Rate Case Application

Our Reference: 118742/172458/GEW/2404

Fees rendered this bill	$ 600.00
Total Current Charges This Matter	**$ 600.00**

*PLEASE INDICATE INVOICE NUMBER 973855 ON PAYMENT

STOLL · KEENON · OGDEN
PLLC
500 West Jefferson Street
Suite 2000
Louisville, Kentucky 40202-2828
502 333-6000
Tax ID # 61-0421389

March 7, 2022

Northern Kentucky Water District
Email bill to: tedge@nkywater.org

INVOICE NO.: 973855
SKO File No.: 118742/172458

MATTER NAME: 2022 Rate Case Application

TOTAL FEES FOR PROFESSIONAL SERVICES PER ATTACHED	600.00
TOTAL CHARGES FOR EXPENSES AND OTHER SERVICES PER ATTACHED	0.00
INVOICE TOTAL	$ 600.00
TOTAL BALANCE DUE	**$600.00**

*PLEASE INDICATE INVOICE NUMBER 973855 ON PAYMENT

BILL DATE: March 7, 2022

Northern Kentucky Water District
Email bill to: tedge@nkywater.org
,

2022 Rate Case Application

LEGAL FEES

DATE	IND	DESCRIPTION OF SERVICE	HOURS	RATE	AMOUNT
02/20/22	GEW	Review final order in Case No. 2028-00292 and related case documents re: regulatory asset; prepare e-mail to T. Edge re: inquiry about sludge removal regulatory asset	1.20	300.00	$ 360.00
02/22/22	GEW	Videoconference with T. Edge re: regulatory asset/test period issues	0.80	300.00	240.00
		SUBTOTAL	**2.00**		**$600.00**

EXPENSES AND OTHER SERVICES

***note: all copies are billed at .10/page unless otherwise indicated*

DATE	DESCRIPTION	AMOUNT
	SUBTOTAL	**0.00**
GRAND TOTAL:		**$600.00**

ATTORNEY/PARALEGAL SUMMARY

TIMEKEEPER	RANK	HOURS	RATE	AMOUNT
G. E Wuetcher	Of Counsel	2.00	300.00	$600.00

STOLL · KEENON · OGDEN
PLLC
500 West Jefferson Street
Suite 2000
Louisville, Kentucky 40202-2828
502 333-6000
Tax ID # 61-0421389
May 6, 2022

Northern Kentucky Water District
Email bill to: tedge@nkywater.org

INVOICE NO.: 977898
SKO File No.: 118742/172458

PAYMENT REMITTANCE

Payments via regular mail:

STOLL · KEENON · OGDEN PLLC
P.O. Box 11969
Lexington, Kentucky 40579-1969

Payments via ACH or EFT:

Stoll Keenon Ogden PLLC IOLTA Account
Fifth Third Bank, Cincinnati OH
ABA/Bank Routing Number: [redacted]
Account Number: [redacted]

Please reference your account and invoice numbers.
Email remittance to payments@skofirm.com

Re: 2022 Rate Case Application

Our Reference: 118742/172458/GEW/2404

Fees rendered this bill	$ 750.00
Total Current Charges This Matter	**$ 750.00**
Balance as of 03/07/22	$600.00
Less credits (payments, adjustments)	$0.00
Balance due on prior billings	**$600.00**
Total Amount Due This Matter	**$1,350.00**

*PLEASE INDICATE INVOICE NUMBER 977898 ON PAYMENT

STOLL · KEENON · OGDEN
PLLC
500 West Jefferson Street
Suite 2000
Louisville, Kentucky 40202-2828
502 333-6000
Tax ID # 61-0421389

May 6, 2022

Northern Kentucky Water District
Email bill to: tedge@nkywater.org

INVOICE NO.: 977898
SKO File No.: 118742/172458

MATTER NAME: 2022 Rate Case Application

TOTAL FEES FOR PROFESSIONAL SERVICES PER ATTACHED	750.00
TOTAL CHARGES FOR EXPENSES AND OTHER SERVICES PER ATTACHED	0.00
INVOICE TOTAL	$ 750.00

BALANCE DUE from previous statements:

Bill Date	Invoice	Outstanding Amount
03/07/22	973855	600.00

Total Balance Due on Previous Statements:	$ 600.00
TOTAL BALANCE DUE	**$1,350.00**

*PLEASE INDICATE INVOICE NUMBER 977898 ON PAYMENT

BILL DATE: May 6, 2022

Northern Kentucky Water District
Email bill to: tedge@nkywater.org
,

2022 Rate Case Application

LEGAL FEES

DATE	IND	DESCRIPTION OF SERVICE	HOURS	RATE	AMOUNT
04/04/22	GEW	Review task list; prepare application requirements list	1.00	300.00	$ 300.00
04/28/22	GEW	Response to T. Edge's questions re: rate case	1.50	300.00	450.00
		SUBTOTAL	**2.50**		**$750.00**

EXPENSES AND OTHER SERVICES

***note: all copies are billed at .10/page unless otherwise indicated*

DATE	DESCRIPTION	AMOUNT
	SUBTOTAL	**0.00**
GRAND TOTAL:		**$750.00**

ATTORNEY/PARALEGAL SUMMARY

TIMEKEEPER	RANK	HOURS	RATE	AMOUNT
G. E Wuetcher	Of Counsel	2.50	300.00	$750.00

STOLL · KEENON · OGDEN
PLLC
500 West Jefferson Street
Suite 2000
Louisville, Kentucky 40202-2828
502 333-6000
Tax ID # 61-0421389
July 11, 2022

Northern Kentucky Water District
Email bill to: tedge@nkywater.org

INVOICE NO.: 981901
SKO File No.: 118742/172458

PAYMENT REMITTANCE

Payments via regular mail:

STOLL · KEENON · OGDEN PLLC
P.O. Box 11969
Lexington, Kentucky 40579-1969

Payments via ACH or EFT:

Stoll Keenon Ogden PLLC IOLTA Account
Fifth Third Bank, Cincinnati OH
ABA/Bank Routing Number: [redacted]
Account Number: [redacted]

Please reference your account and invoice numbers.
Email remittance to payments@skofirm.com

Re: 2022 Rate Case Application

Our Reference: 118742/172458/GEW/2404

Fees rendered this bill	$ 1,380.00
Total Current Charges This Matter	**$ 1,380.00**
Balance as of 05/06/22	$1,350.00
Less credits (payments, adjustments)	$0.00
Balance due on prior billings	**$1,350.00**
Total Amount Due This Matter	**$2,730.00**

*PLEASE INDICATE INVOICE NUMBER 981901 ON PAYMENT

STOLL · KEENON · OGDEN
PLLC
500 West Jefferson Street
Suite 2000
Louisville, Kentucky 40202-2828
502 333-6000
Tax ID # 61-0421389

July 11, 2022

Northern Kentucky Water District
Email bill to: tedge@nkywater.org

INVOICE NO.: 981901
SKO File No.: 118742/172458

MATTER NAME: 2022 Rate Case Application

TOTAL FEES FOR PROFESSIONAL SERVICES PER ATTACHED	1,380.00
TOTAL CHARGES FOR EXPENSES AND OTHER SERVICES PER ATTACHED	0.00
INVOICE TOTAL	$ 1,380.00

BALANCE DUE from previous statements:

Bill Date	Invoice	Outstanding Amount
03/07/22	973855	600.00
05/06/22	977898	750.00

Total Balance Due on Previous Statements:	$ 1,350.00
TOTAL BALANCE DUE	**$2,730.00**

*PLEASE INDICATE INVOICE NUMBER 981901 ON PAYMENT

BILL DATE: July 11, 2022

Northern Kentucky Water District
Email bill to: tedge@nkywater.org
,

2022 Rate Case Application

LEGAL FEES

DATE	IND	DESCRIPTION OF SERVICE	HOURS	RATE	AMOUNT
06/06/22	GEW	Response to Email message from T. Edge; prepare format for Notice of Intent	0.60	300.00	$ 180.00
06/24/22	GEW	Review application documents and exhibits; video conference with client regarding documents and rate case issues	4.00	300.00	1,200.00
		SUBTOTAL	**4.60**		**$1,380.00**

EXPENSES AND OTHER SERVICES
***note: all copies are billed at .10/page unless otherwise indicated*

DATE	DESCRIPTION	AMOUNT
	SUBTOTAL	**0.00**
GRAND TOTAL:		**$1,380.00**

ATTORNEY/PARALEGAL SUMMARY

TIMEKEEPER	RANK	HOURS	RATE	AMOUNT
G. E Wuetcher	Of Counsel	4.60	300.00	$1,380.00

GANNETT FLEMING

Check Payment Information:
Gannett Fleming Valuation and Rate Consultants, LLC
PO Box 829160, Philadelphia, PA 19182-9160 **Federal EIN:** [redacted]
ACH/EFT Payment Information:
Account Name: Gannett Fleming Companies **ABA:** [redacted]
Account No.: [redacted]
Send Remit Info: AccountsReceivable@gfnet.com

Attention: Accounts Payable
Northern Kentucky Water District
2835 Crescent Springs Road
Erlanger, KY 41018
UNITED STATES

Invoice : 0000008934
Invoice Date : 5/25/2022
Project : 071557
Project Name : Northern KY Wtr Dist- CostofSvcSty
Bill Term : 01

For Professional Services Rendered Through 5/6/2022

Cost of Service Study

		Current Billings
000 - Cost of Service Study		9,387.50
	Total :	9,387.50

Current Billings		9,387.50
Amount Due This Bill	**US**	9,387.50

Constance E Heppenstall

Stacey Kamposen

000 - Cost of Service Study

Rate Labor

Class	*Hours*	*Rate*	*Amount*
Associate Analyst	24.00	175.000	4,200.00
Constance E Heppenstall	19.50	250.000	4,875.00
Support Staff	2.50	125.000	312.50
Total Rate Labor	46.00		***9,387.50***
Total Bill Task : 000 - Cost of Service Study			**9,387.50**

Total Project : 071557 - Northern KY Wtr Dist- CostofSvcSty **9,387.50**

GANNETT FLEMING

Check Payment Information:
Gannett Fleming Valuation and Rate Consultants, LLC
PO Box 829160, Philadelphia, PA 19182-9160 **Federal EIN:** [redacted]
ACH/EFT Payment Information:
Account Name: Gannett Fleming Companies **ABA:** [redacted]
Account No.: [redacted]
Send Remit Info: AccountsReceivable@gfnet.com

Attention: Accounts Payable
Northern Kentucky Water District
2835 Crescent Springs Road
Erlanger, KY 41018
UNITED STATES

Invoice : 0000009790
Invoice Date : 6/14/2022
Project : 071557
Project Name : Northern KY Wtr Dist- CostofSvcSty
Bill Term : 01

For Professional Services Rendered For 5/7/2022 Through 6/3/2022

Cost of Service Study

Stacey Kamperman

		Current Billings
000 - Cost of Service Study		1,337.50
	Total :	1,337.50

Current Billings		1,337.50
Amount Due This Bill	**US**	1,337.50

Constance E Heppenstall

Outstanding Receivables

Invoice Number	Date	Amount	Balance Due
0000008934	5/25/2022	9,387.50	9,387.50
			9,387.50

000 - Cost of Service Study

Rate Labor

Class	*Hours*	*Rate*	*Amount*
Associate Analyst	3.00	175.000	525.00
Constance E Heppenstall	3.00	250.000	750.00
Support Staff	0.50	125.000	62.50
Total Rate Labor	6.50		***1,337.50***
Total Bill Task : 000 - Cost of Service Study			**1,337.50**

Total Project : 071557 - Northern KY Wtr Dist- CostofSvcSty **1,337.50**

GANNETT FLEMING

Check Payment Information:
Gannett Fleming Valuation and Rate Consultants, LLC
PO Box 829160, Philadelphia, PA 19182-9160 **Federal EIN:** [redacted]
ACH/EFT Payment Information:
Account Name: Gannett Fleming Companies **ABA:** [redacted]
Account No.: [redacted]
Send Remit Info: AccountsReceivable@gfnet.com

Attention: Accounts Payable
Northern Kentucky Water District
2835 Crescent Springs Road
Erlanger, KY 41018
UNITED STATES

Invoice : 0000010993
Invoice Date : 7/15/2022
Project : 071557
Project Name : Northern KY Wtr Dist- CostofSvcSty
Bill Term : 01

For Professional Services Rendered For 6/4/2022 Through 7/1/2022

Cost of Service Study

		Current Billings
000 - Cost of Service Study		3,275.00
	Total :	3,275.00

Current Billings		3,275.00
Amount Due This Bill	**US**	3,275.00

Stacey Kampsen

Constance E Heppenstall

000 - Cost of Service Study

Rate Labor

Class	*Hours*	*Rate*	*Amount*
Associate Analyst	10.50	175.000	1,837.50
Constance E Heppenstall	5.00	250.000	1,250.00
Support Staff	1.50	125.000	187.50
Total Rate Labor	17.00		***3,275.00***

Total Bill Task : 000 - Cost of Service Study **3,275.00**

Total Project : 071557 - Northern KY Wtr Dist- CostofSvcSty **3,275.00**

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Stacey Kampsen

Q.11. Provide the following information with regard to uncollectible accounts for the three most recent calendar years:

a. Reserve account balance at the beginning of the year;

b. Charges to the reserve account (accounts charged off);

c. Credits to reserve account;

d. Current year provision;

e. Reserve account balance at the end of the year; and

f. Percent of provision to total revenue.

A.11. NKWD submits the following:

	2021 (Test Period)	2020	2019
Reserve account balance at beginning of the year	470,000	35,000	35,000
Charges to the reserve account (accounts charged off)	1,085,273	121,491	650,708
Credits to reserve account	322,288	201,333	225,903
Current year provision	382,985	355,158	424,805
Reserve account balance at the end of the year	90,000	470,000	35,000
Percentage of provision to total revenue	% 0.65	% 0.59	% 0.76

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Stacey Kampsen

Q.12. Provide a schedule of franchise fees paid to cities, towns, or municipalities, including the basis of these fees.

A.12. NKWD does not pay any franchise fees.

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Stacey Kampsen

Q.13. Provide the journal entries relating to the purchase of utility plant acquired as an operating unit or system by purchase, merger, consolidation, liquidation, or otherwise currently included in rate base. Also, provide a schedule showing the calculation of the acquisition adjustment at the date of purchase for each item of utility plant, the amortization period, and the unamortized balance at the beginning of the test year.

A.13. There were no purchases of utility plant acquired in this manner during the test year. Please refer to NKWD's PSC Annual Report incorporated in its application as Exhibit C-1 for a detailed list of historical Utility Plant Acquisition Adjustments and Accumulated Amortization. Also see the summary of the unamortized balance at the beginning of the test year below.

		Acquisition Adjustments (114)	Accumulated Amortization (116)	Unamortizated
Acquisition Adjustments (114)		Balance at 1/1/2021	Balance at 1/1/2021	Balance at 1/1/2021
Original District 9-14-55	$	263,366	263,366	-
District # 2 & 3 12-31-73		18,712	18,712	-
Mentor District 9-1-76		10,741	10,741	-
City of Cold Spring		228,253	228,253	-
City of Silver Grove		24,853	24,853	-
Newport Water Works		4,970,211	3,718,420	1,251,791
Total Plant Acquisition Adjustments	$	5,516,136	4,264,345	1,251,791

The amortization included in the rate base for Newport Water Works acquisition adjustment is $201,120 annually.

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Stacey Kampsen

Q.14. Provide the following:

a. A list of all outstanding issues of long-term debt as of the end of the latest calendar year together with the related information as shown in Schedule D1.

b. An analysis of short-term debt as shown in Schedule D2 as of the end of the latest calendar year.

A.14. NKWD submits the attached Exhibit 14-1, which is a completed Schedule D1. NKWD did not have outstanding short-term debt as of the end of the latest calendar year.

Northern Kentucky Water District

EXHIBIT 14-1

Exhibit 14-1
Schedule D1
Northern Kentucky Water District
Case No. 2022-00161
Schedule of Outstanding Long-Term Debt
For the Year Ended December 31, 2021

Line No.	Type of Debt Issue (a)	Date of Issue (b)	Date of Maturity (c)	Amount Outstanding (d)	Coupon Interest Rate (e)	Cost Rate at Issue (f)	Cost Rate at Maturity (g)	Bond Rating at Time of Issue (h)	Type of Obligation (i)	Annualized Cost Col. (d) x Col. (g) (j)
1	2013A Revenue Bond	6/27/2013	2/1/2038	20,890,000	4.311%	3.875%	3.917%	Aa3	Water Revenue	818,332
2	2013B Refunding Revenue Bond	9/25/2013	2/1/2028	11,485,000	4.683%	3.476%	3.547%	Aa3	Water Revenue	407,422
3	2014B Refunding Revenue Bond	12/23/2014	2/1/2029	4,210,000	4.054%	2.262%	2.405%	Aa3	Water Revenue	101,266
4	2016 Refunding Revenue Bond	11/22/2016	2/1/2031	30,830,000	4.063%	2.346%	2.381%	Aa3	Water Revenue	734,069
5	2019 Revenue Bond	9/26/2019	2/1/2044	16,855,000	3.166%	2.646%	2.687%	Aa2	Water Revenue	452,865
6	2020 Refunding Revenue Bond	11/5/2020	2/1/2035	21,055,000	3.127%	1.714%	1.758%	Aa2	Water Revenue	370,216
7	2021B Refunding Revenue Bond	12/14/2021	2/1/2027	27,730,000	4.000%	0.617%	0.577%	Aa2	Water Revenue	160,002
8	2014A USDA Loan 91-03	12/11/2017	2/1/2057	1,679,500	2.750%	2.750%	2.750%	N/A	Water Revenue	46,186
9	KIA Loan F08-07	11/1/2008	12/1/2032	2,298,344	1.000%	1.000%	1.200%	N/A	Water Revenue	27,580
10	KIA Loan F09-02	6/1/2010	6/1/2033	14,951,862	2.000%	2.000%	2.250%	N/A	Water Revenue	336,417
11	KIA Fund B 15-003	7/1/2016	12/1/2037	1,131,429	0.750%	0.750%	0.950%	N/A	Water Revenue	10,749
12	KIA Loan F15-011	3/1/2016	6/1/2038	3,001,904	1.750%	1.750%	2.000%	N/A	Water Revenue	60,038
13	KIA Loan F14-015	6/1/2015	6/1/2038	3,011,088	1.750%	1.750%	2.000%	N/A	Water Revenue	60,222
14	2021A Bond Anticipation Note	3/18/2021	2/1/2023	24,685,000	0.375%	0.386%	0.489%	MIG 1	Water Revenue	120,696
Total Long-Term Debt and Annualized Cost				**183,814,127**						**3,706,059**

Annualized Cost Rate [Total Col. (j) / Total Col (d)] **2.016%**

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Amy Stoffer

Q.15. Provide the information shown in Schedule E for each construction project in progress, or planned to be in progress, during the 12 months preceding the test year and the test year.

A.15. NKWD submits as follows:

Schedule E
Northern Kentucky Water District
Case No. 2022-00161
Construction Projects
As of July 25, 2022

Line No.	Project No.	Description of Project (C)	Accumulated Costs				Estimated Physical Percent Complete
			Construction Amount (D)	AFUDC Capitalized (E)	Indirect Costs Other (F)	Total Cost (G = D+E+F)	
1	184-0534	TMTP Security Camera Upgrade	61,205	N/A	2,538	63,743	100
2	184-0536	Automated Meter System	12,890,000	N/A	610,000	13,500,000	5
3	184-0478	FTTP Lab Standby Power	78,549	N/A	54,679	133,228	100
4	184-0721	St. Joseph Lane WMR	242,844	N/A	47,605	290,449	100
5	184-0860	Amsterdam Road WMR- HDPE	324,889	N/A	40,708	365,597	100
6	184-0873	Jackson Road WMR	170,860	N/A	27,173	198,033	100
7	184-0877	Valleywood Court & Hickory Lane WMR	149,248	N/A	32,490	181,738	100
8	184-0878	Covert Run to Lincoln WMR	285,917	N/A	70,255	356,172	100
9	184-0884	Thornton & Tower View WMR	123,250	N/A	29,101	152,351	100
10	184-0885	Amsterdam Road WMR (Arlington to Montauge)	301,089	N/A	32,880	333,969	100

11	184-0890	E. Main St WMR	569,010	N/A	54,533	623,543	100
12	184-0891	Ridge and W. Orchard Road WMR	222,863	N/A	33,331	256,194	100
13	184-0893	Crowell & Eustace WMR	404,141	N/A	60,936	465,076	100
14	184-0894	Thatcher Ct & Paul Ln WMR	192,486	N/A	33,190	225,676	100
15	184-0895	Persimmon, etc WMR	460,815	N/A	58,115	518,930	100
16	184-0896	Lexington & Woodward WMR	438,890	N/A	71,591	510,481	100
17	184-0897	E. Main St WMR - Phase 2	420,713	N/A	26,781	447,493	100
18	184-0899	Greenup Street WMR	51,690	N/A	11,953	63,643	100
19	184-0900	Robin Ln WMR	108,644	N/A	21,962	130,606	100
20	184-0901	Wayman Branch WMR	433,045	N/A	38,635	471,680	100
21	184-0902	Sagebrush & Shadyside WMR	344,336	N/A	50,149	394,485	100
22	184-0904	Chapman Lane WMR	153,774	N/A	23,377	177,151	100
23	184-0905	Willowbrook Lane WMR	167,990	N/A	26,076	194,066	100
24	184-0907	Joyce Avenue WMR	85,826	N/A	14,087	99,913	100
25	184-4003	SCADA improvements	673,531	N/A	439,821	3,938,969	35
26	184-4006	FTTP Phase 2 Basin Improvements	5,680,250	N/A	319,750	6,000,000	35
27	184-4008	FTTP Residuals Handling Improvements	2,409,302	N/A	590,698	3,000,000	95
28	184-4012	MPTP Clearwell Rehab and Painting	682,419	N/A	79,566	761,985	100
		TOTALS:	28,127,574		2,901,981	33,855,172	

An explanation of the nature of all indirect costs are as follows: engineering for design and construction, property acquisition and easements, and miscellaneous and contingencies. NKWD's application for rate adjustment is based upon a historical test period, not a forecasted test period.

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Amy Stoffer

Q.16. Provide, in the format provided in Schedule F, an analysis of the utility's Construction Work in Progress (CWIP) as defined in the Uniform System of Accounts for each project identified in Schedule E.

A.16. NKWD submits as follows:

Schedule F
Northern Kentucky Water District
Case No. 2022-00161
Construction Work in Progress – Percent Complete
As of July 25, 2022

Line No. (A)	Project No. (B)	Date Construction Work Began (C)	Estimated Project Completion Date (D)	Percent of Elapsed Time (E)	Original Budget Estimate (F)	Most Recent Budget Estimate (G)	Total Project Expenditures (H)	Percent of Total Expenditures (I) = (H/G)
1	184-0534	4/7/2021	6/25/2021	100	65,000	63,743	63,743	100%
2	184-0536	10/7/2021	10/7/2023	5	13,500,000	13,500,000	157,500	1%
3	184-0478	9/5/2018	7/25/2019	100	237,000	133,228	133,228	100%
4	184-0721	1/25/2021	4/26/2021	100	290,000	290,449	290,449	100%
5	184-0860	4/13/2020	7/8/2020	100	400,000	365,597	365,597	100%
6	184-0873	1/6/2020	3/11/2020	100	205,000	198,033	198,033	100%
7	184-0877	6/15/2020	7/22/2020	100	200,000	181,738	181,738	100%
8	184-0878	11/2/2020	1/21/2021	100	360,000	356,172	356,172	100%
9	184-0884	7/15/2020	9/14/2020	100	155,000	152,351	152,351	100%
10	184-0885	1/6/2020	3/9/2020	100	370,000	333,969	333,969	100%
11	184-0890	6/1/2020	7/20/2020	100	650,000	623,543	623,543	100%
12	184-0891	6/1/2020	7/16/2020	100	270,000	256,194	256,194	100%
13	184-0893	8/10/2020	11/9/2020	100	470,000	465,076	465,076	100%
14	184-0894	6/30/2020	8/21/2020	100	240,000	225,676	225,676	100%
15	184-0895	10/5/2020	2/26/2021	100	545,000	518,930	518,930	100%
16	184-0896	4/12/2021	8/4/2021	100	510,000	510,481	510,481	100%
17	184-0897	6/14/2021	9/10/2021	100	490,000	447,493	447,493	100%
18	184-0899	10/14/2020	11/3/2020	100	65,000	63,643	63,643	100%
19	184-0900	3/15/2021	4/20/2021	100	140,000	130,606	130,606	100%
20	184-0901	8/30/2021	11/17/2021	100	500,000	471,680	471,680	100%

21	184-0902	3/15/2021	6/8/2021	100	420,000	394,485	394,485	100%
22	184-0904	8/16/2021	9/30/2021	100	190,000	177,151	177,151	100%
23	184-0905	8/16/2021	9/20/2021	100	210,000	194,066	194,066	100%
24	184-0907	10/18/2021	11/17/2021	100	110,000	99,913	99,913	100%
25	184-4003	7/6/2020	Ph 2- not bid	35	3,938,969	3,938,969	1,113,352	28%
26	184-4006	6/1/2021	3/23/2023	35	6,000,000	6,000,000	4,553,618	76%
27	184-4008	1/4/2021	6/13/2020	95	3,000,000	3,000,000	2,705,485	90%
28	184-4012	3/16/2020	7/10/2020	100	743,923	761,985	761,985	100%

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Amy Stoffer

Q.17. Concerning the utility's construction projects:

a. For each project started during the last five calendar years, provide the information requested in the format contained in Schedule G1. For each project, include the amount of any cost variance and delay encountered, and explain in detail the reasons for such variances and delays.

b. Using the data included in Schedule G1, calculate the annual "Slippage Factor" associated with those construction projects. The Slippage Factor should be calculated as shown in Schedule G2.

A.17.

a. NKWD submits the attached and incorporated Exhibit 17-1.

Schedule G.1. includes all capital improvement projects which had expenditures in years 2017 through 2021. The expenditures include engineering, construction, and miscellaneous costs. Projects budgets are not tracked on an annual basis, so data for these columns is not provided.

The "Total Budget Project Cost" for completed projects is shown as the "Total Actual Project Cost" although the original project budget would have been higher to allow for contingencies. The "Total Budget Project Cost" for projects that are not completed is the total anticipated and currently budgeted cost of the project. The projects that are not completed are noted as being under design or under construction, except for three projects where design was started but the project later placed on hold.

Project schedule delays may be encountered during design because of easement or property acquisition, lengthy permitting and approval processes, coordination with other in-house projects or other utilities or governments, or the design scope may be expanded based on discoveries made during the design. Project construction delays may be encountered when unforeseen conditions are encountered in the field, weather prevents work, or pandemic impacts such as material availability and delivery due to disruptions in the supply chain.

b. The use of a slippage factor is not applicable to NKWD's application. The Public Service Commission has offered the following reason for the use of a "slippage factor" in a rate case proceeding:

> As part of the capital budgeting process, utilities will estimate the level of capital construction that will be undertaken during the year. Because of delays, weather conditions, or other events, the actual level of construction will often vary from the level budgeted. The difference between the actual and budgeted levels is reflected in the calculation of a "slippage factor," which serves as an indicator of the utility's accuracy in predicting the cost of its utility plant additions and when new plant will be placed into service. The Commission has routinely applied a slippage factor in the forward-looking test period rate cases . . .[1]

The current case involves an application for rate adjustment based upon a historical test period and historical costs. Neither a forward-looking test period nor budget projections were used to determine NKWD's revenue requirement. No need exists to compare the applicant's construction budget to actual results.

[1] *An Adjustment of the Gas Rates of the Union Light Heat and Power Company*, Case No. 2005- 00042 (Ky. PSC Dec. 22, 2005) at 8-9.

Northern Kentucky Water District

EXHIBIT 17-1

Project Number	Project Title/ Description	Annual Actual Cost	Annual Original Budget	Variance in Dollars	Variance as Percent	Percent of Budget	Total Actual Project Cost	Total Budget Project Cost	Variance in Dollars	Date Original Budget Start	Date Original Budget End	Date Actual Start	Date Actual End
184-0475	MPTP Raw Water Lin						$ 189,498	$ 1,000,000.00	$ (810,502)	1/1/2013	on hold	12/31/2013	on hold
184-0477	FTTP Floc/Sed Basins 2 &						$ 2,423,261	$ 2,423,261	$ -	9/22/2011	9/22/2013	6/1/2013	5/31/2017
184-0478	FTTP Laboratory Generator						$ 132,228	$ 132,228	$ -	9/22/2011	9/22/2013	10/7/2013	12/31/2019
184-0486	ORPS2 Rehabilitatior						$ 1,805,456	$ 1,805,456	$ -	7/1/2016	4/19/2019	7/1/2016	1/17/2018
184-0487	Replace Lumley Tank						$ 1,846,222	$ 1,846,222	$ -	12/31/2014	12/31/2018	12/31/2014	12/31/2017
184-0488	TMTP Belt Filter Press Replacemen						$ 1,042,669	$ 1,042,669	$ -	4/1/2015	4/19/2019	4/1/2015	12/31/2019
184-0493	Richardson Road and Ripple Creek Pump Statio						$ 273,734	$ 273,734	$ -	12/31/2015	12/31/2022	12/31/2015	6/1/2022
184-0498	ORPS1 Pump 4 Upgrade						$ 406,115	$ 406,115	$ -	12/31/2017	12/31/2020	12/31/2017	6/30/2020
184-0521	Bromley Tank Gravity Wall						$ 36,640	$ 36,640	$ -	12/31/2014	12/31/2015	12/31/2014	12/31/2017
184-0528	Piner Water Hauling Station Drainag						$ 33,396	$ 33,396	$ -	1/1/2014	12/31/2019	12/31/2014	5/31/2019
184-0532	Bromley Tank Drainage Channel						$ 26,804	$ 26,804	$ -	1/1/2018	12/31/2018	9/1/2018	12/31/2018
185-0533	Old Siry Rd Landslide Mitigatic						$ 14,597	$ 151,000.00	$ (136,403)	1/1/2019	on hold	5/31/2019	on hold
184-0534	TMTP and Tank Security Upgrades						$ 63,743	$ 63,743	$ -	1/1/2020	12/31/2021	10/30/2020	7/1/2021
184-0535	Central Facility Material Bin						$ 2,734	$ 175,000.00	$ (172,266)	1/1/2021	12/31/2021	3/1/2021	under desigr
184-0536	Automated Meter System						$ 1,149,266	$ 13,500,000.00	$ (12,350,734)	1/1/2021	10/6/2023	10/22/2021	under constructior
184-0613	Cox Road and Oliver Road WM						$ 1,432,700	$ 1,432,700	$ -	5/1/2007	12/31/2020	5/1/2007	12/31/2020
184-0721	St. Joseph Lane WMR						$ 274,647	$ 274,647	$ -	1/1/2011	12/31/2021	3/19/2012	6/30/2021
184-0742	Church Street and Faye Drive WMR						$ 250,788	$ 250,788	$ -	12/1/2012	12/31/2018	12/1/2012	8/20/2018
184-0749	36" Licking River Crossing Wild						$ 435,174	$ 5,708,000.00	$ (5,272,826)	12/29/2012	12/31/2024	12/29/2012	accepted bids
184-0750	Sub-District M Phase 2						$ 3,405,865	$ 3,405,865	$ -	1/1/2013	12/31/2018	4/1/2013	12/31/2018
184-0754	16" Cross Country WMR C Coun						$ 56,567	$ 850,000.00	$ (793,433)	12/31/2014	12/31/2024	12/31/2014	under desigr
184-0767	8" & 12" Water Main Connection- Phase						$ 311,787	$ 311,787	$ -	1/1/2013	12/31/2019	8/16/2013	12/31/2019
184-0776	24inch Cross Country WMR projec						$ 1,094,764	$ 1,094,764	$ -	10/8/2014	3/18/2023	10/8/2014	2/28/2020
184-0795	Madison Pike Phase 2 WM						$ 1,385,000	$ 1,385,000	$ -	4/1/2014	4/19/2019	4/1/2014	12/31/2018
184-0807	Edgewood WMR Beech, Buckner Wildrose & Elmwo						$ 809,449	$ 809,449	$ -	12/31/2014	4/19/2019	12/31/2014	1/31/2018
184-0811	Newport WMR 15th,16th, 17th, Parkview & Mai						$ 23,156	$ 830,000.00	$ (806,844)	11/30/2014	on hold	11/30/2014	on hold
184-0812	Parker and Ridge WMF						$ 622,002	$ 622,002	$ -	12/1/2014	4/19/2019	12/1/2014	3/1/2020
184-0813	N. Ft Thomas Phase II 2015 WMI						$ 487,477	$ 487,477	$ -	12/31/2014	12/31/2015	12/31/2014	8/31/2019
184-0824	Latonia Lakes						$ 1,583,144	$ 1,583,144	$ -	1/1/2015	12/31/2018	6/30/2015	6/30/2018
184-0826	Lincoln Avenue WMR (Bellevue						$ 1,060,977	$ 1,060,977	$ -	10/14/2015	4/19/2019	10/14/2015	12/31/2017
184-0830	Riggs Avenue Phase 2 WMI						$ 348,252	$ 348,252	$ -	12/31/2015	4/19/2019	12/31/2015	2/16/2018
184-0836	Blossom Lane WMF						$ 779,111	$ 779,111	$ -	1/1/2016	12/31/2016	3/7/2016	8/1/2018
184-0837	Ervin Terrace & 10th Ave WMF						$ 478,851	$ 478,851	$ -	10/7/2016	4/19/2019	10/7/2016	6/30/2020
184-0838	Echo Hills and Licking Pike WMI						$ 771,044	$ 771,044	$ -	7/31/2016	4/19/2019	7/31/2016	12/31/2019
184-0839	Latonia Avenue WMR						$ 197,669	$ 197,669	$ -	7/12/2016	4/19/2019	7/12/2016	12/31/2017
184-0840	Ann Street WMF						$ 524,259	$ 524,259	$ -	3/7/2016	3/18/2023	3/7/2016	1/7/2020
184-0842	Perimeter Dr- Phase 1 WMI						$ 251,739	$ 251,739	$ -	7/1/2016	4/19/2019	7/1/2016	2/1/2018
184-0843	Perimeter Dr- Phase 2 WMI						$ 255,518	$ 255,518	$ -	7/1/2016	4/19/2019	7/1/2016	6/30/2018
184-0848	Dudley Road and Lyndale Court WMI						$ 772,049	$ 772,049	$ -	9/22/2011	9/22/2013	10/14/2016	6/30/2019
184-0849	Wedgewood Drive and Clubhouse Drive WM						$ 397,239	$ 397,239	$ -	11/1/2016	4/19/2019	11/1/2016	12/31/2017
184-0850	Brookwood Drive WMR - Central Phas						$ 171,664	$ 171,664	$ -	12/1/2016	4/19/2019	12/1/2016	12/31/2017
184-0851	Hudson Avenue WMF						$ 119,904	$ 119,904	$ -	12/15/2016	4/19/2019	12/15/2016	12/31/2017
184-0852	Buttermilk Pike WMF						$ 477,180	$ 477,180	$ -	12/23/2016	4/19/2019	12/23/2016	6/30/2018
184-0853	McHenry Street and Clifton Avenue WMI						$ 91,361	$ 91,361	$ -	3/1/2017	4/19/2019	3/1/2017	12/31/2017
184-0854	McKinney St and 9th Ave WMF						$ 100,953	$ 100,953	$ -	3/31/2017	4/19/2019	3/31/2017	12/31/2017
184-0855	Arlington Road WMI						$ 206,882	$ 206,882	$ -	4/19/2017	4/19/2019	7/1/2017	6/30/2020
184-0856	Lorup Avenue WMR						$ 181,051	$ 181,051	$ -	4/14/2017	4/19/2019	4/14/2017	12/31/2017
184-0857	Caldwell Drive MWF						$ 122,741	$ 122,741	$ -	4/19/2017	4/19/2019	12/31/2017	6/30/2018
184-0858	Erlanger Road Phase 2 WMI						$ 282,887	$ 282,887	$ -	4/19/2017	4/19/2019	8/1/2017	12/31/2018
184-0859	Birch Drive WMR						$ 134,076	$ 134,076	$ -	4/19/2017	4/19/2019	8/2/2017	12/31/2018
184-0860	Amsterdam Road WMR- HDPE						$ 365,597	$ 365,597	$ -	4/19/2017	4/19/2019	10/31/2017	12/31/2020
184-0861	Stonehouse Road WMF						$ 731,576	$ 731,576	$ -	4/19/2017	4/19/2019	9/29/2017	7/1/2020

Project Number	Project Title/ Description	Annual Actual Cost	Annual Original Budget	Variance in Dollars	Variance as Percent	Percent of Budget	Total Actual Project Cost	Total Budget Project Cost	Variance in Dollars	Date Original Budget Start	Date Original Budget End	Date Actual Start	Date Actual End
184-0862	Highland Ave WMF						$ 132,335	$ 132,335	$ -	4/19/2017	4/19/2019	12/1/2017	12/31/2018
184-0863	Amsterdam Road WMR (Morris to Redwoo						$ 168,443	$ 168,443	$ -	4/19/2017	4/19/2019	11/10/2017	12/31/2018
184-0864	Winters Lane WMF						$ 835,220	$ 835,220	$ -	4/19/2017	4/19/2019	12/31/2017	12/31/2018
184-0865	Ripple Creek Road WMI						$ 196,943	$ 196,943	$ -	4/19/2017	4/19/2019	2/1/2018	12/31/2018
184-0866	Pentland Place WMF						$ 222,811	$ 222,811	$ -	4/19/2017	4/19/2019	3/16/2018	12/31/2018
184-0867	Alexander Circle (Cochran Avenue) WM						$ 205,311	$ 205,311	$ -	4/19/2017	4/19/2019	5/18/2018	11/30/2020
184-0868	Brookwood Drive WMR - North Phas						$ 105,963	$ 105,963	$ -	4/19/2017	4/19/2019	3/1/2018	12/31/2018
184-0869	Highland Ave WMR (Oak to Flora						$ 67,450	$ 67,450	$ -	4/19/2017	4/19/2019	5/1/2018	12/31/2018
184-0870	Sunset Drive WMR						$ 178,271	$ 178,271	$ -	4/19/2017	4/19/2019	6/30/2018	12/31/2018
184-0871	N. Ft. Thomas Ave WMR (Covert to Lincoln						$ 603,432	$ 603,432	$ -	4/19/2017	4/19/2019	8/17/2018	1/31/2020
184-0872	Narrows and Nelson WMR Relocatio						$ 53,030	$ 53,030	$ -	4/19/2017	4/19/2019	9/1/2018	9/1/2018
184-0873	Jackson Road WMR						$ 198,033	$ 198,033	$ -	4/19/2017	4/19/2019	12/13/2018	6/30/2020
184-0874	Janet Drive WMR						$ 224,672	$ 224,672	$ -	4/19/2017	4/19/2019	9/30/2018	12/31/2019
184-0875	Hillview Drive WMR (Dixie to Longmeadow						$ 235,736	$ 235,736	$ -	4/19/2017	4/19/2019	11/8/2018	12/31/2019
184-0876	Brookwood and Oakridge Drive WMI						$ 208,944	$ 208,944	$ -	4/19/2017	4/19/2019	6/19/2019	6/30/2020
184-0877	Valleywood Court & Hickory Lane WMI						$ 181,447	$ 181,447	$ -	4/19/2017	4/19/2019	12/31/2019	12/31/2020
184-0878	Covert Run to Lincoln WMI						$ 356,172	$ 356,172	$ -	4/19/2017	4/19/2019	12/31/2018	6/30/2021
184-0879	Rossmoyne, Druid, Warwick WMF						$ 261,460	$ 261,460	$ -	12/31/2018	3/18/2023	12/31/2018	1/31/2020
184-0880	Parkway Dr WMR						$ 460,665	$ 460,665	$ -	4/19/2017	4/19/2019	3/4/2019	6/30/2019
184-0881	Ash Street WMF						$ 128,565	$ 128,565	$ -	5/1/2019	3/18/2023	5/1/2019	12/31/2019
184-0882	Pieck Drive and West Henry Clay Ave WMI						$ 197,223	$ 197,223	$ -	4/19/2019	3/18/2023	4/19/2019	1/22/2021
184-0883	Sunset Drive & Allen Court WM						$ 198,805	$ 198,805	$ -	6/1/2019	3/18/2023	6/1/2019	1/31/2020
184-0884	Thornton & Tower View WM						$ 152,351	$ 152,351	$ -	5/1/2019	3/18/2023	5/1/2019	12/31/2020
184-0885	Amsterdam Road WMR (Arlington to Montaug						$ 329,970	$ 329,970	$ -	6/1/2019	3/18/2023	6/1/2019	6/30/2020
184-0886	Highland Avenue WMF						$ 290,543	$ 290,543	$ -	5/31/2019	3/18/2023	5/31/2019	1/31/2020
184-0887	Wayskin, Marnoam, Sipple, & Dave WMR						$ 501,611	$ 501,611	$ -	1/1/2019	12/31/2021	6/30/2019	8/1/2020
184-0888	Fourth Street MWR (Scott to Greenup						$ 229,237	$ 229,237	$ -	4/1/2019	3/18/2023	4/1/2019	12/31/2019
184-0889	Old Alexandria Pike (CR1557) WM						$ 128,592	$ 128,592	$ -	5/31/2019	3/18/2023	5/31/2019	5/31/2020
184-0890	E. Main St WMR						$ 622,878	$ 622,878	$ -	6/30/2019	3/18/2023	6/30/2019	12/31/2020
184-0891	Ridge and W. Orchard Road WMI						$ 256,194	$ 256,194	$ -	6/30/2019	3/18/2023	6/30/2019	12/31/2020
184-0892	Barma Drive WMR						$ 74,385	$ 74,385	$ -	10/1/2019	3/18/2023	10/1/2019	4/1/2020
184-0893	Crowell & Eustace WMF						$ 463,037	$ 463,037	$ -	4/16/2020	3/18/2023	4/16/2020	12/31/2020
184-0894	Thatcher Ct & Paul Ln WMF						$ 225,676	$ 225,676	$ -	4/19/2017	4/19/2019	5/4/2020	12/31/2020
184-0895	Persimmon, etc WMR						$ 518,930	$ 518,930	$ -	6/1/2020	3/18/2023	6/1/2020	6/30/2021
184-0896	Lexington & Woodward WMF						$ 509,999	$ 509,999	$ -	6/30/2020	3/18/2023	6/30/2020	12/31/2021
184-0897	E. Main St WMR - Phase 2						$ 447,493	$ 447,493	$ -	6/30/2020	3/18/2023	6/30/2020	12/31/2021
184-0899	Greenup Street WMR						$ 60,292	$ 60,292	$ -	4/19/2017	4/19/2019	9/1/2020	12/31/2020
184-0900	Robin Ln WMF						$ 128,516	$ 128,516	$ -	4/19/2017	4/19/2019	11/30/2020	6/30/2021
184-0901	Wayman Branch WMR						$ 471,680	$ 471,680	$ -	1/1/2021	3/28/2023	1/7/2021	6/30/2022
184-0902	Sagebrush & Shadyside WMF						$ 394,485	$ 394,485	$ -	12/31/2020	3/18/2023	12/31/2020	12/31/2021
184-0903	Darlas Dr WMR						$ 19,383	$ 285,000.00	$ (265,617)	3/18/2021	3/18/2023	5/7/2021	under constructior
184-0904	Chapman Lane WMR						$ 177,151	$ 177,151	$ -	1/1/2021	12/31/2021	5/7/2021	12/31/2021
184-0905	Willowbrook Lane WMF						$ 194,066	$ 194,066	$ -	3/18/2021	3/18/2023	5/17/2021	12/31/2021
184-0907	Joyce Avenue WMR						$ 99,913	$ 99,913	$ -	3/18/2021	3/18/2023	9/1/2021	12/31/2021
184-4002	Plant Metering Upgrade						$ 46,553	$ 300,000.00	$ (253,447)	6/30/2018	3/18/2023	6/30/2018	preliminary desigr
184-4003	SCADA improvement						$ 1,113,352	$ 3,938,969.00	$ (2,825,617)	12/6/2016	3/18/2023	12/6/2016	under desigr
184-4005	TMTP Concrete Flow Meter Pi						$ 51,451	$ 51,451	$ -	4/19/2017	4/19/2019	11/1/2017	6/30/2018
184-4006	FTTP Phase 2 Basin Improvement						$ 4,553,618	$ 6,000,000.00	$ (1,446,382)	6/30/2018	3/18/2023	6/30/2018	under constructior
184-4008	FTTP Residuals Handling Improvement						$ 2,705,485	$ 3,000,000.00	$ (294,515)	6/30/2018	3/18/2023	6/30/2018	under constructior
184-4010	TMTP - PAC & UV Replacemer						$ 123,838	$ 1,615,000.00	$ (1,491,162)	1/1/2018	12/31/2024	6/30/2018	under desigr
184-4012	MPTP Clearwell Rehab and Paintin						$ 761,985	$ 761,985	$ -	4/19/2017	4/19/2019	6/30/2018	6/30/2022
184-4013	Taylor Mill Pump Station Backup Generatc						$ 87,497	$ 6,600,000.00	$ (6,512,503)	1/1/2018	12/31/2020	11/1/2018	under desigr

Project Number	Project Title/ Description	Annual Actual Cost	Annual Original Budget	Variance in Dollars	Variance as Percent	Percent of Budget	Total Actual Project Cost	Total Budget Project Cost	Variance in Dollars	Date Original Budget Start	Date Original Budget End	Date Actual Start	Date Actual End
184-4014	Central Facility Standby Powe						$ 420,131	$ 420,131	$ -	9/22/2011	9/22/2013	12/31/2018	12/31/2020
184-4016	MPTP Actiflo Upgrades						$ 103,359	$ 828,000.00	$ (724,641)	1/1/2020	12/31/2024	11/30/2020	under design
184-4017	FTTP Old Clearwell Baffle Replacemer						$ 97,463	$ 750,000.00	$ (652,537)	12/31/2020	12/31/2024	12/31/2020	under design

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Stacey Kampsen

Q.18. Describe in detail how the test year capitalization rate was determined. If different rates were used for specific expenses (i.e., payroll, clearing accounts, depreciation, etc.), indicate the rate and how it was determined. Indicate all proposed changes to the capitalization rate and how the changes were determined.

A.18. NKWD submits the attached Exhibit 18-1. For the test period January 2021 through December 2021, wages are capitalized based on actual time/labor spent working on capital projects. The actual percent of wages capitalized in the test period, 2.57%, was applied to the pro forma wages to calculate pro forma capitalized wages.

Northern Kentucky Water District

EXHIBIT 18-1

Exhibit 18-1
Northern Kentucky Water District
Case No. 2022-00161
Test Period Capitalized Wages

2021 Month	Hourly Amount Capitalized*	Salary Amount Capitalized*	Total
January	7,296.19	-	7,296.19
February	4,810.34	-	4,810.34
March	7,777.71	-	7,777.71
April	18,852.70	-	18,852.70
May	10,377.12	-	10,377.12
June	11,144.32	42,520.84	53,665.16
July	12,246.39	-	12,246.39
August	5,237.70	-	5,237.70
September	9,734.34	-	9,734.34
October	10,493.17	-	10,493.17
November	9,095.80	-	9,095.80
December	7,052.41	97,993.75	105,046.16
Totals	**114,118.19**	**140,514.59**	**254,632.78**

Test Period Wages	$ 9,658,704.04
Add Back Capitalized Wages	$ 9,913,336.82
Actual % of Capitalized Wages 1/1/2021-12/31/2021	2.57%
Pro Forma Wages	$ 12,078,330.91
Pro Forma Capitalized Wages	$ 310,242.56

*Amount Capitalized is based on actual time/labor spent working on projects.

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Stacey Kampsen

Q.19. Provide a calculation of the rate or rates used to capitalize interest during construction for the three most recent calendar years. Explain each component entering into the calculation of the rate(s).

A.19. For the year ended December 31, 2018, NKWD adopted Governmental Accounting Standards Board Statement No. 89, Accounting for Interest Cost Incurred before the End of Construction Period. This guidance requires that interest cost incurred before the end of a construction period be recognized as an expense in the period in which the cost is incurred for financial statements prepared using the economic resources measurement focus. As a result, interest costs incurred before the end of a construction period are not included in the historical cost of a capital asset. NKWD did not capitalize interest during construction for the three most recent calendar years.

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Stacey Kampsen

Q.20. State whether any changes have been made to the utility's internal accounting manuals, directives, and policies and procedures since the utility's most recent rate case. If so, provide each item that was changed and identify the changes.

A.20. NKWD has made the following changes to its internal accounting policies and procedures since NKWD's most recent rate case:

- Purchasing and Payment Process: implemented a procedure for electronic payments to vendors.
- Acquiring and Disposing of Capital Assets: Prior to 2020, NKWD had a policy to capitalize appropriate capital expenditures exceeding $500. For expenditures incurred in 2020, the capitalization threshold was increased to $2,000. For expenditures incurred during 2021 and subsequent years, the capitalization threshold was increased to $3,500.
- Sale or Disposal of District Property: Clarification of process including treatment of property with no value and online auction sales in accordance with Kentucky Revised Statute.
- Delegation of Authority: Revised purchasing approval limits to incorporate the Kentucky General Assembly changes made to KRS 424.260 (commonly referred to as the "bid statute") that increased the threshold for a public agency to obtain formal sealed bids for the purchase of supplies and services from $20,000 to $30,000. The revised KRS 424.260 took effect on June 27, 2019. Accordingly, the NKWD Board voted on June 27, 2019 to adjust the purchasing authority of certain supervisory positions to compensate for the new bidding threshold set forth in KRS 424.260.

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Amy Stoffer

Q.21. Provide the utility's long-term construction planning program.

A.21. NKWD submits the most recent Asset Management Plan, incorporated and attached hereto as Exhibit 21-1. The Asset Management Plan identifies various needs and improvements that form the five-year Capital Improvement Plan ("CIP").

NKWD is in the process of updating its Asset Management Plan through the year 2040. The Risk & Resiliency Assessment and updated Emergency Response Plan components were completed and certified to the Environmental Protection Agency as required by the America's Infrastructure Act of 2019. Unfortunately the field work to conduct the asset condition assessments, which is an important part of the work, was delayed for over two years. This decision was made to protect NKWD employees and the consultant's staff from potentially contracting or spreading the corona virus. The necessary field work, which is conducted jointly with the consultant's and NKWD's staff, is currently underway.

The NKWD's planning efforts factor in information from various sources such as: the Risk & Resiliency Assessment, recent issues with industry-wide supply-chain disruptions and cost increases for materials, goods, and services; a computerized hydraulic model of the distribution system; history of water sales from the Customer Information System (CIS) and recorded daily and hourly peaking factors recorded in the Supervisory Control and Data Acquisition (SCADA) System along with future demand projections based on information available from local planning agencies; condition assessment and criticality information using visual inspection and performance data and corrective maintenance history in the computerized maintenance management (work order) systems; and water quality data and existing and potential future regulatory requirements. This information will be used to prioritize the order in which projects should be completed. The plan will consider different scenarios for completing the projects to understand the potential impact on water rates and customer affordability.

The culmination of these efforts will result in a recommended 5-year and 20-year CIP.

Northern Kentucky Water District

EXHIBIT 21-1

Northern Kentucky Water District
2835 Crescent Springs Rd. • PO Box 18640 • Erlanger, KY 41018-0640

2008 Asset Management Program Update

November 2011

FINAL DRAFT

Report Prepared By:

Malcolm Pirnie, Inc.

8600 Governor's Hill Drive
Suite 210
Cincinnati, OHIO 45249
513-677-8380

4775-011

GRW, Inc. MALCOLM PIRNIE ARCADIS

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Executive Summary

4775-011

GRW, Inc.

MALCOLM PIRNIE

Executive Summary

ES.1. Purpose and Scope of Project

The Northern Kentucky Water District (NKWD) serves over 80,000 accounts in Campbell and Kenton Counties, including retail accounts and wholesale agreements. The most recent expansions of the NKWD service area included the acquisitions of the water system from the City of Newport in 2002 and the water system from the City of Taylor Mill in 2004. Recognizing the need to proactively and cost effectively manage its growing infrastructure base and sustain a high level of customer service, NKWD adopted a formal Asset Management Program in 2004, which established base-line condition assessment data for all above ground assets, provided a preliminary assessment of the overall water distribution system and resulted in a 5-year and 20-year capital improvement program.

The goal of this Asset Management Program (AMP) Update is to integrate the on-going planning for capacity and regulatory needs with an update of the 2004 Asset Management Program. This AMP Update provides a comprehensive planning document for the prioritized and coordinated implementation of all required initiatives within a phased capital improvement program. Key elements of this AMP update include the following:

- Update to the current water distribution hydraulic model including; the allocation of current and projected future water demands, storage requirements, pumping requirements and distribution piping hydraulic improvements through 2030.
- Evaluation of requirements for all three water treatment plant including; raw water intake and pumping, treatment needs and asset renewal and replacement needs.
- Evaluation of water distribution system pumping stations and storage tanks for asset renewal and replacement needs.
- Further evaluation of the water distribution system for renewal and replacement program development.
- Further development of the overall asset management "road map" focusing on condition assessment methods, asset criticality, performance measures, data management, reporting needs and O&M practices, which can guide subsequent updates.
- Review of current information technology tools and development of recommendations for the phased implementation of technology improvements to support and sustain the asset management program.

- Assessment of potential rate impacts in the development of alternatives for the minimum, moderate and aggressive 5-year and 20-year capital improvement programs.
- This AMP Update provides the final 5-yr and 20-yr capital improvement program recommendations consistent with the Northern Kentucky Water District's vision, mission and overall business objectives.

ES.2. Hydraulic Model Update and Analysis

The hydraulic model update included a full model calibration to replicate average day and maximum day demand conditions observed in 2007. The model was then used for several analyses to identify improvements for the existing system and for the planning horizons of 2020 and 2030. These analyses were conducted under average and maximum demand conditions to determine deficiencies in pumping, storage, and pipe capacity. An overall existing system storage and pumping gap analysis was also conducted.

ES.2.1. Population and Demand Projections

Key findings from this effort include the following:

- Supply to wholesale customers is not expected to increase more than 3% a year. These customers used the following amount of water in 2006:
    - City of Walton - 500,000 gpd
    - Bullock Pen Water District – 280,000 gpd
    - Pendleton County Water District – 250,000 gpd
- Population projections indicate that during the planning period through 2030, the average annual increase in population will be about 2.4%.
- Based on area planning information, the District is expected to add about 12,700 accounts through year 2020 and another 10,500 between 2020 and 2030. This number is also less than 3% a year.
- The peaking factor for average day to maximum day demand for this plan is 1.60. While average day demands heavily influence annual operating costs, the size of treatment, pumping, and storage facilities are designed to meet maximum day demand. This slight reduction in the peaking factor from the previous plan means that proposed expansions can generally be postponed for several years.
- Total demand increases about 2% a year.
- Existing treatment capacity is sufficient to meet 2020 demands.

The projected average day and maximum day demands are presented in the table below:

Demand Projections		
Year	**Average Day, MGD**	**Maximum Day, MGD**
2006	28.58	43.15
2010	30.86	48.57
2020	36.59	57.74
2030	41.44	65.50

ES.2.2. Treatment Capacity Expansion

An expansion of Memorial Parkway Treatment Plant to at least 15 MGD (up to 20 MGD) is recommended prior to year 2030. The expansion to Memorial Parkway Treatment Plant will include the addition of another ACTIFLO® train and gravity thickener, and replacement of an existing pump with a larger pump at the Reservoir Pump Station plus replacement of the Reservoir Pump Station discharge line with a 24 inch main. The chemical feed pumps would need to be upgraded to feed additional chemical. One 10 MGD pump would also be added to Ohio River Pump Station No. 2.

ES.2.3. Pumping and Storage Analysis

Key findings from this effort include the following:

- All pump stations have sufficient capacity to meet existing demand requirements. The Ripple Creek Pump Station serving southern Campbell County will not be capable of supplying 2020 demand projections and beyond.
- The combined volume from the Rossford and Lumley Tanks serving the 1017 pressure zone north of the Fort Thomas Treatment Plant are currently undersized to provide storage for meeting recommended volumes for consumption, emergency and fire flows, and equalization. These tanks are filled from the US 27 Pump Station (takes water from Fort Thomas Treatment Plant) and Waterworks Road Pump Station (takes water from Memorial Parkway Treatment Plant). Because of the dual plant supply and the fact that the US 27 Pump Station has a backup power generator, the gap in recommended storage volume is not alarming.
- There is currently a storage gap in the 1080 areas in southern Kenton County that are served by the Industrial, Independence, and Devon Tanks. Having a backup power generator to reliably supply water from Dudley 1080 Pump Station that draws water from the 10 million gallon Dudley Tanks greatly mitigates any immediate concern.
- In addition to the areas discussed above where the present gap increases with added customer demand, the Southern Campbell County area will also have a storage shortfall in year 2020 and beyond.

- The pumps at Bristow Road, Richardson Road, and West Covington Pump Stations do not operate at their best efficiency points. The pumps may have been selected to meet higher demand conditions or improvements to the system piping may have resulted in lower head conditions. This means that a different pump could use less power than the current pumps. The District should consider replacing these pumps with pumps that are better suited to the system conditions when the pumps have reached the end of their useful life or when power savings are sufficient to justify the cost of a new pump.
- The 1010 pressure zone supplied by regulators fed from the 1040 and 1080 pressure zones shows a number of areas where pressures can fall below 35 psi. Until recommended improvements are made, the District should closely monitor the pressure regulator settings and water level in the Taylor Mill Standpipe to help address this condition.

ES.2.4. Recommended Hydraulic Improvements

Recommendations to the existing system to meet projected demands and address existing or future hydraulic concerns include:

Storage Tanks:

- Replace the existing Rossford and Lumley with increased storage volume totaling 1 million gallons. The District will need to decide if one larger tank at the Rossford Tank site or two separate tanks at the existing sites will be maintained. Having two tanks in each pressure zone is helpful and sometimes required for redundancy, particularly when a tank needs to be taken out of service for maintenance. The District should be able to construct a new tank adjacent to the existing Rossford Tank. The Lumley location, however, poses challenges because the property was formerly used as a dump site and is presently used for parking by the City of Ft. Thomas.
- Build a new 1 million gallon tank east of Independence between 2015 and 2020. As this area is already quite developed, the District should consider locating and securing property for this tank around Stephens Road and Taylor Mill Road.
- Build a new 1 million gallon tank in Southern Campbell County between 2015 and 2020. The District should consider locating and securing property for this tank in the vicinity of AA Highway and Lick Hill. The Main Street Tank may be retired for water quality reasons when this new tank is in place.
- Between 2015 and 2020, retire the Taylor Mill Standpipe and convert the 1010 Taylor Mill area to 1040 pressure zone. The District should consider locating and securing property for this tank in the vicinity of the existing standpipe.
- Build a new 1 million gallon tank in Southern Kenton County near Walton between 2025 and 2030.

Pumping Stations:

- Add flow meters for each individual pump at all new pump stations.
- Replace Richardson Road Pump Station with a larger station along KY 17 between 2015 and 2020. The Hands Pike Pump Station could be retired at the same time, although redundancy is desirable in emergencies. The District should identify potential locations for this station and consider procuring the site should the opportunity arise.
- Add variable frequency drives to the pumps at US 27 Pump Station between 2015 and 2020.
- Replace the Ripple Creek Pump Station with a larger station between 2015 and 2020. The existing site may be larger enough to accommodate a new station, but the District should review the site and determine if additional property should be secured.
- Add VFDs at the Dudley 1080 and 1040 Pump Stations and two of the pumps at US 27 Pump Station.
- Between 2025 and 2030, build a new pump station from downtown Newport to downtown Covington for a merged 741 and 763 pressure zone that can be supplied by both Fort Thomas and Memorial Parkway Treatment Plants.

Piping Improvements:

- Add flow meters to the gravity discharge mains from Fort Thomas and Memorial Parkway Treatment Plants.
- By 2020, build a 24 inch pipe upstream and downstream of the existing Richardson Road Pump Station and proposed KY 17 Pump Station along Madison Pike to the new tank east of Independence.
- Build additional piping capacity upstream and downstream of the Ripple Creek Pump Station by 2020.
- Construct piping along AA Highway from Highway 547 and California Cross Roads to the new tank in Southern Campbell County by 2020.
- Between 2025 and 2030, build three miles of 24 inch main and two miles of 16 inch main to serve the South County and Claryville Tanks in Southern Campbell County.

ES.3. Asset Management

The renewal and replacement (R&R) of assets based on the condition and criticality of the asset was the focus of this effort. Approximately 1,600 above-ground assets were assigned to a priority grouping for planning based on their score. Group 1 and 2 assets

are the highest priority and were considered for inclusion within a 5-year period. Groups 3 and 4 are lower priority and were placed in the 20-year period. Groups 5 are lowest priority and were not included in the 20-year planning horizon. For the above-ground assets, approximately 60% are located at treatment plants, 20% are tanks, and 20% are pump stations.

ES.3.1. Condition Assessment for Existing Assets

Key findings of the condition assessment and asset evaluation are summarized below:

Above-Ground Assets

- The majority of assets are in good or very good condition.
- Assets should be replaced on the following schedule:
    - 10% fall within 3 to 5 years (it should be noted that the new chemical building and filter improvements at Memorial Parkway Treatment Plant has since addressed most of these items).
    - 15% fall within 6 to 10 years.
    - 30% fall within 10 to 20 years.
    - 40% fall beyond 20 years.
- Larger projects were identified as specific projects for the 5-year capital improvement projects through year 2030.
- An annual R&R fund was established to address a number of smaller projects each year.

Below-Ground Assets

- The American Water Works Association recommends a pipe break/leak rate of no more than 30 per 100 miles per year.
    - The District averaged 42 breaks/leaks per 100 miles per year for 2003 to 2007. The District is also above the median rate of 33 breaks/leaks per 100 miles per year by a national survey of utilities;
    - Approximately 50% of the distribution system piping meets this rate. The most reliable materials include PVC, ductile iron wrapped with polyethylene, and polyethylene pipe.
    - Approximately 50% of the distribution system piping does not meet this rate. The most failures occurred in cast iron and unwrapped ductile iron followed by asbestos cement and concrete.
- Achieving 30 breaks/leaks per 100 miles per year is estimated to require an expenditure of $76.8 million by targeting 120 miles of main having the highest breaks.

ES.3.2. Recommended R&R Improvements for Existing Assets

A list of the major facilities and recommendations for doing capital improvements to address aging infrastructure through the 5-year budget or the Annual R&R budget are listed below:

Raw Water Supply:

- Ohio River Pump Station No. 1 – address small items through Annual R&R Fund including adding a potable water line for lubrication of pumps, chemical make-up water, equipment washdown, and restroom use; and adding an air handling unit to cool the electrical equipment room.
- Ohio River Pump Station No. 2 – replace the entire station in 2015.
- Licking River Pump Station – add generator and miscellaneous improvements by 2015, and add a dewatering pump for the wetwell.

Treatment Plants:

- SCADA and Security – replace all plant and distribution system SCADA and security systems.
- Building, Mechanical, and Electrical Systems – replace general facility and system needs through the Annual R&R. Building items may include masonry tuck pointing, replacement of roofs and flashing, patching and painting walls, and replacement of tile/skylights/doors/windows. Site items may include driveways and walkways, fencing, and storm water drainage. Mechanical systems may include plumbing, fire protection, air handling and cooling, heating, and dehumidification. Electrical may include analytical instruments, security systems, and power distribution inside the plant.
- Fort Thomas:
    - Replace and upgrade residuals handling system (pumps, belt conveyors, presses, polymer feed, add third bay to dumpster area, upgrade HVAC, add two flow equalization tanks ahead of presses, upsize recycle line and incoming settled water line, and add a plate settler housed in a building to remove solids prior to returning to the reservoir or allowing discharge under a KPDES permit);
    - Renovate by replacing media and installing air scour backwash (note this was completed in 2011) and repair walls;
    - Replace filter backwash tank (may not be needed after installation of new backwash pumps as part of Advanced Treatment);
    - Repair deteriorating concrete walls in flocculation/sedimentation basins (No. 2 and No. 3) and upgrade to 3-stage flocculation.
    - Install an emergency generator for the laboratory;
    - Replace the raw water line to the South reservoir with a new 36" pipe;

- Replace filter valves and actuators;
- Rehabilitate or replace chemical feed systems;
- Upgrade HVAC in sludge pump room;
- Relocate copper sulfate feed system closer to feed point to minimize clogging (first investigate quality of chemical to see if performance could be enhanced by different product);
- Replace nine 30" raw water valves in the yard piping;
- Replace valves on outlet side of clearwell with SCADA controlled, electrically actuated valves to prevent large loss of water in an emergency;
- Replace fan in fluoride room with a larger unit to increase air changes and reduce corrosion (or add another fan);
- Replace laboratory equipment;
- Replace electrical components as indicated by evaluation.

- Memorial Parkway:
  - Replace suction and discharge piping for Reservoir Pump Station;
  - Remove solids from North and South Reservoirs by dredging (equipment purchase would be capitalized, but contractor services or in-house labor would be an O&M expense);
  - Upgrade residuals handling system by adding a gravity thickener, replacing 3 sludge pumps with positive displacement pumps, modify truck loading area roof height for dumpster, and modifications to holding tank and electrical improvements;
  - Rehabilitate or replace chemical feed systems;
  - Rehabilitate or replace the 24" raw water piping located in the tunnel below the old Chemical Building area;
  - Replace raw and finished water valves in yard piping;
  - Demolish or renovate old Chemical Building;
  - Replace actuators on Filters 4, 5, and 6 (note this is part of the Advanced Treatment project);
  - Replace electrical components as indicated by evaluation.

- Taylor Mill:
  - Replace filter control system (includes panels and programmable logic control);
  - Replace rapid mixing, flocculation basins, and sedimentation basins;
  - Replace sludge conveyor and belt filter press and make repairs to dumpster room;
  - Rehabilitate or replace chemical feed systems;
  - Replace electrical components as indicated by evaluation.

Pump Stations:

- Replace valves and actuators in Taylor Mill PS;
- Replace up to 4 pumps in Dudley 1040 PS;

- Replace all 6 pumps in Taylor Mill PS (4 pumps in first phase and 2 pumps in second phase);
- Replace all 3 pumps at Bromley PS, chlorine feed system (if still needed for maintaining residual), valves, actuators, and various electrical and security improvements;
- Replace motor control centers and upgrade electrical, mechanical, and lighting systems at Dudley 1040 PS;
- Replace pumps, motors, motor control centers, and electrical upgrades at Carothers Road PS;
- Replace pumps and install new VFDs at Bristow Road PS;
- Replace motor control centers and upgrade electrical, mechanical, and lighting systems at Dudley 1080 PS;
- Replace motor control centers and upgrade electrical, mechanical, and lighting systems at Latonia PS (if not retired with Ida Spence Tank);
- Replace motor control centers and upgrade electrical, mechanical, and lighting systems at Waterworks Road PS and add an emergency generator;
- Replace motor control centers and upgrade electrical, mechanical, and lighting systems at US 27 PS.

Tanks:

- Inspection – a schedule for conducting maintenance inspections after coating a tank was developed which includes a 5-year and 10-year post coating inspection. The 10-year inspection will be more detailed and will indicate whether a renovation or re-painting project needed, typically within 5 to 10 years following the 10-year inspection.
- Install isolation valves on Dudley Tanks to keep the tanks from rapid water loss that could occur from a large water main break;
- Replace Bellevue Tank (or rehabilitate if suitable);
- Replace Dayton Tank (or rehabilitate if suitable);
- Replace Lumley Tank (or retire with addition of larger Rossford Tank);
- Replace Ida Spence Tank (or retire it and Latonia PS and serve from 1040 system);
- Replace Kenton Lands Tank.

ES.3.3. Recommendations for Asset Management Program

It is recommended the District incorporate into its asset management program the recommendations provided below:

Program:

- Develop a modified hierarchy of assets in accordance with the format outlined in this report.
- Use the same asset ID for work order system, financial system, and asset management system.
- Considering the magnitude of upcoming capital program for adding advanced treatment and the need to address water main R&R, a minimal staffing review is recommended particularly considering the record high number of overtime hours reported in 2007.
- Review performance using the following eight performance measures:
    1. Service and Reliability
        - Total Water Main Breaks/Leaks
        - Total Water Quality Complaints
        - Low Water Pressure Events
    2. Regulatory Compliance
        - Total Water Quality Incidents/Failure of Safe Drinking Water Act Standards (Primary and Secondary)
    3. Financial and Business Operations
        - Total Percent of Non-Revenue Water
        - O&M Cost Ratio (O&M cost per account and per MGD processed)
    4. Operations and Maintenance
        - Planned Maintenance Ratio (scheduled vs. unscheduled) for Distribution, Pump Stations, and Plants
        - Total Miles of Water Mains Flushed (planned to actual and percent of system per year)

Above-Ground Assets:

- Develop a comprehensive condition assessment data collection form for specific types of assets and link to the work order system;
- Add the following fields to the Antero database and populate with available information and update by periodic inspections:
    - installed date;
    - installed cost;
    - estimated remaining useful life;
    - replacement cost;
    - criticality;
    - physical condition;
    - performance condition;

- For the performance condition rating (i.e. how well is the asset doing its job) need to assess its ability to:
    - Meet capacity;
    - Comply with regulations;
    - Perform reliably without breakdown;
    - Run without abnormal maintenance;
    - Find repair parts;
- Consider a separate work order type for all predictive maintenance types (e.g. similar to PUMPVIB task for pump vibration monitoring) which will allow tracking time spent on each asset;
- Prepare reports to:
    - Track corrective maintenance identified and completed as a result of scheduled preventative maintenance;
    - Review asset condition versus effective useful life by criticality (prioritize assets in worst condition that are beyond their expected life and are also a critical asset);
    - Determine maintenance cost per asset replacement value;
    - Identify mean time between asset failures;
- Review updates to new releases of the Antero and Operator 10 software from AllMAX;
- Consider upgrades to Operator 10 that will allow operator log sheets to be managed in the software instead of Excel;
- Integrate SCADA with Antero to automate comparison of equipment run-time recorded in SCADA with vibration analyses delivered from hand-held units;
- Add an electronic link to Antero to notify user that a Standard Operating Guideline exists for a particular task.

Below-Ground Assets:

- Review records and add information where it may be missing for installed date, material type, and lining;
- Consider implementing cathodic protection for new and to retrofit existing pipe and consult with a corrosion engineer to develop guidance;
- Establish internal improvement goals with the next AMP update based on recommended benchmarks and budget constraints;
- Focus R&R program on most unreliable cast iron pipe while also performing strategic replacement (or rehabilitation) of unwrapped ductile iron;
- Correct inconsistencies in pipe identification and numbering in work orders;

- Develop a Standard Operating Guideline for capturing information from mapping and updating GIS, and require as-built information from contractors and electronic record drawings from engineers;
- Consider implementing a leak detection program and utilize data to prioritize water main R&R program;
- Consider implementing a valve exercising program on a limited basis, subject to resource availability, to focus on the most reliable mains which will not be targeted for replacement.

ES.3.4. Recommendations for Additional Studies

It is recommended the District perform the following studies as part of its O&M budget:

- Electrical Systems Evaluation - evaluate power distribution systems at all 3 treatment plants as an electrical failure inside the plant would be crippling to the treatment and supply process.
- Surge Analysis – conduct a computer model surge analysis for ORPS1 to verify that the existing surge relief valve will perform as intended following a power failure. If the analysis indicates a problem, the surge valve should be converted from a pressure relief design to a surge relief design. It is also recommended that sediment protection features be added to the surge valve to help prevent possible clogging from silt.
- Pipe Corrosion Soils Analysis – implement a program to perform corrosion testing at water main break locations or other areas of concern to develop information to support on-going analysis and project prioritization. Monitoring of newly installed cathodic protection systems is also needed. The District should consult with a corrosion specialist to develop a program.
- Plant Capacity Analysis – conduct a comprehensive analysis of the treatment plants to identify hydraulic bottlenecks that may restrict plant capacity and to determine the true capacity as compared to the rated capacity. One area of concern is the filter influent flume at Fort Thomas Treatment Plant. This information will be critical for timing the expansion of MPTP.
- ORPS2 Structural Analysis – conduct a structural analysis of the building foundation, flooring, and walls. Numerous structural and destructive testing are recommended to be preformed to accurately assess the condition of the existing superstructure. The pump station's concrete and brick have significantly deteriorated over the years and any rehabilitation would be challenging and unpredictable.

ES.4. IT Master Plan

Information systems and access to key data contained in the systems play a key role in supporting the successful implementation of an Asset Management Program. The District's key IT systems related to management of assets include:

- Geographic Information System (GIS)
- Work Order System
- Customer Information System (CIS)
- Laboratory Information Management System (LIMS)
- Supervisory Control and Data Acquisition (SCADA)
- Financial Information System (FIS)

ES.4.1. Information Systems Assessment

The key findings and recommendations of information systems is summarized below:

- Use a phased approach to implement improvements in core business processes and integration of systems;
- Convert GIS to a "geodatabase" structure;
- Continue to improve reliability and speed of data network communications between facilities;
- Continue to use GBA for below-ground assets and Antero for above-ground assets in the near term, but consider migrating to one system long term;
- Implement a service request and tracking system to schedule work by IT staff;
- Identify opportunities for outsourcing IT services by issuing a solicitation for IT services by gauging the local availability and cost of services;
- Add integration of GIS, work order systems, and SCADA to improve key business processes and support the asset management program;
- Reconcile inventory control by standardizing on one method to eliminate disparity between CIS, FIS, and work order system;
- Add integration of CIS and LIMS to consolidate billing and to streamline customer inquiries;
- Long-term, through a major systems evaluation and consolidation/integration of systems, implement of a Data Management/Reporting services system or a Business Intelligence system to leverage operational data for strategic purposes.

ES.5. Funding Strategy

ES.5.1. Development of Strategy

The Asset Management Program is intended to be a comprehensive source of guidance for the District in the planning and implementation of various programs and improvements to properly respond to customers' needs, changing regulatory requirements, and aging infrastructure systems. These competing areas of needs must be satisfied and accomplished while continuing to operate the utility in a sound fiscal manner that maximizes the return for the money spent and minimizes the resulting rate impacts on the customers.

The primary guide for plotting the District's course is the 5-Year Capital Improvement Plan (CIP) which outlines significant projects that should be implemented and the timeline for their accomplishment. The current CIP includes projects to address needs identified through year 2030. It is important to understand that the implementation of projects constantly evolves depending on numerous drivers such as regulatory changes, customer viewpoints, rate making strategy, resources to implement projects, and actual water consumption. The conclusions and recommendations that are part of this report should be reviewed at regular intervals to ensure that they keep pace with the latest trends.

ES.5.2. Scenarios

With the first Asset Management Program report, the District developed and has since effectively used an approach for analyzing the potential impact on rates. This approach considers three scenarios for implementing the recommended improvements: Aggressive, Minimal, and Moderate.

> Aggressive – In this scenario all projects are built at the ideal time, if economic constraints did not exist.
>
> Minimal – This scenario would meet system demand and regulatory requirements but would not include system reliability and other items important to consumer confidence and customer care because it provides limited rehabilitation and replacement funding even though this ignores deterioration of the infrastructure. It also removes funding for extending water service to new customers.
>
> Moderate – This scenario is intended to balance needs with practical financial limitations that exit. Timing of projects is important to maintain a desirable level of customer service.

The estimated total costs for these scenarios for 5-Year CIP projects between 2009 and 2030 are as follows:

Minimal	$382,424,000
Moderate	$567,318,000
Aggressive	$737,978,000

The Moderate approach results in a cost reduction of 23% over the Aggressive approach, while the Minimal approach would result in a reduction of 48% over the Aggressive approach.

The proposed cost reductions for the Minimal approach would be as follows:

- Delete the "Annual Water Main Replacement" projects from 2009 through 2030 for a total reduction of $126,850,000. We would continue with the program for "Coordinated Water Main Replacement" that sets aside monies for coordinating projects with cities at $2,500,000 a year.
- Delete "Annual Mains into Unserved Areas" for $250,000 each year for a total reduction of $5,500,000.
- Eliminate back-up power generators at Carothers Road Pump Station, Licking River Pump Station, and FTTP Laboratory for a reduction of $4,724,000.
- Cancel projects for upgrading systems and improving technology for SCADA and IT for a total reduction of $11,395,000.
- Eliminate ten water transmission system redundancy projects for a total reduction of $17,098,000.
- Defer tank replacement of aging tanks by rehabilitating instead of replacing Bellevue, Dayton, Lumley, Taylor Mill, Ida Spence and Kenton Lands for a total reduction of $10,722,000.
- Cancel or defer 7 projects to improve hydraulics or system operations for a total reduction of $4,107,000.

The total reductions would be $180 million over the Moderate approach. Deferring or canceling projects is a difficult decision that must be weighed against many factors. It is anticipated the District will carefully consider their options as part of the annual budgeting and rate making process.

The $170 million differences in cost between the Moderate and Aggressive approach are attributed to:

- Increasing funding for "Annual Mains into Unserved Areas" for a total of $27,500,000 through 2030. The funding for unserved areas would be increased from $250,000 to $1,500,000 each year.
- Increasing "Coordinated Main Replacement by a total of $143,150,000. The accelerated funding for main replacement would bring the budget to the full amount proposed in this plan.

ES.5.3. Summary of Costs

The total costs by year for the 5-Year CIP and the annual O&M costs are presented in the table below for the planning period.

Yearly Costs for Projects and O&M				
Year	5-Year CIP, Million Dollars			O&M, Million Dollars
	Minimal	Moderate	Aggressive	
2009	$15.47	$22.17	$26.32	$23.43
2010	$23.08	$29.50	$33.25	$23.45
2011	$26.08	$30.51	$34.26	$23.47
2012	$45.73	$53.16	$57.41	$23.63
2013	$17.30	$28.69	$33.44	$26.55
2014	$12.92	$22.60	$27.85	$27.80
2015	$22.40	$38.12	$42.87	$27.99
2016	$21.39	$27.69	$32.69	$28.34
2017	$21.58	$28.63	$33.88	$28.34
2018	$11.35	$21.05	$26.55	$28.50
2019	$26.30	$38.05	$43.80	$28.68
2020	$5.88	$16.85	$23.11	$28.85
2021	$6.17	$12.92	$20.17	$29.04
2022	$20.26	$27.01	$35.26	$29.22
2023	$9.59	$16.34	$25.59	$29.42
2024	$4.32	$11.07	$21.32	$29.68
2025	$12.65	$19.40	$30.65	$29.83
2026	$6.88	$13.88	$25.88	$30.04
2027	$10.50	$17.75	$30.50	$30.26
2028	$25.64	$33.39	$46.64	$30.49
2029	$29.78	$38.03	$51.78	$30.72
2030	$7.16	$20.51	$34.76	$30.96
Total	**$382.42**	**$567.32**	**$737.98**	-

ES.5.4. Financial Analysis

A major component of any Asset Management Program and CIP program is the financial impact on the District and its rate payers. Rate payers continue to signal a disdain for any rate increase in the new economy post the 2008 "Financial Meltdown". Projects require obtaining funds, which in turn may result in a rate increase to provide revenue to sufficiently service the debt. The political climate continues to perpetuate the belief that utilities should continue to operate and provide services without raising rates and in many cases to lower rates through efficiency. This is the challenging climate in which the

District must address the multiple issues of aging infrastructure, increased uncontrollable operating costs, and unfunded regulatory mandates.

The climate has drastically redefined what is meant by "customer rate shock" to include almost any rate increase. As a result, it will be incumbent on the District to analyze and prioritize any project to demonstrate the need and potential return each project will provide. The following sections attempt to evaluate the financial impact of CIP scenarios knowing that the longer the projection horizon the more difficult to forecast the outcomes in a climate of such uncertainty.

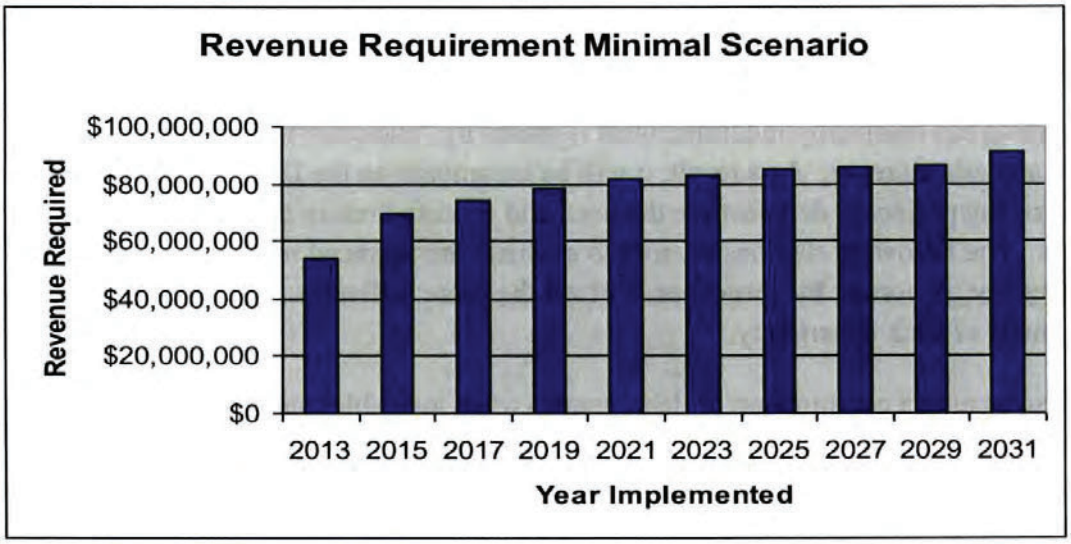
The District uses a combination of debt, grants (when available), and cash from the Internal Repair and Replacement (IRR) budget to finance major necessary capital improvements. Debt instruments include open-market revenue bonds, Kentucky Infrastructure Authority low interest loans, and Bond Anticipation Notes (BANs). The regulatory process conducted by the Kentucky Public Service Commission (PSC) requires approval before long-term debt may be issued and is part of a rate case. The following assumptions apply for projects requiring the issuance of long term debt:

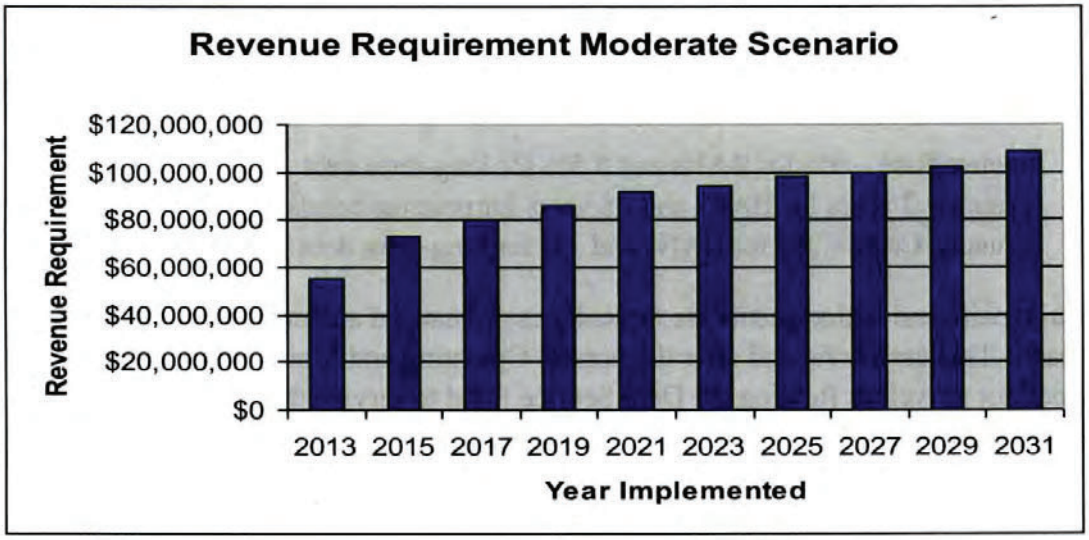
Interest Rate – 3% for BANs and 5.5% for long-term debt
Tenure – 2 years for BANs and 25 years for revenue bonds
Issuance Costs – 2% for BANs and 3% for long-term debt

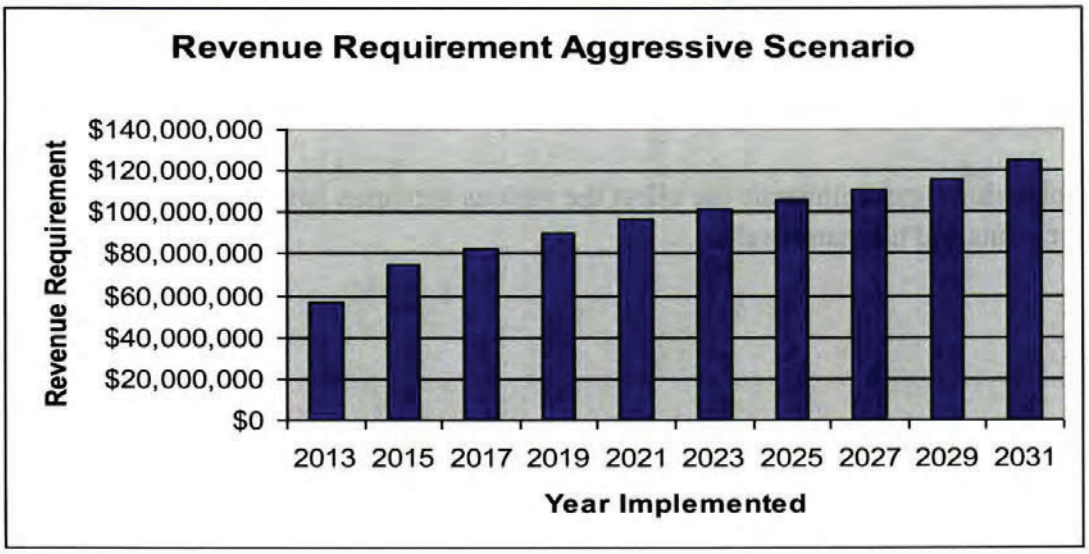
Annual repairs and replacements are typically cash financed and are satisfied from the IRR cash. This cash is funded after the normal Operating and Maintenance expenses are provided for as well as funding the Debt Service Fund to service the long term debt payments and maintaining adequate cash balances.

In general, the District files approximately every two years for rate adjustments to provide for Operation and Maintenance Expense increases, service additional long term debt acquired by paying off BANS, and changes in depreciation as a result of adding infrastructure. Revenue adjustments are effective in the analysis for 9 months of the year implemented.

The following figures illustrate the effect the various scenarios have on revenue requirements and ultimately rates.


Revenue Requirement Minimal Scenario
$100,000,000
$80,000,000
$60,000,000
$40,000,000
$20,000,000
$0
Revenue Required
2013 2015 2017 2019 2021 2023 2025 2027 2029 2031
Year Implemented


Revenue Requirement Moderate Scenario
$120,000,000
$100,000,000
$80,000,000
$60,000,000
$40,000,000
$20,000,000
$0
Revenue Requirement
2013 2015 2017 2019 2021 2023 2025 2027 2029 2031
Year Implemented


Revenue Requirement Aggressive Scenario
$140,000,000
$120,000,000
$100,000,000
$80,000,000
$60,000,000
$40,000,000
$20,000,000
$0
Revenue Requirement
2013 2015 2017 2019 2021 2023 2025 2027 2029 2031
Year Implemented

NKWD 001419

ES.5.5. Financial Summary

Reviewing the results of the analysis highlights several key issues as the District moves forward into an uncertain future. The Operational and Maintenance cost increase with the introduction of the Granular Activated Carbon process and the resulting replacement of spent carbon, is illustrated in the large revenue requirement increase in all the scenarios when the 2014 rate case results are implemented in 2015. As would be expected, the intensity of capital projects and the resulting debt service is the primary difference in the revenue requirements projected in each of the scenarios. At the beginning of the analysis period and subsequent to the 2010 rate case, the average monthly residential bill based on 6,000 gallons of consumption was $40.99. At the conclusion of the analysis period, the average monthly residential bills in year 2031 for each of the scenarios are as follows:

Minimal Scenario	$76.99
Moderate Scenario	$91.67
Aggressive Scenario	$105.21

The average yearly increase is 3.85% for Minimal, 6.18% for Moderate, and 7.83% for Aggressive. The actual yearly increases will vary based on the particular projects being implemented and other cost factors prevailing at the time. While it is certain the District will not implement the Aggressive scenario, it is prudent for the District as a viable service provider to implement projects listed in the Minimal scenario. The District will continually scrutinize O&M costs to dampen the impacts of implementing necessary capital projects.

The takeaways from this analysis are that many of the factors considered are unknown and highly volatile. The time frame alone in this time of drastic change and uncertainty makes it very difficult to project with any sense of reality and accuracy. Projecting what exactly will be needed and the cost to construct and implement are educated estimates at best. The current economic conditions we now face are in many ways new territory that we have little precedent to guide us into the future. The ability and desire of the rate payers to absorb higher bills to support the efforts necessary to address the increasing operation and maintenance expense, the aging infrastructure, and unfunded mandates is tenuous at this time with limited prospects to improve in the future.

In this environment, the District must keep in mind methods of operating to best represent the needs of all the stakeholders while keeping its focus on the primary mission of providing a safe water supply to meet the needs of the customer base. The District must move ahead with caution and use the rate payers' resources to the best of its abilities to provide the most basic of resources and to assure the vitality of our community.

1. Hydraulic Model Update and Analyses

1.1. Introduction

As part of the update to the 2004 Asset Management Program, a new all-pipes hydraulic water model was created in the InfoWater software using the District's GIS as the platform for the model facilities. The new model includes updated asset ID's and greatly enhances the ability to share information across departments. The new model contains average demand data from 2007 billing records that was geo-located by customer address which is a much more accurate way to distribute demands than methods used in previous models. Three scenarios were analyzed in the new model, which include an existing system analysis, a future 2020 and future 2030 system analysis. The following describes the model set up, analysis results, and overall system recommendations.

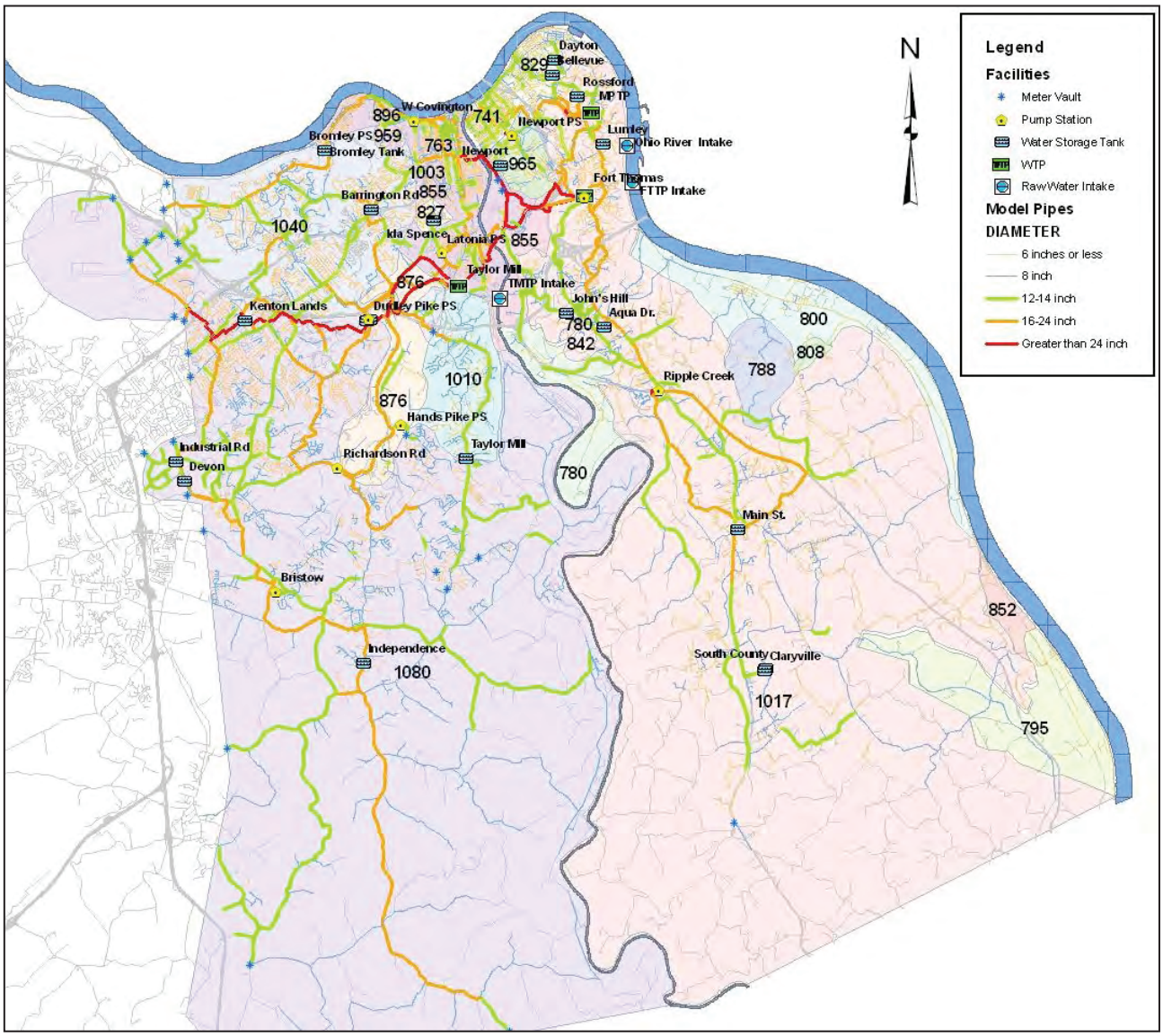
1.2. Existing System Facilities

1.2.1. Distribution System Overview

The Northern Kentucky Water District is comprised of 24 pressure zones located in Kenton and Campbell Counties as well as parts of Boone, Pendleton, and Grant Counties. The pressure zones are served by three water treatment plants namely Fort Thomas, Taylor Mill, and Memorial Parkway. FTTP and MPTP serve mainly the areas east of the Licking River, as well as the City of Covington. TMTP serves mainly the area west of the Licking River. FTTP also transfers by gravity approximately 8 MGD on average to the TMTP clearwell to be re-pumped into the TMTP service area.

The size of the pressure zones vary greatly from approximately six acres up to 88,000 acres. The hilly terrain in both southern Kenton and Campbell counties have resulted in pockets of undevelopable land mainly due to steep gradient conditions. Areas along the river closest to Cincinnati have the highest density of development. Currently NKWD serves three wholesale customers which include the City of Walton, Bullock Pen Water District, and Pendleton County. See Figure 1-1, System Overview Map for an overview of the system layout.

Figure 1-1: System Overview



1.2.1.1. Fort Thomas & Memorial Parkway WTP Service Areas

At one time, FTTP served only the areas to the south of the plant within Campbell County and provided gravity flow to areas within the City of Covington. Currently the plant is serving a much larger service area that includes all of the customers previously served by MPTP except for those served by the MPTP clearwell by gravity. Treated water leaving FTTP heads out in three different directions by gravity flow. One transmission main carries flow by gravity into the 763 pressure zone that serves the City of Covington and the Latonia Pump station that pumps water up to the 1003 pressure zone served by the Ida Spence tank. A second transmission main is dedicated to providing flow by gravity to the TMTP to be repumped at the plant into those pressure zones west of the Licking River. A third transmission main carries water to the nearby US 27 pump station. From here, the water is pumped to serve customers in Campbell County. To the south, the US 27 pump station serves the 1017 pressure zone and eight other pressure zones (800, 808, 788, 852, 795, 780, 842, 780) that are fed by regulators off the 1017 zone. To the north, the US 27 pump station serves the 1017 pressure zone and two additional pressure zones (855, in Wilder and 829, in Dayton and Bellevue) that are fed by regulators. The FTTP may also supply the area served by MPTP though interconnections that are regulated. The MPTP is currently operated during the week to supply water to the City of Newport and areas to the South.

1.2.1.2. Taylor Mill WTP Service Areas

Water from the Taylor Mill WTP gets pumped to the Dudley 1040 and Dudley 1080 tanks, which are each 5 million gallons. The plant also directly serves the 876 pressure zone. From the Dudley tanks the water gets pumped into two large pressure zones, 1080 and 1040 and a smaller 1010 zone. The Bromley pump station also serves the 1040 pressure zone from the north using water that originated from Fort Thomas.

1.2.1.3. Wholesale Supply

NKWD supplies water to the City of Walton, Bullock Pen Water District, and Pendleton County through supply connections at the extremities of the distribution system. In 2006, approximately 500,000 gallons per day was supplied to the City of Walton, 280,000 gallons per day was supplied to Bullock Pen Water District and 250,000 gallons per day to Pendleton County. Future demand to these supply customers is not expected to increase more than about 3% per year and there are no other future supply connections planned at this time.

1.2.2. System Pumping

A summary of pumping facilities and their rated firm capacities are given in Table 1-1. All capacities are based on the flow rate available with the largest pumping unit out of service. Capacity information was obtained from the May 2004 Asset Management Program Report by Black and Veatch and was updated to reflect any pump station changes since the date of the report.

Table 1-1.
Summary of Pump Station Capacities

Pump Station	Pressure Zone(s) Served	Rated Firm Capacity (mgd)
Bristow	1080	8.4
Bromley	1040	1.7
Carothers Road	965	2.3
Dudley 1040	1040, 1010	11.3
Dudley 1080	1080, 1010	24.8
Hands Pike	1080	0.7
Latonia	1003	1.0
Richardson Road	1080	6.0
Ripple Creek	1017, 852, 808, 795, 788	6.0
Taylor Mill (Booster)	876	32.3
Taylor Mill (Lift)	876	28.1
US 27	1017, 855, 842, 829, 800, 780, 763	20.0
Waterworks Road	1017, 829	12.1
West Covington	763	2.9

1.2.3. System Storage

Water distribution storage generally provides:

- Equalization of demands in excess of average demand throughout the day
- Fire protection
- Emergency reserves

NKWD has mostly elevated water storage in the distribution system. The only tanks located at pump stations are the Bromley, Dudley 1040 and Dudley 1080 tanks, which are ground storage tanks which provide supply-side equalization. In an analysis of storage volumes, the ground storage can generally only be counted toward equalization volume requirements if the appropriate peak pumping capability is available at a pump station with backup power. When maximum day demands approach the firm capacity of a pump station, peak pumping capabilities no longer exist. All of the remaining tanks are located downstream of pump stations and provide equalization to the distribution system.

Table 1-2 provides a summary of the current available storage in the NKWD's distribution system.

Table 1-2.
Current Available Storage

Tank	Elevated	Pressure Zone(s)	Volume (MG)
Aqua Drive	Yes	1017	2.00
Barrington	Yes	1040, 959	1.00
Bellevue	Yes	829	0.60
Bromley	No	763	3.00
Dayton	Yes	829	0.50
Devon	Yes	1080	2.00
Dudley 1040	No	1040	5.00
Dudley 1080	No	1080	5.00
FTTP Clearwells	No	763	6.50
Ida Spence	Yes	1003, 855, 827	0.50
Independence	Yes	1080	1.00
Industrial Park	Yes	1080	0.50
John's Hill Road	Yes	1017	0.50
Kenton Lands	Yes	1040	0.50
Lumley	Yes	1017	0.28
MPTP Clearwell	No	741	3.0
Main Street	Yes	1017	0.30
Rossford	Yes	1017	0.30
South County	Yes	1017	1.00
South Newport	Yes	965	1.00
TMTP Clearwell	No	876	1.00
Taylor Mill Standpipe	No	1010	0.33
Claryville	Yes	1017	0.75

1.2.4. SCADA and Controls

1.2.4.1. Data Acquisition

The NKWD SCADA system, located at the District offices, enables staff to monitor and control the daily operations of the water distribution system. The following parameters are among those monitored and recorded by the SCADA system:

- Tank, reservoir, and clearwell levels
- Discharge pressures at all booster stations and suctions pressure at some booster stations
- Discharge flow rates from the booster stations

1.2.4.2. Pump Controls

The main SCADA system controls all of the NKWD booster pumps. The water levels in the elevated tanks and ground storage reservoirs regulate the on/off status of the pumps. The pump controls are also occasionally overridden manually when booster station discharge pressures become too high or to take advantage of filling tanks during off-peak electrical charge or other operational considerations. The pump controls that NKWD uses can also vary throughout the year and depend on the anticipated demand within the system.

Each of the booster stations has at least one lead and one lag pump. The pump controls also include low suction pressure cut-offs to prevent cavitation or air binding of the pumps. Table 1-3 lists the tanks that normally serve as a control input for each pump station.

Table 1-3.
Summary of Pump Station Controls

Station	Zone(s)	Controlling Tank
Bristow	1080	Independence
Bromley	1040	Barrington (runs 24 hours per day)
Carothers Road	965	S. Newport
Dudley 1040	1040, 1010	Barrington
Dudley 1080	1080, 1010	Devon
Hands Pike	1080	Independence
Latonia	1003	Ida Spence
Richardson Road	1080	Independence
Ripple Creek	1017, 852, 808, 795, 788	South County
Taylor Mill	876	Dudley Tanks
US 27	1017, 855, 842, 829, 800, 780, 763	Aqua
Waterworks Road	1017, 829	Dayton
West Covington	763	Bromley

1.3. Water Demand

1.3.1. Introduction

As part of the hydraulic model update, Malcolm Pirnie developed demand projections for the District's service area through the year 2030. The demand planning was conducted at the parcel level so that the specific service location could be identified and accounted for in the planning, not just the overall water consumption. GIS tools were used to code individual parcels by development type and planning horizon for incorporation into the hydraulic model. The two planning horizons were 2020 and 2030. Interpolations were made between the planning horizons to present a complete picture of annual projected demand growth.

1.3.2. Data Sources

The Northern Kentucky Area Planning Commission (NKAPC) was contacted to obtain landuse and parcel shapefiles for Kenton and Campbell Counties. NKAPC was able to provide existing landuse, parcel, and zoning shapefiles for each county to define existing development. For future demand projections, the most up-to-date information available was the 2026 comprehensive plan for Kenton County and the 2020 comprehensive plan for Campbell County.

To fill in the missing gaps of the Campbell County comprehensive plan (no data was available for Newport, Bellevue, Dayton, Woodlawn, Ft. Thomas, Wilder, Highland Heights, Cold Spring, and Alexandria) the following data was used:

- Cold Spring comprehensive plan
- Alexandria and Ripple Creek landuse projections from previous studies
- Parcel ownership (to determine residential vs. commercial) and size for areas in Newport, Bellevue, and Dayton that were considered 100% or nearly 100% developed.

1.3.3. Landuse Assignment

1.3.3.1. Classifications

Six landuse classifications were used in the development of the future demand projections. These classifications included low density residential; medium density residential; high density residential; public; commercial, retail, and industrial; and agriculture/open space. Several additional classifications were used in the Kenton and Campbell County comprehensive plans, however to minimize the complexity of the demand projections, these additional categories were assigned to one of the six baseline landuse categories as shown in Table 1-4.

Table 1-4.
Landuse and Corresponding Comprehensive Plan Categories

Landuse Category	Comprehensive Plan Categories
Low Density Residential	Residential under 2.0 households per acre
Medium Density Residential	Residential 2.1 to 7.0 households per acre
High Density Residential	Residential 7.1 or greater households per acre
Commercial, Retail, Industrial	Commercial Retail/Service; Commercial Office; Commercial Rural; Industrial; Business Parks,,
Public	Schools, Churches, Community Facilities, Public/Institutions
Agriculture/Open Space	Recreation and Open Space, Woodland, Physically restricted development areas, Agriculture and Rural.

Residential areas unclassified by the Campbell County Comprehensive Plan were assigned the following classification based on parcel size.

< 0.25 acres = High Density Residential,
0.25 – 0.5 acres = Medium Density Residential
> 0.5 acres = Low Density Residential

Using these rules, the older residential neighborhoods in the areas of Newport, Bellevue and Dayton, with houses in very close proximity to one another on small parcels of land were therefore classified as high density residential. Larger residential parcels in the more suburban areas were typically classified as medium and low density.

1.3.3.2. 2020 and 2030 Development

Landuse assignments were made for two planning horizons, 2020 and 2030. The 2020 landuse assignments included all of the areas projected to develop in the near-term as well as a portion of the parcels projected to develop in the comprehensive plans. See Figure 1-2. For Campbell County, a meeting was held with county planners to determine the near-term development projects. For Kenton County, near-term development projects were assigned based on a shapefile provided by NKAPC of the parcels for which developers had requested building permits. For both Kenton and Campbell counties a portion of the parcels originally assigned to the 2020 development period from the comprehensive plans were shifted to the 2030 development period in order to bring the

projected demands more in line with population projection increases as discussed in Section 1.5. The projected development for 2030 is shown in Figure 1-3.

Figure 1-2: 2020 Development Areas

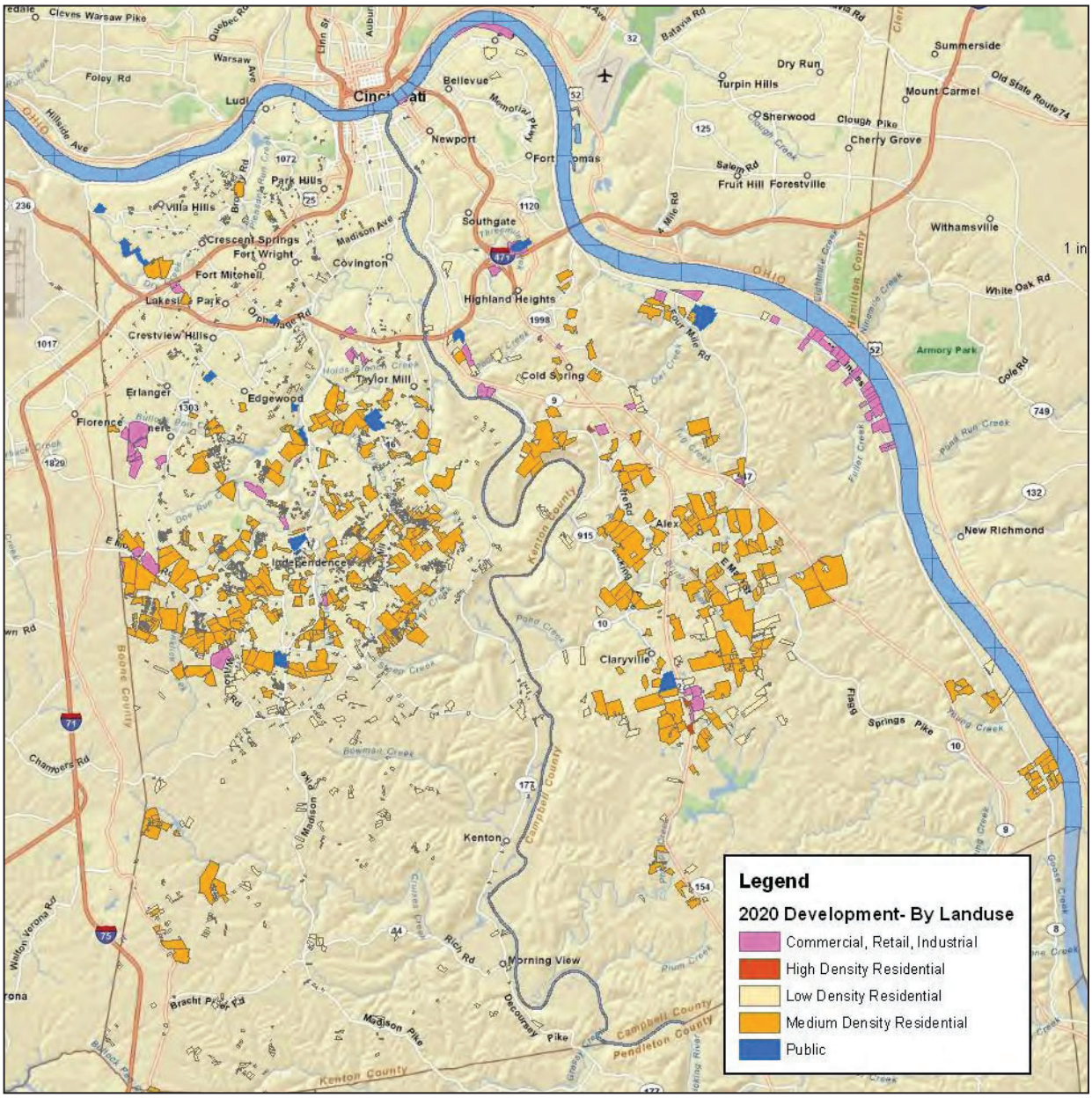
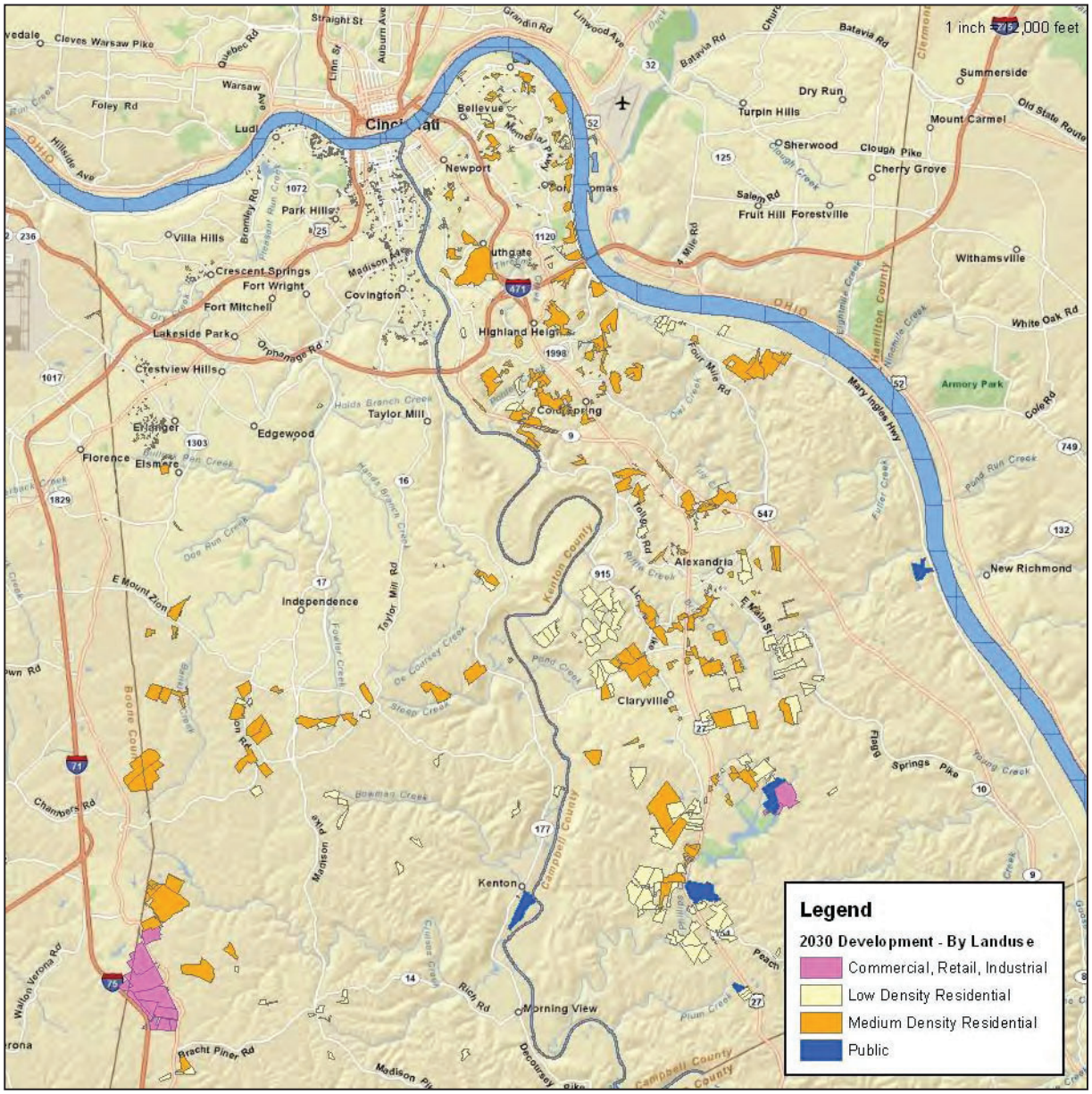


Figure 1-3: 2030 Development Areas



1.3.4. Consumption

Consumption for each landuse type was determined based on 2006 billing record data and an assumption of future demand trends. Typical landuse in the NKWD service area was also examined to determine the density of development that could be expected in the future. Discussions with NKWD led to the following assignments for future consumption.

Table 1-5.
Unit Values for Consumption

Landuse Type	Average Consumption (gal/day/acre)
Low Density Residential	160
Medium Density Residential	360
High Density Residential	500
Commercial/Retail/Industrial	2,000
Public	400

For each planning horizon, a summation was made of the total acreage assigned to each landuse type. Using the unit values as shown in Table 1-5, the total gallons per day of consumption for the entire system was determined. This number was then converted into the total number of new accounts for the entire planning horizon. The number of accounts per year was used to determine the annual growth in demand. The historical number of accounts per year has been no greater than 1,100 and future trends do not project an increase in that number. The accounts were spread across the different landuse categories according to the proportion of total flow for the planning horizon. See Tables 1-6 and 1-7 for a summary of these computed results.

Table 1-6.
New Account Projections: Present through 2020

	Total Acreage	gal/day/acre	Total GPD	% of Total	No of New Accounts
Low Density Residential	2,340	200	467,970	6.93%	2,340
Medium Density Residential	10,778	360	3,880,173	57.49%	3,593
High Density Residential	35	500	17,500	0.26%	9
Commercial, Retail, Industrial	1,107	2,000	2,213,706	32.80%	6,641
Public	426	400	170,298	2.52%	128
Totals	14,686		6,749,646		12,710

Table 1-7.
New Account Projections: 2021 through 2030

	Total Acreage	gal/day/acre	Total GPD	% of Total	No of New Accounts
Low Density Residential	3,122	200	624,473	32.55%	3,122
Medium Density Residential	5,116	360	1,841,757	53.34%	1,705
High Density Residential	0	500	0	0.00%	0
Commercial, Retail, Industrial	930	2,000	1,859,205	9.69%	5,578
Public	424	400	169,689	4.42%	127
Grand Total	9,592		4,495,123		10,533

A breakdown of the demand projections by year is shown in Table 1-8 on the following page. Although development is not expected to occur in a linear fashion, for planning purposes, the total number of new accounts was divided evenly by the total number of years in the planning horizon. Although the number of new accounts per year between 2020 and 2030 is greater, the total additional demand per year is less as a result of the type of accounts being added (residential, commercial, etc.).

Table 1-8.
NKWD Future Demand Projections

	Wholesale Customers							*New Accounts*		*Total Consumption Demands*			*Total System Demand*		
Year	Bullock Pen[1] (MGD)	Additional Demand per Year (MGD)	City of Walton[2] (MGD)	Additional Demand per Year (MGD)	Pendelton County[1] (MGD)	Additional Demand per Year (MGD)	Total Additional Wholesale (MGD)	No. of New Accounts Per Year	New Accounts ADD Demand[3] (MGD)	Average Day Demand (MGD)	Percent Increase	Maximum Day Demand[4] (MGD)	Plant Demand[5]	*Total Average Day Demand (MGD)*	*Total Maximum Day Demand (MGD)*
2006	0.280		0.500		0.250			986		27.25		41.82	1.33	28.58	43.15
2007	0.288	0.008	0.510	0.010	0.258	0.008	0.026	1025	0.544	27.82	2.09%	44.51	1.33	29.15	45.84
2008	0.297	0.009	0.520	0.008	0.265	0.008	0.024	1025	0.544	28.39	2.04%	45.42	1.33	29.72	46.75
2009	0.306	0.009	0.530	0.008	0.273	0.008	0.025	1025	0.544	28.96	2.00%	46.33	1.33	30.29	47.66
2010	0.315	0.009	0.540	0.008	0.281	0.008	0.025	1025	0.544	29.53	1.97%	47.24	1.33	30.86	48.57
2011	0.325	0.009	0.550	0.008	0.290	0.008	0.026	1025	0.544	30.10	1.93%	48.16	1.33	31.43	49.49
2012	0.334	0.010	0.560	0.008	0.299	0.009	0.026	1025	0.544	30.67	1.90%	49.07	1.33	32.00	50.40
2013	0.344	0.010	0.570	0.008	0.307	0.009	0.027	1025	0.544	31.24	1.86%	49.98	1.33	32.57	51.31
2014	0.355	0.010	0.580	0.008	0.317	0.009	0.028	1025	0.544	31.81	1.83%	50.90	1.33	33.14	52.23
2015	0.365	0.011	0.590	0.008	0.326	0.010	0.028	1025	0.544	32.38	1.80%	51.81	1.33	33.71	53.14
2016	0.376	0.011	0.600	0.008	0.336	0.010	0.029	1025	0.544	32.96	1.77%	52.73	1.33	34.29	54.06
2017	0.388	0.011	0.610	0.008	0.346	0.010	0.029	1025	0.544	33.53	1.74%	53.65	1.33	34.86	54.98
2018	0.399	0.012	0.620	0.008	0.356	0.010	0.030	1025	0.544	34.10	1.71%	54.57	1.33	35.43	55.90
2019	0.411	0.012	0.630	0.008	0.367	0.011	0.031	1025	0.544	34.68	1.69%	55.49	1.33	36.01	56.82
2020	0.424	0.012	0.640	0.008	0.378	0.011	0.031	1025	0.544	35.26	1.66%	56.41	1.33	36.59	57.74
2021	0.436	0.013	0.650	0.008	0.389	0.011	0.032	1053	0.450	35.74	1.37%	57.18	1.33	37.07	58.51
2022	0.449	0.013	0.660	0.008	0.401	0.012	0.033	1053	0.450	36.22	1.35%	57.95	1.33	37.55	59.28
2023	0.463	0.013	0.670	0.008	0.413	0.012	0.034	1053	0.450	36.70	1.33%	58.72	1.33	38.03	60.05
2024	0.477	0.014	0.680	0.008	0.426	0.012	0.034	1053	0.450	37.19	1.32%	59.50	1.33	38.52	60.83
2025	0.491	0.014	0.690	0.008	0.438	0.013	0.035	1053	0.450	37.67	1.30%	60.27	1.33	39.00	61.60
2026	0.506	0.015	0.700	0.008	0.452	0.013	0.036	1053	0.450	38.16	1.29%	61.05	1.33	39.49	62.38
2027	0.521	0.015	0.710	0.008	0.465	0.014	0.037	1053	0.450	38.64	1.27%	61.83	1.33	39.97	63.16
2028	0.537	0.016	0.720	0.008	0.479	0.014	0.038	1053	0.450	39.13	1.26%	62.61	1.33	40.46	63.94
2029	0.553	0.016	0.730	0.008	0.493	0.014	0.038	1053	0.450	39.62	1.25%	63.39	1.33	40.95	64.72
2030	0.569	0.017	0.740	0.008	0.508	0.015	0.039	1053	0.450	40.11	1.23%	64.17	1.33	41.44	65.50
Total		0.289		0.194		0.258	0.741	24,880	12.116						
Average								1,037			1.62%				

Notes:

[1]Based on a 3% increase per year
[2]Based on an increase of 50 homes/year with demand of 200 gal/day/home
[3]Based on an average of 256 gpd/account for 2007-2020 and 280 gpd/account for 2021-2030.
[4]Based on a Peak Multiplier of 1.60
[5]Based on estimated values including demand from GAC

1.3.5. Population Projections

Population projections for Kenton and Campbell County indicate an average population increase of 2.37% between 2005 and 2030 (see Table 1-9). Recent trends in water consumption indicate an overall decrease in water usage per person as environmental awareness becomes more prevalent and more efficient appliances and plumbing related devices (i.e. low flow toilets, showerheads, etc.) replace some of the older generation models.

Table 1-9.
Historical and Projected Population by County

Year	Kenton	Campbell	Total	% Change
1990	142,031	83,866	225,897	
1995	147,206	87,742	234,948	3.85%
2000	151,464	88,616	240,080	2.14%
2005	152,240	87,518	239,758	-0.13%
2010	154,572	91,130	245,702	2.42%
2015	158,966	95,828	254,794	3.57%
2020	163,014	100,167	263,181	3.19%
2025	166,579	104,251	270,830	2.82%
2030	169,402	108,024	277,426	2.38%
			Average (2005-2030)	**2.37%**

Source: Kentucky State Data Center, Projections from November 2004

As indicated in Table 1-8 the average annual percent increase in the projected average day demand between now and 2030 is 1.62%. Discussions with NKWD indicate a level of confidence with these projections and their relation to the population projections.

1.4. Supply and Storage Requirements

1.4.1. Introduction

A supply and storage gap analysis was performed to determine, based on a planning level approach, if there are any system deficiencies based on current and future demands. The supply gap analysis examined the current firm pumping capacities at each of the pump stations and compared that to the current and future demands by pressure zone. The supply gap analysis assumed that maximum day demands will need to be met through pumping only and did not take into account any excess storage available.

The storage gap analysis examined the available storage by pressure zone and compared that with a theoretical required volume needed to meet pressure equalization, fire flow, and emergency storage. The storage gap analysis did not take into account any back-up power available at pump stations to provide emergency water.

1.4.2. Supply Gap Analysis

The supply gap analysis results are shown in Tables 1-10, 1-11, and 1-12. Each table summarizes by pressure zone the average and maximum day demands for each planning horizon, the firm capacity for each pumping station, and the total required volume. The final column of each table notes whether or not a pumping gap exists and if so, the amount of the gap in millions of gallons per day. Ripple Creek Pump Station was the only pump station that showed a deficiency for the 2020 and 2030 demand analysis.

Table 1-10.
Existing Pumping Capacity Analysis

Pressure Zone	Description	Served By	2006 Average Day Demand (mgd)	2006 Maximum Day Demand[1] (mgd)	Pump Station	Firm Capacity (mgd)	Total Required Volume (mgd)	Pumping Gap[2] (mgd)
741	Newport Low	MPTP	1.11	1.78	Gravity	-	1.78	-
829	Dayton, Bellevue	FTTP or MPTP	1.01	1.61	Memorial Pkwy Regulator	12.10	1.61	-
876	Taylor Mill to Dudley	TMTP	0.36	0.57	TMTP Boosters	32.30	0.57	-
965	Newport High	MPTP	0.55	0.88	Carothers Rd.	5.40	0.88	-
1003, 820	Ida Spence	FTTP	0.16	0.26	Latonia	1.00	0.26	-
1017, 780, 788 ,842 ,920 ,800	Between FTTP and Ripple Creek	FTTP	1.87	2.99	US27	20.00	2.99	-
1017N	North of FTTP	FTTP or MPTP	1.65	2.64	Waterworks	12.10	2.64	-
1017RC, 808, 795, 852	Downstream of Ripple Creek	FTTP	2.37	3.79	Ripple Creek	6.00	3.79	-
1040, 896, 959, 1010	TM North	TMTP	4.24	6.78	Dudley 1040, Bromley	11.30	6.78	-
1080, 730	TM South	TMTP	9.39	15.03	Dudley 1080, Hands Pike, Richardson	31.50	15.03	-
763, 855	Covington	FTTP	4.36	6.97	Gravity	-	6.97	-
Totals			27.06			131.70	43.29	0.00

Table 1-11.
2020 Pumping Capacity Analysis

Pressure Zone	Description	Served By	2020 Average Day Demand (mgd)	2020 Maximum Day Demand[1] (mgd)	Pump Station	Firm Capacity (mgd)	Total Required Volume (MG)	Pumping Gap[2] (MG)
741	Newport Low	MPTP	1.13	1.81	Gravity	-	1.81	-
829	Dayton, Bellevue	FTTP or MPTP	1.17	1.87	Memorial Pkwy Regulator	12.10	1.87	-
876	Taylor Mill to Dudley	TMTP	0.51	0.81	TMTP Boosters	32.30	0.81	-
965	Newport High	MPTP	0.55	0.88	Carothers Rd.	5.40	0.88	-
1003, 820	Ida Spence	FTTP	0.17	0.27	Latonia	1.00	0.27	-
1017, 780, 788 ,842 ,920 ,800	Between FTTP and Ripple Creek	FTTP	3.35	5.35	US27	20.00	5.35	-
1017N	North of FTTP	FTTP or MPTP	1.66	2.65	Waterworks	12.10	2.65	-
1017RC, 808, 795, 852	Downstream of Ripple Creek	FTTP	4.83	7.73	Ripple Creek	6.00	7.73	1.73
1040, 896, 959, 1010	TM North	TMTP	4.79	7.66	Dudley 1040, Bromley	11.30	7.66	-
1080, 730	TM South	TMTP	12.82	20.52	Dudley 1080, Hands Pike, Richardson	31.50	20.52	-
763, 855	Covington	FTTP	4.37	6.99	Gravity	-	6.99	-
Totals			35.33			131.70	56.54	1.73

Table 1-12.
2030 Pumping Capacity Analysis

Pressure Zone	Description	Served By	2030 Average Day Demand (mgd)	2030 Maximum Day Demand[1] (mgd)	Pump Station	Firm Capacity (mgd)	Total Required Volume (MG)	Pumping Gap[2] (MG)
741	Newport Low	MPTP	1.14	1.83	Gravity	-	1.83	-
829	Dayton, Bellevue	FTTP or MPTP	1.17	1.88	Memorial Pkwy Regulator	12.10	1.88	-
876	Taylor Mill to Dudley	TMTP	0.51	0.82	TMTP Boosters	32.30	0.82	-
965	Newport High	MPTP	0.57	0.91	Carothers Rd.	5.40	0.91	-
1003, 820	Ida Spence	FTTP	0.17	0.27	Latonia	1.00	0.27	-
1017, 780, 788 ,842 ,920 ,800	Between FTTP and Ripple Creek	FTTP	3.74	5.99	US27	20.00	5.99	-
1017N	North of FTTP	FTTP or MPTP	1.79	2.86	Waterworks	12.10	2.86	-
1017RC, 808, 795, 852	Downstream of Ripple Creek	FTTP	6.45	10.32	Ripple Creek	6.00	10.32	4.32
1040, 896, 959, 1010	TM North	TMTP	4.85	7.76	Dudley 1040, Bromley	11.30	7.76	-
1080, 730	TM South	TMTP	15.10	24.16	Dudley 1080, Hands Pike, Richardson	31.50	24.16	-
763, 855	Covington	FTTP	4.51	7.22	Gravity	-	7.22	-
Totals			40.01			131.70	64.02	4.32

Notes:
1. Based on maximum day multiplier of 1.6
2. A positive pumping gap indicates a deficiency

1.4.3. Storage Gap Analysis

The storage gap analysis results are shown in Tables 1-13, 1-14, and 1-15. Each table summarizes by pressure zone the average and maximum day demands for each planning horizon, the amount of required storage needed for pressure equalization, the amount of required storage for emergency and fire flows, the total required volume, and the total amount of available storage. The final column of each table notes whether or not a storage gap exists and if so, the amount of the gap in millions of gallons. It should be noted that the two Dudley Pike 5.0 MG tanks do not provide accessible storage for meeting equalization, fire flow, or emergencies since they are supply side tanks that are used by the Dudley Pump Station. As noted earlier these results do not take into account any back-up power available for pumping water during emergencies. At the time of this writing, back-up power exists only at the Dudley 1040, Dudley 1080, and US27 pump stations. The District intends to purchase two portable generators to serve five stations: West Covington, Latonia, Ripple Creek, Bromley, and Bristow Road. The installation of additional backup power could serve to offset future storage requirements if sufficient peak pumping capacity is available.

Table 1-13.
Existing Storage Analysis

Pressure Zone(s)	Description	2006 Average Day Demand (mgd)	2006 Maximum Day Demand[1] (mgd)	Equalization 20% Max Day[2] (MG)	Emergency & Fire Volume 50% total[3] (MG)	Total Required Volume (MG)	Current Available Storage (MG)[4]	Available Storage (MG)	Storage Gap[5] (MG)
741	Newport Low	1.11	1.78	0.36	1.50	1.86	MPTP Clearwell (3.0MG)	3.00	-
829	Dayton, Bellevue	1.01	1.61	0.32	0.55	0.87	Bellevue (0.6 MG), Dayton (0.5 MG)	1.10	-
876	Taylor Mill to Dudley	0.36	0.57	0.11	0.50	0.61	TMTP Clearwell (1.0 MG)	1.00	-
965	Newport High	0.55	0.88	0.18	0.50	0.68	S Newport (1.0 MG)	1.00	-
1003, 820	Ida Spence	0.16	0.26	0.05	0.25	0.30	Ida Spence (0.5 MG)	0.50	-
1017, 780, 788 ,842 ,920 ,800	Between FTTP and Ripple Creek	1.87	2.99	0.60	1.25	1.85	Aqua Dr (2.0 MG), Johns Hill (0.5 MG)	2.50	-
1017N	North of FTTP	1.65	2.64	0.53	0.29	0.82	Rossford (0.3 MG), Lumley (0.28 MG)	0.58	0.24
1017RC, 808, 795, 852	Downstream of Ripple Creek	2.37	3.79	0.76	1.03	1.78	Main St. (.30 MG), South County (1.0 MG), Claryville (0.75 MG)	2.05	-
1040, 896, 959, 1010	TM North	4.24	6.78	1.36	2.25	3.61	Bromley (3.0 MG), Barrington (1.0 MG), Kenton Lands (0.5)	4.50	-
1080, 1010, 730	TM South	9.39	15.03	3.01	1.94	4.95	Industrial (0.5 MG), Independence (1.0 MG), Devon (2.0 MG), TM Standpipe (0.33)	3.88	1.07
763, 859	Covington	4.36	6.97	1.39	3.25	4.64	FTTP Clearwell	6.50	-
Totals		27.06			13.31	21.96		26.61	

Table 1-14.
2020 Storage Analysis

Pressure Zone(s)	Description	2020 Average Day Demand (mgd)	2020 Maximum Day Demand[1] (mgd)	Equalization 20% Max Day[2] (MG)	Emergency & Fire Volume 50% total[3] (MG)	Total Required Volume (MG)	Current Available Storage (MG)[4]	Available Storage (MG)	Storage Gap[5] (MG)
741	Newport Low	1.13	1.81	0.36	1.50	1.86	MPTP Clearwell (3.0MG)	3.00	-
829	Dayton, Bellevue	1.17	1.87	0.37	0.55	0.92	Bellevue (0.6 MG), Dayton (0.5 MG)	1.10	-
876	Taylor Mill to Dudley	0.51	0.81	0.16	0.50	0.66	TMTP Clearwell (1.0 MG)	1.00	-
965	Newport High	0.55	0.88	0.18	0.50	0.68	S Newport (1.0 MG)	1.00	-
1003, 820	Ida Spence	0.17	0.27	0.05	0.25	0.30	Ida Spence (0.5 MG)	0.50	-
1017, 780, 788 ,842 ,920 ,800	Between FTTP and Ripple Creek	3.35	5.35	1.07	1.25	2.32	Aqua Dr (2.0 MG), Johns Hill (0.5 MG)	2.50	-
1017N	North of FTTP	1.66	2.65	0.53	0.29	0.82	Rossford (0.3 MG), Lumley (0.28 MG)	0.58	0.24
1017RC, 808, 795, 852	Downstream of Ripple Creek	4.83	7.73	1.55	1.03	2.57	Main St. (.30 MG), South County (1.0 MG), Claryville (0.75 MG)	2.05	0.52
1040, 896, 959, 1010	TM North	4.79	7.66	1.53	2.25	3.78	Bromley (3.0 MG), Barrington (1.0 MG), Kenton Lands (0.5)	4.50	-
1080, 730	TM South	12.82	20.52	4.10	1.94	6.04	Industrial (0.5 MG), Independence (1.0 MG), Devon (2.0 MG), TM Standpipe (0.33)	3.88	2.16
763, 859	Covington	4.37	6.99	1.40	3.25	4.65	FTTP Clearwell	6.50	-
Totals		35.33				24.61		26.61	

Table 1-15.
2030 Storage Capacity Analysis

Pressure Zone(s)	Description	2020 Average Day Demand (mgd)	2020 Maximum Day Demand[1] (mgd)	Equalization 20% Max Day[2] (MG)	Emergency & Fire Volume 50% total[3] (MG)	Total Required Volume (MG)	Current Available Storage (MG)[4]	Available Storage (MG)	Storage Gap[5] (MG)
741	Newport Low	1.14	1.83	0.37	1.50	1.87	MPTP Clearwell (3.0MG)	3.00	-
829	Dayton, Bellevue	1.17	1.88	0.38	0.55	0.93	Bellevue (0.6 MG), Dayton (0.5 MG)	1.10	-
876	Taylor Mill to Dudley	0.51	0.82	0.16	0.50	0.66	TMTP Clearwell (1.0 MG)	1.00	-
965	Newport High	0.57	0.91	0.18	0.50	0.68	S Newport (1.0 MG)	1.00	-
1003, 820	Ida Spence	0.17	0.27	0.05	0.25	0.30	Ida Spence (0.5 MG)	0.50	-
1017, 780, 788 ,842 ,920 ,800	Between FTTP and Ripple Creek	3.74	5.99	1.20	1.25	2.45	Aqua Dr (2.0 MG), Johns Hill (0.5 MG)	2.50	-
1017N	North of FTTP	1.79	2.86	0.57	0.29	0.86	Rossford (0.3 MG), Lumley (0.28 MG)	0.58	0.28
1017RC, 808, 795, 852	Downstream of Ripple Creek	6.45	10.32	2.06	1.03	3.09	Main St. (.30 MG), South County (1.0 MG), Claryville (0.75 MG)	2.05	1.04
1040, 896, 959, 1010	TM North	4.85	7.76	1.55	2.25	3.80	Bromley (3.0 MG), Barrington (1.0 MG), Kenton Lands (0.5)	4.50	-
1080, 730	TM South	15.10	24.16	4.83	1.94	6.77	Industrial (0.5 MG), Independence (1.0 MG), Devon (2.0 MG), TM Standpipe (0.33)	3.88	2.89
763, 859	Covington	4.51	7.22	1.44	3.25	4.69	FTTP Clearwell	6.50	-
Totals		40.01				26.11		26.61	

Notes:
1. Based on maximum day multiplier of 1.6
2. Based on recommended industry standards
3. Under max hour conditions, it is recommended to utilize no more than one half of the volume of the system storage
4. The Dudley 1040 and Dudley 1080 tanks are not included in this analysis because they do not provide floating storage to the system
5. A positive storage gap indicates a deficiency.

1.5. Model Development and Calibration

1.5.1. Background

Over the last 30 years, the hydraulic model of the NKWD service district has existed in various forms within multiple software platforms. The model began as two separate models, one for Campbell County which was developed in the late 1980's and one for Kenton County which was developed in the early 1990's. These original models were created using the CyberNet software. In 1998, the models were merged and converted to BVNET (a proprietary software of Black and Veatch). The model was next converted to KYPIPE for use by the NKWD staff.

In 2001, a new all-pipes hydraulic model was created in EPANET software using the District's pipe infrastructure database in GIS. Unlike previous models, the demands were allocated and assigned to junctions in the model. Updates to the model facilities were performed on a regular basis by District staff from this time frame forward. In 2002, the model was converted to H2Onet by District staff and in 2003 the demands were updated system-wide to reflect the 2003 usage.

In early 2007, District staff began creating a new hydraulic model of the water distribution system using the Infowater software platform. Infowater is a GIS based modeling program that allows information to be shared among District departments on a single platform. The NKWD asset numbering system was also changed at this time and the new model incorporated these changes. The model includes all system pipes, with a total of 13,540 pipes comprising 1,206 miles of water main. Malcolm Pirnie began working with the model in the fall of 2007 to update the existing demand in the new model and to allocate future demands for 2020 and 2030.

1.5.2. Model Demand

NKWD staff incorporated the 2006 average daily demands into the model using detailed customer billing data. This was performed by geocoding customer addresses and assigning their average daily demand to the nearest model node using the Thiessen polygon method. The 2006 average demand for the system is approximately 27 MGD.

Gravity flow from the FTTP to the TMTP was modeled using a point demand at the TMTP. The demand node selected was closest to the TMTP clearwell. Demand values were obtained from records of plant production and gravity flows for the calibration dates of April 17, 2007 (average day demand) and September 3, 2007 (maximum day demand). The gravity demands used in the model were 8.64 MGD for an average demand day and 17.3 MGD for a maximum demand day.

Demand for 68 large users was manually added to the model under a separate demand category. Other demands that were accounted for in the model include hydrants where

regular flushing occurs and unaccounted-for water usage. The unaccounted-for water usage was computed by pressure zone based on a mass balance analysis that compared water production to the water usage billed in 2006. Unaccounted-for water was distributed equally among nodes within each pressure zone. Future demands were also added to the model under separate demand sets for the planning horizons of 2020 and 2030. The following denotes the demand allocation categories assigned in the model.

Demand 1 – 2006 average daily demands (base demand)
Demand 2 – Large user demand
Demand 3 – Hydrant Flushing demand
Demand 4 – Unaccounted-for water
Demand 5 – Additional demand for 2020 (beyond baseline 2006)
Demand 6 – Additional demand for 2030 (beyond 2020)

Distinct residential demand patterns were added to the model for each of the large pressure zones. A total of 10 different residential patterns were used in the model. Large commercial demand patterns were developed for 11 of the largest users based on flow meter data collected by the District. Large user patterns were computed for the City of Walton, Pendleton County, Bullock Pen, Trauth Dairy, St. Elizabeth Medical Center, St. Elizabeth Village, La Farge North America, Club Chef, SSE Manufacturing, Hillshire Farms/Kahn's, and the Airport. Graphs of all the demand patterns can all found in Appendix A. Demand patterns were initially calculated from a mass balance for each zone and then further adjusted during model calibration to better match actual system conditions.

Allocation of future demand was based on projected parcel development as discussed in Section 1.7. Future demands were assigned to the nearest model node when located near the current distribution system. A few additional pipes and nodes were added to the model to accommodate future demand allocation in areas where the piping network currently does not extend. All future model pipes were assumed to be 8 inches in diameter and node elevations were assigned based on ground elevations.

1.5.3. Model Calibration

Model calibration was performed iteratively to match the conditions of September 3, 2007, a peak demand day where approximately 65 MGD was produced at the treatment plants. SCADA data for tanks and pumps were used to match pump on/off times and tank levels. The peak multiplier was determined to be 2.40 for this date, although a global multiplier of 2.0 provided a better fit in the model calibration. This decrease in the multiplier was made to balance specific pressure zone demand patterns and account for system leakage that was discovered after the calibration date. Pump curves were adjusted

to provide the best fit to the SCADA data as well as some minor PRV setting adjustments to model valves.

Upon completion, the calibration curves showed very good agreement between the SCADA data and model results given the high demand for this date. Calibration results were well within industry guidelines for the margins of error. A summary of the calibration results can be found in Appendix B.

There were some calibration challenges that included a discrepancy between the predicted Industrial Road tank levels and the SCADA data. The SCADA tank levels appeared to be much lower than the model tank levels during the off-peak hours of midnight to 6 a.m. A second calibration using average day demand data for the date of April 17, 2007 verified that the model was accurately predicting what the tank levels should be for that date. The peak day data seems to be an anomaly and may be the result of atypical water usage by one of the industrial customers near the tank on that particular day. Other calibration challenges included model predictions of tanks levels increasing and decreasing at a faster rate compared to SCADA results even when flows from pump stations appeared very accurate. It is believed that this error may have been due to minor losses associated with tank piping and valves that were not accounted for in the model. This situation often occurs in modeling because it is difficult to predict instantaneous peak demands for users, especially those located near the elevated tanks, using one-hour intervals for demand pattern calculations.

Another modeling calibration challenge was determining the flow through different pressure regulating valves. For several pressure zones, the regulators are the only source of water (i.e. there are no pumped flows recorded by SCADA). In addition, the valve settings are adjusted in the field and not automatically recorded in SCADA. For future model calibration exercises, it is recommended to install temporary flow meters or other recording equipment to better capture the entry of water into those zones.

Additional pressure data was collected by NKWD at various locations in the system in the spring of 2008 as a final check of the model calibration accuracy. These comparisons also showed a high degree of correlation.

1.6. Existing System Performance Analysis

The performance of the existing system during average and maximum day conditions was analyzed using the calibrated model. The performance criteria used for the analysis were based on industry standards for acceptable pressures, velocities, and headloss (Recommended Standards for Water Works, Great Lakes – Upper Mississippi River

Board of State and Provincial Public Health and Environmental Managers, 2003; Distribution System Requirements for Fire Protection, AWWA Manual M31, 1998; Distribution Network Analysis for Water Utilities, AWWA Manual M32, 1989; Advanced Water Distribution Modeling and Management, Haested Methods et al, 2003). The criteria are summarized in Table 1-16.

Table 1-16.
Summary of System Performance Criteria for Maximum Day Demand

Item	Performance Criteria
Velocity	5 feet per second maximum
Pressure	35 psi minimum
Headloss	3 feet per 1,000 feet of pipe for transmission (12" and larger) 10 feet per 1,000 feet of pipe for distribution (less than 12")

In general, it is recommended that pipe pressures not exceed 100 psi due the increased risk of pipe failure. However, pressures often exceed 100 psi in the NKWD distribution system especially in the low lying areas. The variability of the terrain, including steep slopes and rolling hills, prevent NKWD from maintaining pressures below the 100 psi guideline.

1.6.1. Average Day Demand Analysis

The Average Day Demand Analysis was performed using the calibrated model with base demands set to the average consumption in 2006 and a global multiplier set to 1.0. Tank levels were used to control the pump on/off status and gravity flows from FTTP to TMTP were set at 8.64 mgd. An extended period simulation of 14-days was run for this analysis.

The results of the analysis show that the District has very few areas of concern in regard to excessive pipe velocities on an average day (see Figure 1-4). The 16-inch distribution main running south along Madison Pike near the Dudley Pump Stations showed a velocity just over 5 fps. This transmission pipe is the main feed for the Hands Pike and Richardson Road pump stations. As demands increase over the next 10-15 years in the 1080 pressure zone along the Taylor Mill Road corridor, additional capacity will be needed from the Richardson Road Pump Station. Since this pipe line is already slightly exceeding the recommended maximum velocity, it should be considered of high priority to provide additional capacity along this route.

A few other small areas of concern were identified in the average day analysis. A 2,000 foot segment of 8 inch pipe along Senour Rd was found to be exceeding 5 fps during

peak demand hours of the day. The upstream pipe segment is a 16-inch transmission mainsand downstream pipes are a 6-inch and 8-inch diameter. Additional capacity is needed to bridge this gap and allow water to move more freely along Senour Rd.

Similarly in the John's Hill Drive area, there is 1,200 feet of 16-inch pipe that runs along U.S.27 between Marshall Road and John's Hill Rd that needs to be increased in capacity. The transmission main is 20 inches both up and downstream along U.S.27.

An analysis of the minimum system pressures during an average day demand found just one large area of concern (see Figure 1-5). The 1010 Pressure Zone appears to have multiple locations that fall below 35 psi on a regular basis. This area is highly residential and would be considered especially vulnerable during a fire emergency. The Taylor Mill standpipe does serve this area and back-up power is available at the Dudley 1040 pump station to provide emergency flow. NKWD staff has confirmed that low pressures are often a problem in this area.

Other isolated areas where junction pressures fell below 35 psi are located mainly close to tanks (Dayton and Bellevue Tanks) at the higher elevations within a pressure zone and near PRV valves which could be adjusted to provide additional pressure.

1.6.2. Maximum Day Demand Analysis

The Maximum Day Demand Analysis for the existing system was performed using the calibrated model with base demands set to the average consumption in 2006 and a global multiplier set to 1.6. Tank levels were used to control the pump on/off status and gravity flows from FTTP to TMTP were set at 17.3 mgd. An extended period simulation of 3-days was run for this analysis.

Figure 1-4: Existing System – Average Demand Day Maximum Pipe Velocity Results

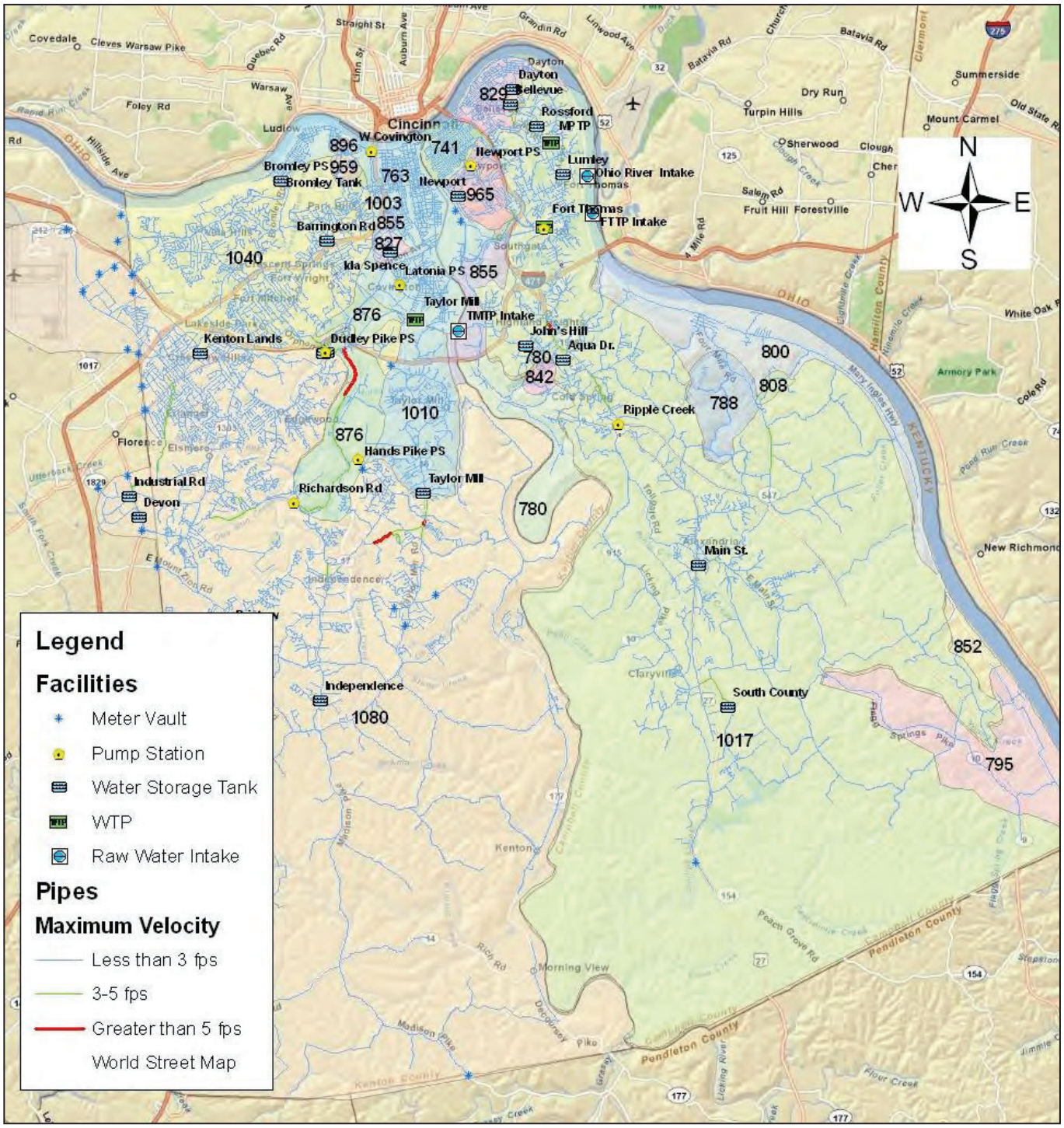
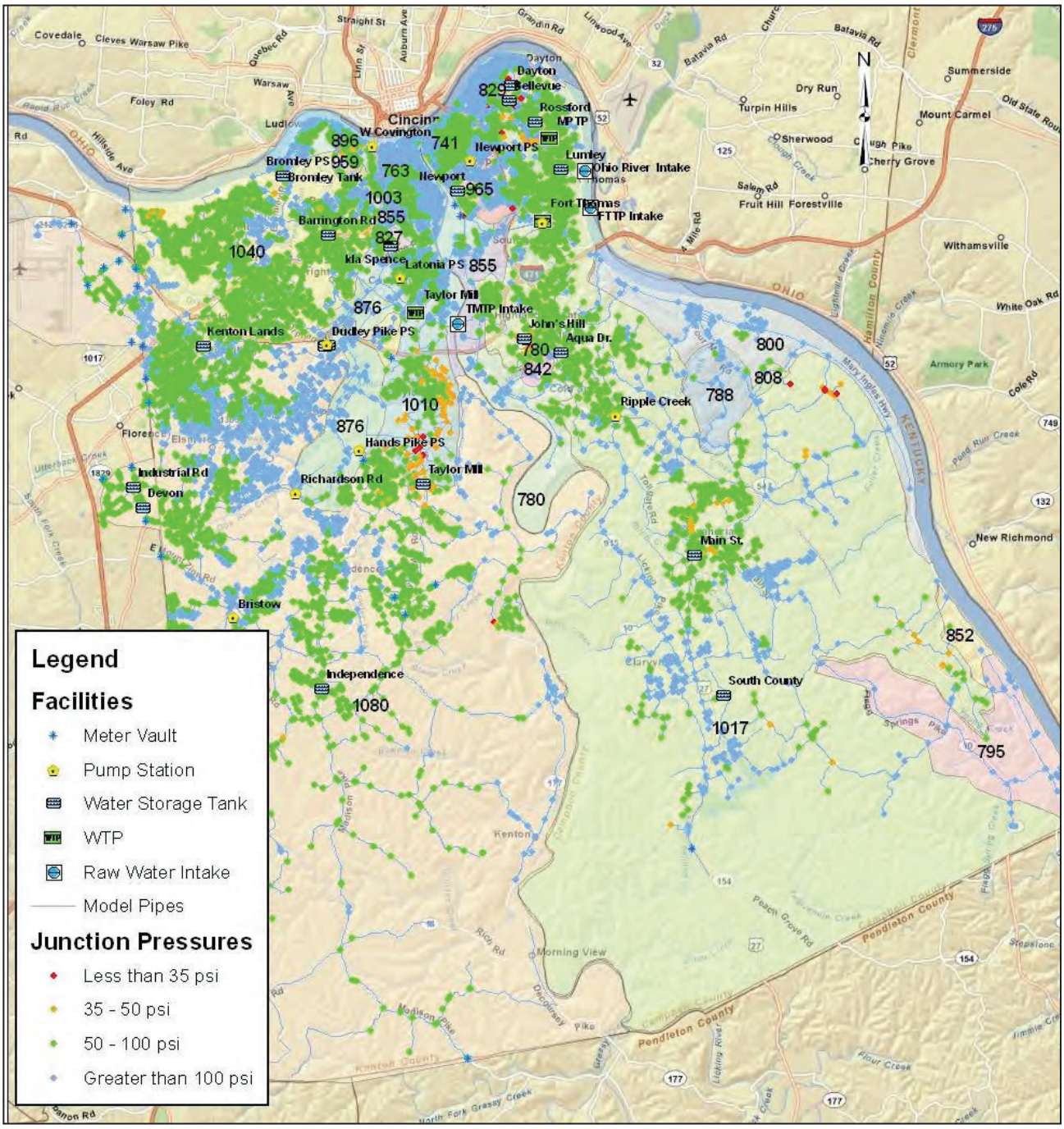


Figure 1-5: Existing System – Average Demand Day Minimum Pressure Results



Additional pipes with velocities that exceeded 5 fps during Maximum Day Demands were just an extension of those that appeared during the average day demand analysis (see Figure 1-6). The pipe along Madison Road shows the exceedance extending farther south along the 16 inch transmission main. Also piping along Orphanage Road, downstream of the discharge piping from Dudley 1040 PS, demonstrates excessive velocity during maximum day demands.

An analysis of the minimum system pressures during maximum day demand shows additional areas with pressures less than 35 psi (see Figure 1-7). As noted above, many of these areas are located at higher elevations within a pressure zone or near PRV valves. The one additional area of concern is the southwest corner of Kenton County near the City of Walton and Bullock Pen meters vaults. An increase in the wholesale supply to these customers may require additional booster pumpage to increase the water pressure at these supply points.

Figure 1-6: Existing System – Maximum Demand Day Maximum Pipe Velocity Results

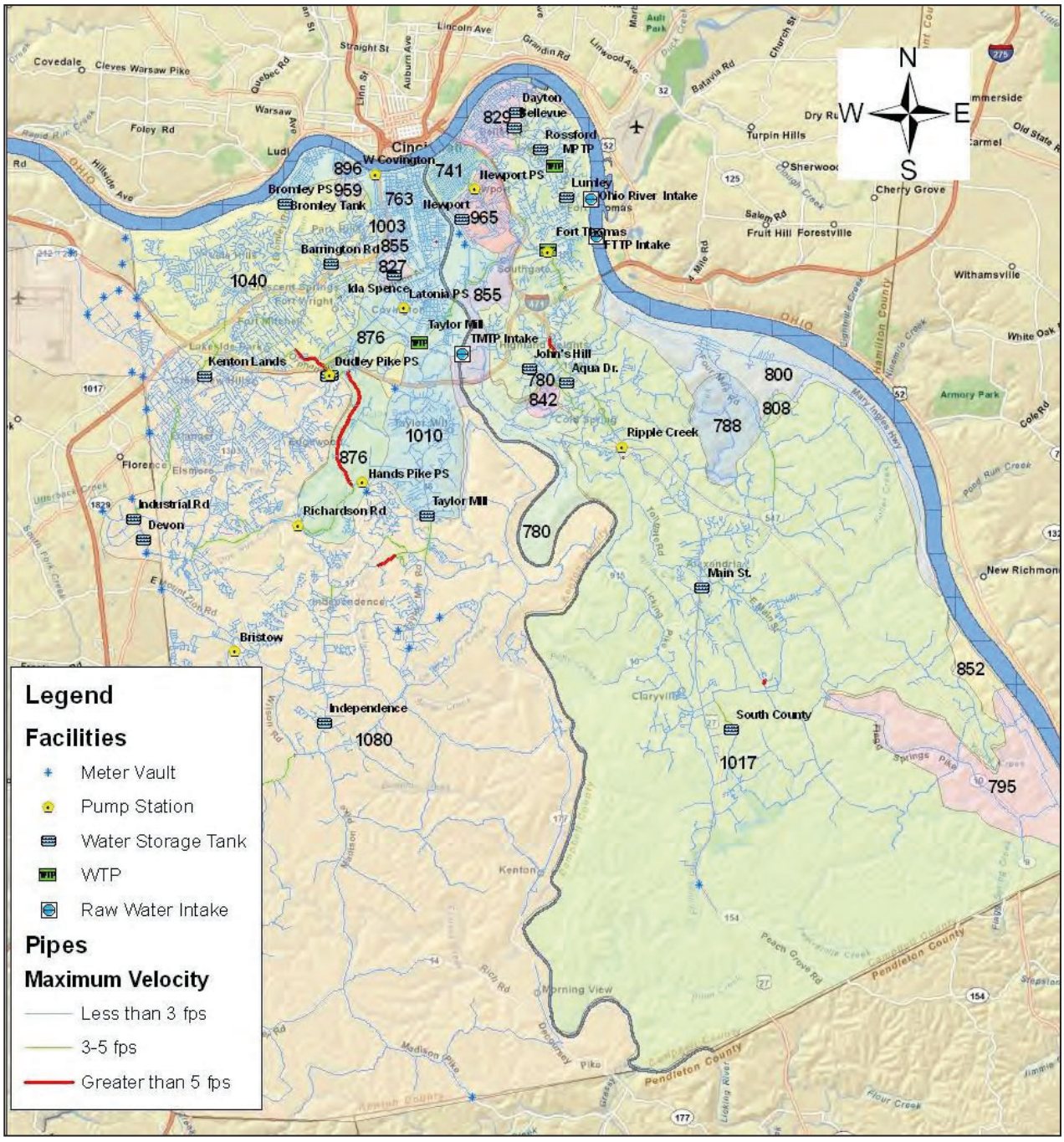
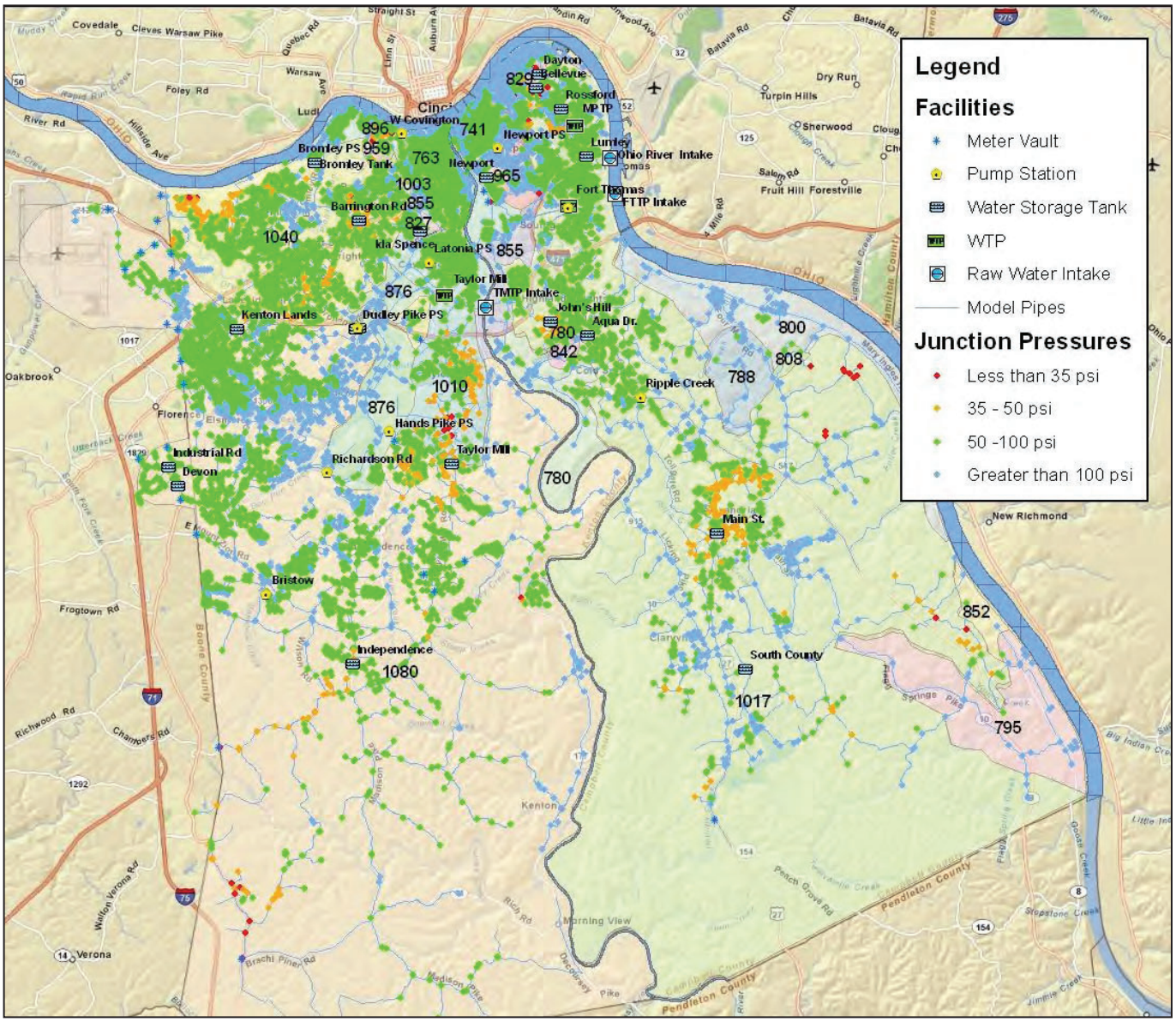


Figure 1-7: Existing System – Maximum Demand Day Minimum Pressure Results



1.6.3. Pump Curve Analysis

Significant adjustments were required to many of the pump curves during model calibration. This may signify that there are pumps that are no longer performing as originally designed/manufactured, which commonly occurs as pumps wear during years of use or when system conditions change from design conditions. From a planning level approach, a comparison was made between the manufacturer's curve and the calibration day SCADA data flow and head conditions for each of the pump stations. Head conditions were estimated based the difference between suction and discharge pressures without taking into consideration any losses between pump heads and gauges (note that this method of estimation is not considered to be highly accurate).

Figure 1-8 through 1-19 show the results of this analysis. Best Efficiency Points are noted on some of the curves when the information was available. The Waterworks Rd. pump station was not included in this analysis since there are variable frequency drives on those pumps.

Based on these graphs, several of the pumps seem to be running at operating points near the far right of their curves in particular, the Bristow Road, Richardson Road, and West Covington Pumps seem to be running at much lower head conditions than their design. These pumps may have been selected to meet higher demand conditions or improvements to the system network piping have resulted in lower system head conditions. Copies of the manufacturer's pump curves can be found in Appendix C. Changes to pumps were examined as part of the future analyses Section 1.7.

Figure 1-8: Bristow Pump Station

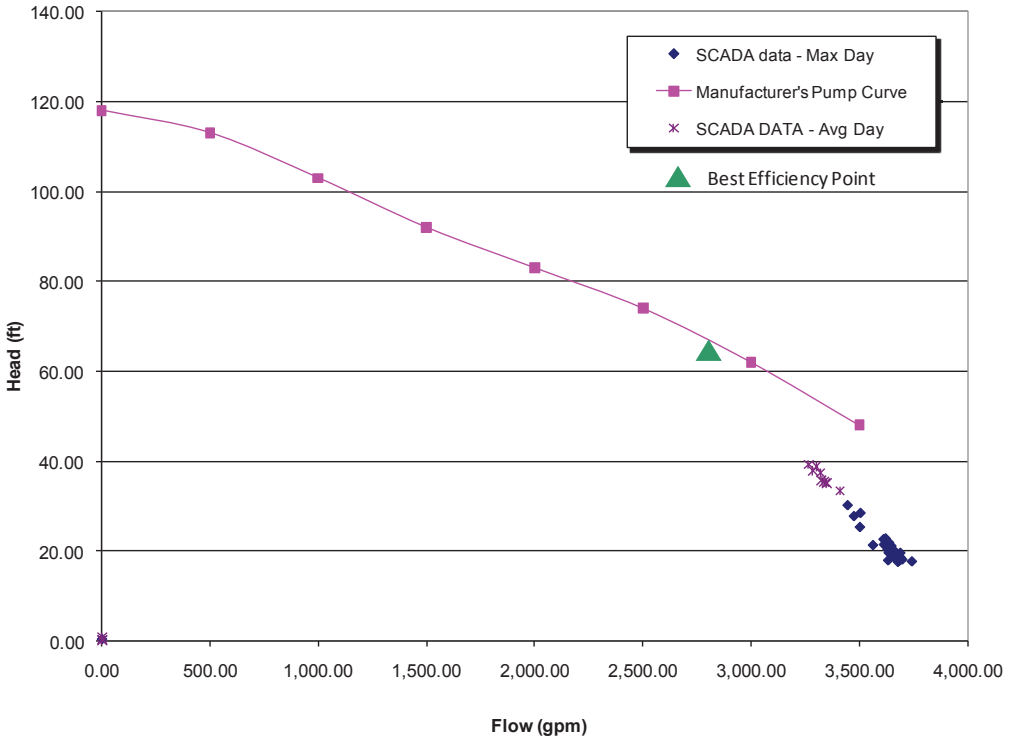


Figure 1-9: Bromley Pump Station

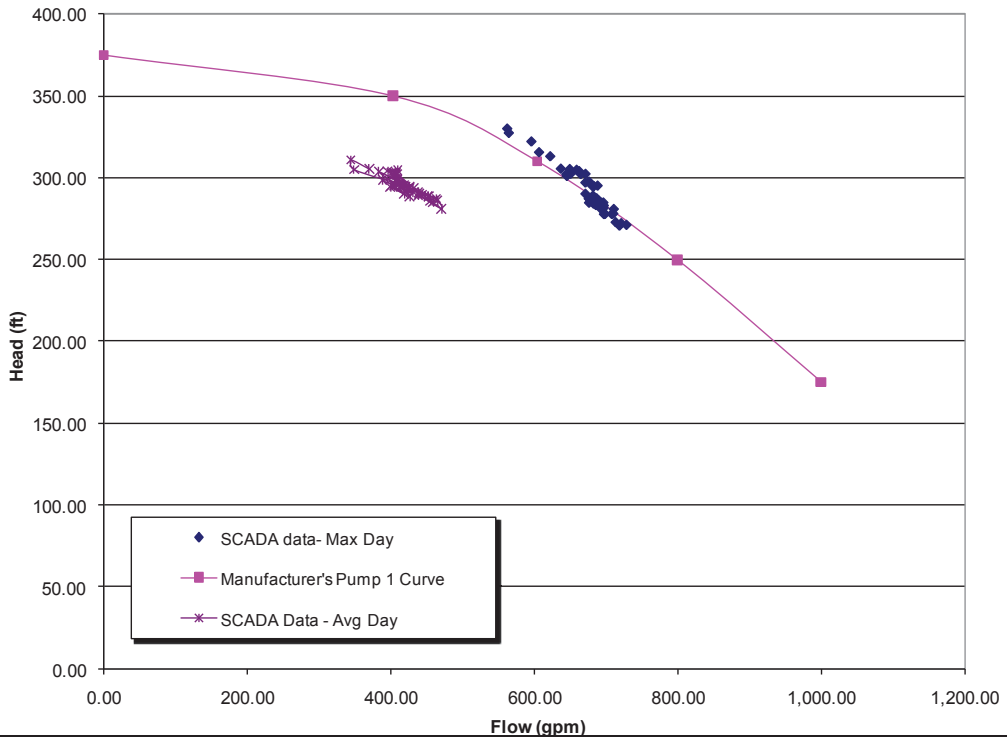


Figure 1-10: Carothers Pump Station

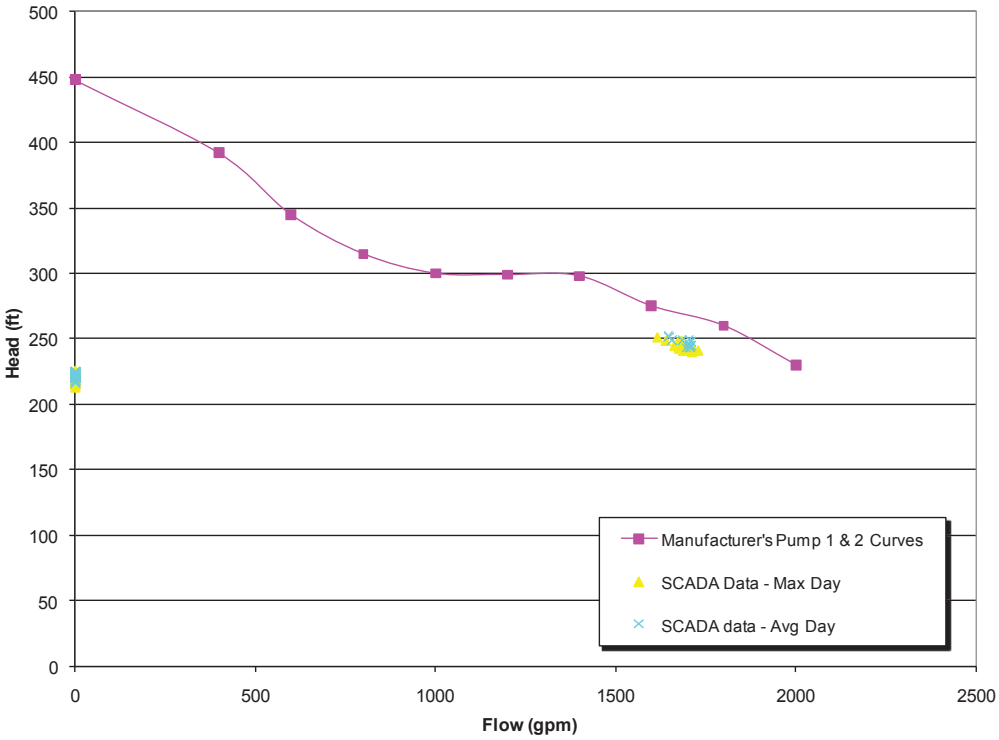


Figure 1-11: Dudley 1040 Pump Station

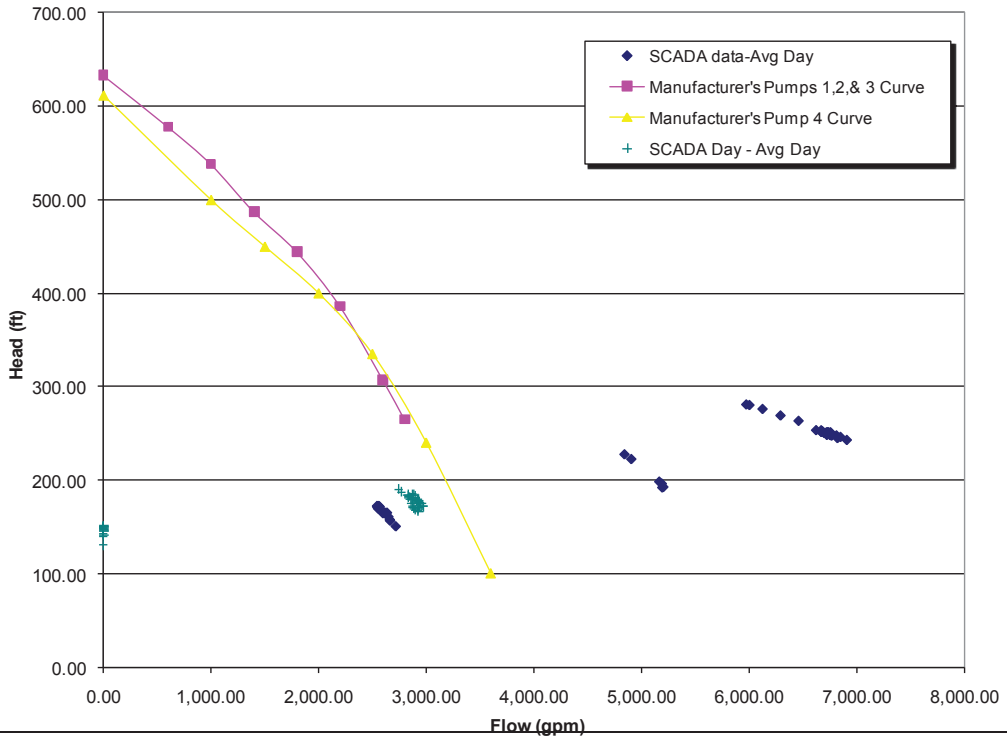


Figure 1-12: Dudley 1080 Pump Station

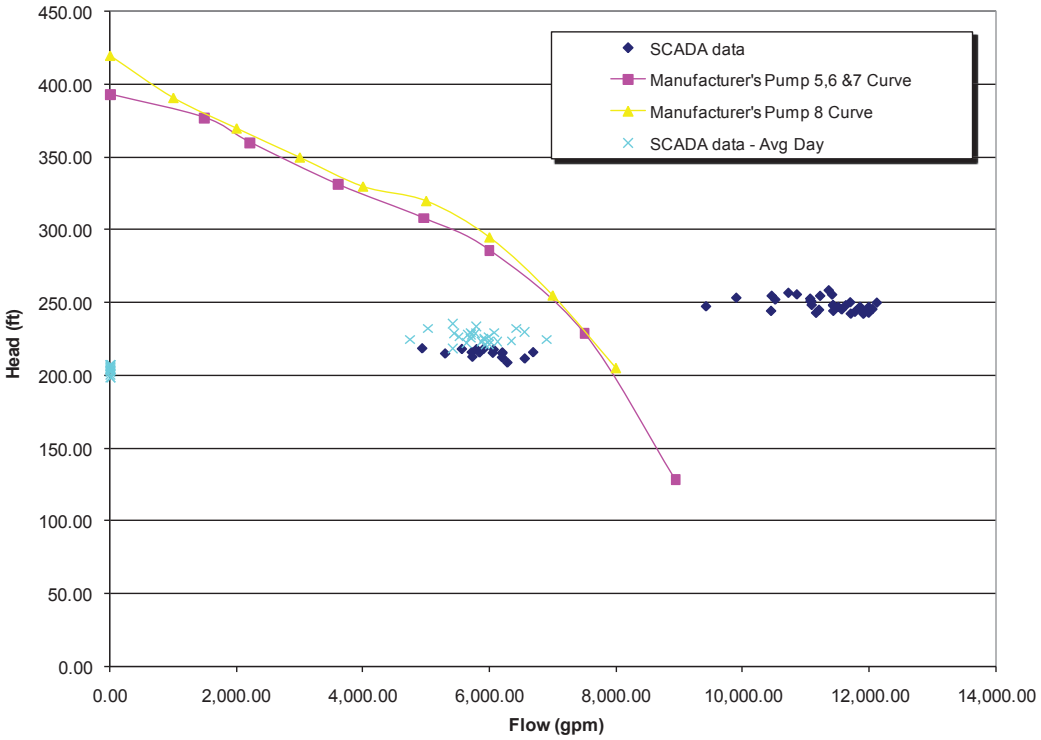


Figure 1-13: Hands Pike Pump Station

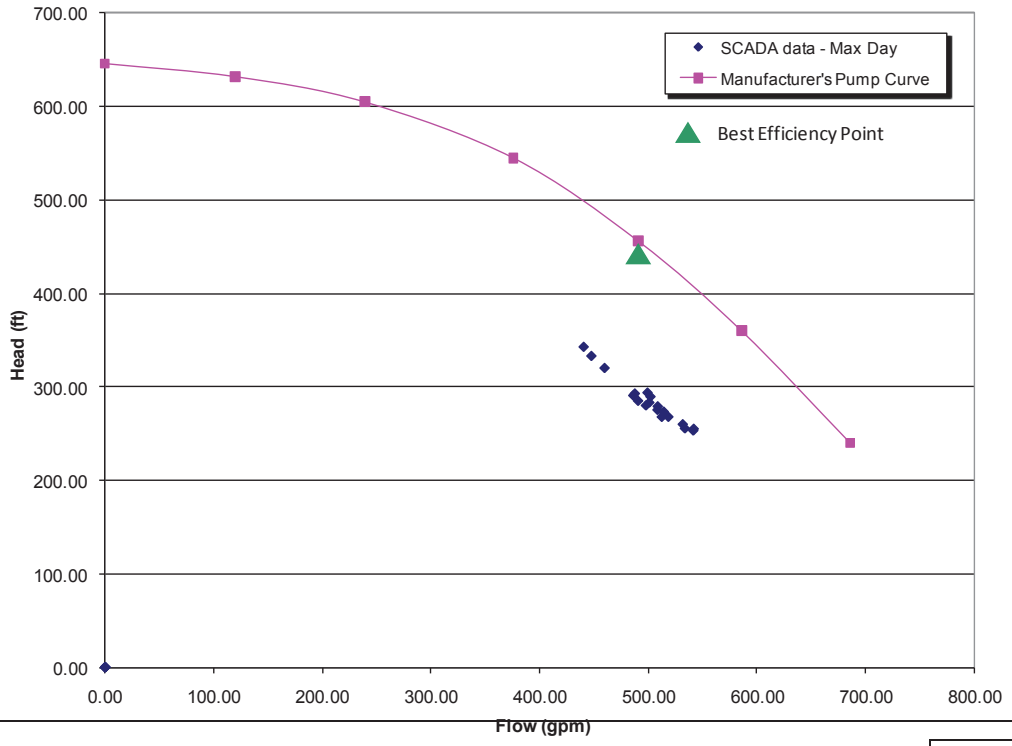


Figure 1-14: Latonia Pump Station

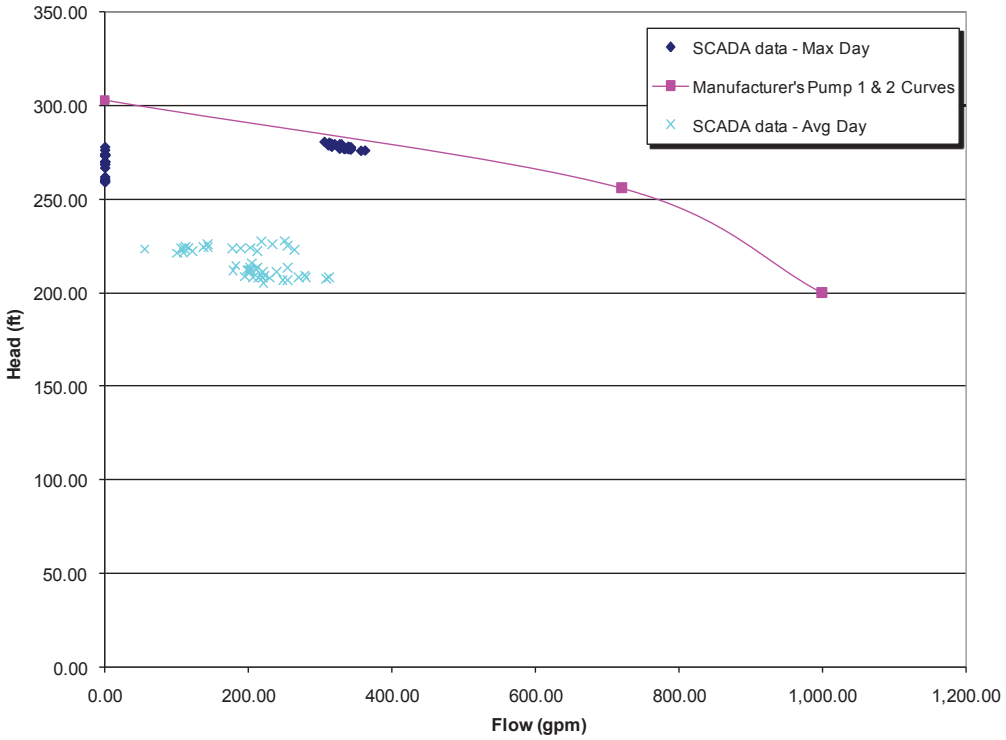


Figure 1-15: Richardson Road Pump Station

Figure 6-12
Richardson Road Pump Station

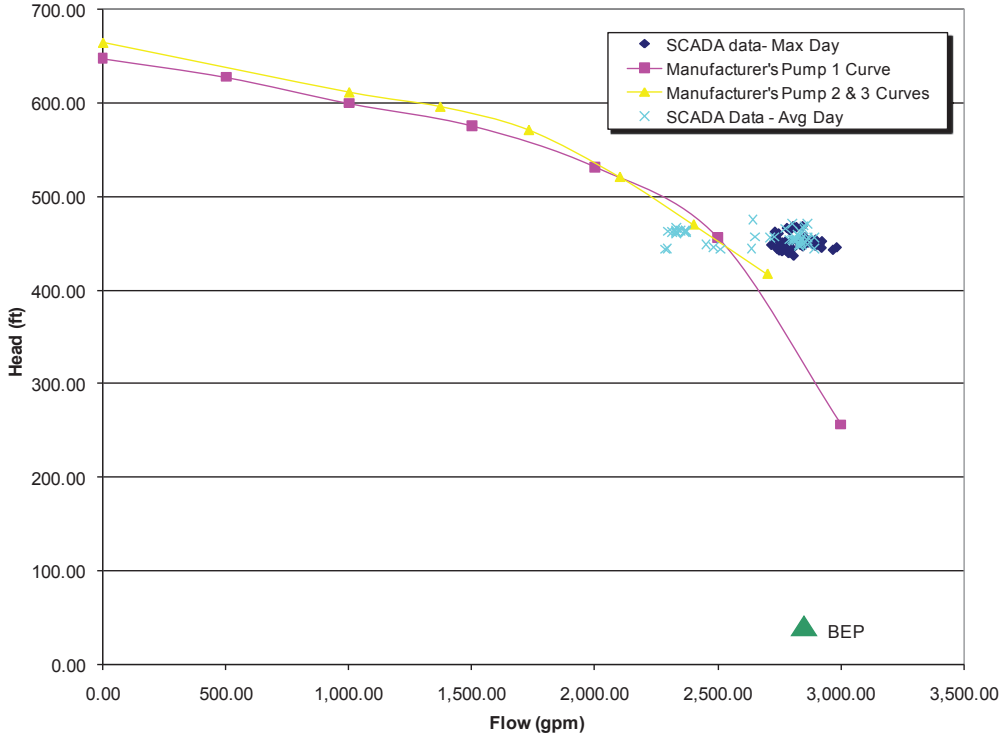


Figure 1-16: Ripple Creek Pump Station

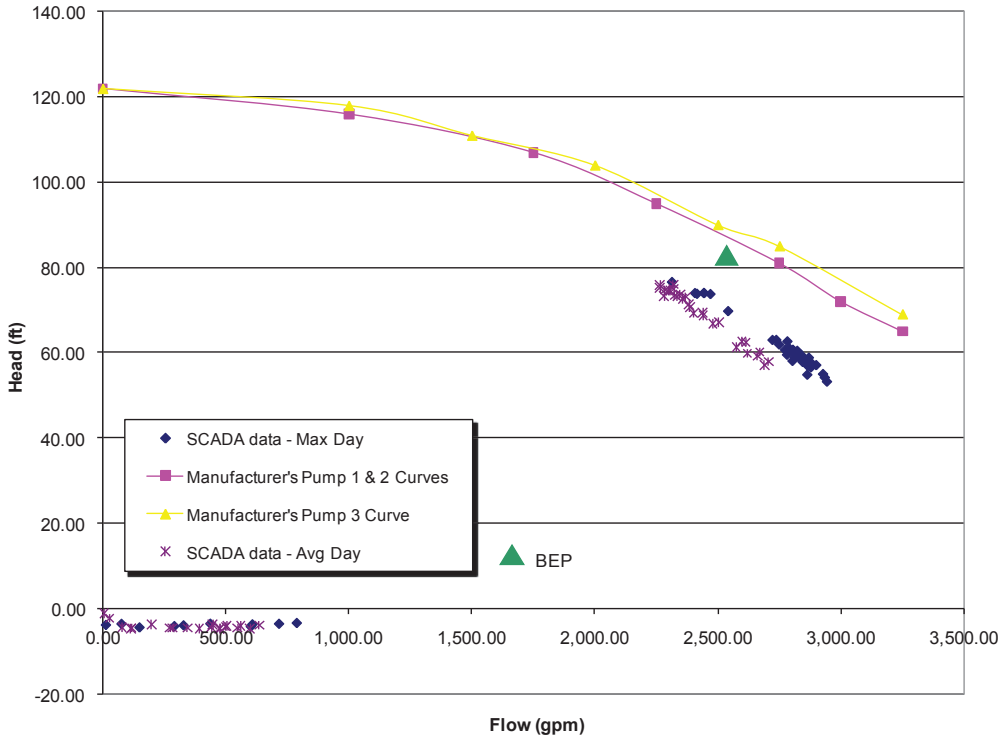


Figure 1-17: Taylor Mill Pump Station

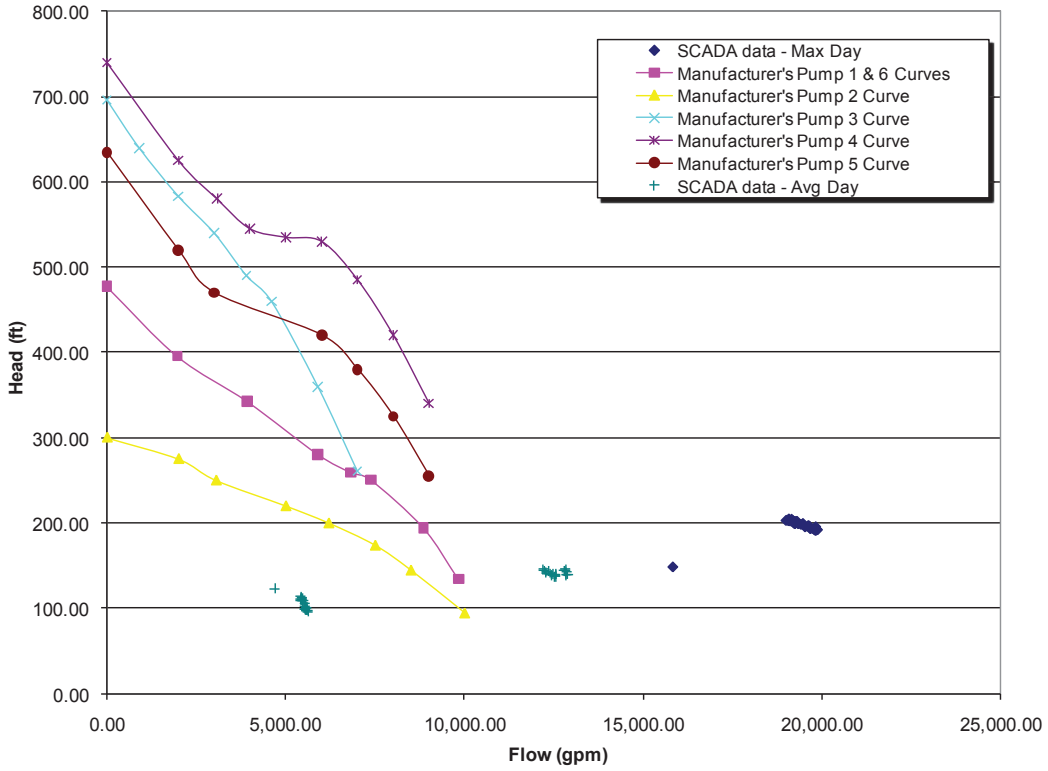


Figure 1-18: US 27 Pump Station

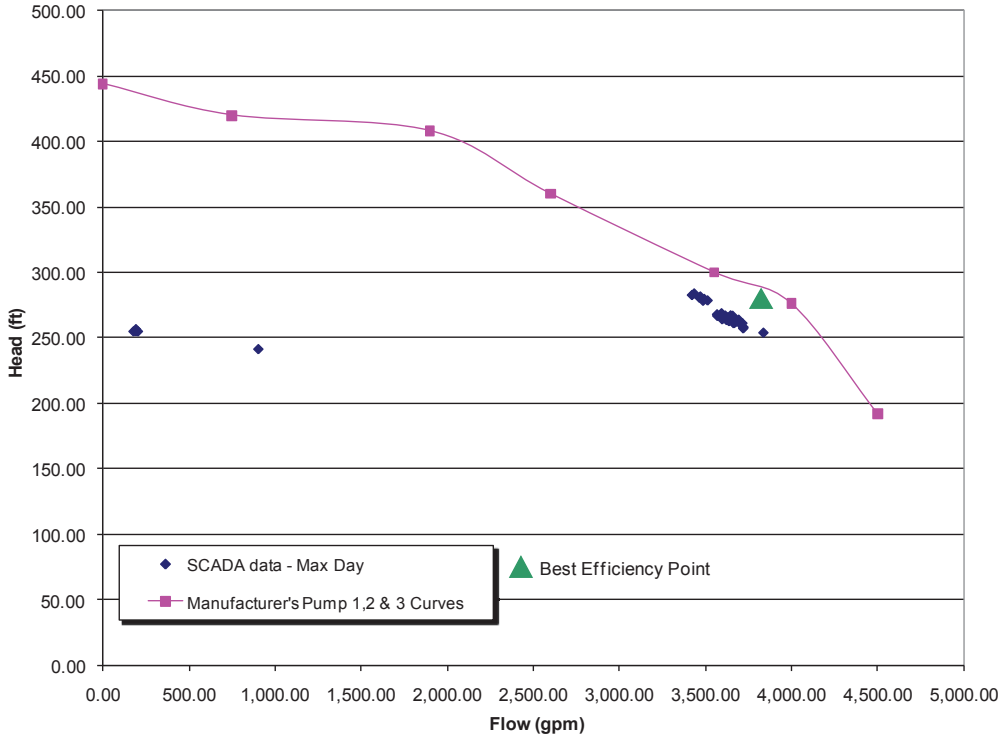
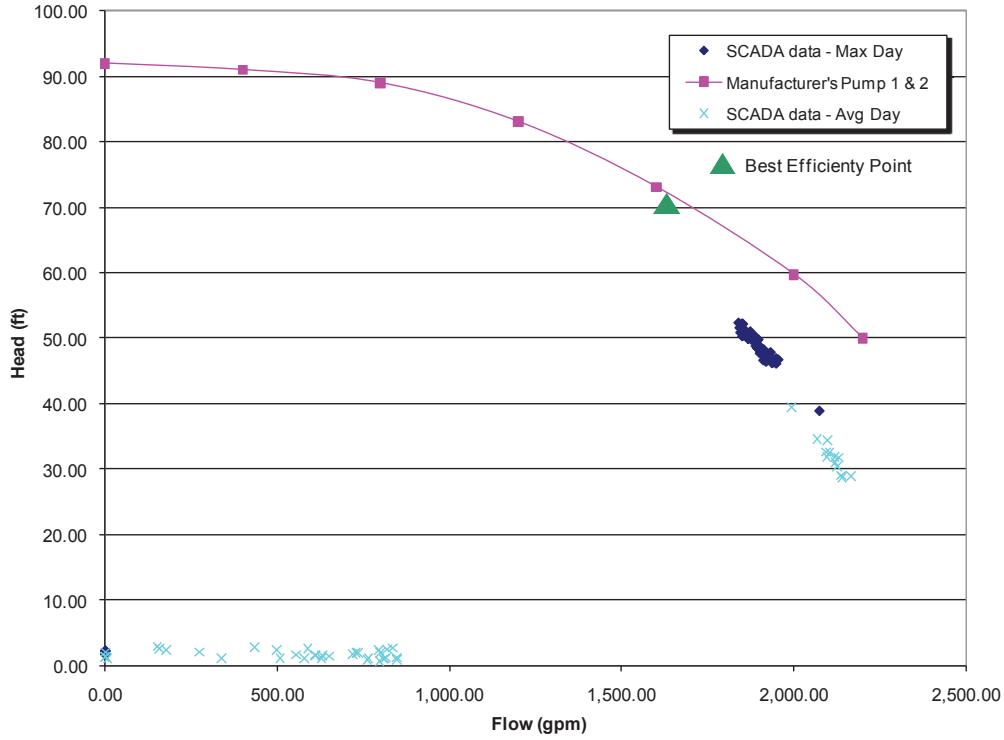


Figure 1-19: West Covington Pump Station



The benefits of adding a VFD to any of the pump stations were also examined. Typically VFD's are needed in order to stabilize large fluctuations in system pressures or in situations where they can provide a significant cost savings by having one or several pumps run at lower speeds over a longer period of time to meet the same demand conditions. A pump is often designed to meet peak flow and head criteria but may not need to run at 100% speed under normal circumstances. This often results in a pump having an excessive number of starts and stops during a 24 hour period and running for only short periods of time (less than 1 hour). Under existing conditions, each pump station was examined to determine the number of pumps running and the number of pump starts occurring under average and maximum demand conditions. A summary of this information is presented in Table 1-17.

Table 1-17.
Pump Starts Analysis

Pump Station	No. of Pumps Running		Maximum No. of Starts Per Day Per Pump	
	ADD[1]	MDD[2]	ADD[1]	MDD[2]
Bristow	1 of 3	1 of 3	2	2
Bromley	1 of 3	1 of 3	1	1
Dudley 1040	1 of 4	3 of 4	2	2
Dudley 1080	1 of 4	2 of 4	3	4
Handspike	0 of 2	1 of 2	0	1
Latonia	1 of 2	1 of 2	1	1
Carothers	1 of 2	1 of 2	3	3
Richardson	1 of 3	1 of 3	1	1
Ripple Creek	1 of 3	1 of 3	3	2
Taylor Mill High Service	2 of 6	3 of 6	2	1
US 27	1 of 6	2 of 6	2	2
West Covington	1 of 2	1 of 2	1	2

[1]ADD - Average Day Demand conditions based on 4/17/07
[2]MDD - Maximum Day Demand conditions based on 9/3/07

Based on the above information, none of the pump stations demonstrate the need to add a VFD for the purpose of increasing a pump's run time and reducing its number of starts and stops in a day. Additional discussion on the need to add VFD's to pump stations in

order to reduce system pressure fluctuations is discussed in the Recommended Improvements for the Existing System, Section 1.8.1.3.

1.7. Future System Analysis

1.7.1. 2020 Analysis

For the 2020 future system analysis, new demands in areas where growth was projected were added to the model under a separate demand category. The average demand for the system in 2020 is anticipated to be 36.6 MGD. Without any expansions to the District's current treatment capacity, it is anticipated that the 2020 demands could be met by the existing treatment plants. A breakdown of the demands by pressure zone is presented in Table 1-18 and a summary of the total treatment plant demands is provided in Table 1-19. Note it is assumed that MPTP will be serving the 1017 north pressure zone by 2020.

Table 1-18.
2020 Demands by Pressure Zone

Pressure Zone	Description	Served By	2020 ADD (mgd)	2020 MDD[1] (mgd)
741	Newport Low	MPTP	1.13	1.81
829	Dayton, Bellevue	MPTP	1.17	1.87
876	Taylor Mill to Dudley	TMTP	0.51	0.81
965	Newport High	MPTP	0.55	0.88
1003, 820	Ida Spence	FTTP	0.17	0.27
1017, 780, 788, 842, 920 ,800	Between FTTP and Ripple Creek	FTTP	3.35	5.35
1017N	North of FTTP	MPTP	1.66	2.65
1017RC, 808, 795, 852	Downstream of Ripple Creek	FTTP	4.83	7.73
1040, 896, 959	TM North	TMTP	3.97	6.35
1080, 1010, 730	TM South	TMTP	13.64	21.83
763, 855	Covington	FTTP	4.37	6.99
Totals (including water loss)			35.34 (36.6)	56.54 (57.7)

Table 1-19.
2020 Demands by WTP Service Area

Year	FTTP (40 MGD Capacity)			TMTP (10 MGD Capacity)			MPTP (10 MGD Capacity)		Total	
	ADD	MDD	Avail. to Transfer	ADD	MDD	Amount Needed	ADD	MDD	ADD	MDD
2006	10.4	16.7	23.4	14.0	22.4	12.4	2.7	4.3	27.1	43.3
2020	12.7	20.3	19.7	18.1	29.0	19.0	4.5	7.2	35.3	56.5

For the 2020 analysis, planned water main projects included in NKWD's 5-year CIP were added to the model. Additional pipes were also added to reach future customer demands. New customer pipes were added to the model with an 8-inch diameter. Finally, proposed piping to be added to the Bullock Pen system was also included in the model for analysis.

The average and maximum demand day head and flow conditions for each pump station were examined under the 2020 conditions. No significant changes to the head or flow conditions were found for the majority of the pump stations. In the year 2020, the model reflects the need for a new pump station in the vicinity of the new SR17 and Fowler Creek. Pumps in this station demonstrated a required head of approximately 240 feet at a discharge rate of 800 gpm under maximum demand conditions. In the 2020 model, a new or expanded pump station was also required in the vicinity of the existing Ripple Creek Pump Station. Head conditions for this pump stations are based on a pump discharge elevation of 800 feet, which is the same discharge elevation of the Ripple Creek pumps. This pump station is reflected in the model with 2 pumps running at a station discharge of approximately 6,000 gpm at about 100 feet of head under maximum demand conditions.

1.7.2. 2030 Analysis

For the 2030 future system analysis, new demands in areas where growth was projected were again added to the model under a separate demand category. The average demand for the system in 2030 is anticipated to be around 41 MGD. A breakdown of the demands by pressure zone is presented in Table 1-20.

Table 1-20.
2030 Demands by Pressure Zone

Pressure Zone	Description	Served By	2030 ADD (mgd)	2030 MDD (mgd)
741	Newport Low	MPTP	1.14	1.83
829	Dayton, Bellevue	MPTP	1.17	1.88
876	Taylor Mill to Dudley	TMTP	0.51	0.82
965	Newport High	MPTP	0.57	0.91
1003, 820	Ida Spence	FTTP	0.17	0.27
1017, 780, 788 ,842, 920 ,800	Between FTTP and Ripple Creek	FTTP	3.74	5.99
1017N	North of FTTP	MPTP	1.79	2.86
1017RC, 808, 795, 852	Downstream of Ripple Creek	FTTP	6.45	10.32
1040, 896, 959	TM North	TMTP	4.03	6.45
1080, 1010, 730	TM South	TMTP	15.92	25.47
763, 855	Covington	FTTP	4.51	7.22
Totals (including water loss)			**40.02 (41.4)**	**64.03 (65.5)**

An expansion of the MPTP to at least 15 MGD would be required prior to 2030 as shown in Table 1-21, if the plants can reliably produce 64 mgd. If the plant capacities listed in Table 1-21 are applied, additional capacity would be needed in 2022. If the capacity of FTTP is 44 MGD, then an expansion would be needed to just meet 2030. New demands would be met by transferring a portion of the MPTP production to the Covington area as described below.

Table 1-21.
2030 Demands by WTP Service Area

	FTTP (40 MGD Capacity)			TMTP (10 MGD Capacity)			MPTP (15 MGD Capacity)			Total	
Year	ADD	MDD	Avail to Transfer	ADD	MDD	Amount Needed	ADD	MDD	Avail. to Transfer	ADD	MDD
2010	10.4	16.7	23.4	14.0	22.4	12.4	2.7	4.3	-	**27.1**	**43.3**
2020	12.7	20.3	19.7	18.1	29.0	19.0	4.5	7.2	-	**35.3**	**56.5**
2030	14.9	23.8	16.2	20.5	32.7	22.7	4.7	7.5	7.5	**40.0**	**64.0**

The expansion of at least one WTP facility will be needed to meet 2030 projected demands. Previous studies have indicated that the least costly option would be to expand MPTP to a 15 or 20 MGD plant. The location of this plant however is the furthest from the projected areas of growth. Based on discussions with NKWD staff, it was decided that serving a portion of Covington from the MPTP would allow FTTP to provide additional flow to southern Campbell County and also provide additional gravity flow to TMTP for meeting the 2030 demands. Based on model results, this option seems highly feasible. This option would connect the 741 pressure zone (served by MPTP) to a gravity main from FTTP along Moock Rd with a flow control valve to the 763 pressure zone. A check valve would also be needed on the gravity main to prevent flow from flowing back to the FTTP clearwell from the 741 pressure zone. Additionally, it was decided that for reliability, a pump station should be built near the Licking River in Newport to connect the 741 pressure zone with the 763 pressure zone. This would provide an additional route for the MPTP treated water to enter Covington. This second delivery point of MPTP water into Covington also appeared to work well in the model.

The average and maximum demand day head and flow conditions for each pump station were examined under the 2030 conditions. No significant changes to the head or flow conditions were found for the majority of the pump stations. New pump conditions did exist for the Bristow Road pump station. This pump station will become the primary supply for a new Southern Kenton County Tank which will dictate new pump head conditions. In the model using the maximum day demand conditions, the three Bristow Road pumps were replaced with three constant speed 50 horsepower pumps. With one pump running, the model pump ran at approximately 4,200 gpm at 50 feet of head. With two pumps running (required under peak hour demands), the head increased to around 70 feet and produced a total pump station flow of 5,500 gpm. New pumps were also added to a new pump station used to bring water from the MPTP gravity fed 741 pressure zone up to the 763 pressure zone through a crossing of the Licking River. This model pump worked well at providing the adequate capacity needed while running continuously (24 hours) at approximately 2,600 gpm with 75 feet of head.

1.7.3. Bullock Pen Analysis

Based on information provided by the City, two growth scenarios for Bullock Pen were incorporated into the 2020 and 2030 analysis. Both scenarios assumed a second meter pit will be installed at the intersection of Bracht Piner Rd. and Madison Pike. The existing meter pit is at Bracht Piner Rd. and Dixie. For the 2020 scenario, an additional 600 gpm of demand split was between the two meter pit locations and added onto the projected 2020 base demands. For the 2030 scenario, an additional 750 gpm of demand was split between the two meter pit locations and added onto the projected 2030 base demands. Results from both scenarios did not indicate any deficiency in pipe capacity in the water mains leading to the meter pits.

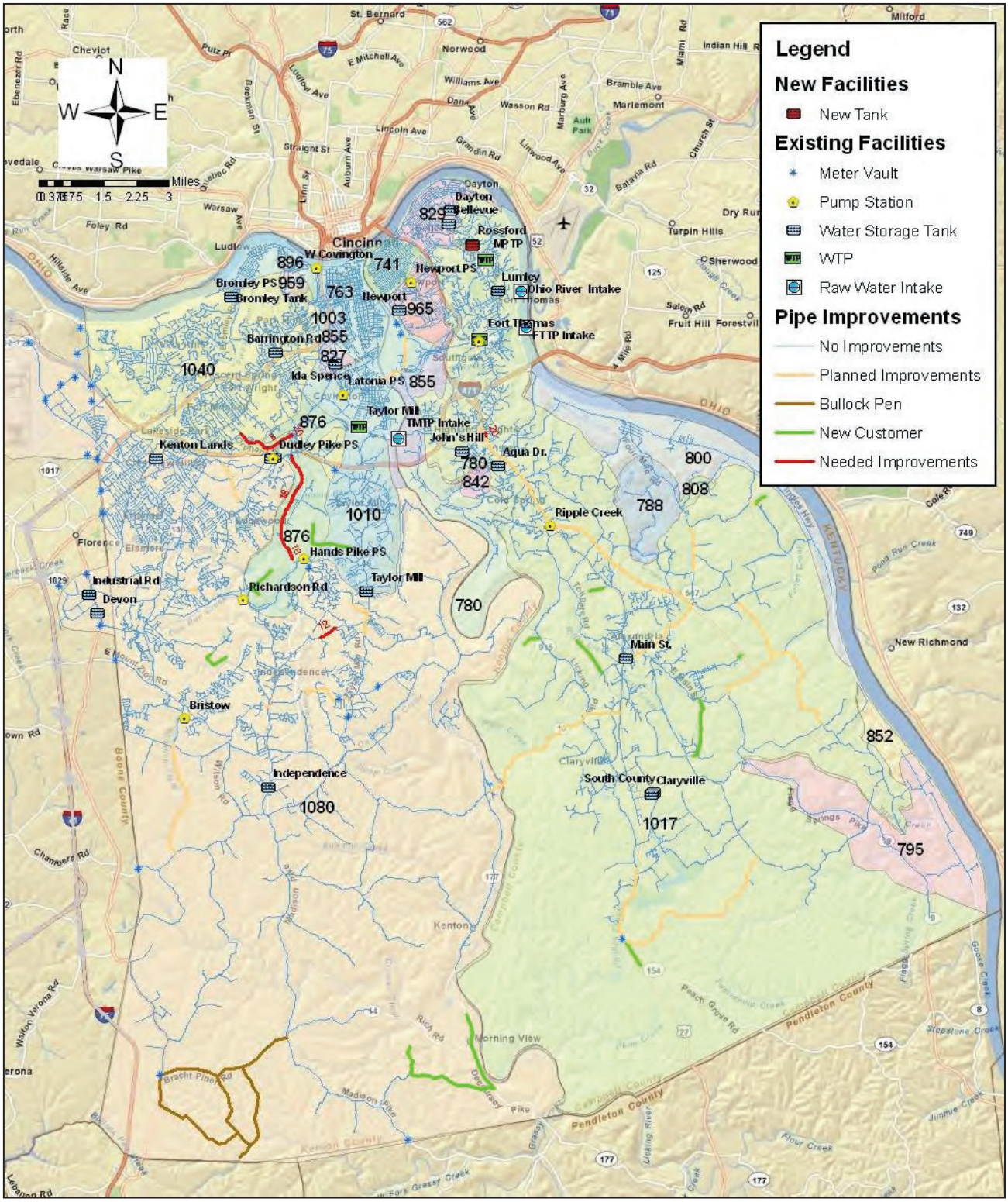
Proposed water mains in the Bullock Pen service area, known as the Phase 6 Waterline Extension Project were also added to the model to examine pipe capacity within the proposed Bullock Pen system extension. For this analysis, all of the projected demand growth was moved to the intersection of Bagby and Shady Lane. Model runs again showed adequate capacity in both the NKWD transmission and the proposed Bullock Pen pipes.

1.8. Recommended Improvements

1.8.1. Existing System

Improvements identified in the existing system analysis are generally considered to be of highest priority and are recommended to be added to the 5-year CIP. The recommended improvements are summarized below and shown in Figure 1-20. A detailed breakdown of each project including cost and priority is included in Appendix D.

Figure 1-20: Existing System Improvements



1.8.1.1. Existing System Tanks

The existing system storage gap analysis indicated a 0.24 million gallon deficit currently of storage in the 1017N pressure zone and a 1.26 million gallon storage deficit in the pressure zones served by the Dudley 1080 pump station. To provide the required storage for meeting both the current and future needs in the 1017N pressure zone, it is recommended that a new 1.0 MG storage tank be built to replace both the existing Rossford and Lumley tanks. This tank could be constructed on the existing Rossford tank site without taking the existing tank out of service until after construction is complete. The Lumley tank could then be decommission upon completion of its service life. No additional storage is recommended for the pressure zones served by the Dudley 1080 pump station because generators at this facility will provide power to the pumps serving this area during an electrical outage.

1.8.1.2. Existing System Pipe Improvements

Piping improvement needed in the existing system include at least a 12 inch parallel main along Madison Rd between Dudley Rd and Hands Pike Rd. This pipe will provide the additional capacity needed for the Richardson Road pump station flow. Secondly, a section of new 12 inch pipe along Senour Rd. just west of Cloverridge Dr. is needed to improve transmission. Downstream of the Dudley 1040 pump station, a parallel piping improvement is recommended along Orphanage Road between Redwood and Valley Plaza and then a 20- inch pipe along Valley Plaza north for about 60 feet to a connecting 20-inch pipe. These improvements are needed to complement the existing project planned to increase capacity leaving the Dudley 1040 pump station. They will provide capacity needed to meet current and future demands. Finally, a new 24-inch parallel pipe along US27 between Sunset Rd and Martha Lane will reduce velocities of water moving in this piping section.

1.8.1.3. Other Existing System Improvements

In order to increase minimum pressures in the 1010 pressure zone, it is recommended that the 1010 pressure zone be incorporated into the existing 1040 pressure zone. This could be accomplished without cost by closing the Sipple Road PRV and opening fully the Sandman PRV. The hydraulic grade change within the pressure zone will result in the Taylor Mill Standpipe becoming defunct since it only serves to maintain pressures at a hydraulic gradient up to 1010 feet. To maintain pressures and better manage pressure variations, it is recommended that VFD's be installed in the Dudley 1040 Pump Station. If additional storage for the converted 1010 pressure zone is desired, a taller tank could be erected at the site of the Taylor Mill standpipe. Due to the ground elevation of this site, a new elevated tank will need to be approximately 175 feet high.

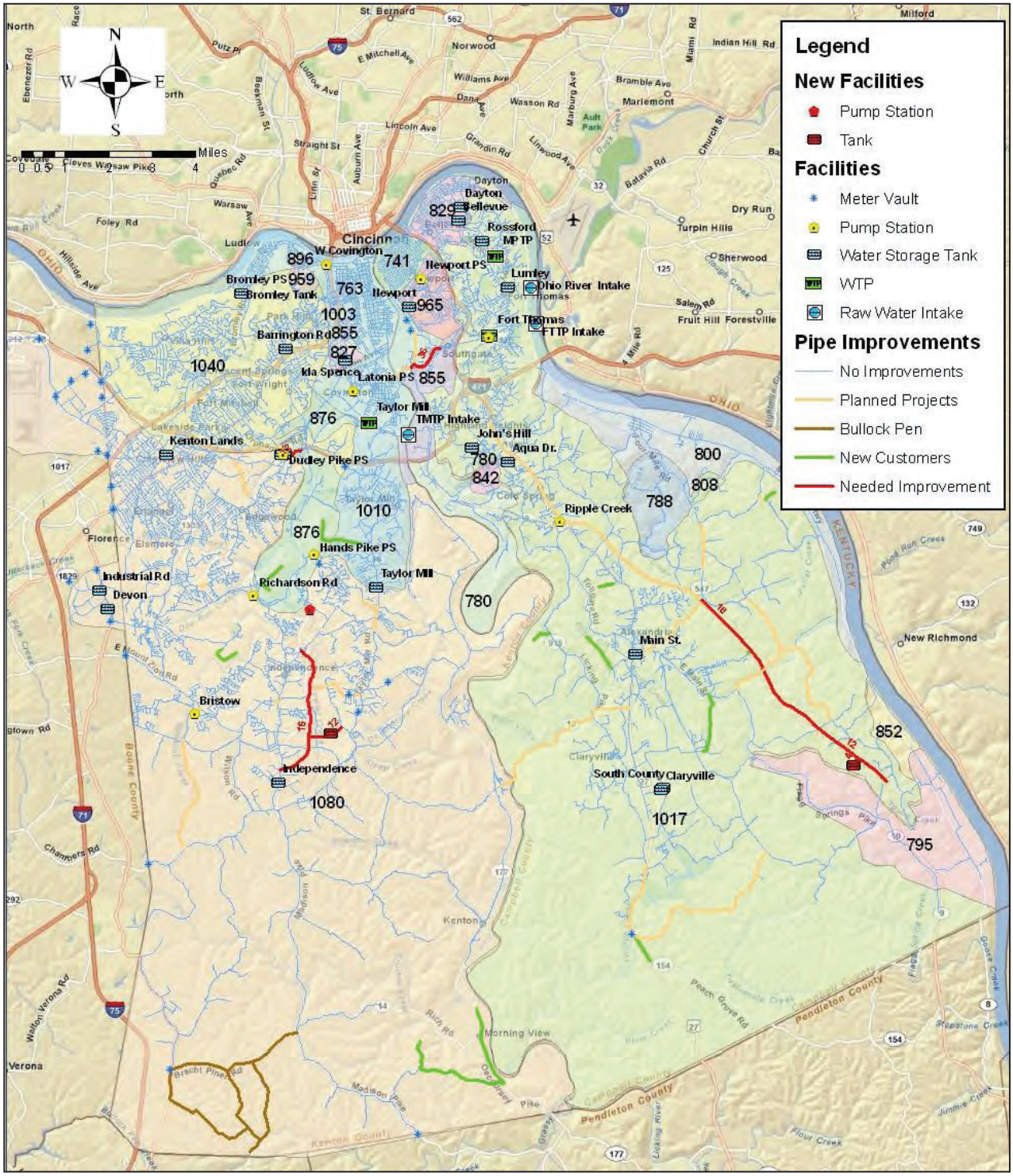
One final recommendation for the existing system is the addition of VFD's at the Dudley 1080 pump station. This pump station contains four pumps with rated capacities ranging

from 5,200 – 6,000 gpm. Due to the size of these pumps, variability of demands due to large industrial users served by this pump station and the potential for large fluctuations in system pressures, VFD's should be considered.

1.8.2. 2010 - 2020 Improvements

Based on the 2020 demand analysis, a number of improvement projects were identified for the 2010-2020 planning horizon. These projects include storage, pumping and piping projects. The recommended improvements needed to meet the 2020 demands are summarized below and shown in Figure 1-21. A detailed breakdown of each project including cost and priority is included in Section 1.9, Conclusions.

Figure 1-21: 2010 – 2020 System Improvements



1.8.2.1. 2010-2020 System Tanks

The 2020 storage gap analysis indicated additional deficiencies 0.52 million gallons of storage in the 1017 pressure zone and 2.35 million gallons in the 1080 pressure zone. Based on discussions with NKWD staff and a detailed analysis of the existing elevations and terrain most appropriate for the siting of the new tanks, two locations were selected as general areas where the new tanks could be constructed. For the 1017 pressure zone, this area is near SR9 (AA Highway) and Lick Hill. Placement of a new tank in this area assumes water transmission will continue to be built along SR9 as a dual feed to southern Campbell County. For the 1080 pressure zone, the area selected for placement of a new tank is around Stephens Road and Taylor Mill Rd. This area is already quite developed and may be challenging to acquire the land for a tank. This tank would be served by a new transmission main constructed along the new SR17. Both of these tanks and the associated pipes that are required to serve these tanks were added to the 2020 model.

1.8.2.2. 2010-2020 System Pump Stations

Ripple Creek pump station was identified as needing additional capacity by 2020. This pump station currently houses three pumps (two duty and one stand-by) and was not designed for additional expansion. The pump station property may be large enough to accommodate a new pump station on site. A new pump station at or near this site would not be able to connect directly into the existing pump station suction or discharge piping due to limited capacity. At the time of this writing, there are planned projects to bring a new 24 inch pipe into the Ripple Creek pump station along US27 and a new 24 inch transmission main is being planned that could be used for discharge along Hwy 9 (AA Highway). These mains could be used to transport additional capacity to and from a new pump station at the Ripple Creek site.

The Richardson Road pump station is controlled by tank levels in the Independence tank. It serves the Independence tank along with the Bristow Pump Station. Currently the Richardson Road Pump station discharges into two transmission mains, a 16 inch transmission main heading east and a 20 inch transmission main heading west. During modeling analysis, it was observed that a large percentage of the water leaving the pump station to the west was being re-pumped through the Bristow Road pump station. When this pipeline was closed, the entire pump station discharge went directly towards serving the Independence tank and all the customers in between. The existing 16 inch transmission main however, is not of large enough capacity to maintain velocities below the recommended limits to meet either current or future demands. Additionally, during the pump curve analysis (See Section 1.6.3) it was noted that the pumps at the Richardson Road pumps are running at much lower heads than their design. Due to these reasons as well as the geologic conditions, which include steep gradients at and near the site, it is recommended that the Richardson Road Pump station be replaced with a new pump station along the new SR17 route. This new station could replace both the existing

Richardson Road and Hands Pike Pump Stations. The Hands Pike pump station is not actively pumping water in the distribution system. It is run only on occasion to "exercise" the pumps and is available for emergency back-up.

1.8.2.3. 2010-2020 System Pipe Improvements

Piping projects for the 2010-2020 planning horizon are mainly focused on improved transmission along what is considered to be the backbone of the distribution system.

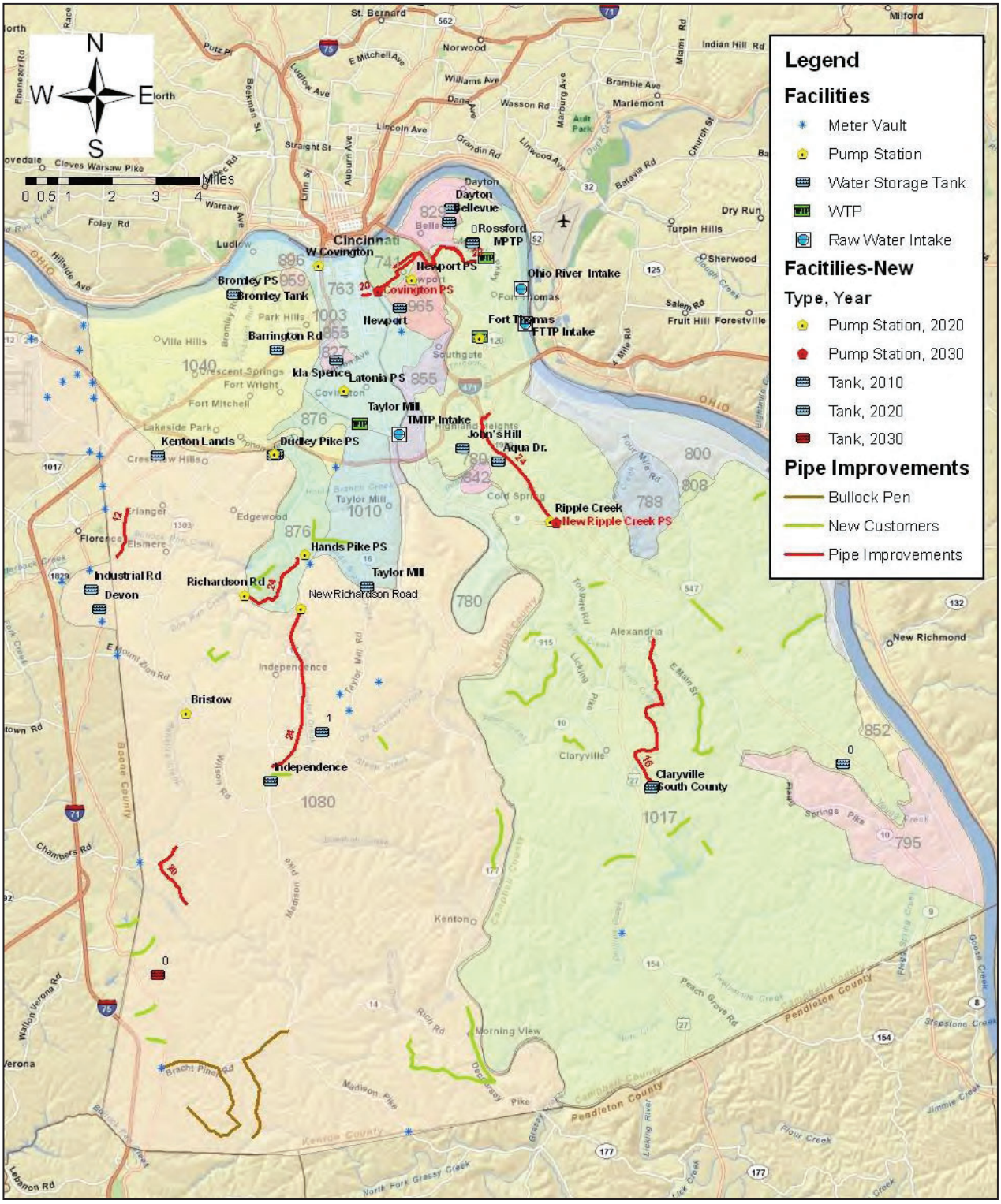
A new pipeline to the new 1080 tank (east of Independence) is recommended to be constructed in the right-of-way of the new SR17. This pipe would connect into the existing system at Hands Pike Rd, continue south along the new SR17 through a new pump station as recommended above, and then reconnect into the existing system along Madison Pike near Apple Dr. This transmission main would not only provide flow to a new 1080 tank, it would provide additional transmission needed into the Independence area to meet future demands and provide redundant transmission to the Independence tank from the north.

Another large transmission project being recommended is for the extension of the pipeline along SR9 from Hwy 547 to California Cross Road. This water main would only need to be 16 inches in diameter and would provide flow to the new Southern Campbell County Tank. Upon completion of this project and the tank project, the Main Street tank could be decommissioned. With the Main Street tank left in the distribution system, the model demonstrates that water turnover would be minimal which would result in water quality problems.

1.8.3. 2020-2030 Improvements

Based on the 2030 demand analysis, a number of improvement projects were identified for the 2020-2030 planning horizon. These projects include storage, pumping and piping projects. The recommended improvements needed to meet the 2030 demands are summarized below and shown in Figure 1-22. A detailed breakdown of each project including cost and priority is included in Section 1.9, Conclusions.

Figure 1-22: 2020 – 2030 System Improvements



1.8.3.1. 2020-2030 System Tanks

The recommended additional storage needed to meet the 2030 demands includes one additional storage tank in Southern Kenton County. This tank would be served predominately by the Bristow Road pump station and would maintain pressures to everything south of the Independence tank. It is recommended that a check valve be placed along Independence road to prevent Bristow Road Pump Station from pumping directly to the Independence tank. This will allow more flow to go south in order to keep the Southern Kenton County tank filled. Conversion of the Bristow Road pump station to serve this new tank is expected to have a significant impact on the head and flow conditions at the pump station as discussed in Section 1.7.2.

1.8.3.2. 2020-2030 System Pump Stations

To provide redundancy for the flow from MPTP into Covington, it is recommended at this time to construct a new pump station on the banks of the Licking River to pump water from the 741 Pressure Zone into downtown Covington.

1.8.3.3. 2020-2030 System Pipe Improvements

A new 20 inch piping will be needed to cross the Licking River and connect 11th street in Newport to 12th Street in Covington. As part of this project the 100 year old plus 20 inch dual gravity mains from the MPTP clearwells through the 741 pressure zone should also be replaced. Piping improvements to the new tank in Southern Kenton County include a 20-inch main along Percival Rd. Other piping improvements needed during this planning horizon include a new section of 12 inch parallel piping between Vulcan and Lytle Road in the 1080 pressure zone. This improvement will provide additional capacity to the Industrial and Devon tanks. Finally, additional pipe capacity will also be needed upstream of the Claryville and South County tanks from SR547 southward and include a 24-inch parallel main along Persimmon Grove for 16,000 linear feet and approximately 9,000 linear feet of 16-inch main along Jerry Wright, Lickert Road and Old State Route 4.

1.8.4. Other Improvements

To assist in future modeling efforts, it is recommended that flow meters be installed on all new pump discharge piping. Total pump station flows and pressures are currently monitored by the District and provide a good overview of how the station is operating. To more precisely analysis pump flow conditions, individual flow meters are needed. Individual flow meters could assist in determining whether or not a pump is running off of its curve. In addition, future pressure reducing valves (PRV's) should be tied into the SCADA system for both monitoring of the pressures and controlling of the settings. Finally, flow monitors within the gravity mains would assist in verifying how much of the treated water is being supplied to the system without pumping.

Through discussions with the District about future improvements needed for the distribution system a number of plant and pump station concerns were also identified. These concerns include the need for performing a capacity analysis at all three plants to verify if the plants can meet their rated capacities and determine how much additional supply may be available after future demands are met. The analysis at MPTP in particular is considered critical.

District staff also expressed a concern about the pressure drop experienced in the 763 pressure zone when three or more pumps are turned on in at the TMTP. This drop in pressures is not evident in the model. The addition of MPTP treated water to the Covington area through a pump station is expected to lessen this drop in pressures.

Lastly there is a concern about pressure spikes when turning on three or more pumps at the US27 pump station. It is recommended that VFD's be added to at least two pumps to accommodate changes in the system pressures. VFD's for this pump station have been included in the existing system recommendations found in Section 1.9, Conclusions. When the US27 pump station ceases to serve the area north of FTTP, the main discharge of the pump station will be to two large transmission mains. These mains are sized to handle a large amount of flow and should help to lessen any surges.

1.9. Conclusions

The District's water model provides a sound basis for future planning and water supply management. The use of advanced tools like GIS, along with detailed hydraulic modeling and engineering analysis of results, all provide a level of confidence for the District and their customers that the recommended improvements represent an efficient use of capital expenditures.

Table 1-22, provides a summary of all the recommended improvements and costs which are listed in order of priority and summarized by planning horizon.

Table 1-22
Recommended System Improvements and Costs

Existing System Improvements (2009-2012)

CIP Year (aggres, mod, min)	Type	Improvement	Location	Pipe Dia	LF	No. Units	Unit Cost	Total Cost
2010, 2011, 2012	Storage	1.0 MG storage tank	Rossford Tank Replacement			1	$2,500,000	$2,500,000
2009, 2010, 2011	Piping	12 inch main	Madison Ave. parallel main between Dudley Rd and Hands Pike Rd	12	14,160		$130	$1,840,800
2009, 2010, 2011	Piping	12 inch main	Senour Ave. west of Cloverridge Dr.	12	2,210		$130	$287,300
2009, 2010, 2011	Piping	24 inch main	US27 parallel main between Sunset and Martha Lane	24	1,100		$160	$176,000
2009, 2010, 2011	Piping	8 inch main	Orphanage Road parallel main between Redwood and Valley Plaza	8	7,500		$160	$1,200,000
2009, 2010, 2011	Piping	8 inch main	Valley Plaza parallel main north of Orphanage	20	60		$155	$9,300
2009, 2010, 2011	WTP	Capacity Analysis	Capacity Analysis Study at TMTP			1	$40,000	$40,000
2009, 2010, 2011	WTP	Capacity Analysis	Capacity Analysis Study at FTTP			1	$40,000	$40,000
2009, 2010, 2011	Pump Station	VFD's installed	US27 Pump Station VFD's			2	$80,000	$160,000
2011, 2012, 2013	Pump Station	VFD's installed	Dudley 1040 and Dudley 1080 Pump Station VFD's			4	$80,000	$320,000

2010-2020 System Improvements

CIP Year (aggres, mod, min)	Type	Improvement	Location	Pipe Dia	LF	No. Units	Unit Cost	Total Cost
2013, 2016, 2017	Storage	1.0 MG storage tank	Southern Campbell County			1	$2,500,000	$2,500,000
2012, 2017, 2019	Storage	1.0 MG storage tank	East of Independence			1	$2,500,000	$2,500,000
2014, 2016, 2019	Pump Station	New Pump Station	Near the existing Ripple Creek PS			1	$1,000,000	$1,000,000
2013, 2016, 2018	Pump Station	New Pump Station	Replacement of Richardson Rd Pump Station			1	$1,000,000	$1,000,000
2012, 2015, 2017	Piping	24 inch main	SR17 between Hands Pike Road to Apple Dr. (24 inch)	24	11,830		$160	$1,892,800
2012, 2015, 2017	Piping	16 inch main	SR17 between Hands Pike Road to Apple Dr. (16 inch)	16	17,340		$150	$2,601,000
2012, 2015, 2018	Piping	12 inch main	Main to new 1080 tank east of Independence	12	4,440		$130	$577,200
2013, 2016, 2018	Piping	24 inch main	US27 between FTTP and Marshell Lane	24	13,100		$160	$2,096,000
2012, 2015, 2018	Piping	16 inch main	SR9 between Hwy 547 and California Cross Rd	16	31,840		$150	$4,776,000
2015, 2017, 2020	Piping	36 inch main	Moock Rd between Covington Waterworks Rd and SR9	36	5,150		$150	$772,500

2020-2030 System Improvements

CIP Year (aggres, mod, min)	Type	Improvement	Location	Pipe Dia	LF	No. Units	Unit Cost	Total Cost
2022, 2025, 2028	Storage	1.0 MG storage tank	Southern Kenton County Tank			1	$2,500,000	$2,500,000
2023, 2026, 2028	Pumping	New Pump Station	Licking River PS Raw Water Main			1	$1,000,000	$1,000,000
2022, 2025, 2028	Piping	20 inch main	Percival Rd to New Southern Kenton County Tank	20	12,426		$155	$1,926,030
2021, 2024, 2028	Piping	12 inch main	Parallel main between Vulcan and Lytle Road	12	6,300		$140	$882,000
2023, 2028 , --	Piping	20 inch main	MPTP Gravity Discharge (2-20 inch mains)	20	31,800		$155	$4,929,000
2023, 2026,2028	Piping	20 inch main	Connecting 11th street in Newport to 12th street in Covington	20	5,600		$155	$868,000
2021, 2024, 2028	Piping	24 inch main	Persimmon Grove and Jerry Wright Rd	24	8,650		$160	$1,384,000
2021, 2024, 2028	Piping	16 inch main	Lickert Rd. and Old State Route 4 to Claryville Tank	16	15,530		$150	$2,329,500
2025, --, --	Piping	16 inch main	Dedicated transmission from MPTP to Covington for Redundancy	16	40,000		$150	$6,000,000

2. Asset Management Plan

2.1. Introduction

This asset management plan (AMP) update provides for the continued development of the District's overall asset management program in support of capital planning and maintenance program optimization for above ground assets (water plants, pump stations, storage tanks, etc.) and the water distribution system piping buried assets. Information from the 2004 AMP was incorporated and updated where required to develop this 2008 AMP Update. Key components of this AMP update include the following:

Asset hierarchy evaluation:

The existing asset hierarchies were reviewed for two software tools currently utilized by the District to manage above ground asset data: (1) the computerized maintenance management system (CMMS) product, Antero, currently utilized by the District for work order management and, (2) the AwwaRF Assessment Tool, which was utilized in the previous 2004 AMP to assign the asset physical condition scores. Recommendations are provided for developing an overall asset hierarchy for above ground assets and for integrating the asset inventory and condition assessment data from these two software tools.

Asset inventory and physical condition data update:

The overall asset inventory data and physical condition scores for the above ground assets (water treatment plants, pump stations and storage tanks) from the 2004 AMP were updated by the District. The physical condition data was then combined with asset criticality rankings to assign an overall asset priority. Recommendations are provided for the further development of an asset performance condition scoring methodology in the next AMP update, which will further facilitate the ranking and prioritizing of above ground assets.

Asset criticality evaluation, prioritization and R&R planning:

The District assigned asset criticality ratings within the existing AwwaRF tool for all the above ground assets. The criticality ratings were then combined by Malcolm Pirnie with the physical condition scores to evaluate an overall asset priority as follows:

*Priority = Condition * Criticality* (note the possible priority score range is from 1 to 15).

Assets were then assigned to an initial priority grouping (Group 1 to Group 5) for renewal and replacement (R&R) planning based on their overall priority score. Group 1 & 2 assets are the highest priority and were considered for inclusion in the 5-year capital improvement program (CIP). Group 3 & 4 assets are lower priority and were considered for inclusion in the 20-year CIP. Group 5 assets are the lowest priority and were initially considered to be outside of the 20-year planning horizon.

Asset effective useful life evaluation:

An estimate of overall asset effective useful life (EUL) was developed by Malcolm Pirnie based on available water industry data and experience with similar evaluations for other water utilities. The assets in priority groups 3, 4 and 5 (where install dates were available) were further reviewed against the effective useful life estimates, and considering the physical condition scores, to adjust the CIP planning years and budget estimates. For example, "young" assets below their estimated EUL age, but with poor condition scores, could potentially advance within the CIP priority. Similarly, "old" assets near or above their estimated EUL age, but with good conditions scores, could potentially move down within the CIP priority. In some situations, a future detailed asset evaluation is recommended to make the final determination.

Proposed performance measures:

Eight performance measures in the areas of asset reliability, regulatory compliance, business operations and operations and maintenance are recommended for consideration by the District to support the overall asset management program. Benchmarking data from AWWA QualServe 2006 is provided, where available, for the various measures.

Overall facility and asset evaluations for final CIP development:

The results of the asset renewal and replacement (R&R) evaluations were combined with alternatives evaluated to meet current and future expected needs in the areas of capacity and regulatory compliance to develop the final CIP. Additional evaluations considered:

- Raw water supply: capacity and performance improvements for the Ohio River Pump Station No.1 (ORPS1), Ohio River Pump Station No.2 (ORPS2) and the Licking River Pump Station (LRPS).
- Water treatment plants:
  - Memorial Parkway WTP: addition of granular activated carbon (GAC) to meet the Stage 2 Disinfectant/Disinfection By-Product (D/DBP) Rule and ultraviolet (UV) disinfection to meet the Long-Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR). An overall capacity upgrade from 10 MGD to 15 MGD was also evaluated.

  - Fort Thomas WTP: addition of granular activated carbon (GAC) to meet the Stage 2 Disinfectant/Disinfection By-Product (D/DBP) and ultraviolet (UV) disinfection to meet the Long-Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR).
  - Taylor Mill WTP: addition of granular activated carbon (GAC) to meet the Stage 2 Disinfectant/Disinfection By-Product (D/DBP) Rule
- Pumping stations and storage tanks: capacity evaluations were performed as part of the hydraulic model update and recommendations for new and/or upgraded facilities integrated into the final CIP.

Operations and maintenance program considerations:

The District currently performs a number of on-going programs which support the overall asset management program. Discussions, evaluations and recommendations are provided for enhancing the use of the current Antero CMMS product, expanding the pump inspection program techniques to other assets and the need to update existing standard operating guides (SOGs).

Water distribution system overview evaluation:

The District completed extensive data collection and GIS updates for the water distribution system subsequent to the 2004 AMP. The distribution system evaluation reviewed current data on water main breaks and leaks for the period 2003 to 2007. The overall performance of various ages and type of water main was evaluated in terms of annual break rate. Estimates of water main replacement costs were developed along with a potential to utilize some form of cathodic protection "hot spotting" to assist in reducing the number of annual breaks. Recommendations are provided for continuing to enhance the condition and criticality evaluations to prioritize water mains with the overall replacement program. On-going water distribution O&M programs are discussed with recommendations relating to leak detection, valve exercising, data collection during water main break / leak repair and distribution system mapping. The recommendation from the original 2004 AMP, for a field corrosion study to confirm the optimum approach to water main renewal and replacement system wide, is further recommended in this AMP update.

2.2. Above Ground Asset Inventory and Hierarchies

The asset inventory for the water treatment plants, pumping stations, meter pits and regulator pits is all contained in the Antero computerized maintenance management system (CMMS), which supports the maintenance program for all above ground assets. The condition data from the 2004 AMP, along with asset criticality ratings developed for this AMP Update, are currently contained in the AwwaRF Assessment Tool.

2.2.1. Current AwwaRF and Antero Asset Hierarchy

The Antero CMMS does not support a complete asset hierarchy, but does allow for assignment of assets to locations and for grouping of assets. The AwwaRF Assessment Tool, which does support a defined asset hierarchy to four levels, was initially populated for the 2004 AMP using the asset inventory from Antero. Additional assets, which are generally non-treatment process related (e.g. buildings, electrical, HVAC) were then added to facilitate the condition assessment.

The template for the AwwaRF Assessment Tool four level asset hierarchy is as follows:

- Level 1: Facility
  - Level 2: System
    - Level 3: Subsystem
      - Level 4 Units

Each water treatment plant has the following "systems" (e.g. 2nd level in the hierarchy) defined within the AwwaRF Assessment Tool:

- Buildings
- Chemical Feed Systems
- Civil / Site Work
- Distribution System
- Finished Water
- Raw Water
- Support Systems
- Water Treatment System

2.2.2. Asset Hierarchy – Summary Recommendations

The following are recommendations for improving the overall hierarchy to better support R&R planning:

- Consider a five to six level hierarchy in lieu of the four levels, which will allow for better definition and grouping of assets.
- Limit "support systems" to only non-treatment process related assets.
- Establish the Distribution System at the Facility Level (e.g. first level in the hierarchy) such that all pump stations can be grouped together.
- Establish consistent attribute data for all above ground assets.

2.2.2.1. Five to Six Level Asset Hierarchy

A modified hierarchy template with 5 to 6 levels is recommended for consideration to support overall asset R&R planning as follows:

- Level 1: Facility
    - Level 2: Location / Area / Functional Group
        - Level 3: Process / System
            - Level 4: Equipment Group
                - Level 5: Asset / Asset Group
                    - Level 6: Component (optional)

The adoption of a five to six level hierarchy will provide for better definition of assets within the currently broad categories of "chemical feed systems", "water treatment system" and "support systems". Following is the current AwwaRF Assessment Tool definition for a typical chemical feed system using the four level asset hierarchy:

- Water Treatment Plant
    - Chemical Feed Systems
        - Liquid Sodium Hypochlorite
            - Storage Tank 1
            - Storage Tank 2
            - Storage Tank 3
            - Storage Tank 4
            - Day Tank 1
            - Transfer Pump1
            - Transfer Pump 2
            - Metering Pump 1
            - Metering Pump 2
            - Metering Pump 3

The following example shows the same typical chemical feed system using a five level asset hierarchy:

- Water Treatment Plant
    - Chemical Feed Systems
        - Liquid Sodium Hypochlorite
            - Bulk Storage Tanks
                - Storage Tank 1
                - Storage Tank 2
                - Storage Tank 3
                - Storage Tank 4
            - Day Tanks
                - Day Tank 1
            - Transfer Pumps
                - Transfer Pump 1
                - Transfer Pump 2

- Metering Pumps
  - Metering Pump 1
  - Metering Pump 2
  - Metering Pump 3

The main difference is at the fourth level where assets are assigned to an "equipment group". Overall, the deeper five level asset hierarchy with the equipment groupings, makes it easier to assign and manage attributes for performance condition and criticality, which support overall asset R&R planning. In the above example, scores for overall redundancy, reliability, O&M issues, etc. can be applied at the system level with modifications made at the equipment group level rather than the individual asset level.

Also, within the AwwaRF Assessment Tool, "support systems" (2nd level in the hierarchy) includes several disparate groups of assets at the subsystem level such as the plant control system, compressed air, electrical systems, filter backwash and residuals handling. The functional area "support systems" is recommended to include only those assets not directly related to the water treatment process. NKWD should consider moving backwash and residuals up under water treatment, which will result in a clear distinction between water treatment process assets and non-treatment process assets within the overall hierarchy.

2.2.2.2. Water Distribution at the Facility Level

The current AwwaRF Assessment Tool configuration includes the distribution system at the 2nd level in the hierarchy, which then repeats under the individual water treatment plants. Each distribution pump station then appears twice at the 3rd level of the hierarchy (once under "Buildings" and again under "Distribution System"). See the example below for the Bristow Rd. Pump Station, which is currently under the Ft. Thomas WTP facility:

Ft Thomas WTP
- Buildings
  - Bristow Rd. PS
    - Building Superstructure
    - Electrical
    - Fire Protection
    - Lighting System
    - Unit Heaters
    - Fans
    - Ductwork
    - Potable Water
    - Sanitary Drainage
    - Lavatory
- Distribution System
  - Bristow Rd. PS
    - Pump 1
    - Pump 2

- Pump 3
- Flow Meter
- Hypo Tank
- Hypo Pump 1
- Hypo Pump 2
- Valves Actuators

Repeating assets at different places within the overall hierarchy makes it difficult to get a comprehensive view of overall asset condition in support of R&R planning.

Establishing the water distribution system at the "facility" level (e.g. top level in the hierarchy) with each pump station at the "location" level is recommended. Following is an example of the extended hierarchy template for the Bristow Rd. Pump Station:

- Water Distribution System
  - Bristow Rd. Pump Station
    - Buildings and Support Systems
      - Buildings and Site
        - Bldg Superstructure
        - Roof
        - Sanitary Drainage
        - Fencing
        - Access Road
      - HVAC and Plumbing
        - Fans
        - Unit Heaters
        - Ductwork
        - Lavatory
        - Potable Water
      - Electrical
        - MCCs
        - Lighting
    - Pumping System
      - Booster Pumps
        - Pump 1
        - Pump 2
        - Pump 3
      - Piping and Valves
        - Valves
        - Flow Meter
    - Sodium Hypochlorite System
      - Storage Tanks
        - Hypochlorite Tank
      - Metering Pumps
        - Metering Pump 1
        - Metering Pump 2

2.2.3. Asset Attribute Data

In addition to the asset hierarchy development, consistent attribute data is also required for all above ground assets in order to facilitate the overall asset management program. The following additional attributes should be updated:

- Asset ID field to coordinate with the CMMS and the Financial System (Great Plains). The current Asset ID field in Antero is blank.
- Estimate installation year and cost on remaining assets.
- Assign effective useful life (EUL) estimates.
- Asset nameplate data and physical characteristics

Addition of the above data will allow more appropriate determination of R&R costs based on remaining useful life calculations, as well as, development and tracking of performance metrics.

2.3. Asset Condition Assessment

2.3.1. Physical Condition Assessment

The 2004 Asset Management Project completed a visual condition assessment of all above ground assets (water treatment plants, pump stations and storage tanks). The results were input to the AwwaRF Water Treatment Plant Infrastructure Assessment Manager. For this project, the District updated the physical condition ratings from 2004. The AwwaRF scores were then converted to a 1 (best) to 5 (worst) ranking system, as recommended in the *International Infrastructure Management Manual* (IIMM).

A field walkthrough was then conducted for all equipment, which received an unfavorable condition score of 4 or 5. An opinion of cost was then assigned for the renewal or replacement as appropriate to develop the immediate and short-term capital improvement program (CIP) cost projections.

The 2004 AMP utilized a generic condition assessment form for all equipment, which was adequate to gather base-line data. The long-term recommendation is for NKWD to adopt a more comprehensive condition assessment program utilizing data collection forms customized to the type of asset.

2.3.2. Summary of Results

The District reviewed the asset data in the AwwaRF tool from the 2004 AMP, including:

- Adding new above ground assets constructed or placed in service since 2004.
- Updating condition data where necessary for existing assets.

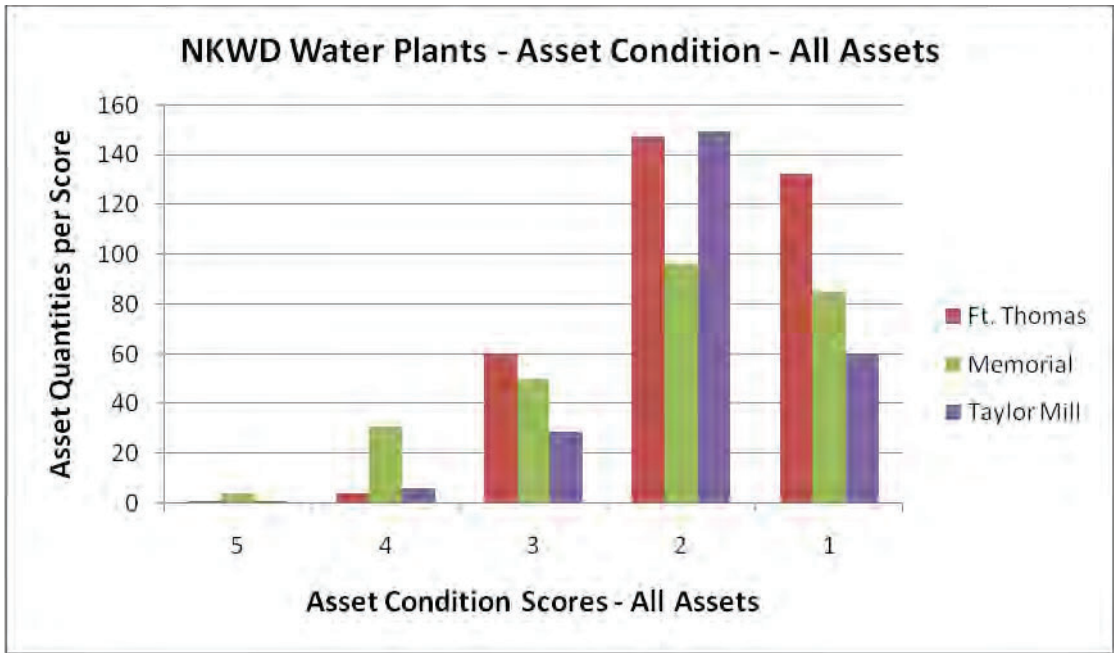
A complete summary of all asset physical condition ratings is presented in Appendix D. The following table summarizes the quantities of assets rated in poor to very poor condition (physical condition score of 4 or 5) for the three water treatment plants and the distribution pumping stations and storage tanks:

Table 2-1.
Asset Physical Condition Summary of Worst Scores (4 or higher)

Asset Type	Condition Score	Facilities and Asset Quantities				
		Fort Thomas	Taylor Mill	Memorial Parkway	Pumping Stations	Tanks
Treatment Process	5	0	0	1	NA	NA
	4	2	4	16	NA	NA
Non-Treatment Process	5	0	0	3	1	0
	4	2	2	15	5	1

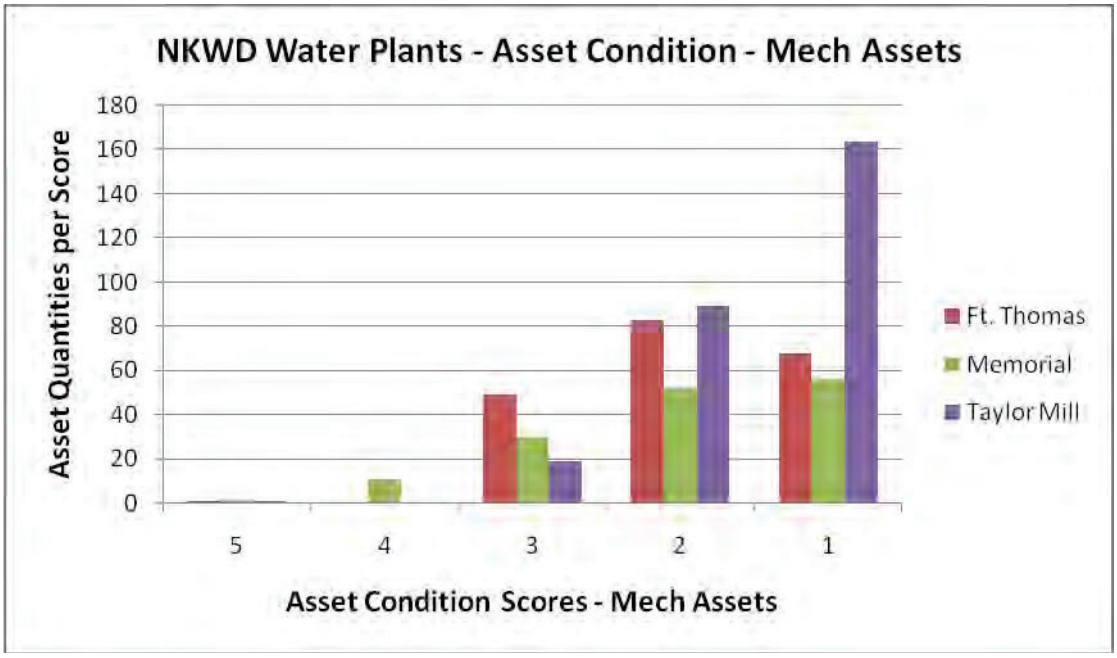
The following graph shows the physical condition scoring distribution of all assets for the District's three water treatment plants. The majority are rated 2 (good) to 1 (very good).

Figure 2-1: NKWD Water Plants - Asset Condition - All Assets



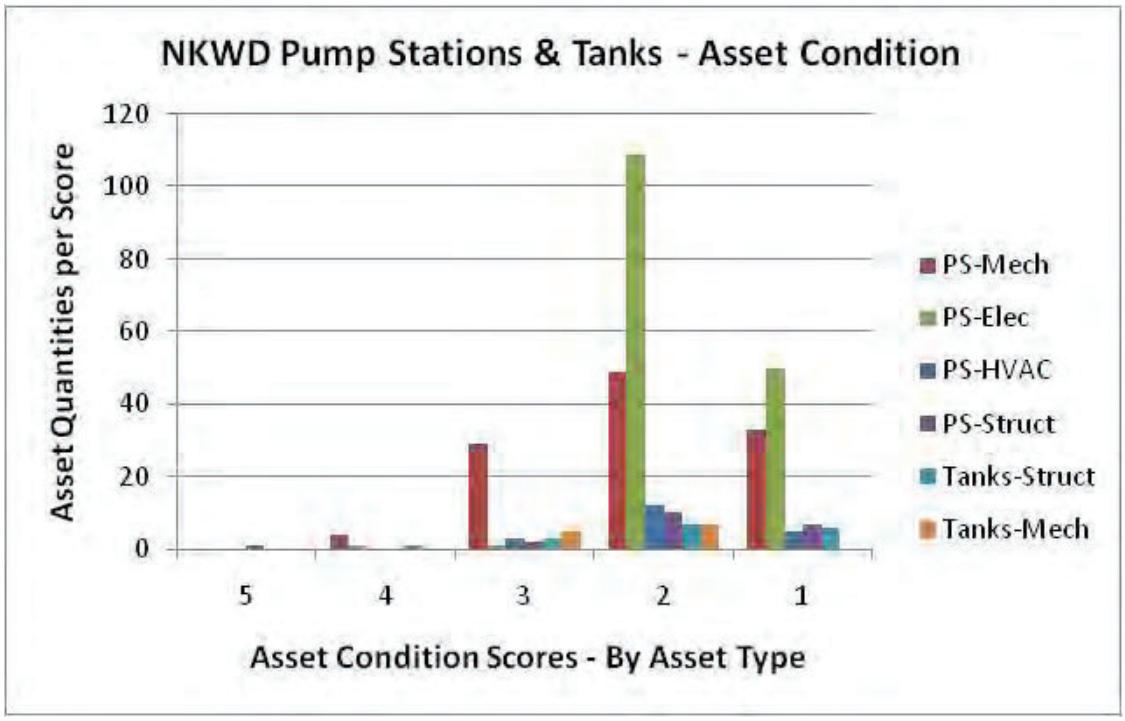
The following graph shows the distribution of physical condition scores for just the mechanical process equipment assets, which follow the same general trend of all assets, with the majority rated 2 (good) to 1 (very good).

Figure 2-2: NKWD Water Plants - Asset Condition - Mechanical Assets



The following graph shows the distribution of physical condition scores for all assets at the distribution pump stations and storage tanks by asset class (process mechanical, electrical, HVAC and structural). Again, the results demonstrate the same general trend as the treatment plant results, with the majority of assets scoring 2 (good) to 1 (very good). The exceptions are two "spikes" showing condition 3 (fair) and 4 (poor) process mechanical assets at the pump stations, including valves and chemical feed equipment.

Figure 2-3: NKWD Pump Stations & Storage Tanks - Asset Condition - All Assets by Class



2.3.3. Summary of Recommendations

The final asset management program for NKWD is recommended to include two measures of equipment condition as follows:

Physical Condition: Defined as the current state of repair and operation of the asset as influenced by age, historical maintenance and operating conditions. Physical condition can be assessed in a series of three tiers:

- Tier 1 – a visual inspection of the asset based on a set of criteria defined for the asset type (e.g. mechanical, electrical, HVAC and structural). The ratings are generally assigned from 1 (excellent) to 5 (poor). The results of a visual inspection can be adjusted based on a review of maintenance records or other operational data.
- Tier 2 – a performance based inspection involving some type of testing (capacity, thermography, vibration, oil analysis, etc.). Tier 2 testing can be recommended following the visual assessment for more critical assets where the consequence of failure is high and the equipment condition cannot otherwise be adequately determined. The District is currently utilizing some Tier 2 testing within the Pump Inspection Program (PIP).
- Tier 3 – specialized testing appropriate to the type of asset and operating conditions, which generally involves significant effort and/or expense (e.g. metallurgical analysis).

Performance Condition: Defined as the ability of the asset to meet current and future performance requirements in areas such as capacity, regulatory compliance and overall reliability. General O&M issues, beyond reliability, and issues of overall equipment obsolescence can also be considered in the performance condition evaluation. Performance condition is evaluated on a series of weighted criteria with scoring accomplished via interviews of O&M personnel and review of historic operating data. Because performance condition also incorporates the projection of future capabilities, the overall scoring must be coordinated with master planning / facility planning activities related to capacity and/or process modifications to accommodate growth and regulatory needs.

The 2004 AMP did not include a comprehensive asset performance assessment, but did provide some basic rating of asset performance within the overall physical condition assessment. The long-term recommendation is for NKWD to adopt formal performance condition assessment processes for water treatment and pumping related assets and for non-water treatment related assets such as electrical and HVAC. A weighted criteria approach is recommended for the performance condition assessment. The assets are evaluated against the criteria on a scale from 1 to 5, similar to the physical condition rating process. An example of typical performance condition evaluation criteria, with weights and scoring guidelines for treatment process assets, is shown in the example below:

Figure 2-4: Examples of Typical Asset Performance Condition Criteria and Scoring

Process/Performance Condition Ranking Table								
Criteria	**Assessment Level**	**Weight**	**Condition**	**1**	**2**	**3**	**4**	**5**
Capacity	System/ Process	25%	Ability to meet current capacity	Average - Yes* Peak - Yes*	Average - Yes* Peak - Yes**	Average - Yes* Peak - No**	Average - Yes** Peak - No**	Average - No** Peak - No**
			Ability to meet future capacity	Average - Yes* Peak - Yes*	Average - Yes* Peak - No*	Average - Yes** Peak - No**	Average - No* Peak - No**	Average - No** Peak - No**
Regulatory	System/ Process	25%	Ability to meet current regulations and utility goals	Yes	Yes	Yes	Yes - with some modifications required	No
			Ability to meet future regulations and utility goals	Yes	Yes - with some modifications required	No	No	No
Reliability	Equipment Group	20%	Average time equipment is available when needed	99-100% (4 days O/S)	95-99% (up to 18 days O/S)	90-94% (up to 36 days O/S)	85-89% (up to 55 days O/S)	<84% (over 55 days O/S)
O&M Issues	Equipment Group	15%	Frequency of O&M Issues (Excluding Breakdowns)	None	Very Infrequently (Quarterly)	Infrequently (Monthly)	Frequently (Weekly)	Very Frequently (Daily)
Obsolescence	Equipment Group	15%	Equipment Technology	Technology Best Available/ State of the Art	Technology Industry Standard/ "Tried and True"	Technology Considered Appropriate	Technology Nearing Obsolescence	Technology Obsolete / Out of Date

* - With One Unit Out of Service ** - With All Units In Service O/S - Out of Service

The use of a second condition scoring category provides further differentiation in the calculation of asset priority for renewal and replacement planning (see Section 2.5).

Additional recommendations include the following:

- Adopt the 1 to 5 ranking system for visual condition assessment as recommended by the IIMM.
- Establish baseline data in the CMMS from the 2004 AMP and subsequent updates completed for this AMP Update.
- Create a work order type in the CMMS specific to a Tier 1 visual condition assessment.
- Schedule condition assessment updates based on asset criticality and current baseline condition.
- Coordinate with effective useful life (EUL) estimates.
- Develop asset specific condition assessment forms.
- Link forms to assets in CMMS.

2.4. Above Ground Asset Criticality

Criticality evaluates the consequence of failure. The 2004 AMP did not include the assignment of asset criticality. The District assigned criticality within the AwwaRF Assessment Tool as a baseline to begin this AMP update.

2.4.1. Criticality Approach

The AwwaRF Assessment Tool scores assigned by the District were converted to a weighted criteria evaluation approach, which allows criticality to be assigned at the process level with exceptions made at the equipment group or asset level as required. Assigning criticality at the upper levels in the asset hierarchy simplifies the data management effort and the overall asset renewal and replacement analysis.

Criticality criteria and weights were established for the following asset classes:

- Water treatment process assets (e.g. pumps, chemical systems, etc.) at the water treatment plants. All water treatment plants utilized the same criteria and weights.
- Non-treatment process assets (e.g. HVAC, electrical, etc.) at each water treatment plant. Similar to the treatment process assets, all criteria and weights are the same for each plant.
- Water distribution pump stations and tanks utilized the same criteria as the non-treatment process assets, but different weighting factors, which were the same for all sites.

- Building related assets (e.g. Roofs, structural elements, elevators and other building systems). The same criteria and weights were used for all building assets at the three water treatment plants. The pump station building structures were not evaluated separately and were included with the pumping stations.

The following table summarizes the criteria and weights utilized for asset criticality:

Table 2-2.
Asset Criticality - Final Criteria and Weights

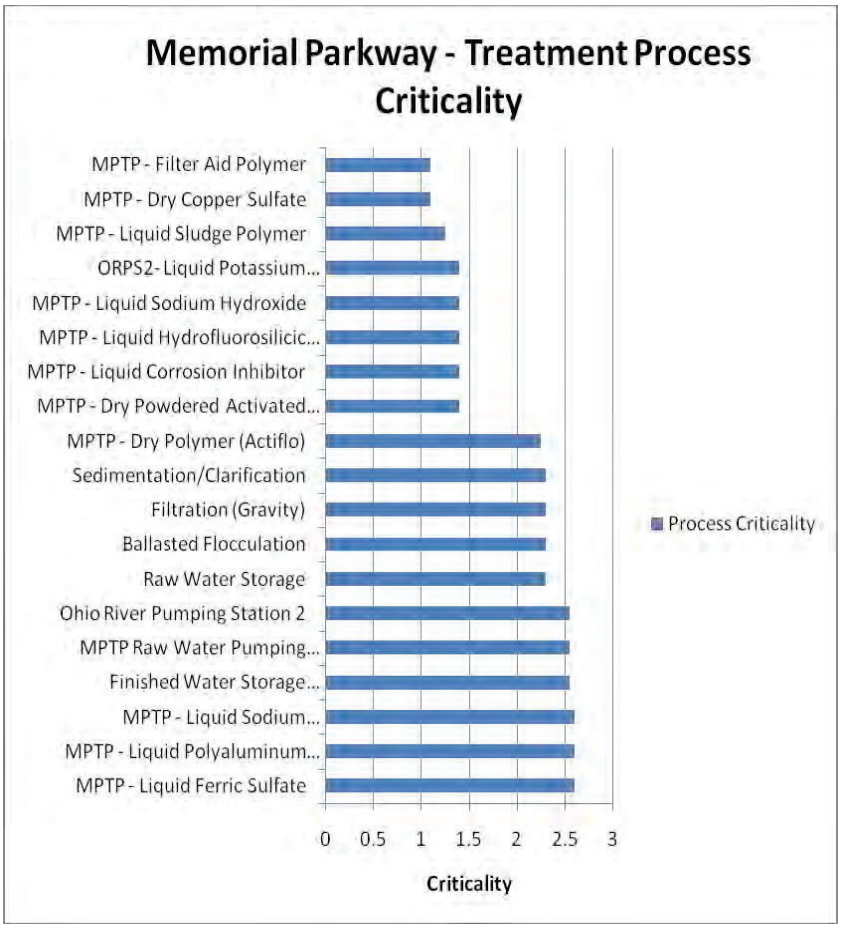
Asset Type	Criticality Criteria Weights						
	Regulatory	Level of Service	Safety	Redundancy	O&M Impacts	Facilities Impact	Process Impacts
WTP Treatment Process	30%	30%	15%	15%	10%	NA	NA
WTP Non-Treatment (Elec, HVAC, etc)	NA	NA	35%	35%	30%	NA	NA
Pump Stations & Storage Tanks	NA	NA	10%	50%	40%	NA	NA
Building Assets	NA	NA	NA	NA	25%	25%	50%

The assets were evaluated on a scale from 1 (least critical) to 3 (most critical).

2.4.2. Summary of Results

The complete results are presented in Appendix E for all the asset types. The following figure summarizes the criticality results for the treatment processes at Memorial Parkway water treatment plant. Results for the other water plants are similar.

Figure 2-5: Memorial Parkway WTP - Example Treatment Process Criticality



The following table summarizes the pump station criticality scores utilizing the weighted criteria approach as compared to the criticality assigned via the AwwaRF Assessment Tool:

Table 2-3.
Pump Station Criticality - Current Scores Compared to AwwaRF Ratings

Pump Station	Criticality	AwwaRF
Dudley 1080	**3**	FATAL
Dudley 1040	**2.8**	FATAL
Latonia	**2.8**	FATAL
Ripple Creek	**2.8**	FATAL
Taylor Mill	**2.8**	FATAL
US 27	**2.8**	FATAL
Carothers Rd.	**2.4**	SEVERE
Bristow Road	**2.1**	MODERATE
W. Covington	**2.1**	MODERATE
Bromley	**1.9**	MODERATE
Richardson	**1.9**	MODERATE
Waterworks Rd.	**1.9**	MODERATE
Hands Pike	**1**	MINOR

2.4.3. Summary of Recommendations

The recommendation is for NKWD to adopt a more standardized approach to asset criticality than can be supported within the current AwwaRF Assessment Tool:

- Adopt a weighted criteria approach with numerical scoring for: treatment, non-treatment and building system assets.
- Apply scoring at the process and equipment group (3rd and 4th) levels in the asset hierarchy with exceptions only at the asset (5th) level.
- Integrate with current reliability centered maintenance programs (e.g. the Pump Inspection Program) to prioritize equipment for inspection and evaluation.
- Utilize criticality to expand RCM program to other critical assets as part of next AMP update.

2.5. Asset Renewal and Replacement (R&R) Planning

2.5.1. R&R Evaluation Alternatives

The asset evaluation for renewal and replacement (R&R) planning utilized two approaches: (1) asset priority and (2) effective useful life to develop the final renewal and replacement portion of the overall capital improvement program (CIP).

The assets were placed into five CIP Groups, corresponding to planning periods, as shown in the table below:

Table 2-4.
Asset R&R Planning and CIP Groups

Group	Priority	Years	CIP	Evaluation Approach
1	**Highest**	1-3	5-year	Asset Priority
2	**High**	1-5	5-year	Asset Priority
3	**Moderate**	6-10	20-year	Effective Useful Life
4	**Low**	11-20	20-year	Effective Useful Life
5	**Lowest**	Beyond 20	NA	Effective Useful Life

2.5.1.1. Asset Priority Evaluation Approach – 5 yr CIP

The 5-year CIP for short-term asset replacement needs in CIP groups 1 and 2 was developed based on a calculation of asset priority using the following approach:

$$Priority = (\sum Condition) * Criticality$$

For this AMP Update, which only includes the single score for physical condition, the priority evaluation is simplified, with possible scores from 1 to 15.

The next AMP Update, which is recommended to include an additional rating for performance condition, will be able to support more detailed analysis of asset R&R needs beyond physical condition. For example, an analysis could be done to identify the highest priority assets with the worst scores in all the weighted performance condition criteria (e.g. capacity, regulatory, reliability, etc.).

2.5.1.2. Effective Useful Life

The 20-year CIP for years 6 through 20 of the planning period was developed utilizing the physical condition data provided by NKWD and an estimate of asset effective useful life. The effective useful life for various asset classes utilized in the evaluation is summarized in the following table:

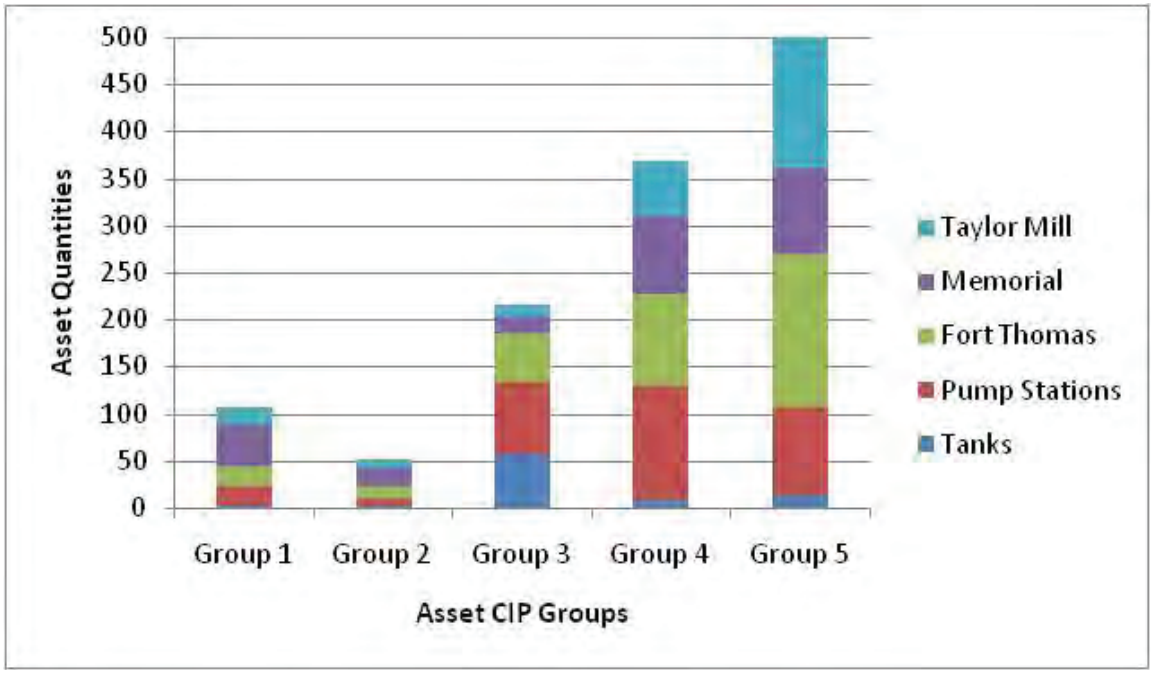
Table 2-5.
Asset R&R Planning - Effective Useful Life Estimates

Asset Class	Asset Type	PSC EUL (yrs)	Industry EUL (yrs)
Process Mechanical	Process Pumps	20	30
	Residuals Pumps	20	20
	Process Equipment	30	20
	Process Valves	30	30
	Process Piping	--	40
	Gates	--	40
Chemical Feed	All Equipment	30	15
Electrical	Generators	20	20
	MCCs & Distribution	20	20
	Lighting	37.5	20
	Building Electrical	37.5	30
Instrumentation	Flow Meters	20	20
	Field Instruments	10	10
HVAC	All Equipment	37.5	20
Structural	All masonry / concrete	37.5	67

2.5.2. Summary of Results

The complete results of the asset R&R evaluations for all facilities are presented in Appendix D. Condition data was utilized for a total of 1,248 assets between the water plants, pump stations and storage tanks. Approximately 13% (159) assets fell into the higher priority CIP Groups 1 and 2 for the 5-year CIP projections. Approximately 47% (585 assets) fell into CIP Groups 3 and 4 for the 20-year CIP projections. The remaining assets (approximately 40% or 504 total assets) fell into Group 5, which is outside of the 20-year planning period. The following graph illustrates the final asset CIP groupings and asset quantities in each group for the three water treatment plants, storage tanks and pump stations:

Figure 2-6: NKWD Water Plants, Pump Stations and Tanks - Asset R&R Groups and Quantities



2.5.3. Summary of Recommendations

2.5.3.1. Effective Useful Life Approach

The recommendation for this AMP Update is for the District to move towards an effective useful life (EUL) approach to above ground asset R&R planning and budget forecasting. The "effective useful life" of an asset is not a static number. The initial estimate can be based on published industry data, manufacturer recommendations or internal experience with similar equipment. Initially the District will adopt the life expectancy as directed by the PSC for use in the depreciation of assets. The asset EUL will then be adjusted over time based on operating conditions, maintenance program history and performance. The EUL program needs to evolve over time and will provide a flexible R&R approach able to accommodate the following:

- Assets which are operated only seasonally or infrequently (adjust EUL upwards).
- Situations where assets have been partially or substantially rebuilt (adjust EUL upwards).
- Assets operating in severe duty situations (adjust EUL downwards).

The adoption of an EUL approach for asset R&R planning supports the use of reliability centered maintenance (RCM) principles similar to the current Pump Inspection Program (PIP), which can serve as a familiar model for the District moving forward. Overall, the

effective useful life approach will provide a consistent framework for evaluating / comparing asset replacement decisions across all three treatment plants and the pumping stations.

The effective useful life approach can also be used to administer the use of general R&R budgets for asset classes such as building systems, HVAC and electrical distribution. Annual budgets are recommended based on the updated condition data and the walk through of each facility conducted for this AMP Update. These budgets should be reviewed annually and the programs evaluated for the next AMP Update.

Specific recommendations on the types of data required and modifications to the current Antero CMMS to support an EUL program are discussed in Section 3. The overall implementation strategy over a five year period is outlined as follows:

- Year 1:
  - Migrate AwwaRF Assessment tool condition data over to a modified Antero database as discussed in the IT Master Plan.
  - Configure "blanket" style work orders for updating of asset condition data in conjunction with already scheduled inspections. Schedule equipment condition updates based on criticality.
  - Configure the asset condition and EUL reports within Antero.
- Years 2-3:
  - Continue to update / improve asset attribute data for performance condition, criticality, expected life and replacement cost.
  - Perform first update of equipment condition ratings as required by the overall schedule.
  - Use EUL in preparation of annual budget.
  - Evaluate the overall need for integration of SCADA data with the CMMS to automate the use-based and condition-based portions of the overall maintenance program. The initial focus should be on run time information and vibration data.
- Years 4-5:
  - Implement SCADA / CMMS system integration as necessary based on evaluation. Note that this decision should coincide with the Antero upgrade discussed in the IT Master Plan.

2.6. Proposed Performance Measures

Performance measures are a critical component of any asset management program. A well developed set of measures will enable the District to track and report progress over time, gauge the effectiveness of capital and maintenance decisions, and make adjustments as necessary. We recommend that the District implement a small sample of measures in 2009 that align with specific asset management program objectives. These measures should encompass a number of key areas including reliability, regulatory compliance, financial, and operations and maintenance.

In selecting the recommended set of measures we have considered such issues as: current District practices, industry standards, current and future data availability, internal and external stakeholder needs, and alignment with current and future asset management program elements. The measures detailed below could also fit into a District-wide "balanced scorecard" or "triple bottom line" effort in the future, if desired.

Below is a list of the eight recommended measures in support of ***current AMP efforts***. Reporting for most of the measures is currently in place and will be further supported by the recommended IT system enhancements and integration.

Service Level and Reliability

1. Total Water Main Breaks and Leaks (Per 100 Miles of Pipe)
   - *Current Status* – The District currently tracks breaks and leaks and reports breakage rate.
   - *Reporting Guidelines* – Currently on a monthly basis. Consider also reporting overall reliability (breaks & leaks) on a monthly basis with a rolling 12 month average.
   - *Data Source* – GIS and GBA CMMS. GIS conversion to geodatabase will facilitate integration with GBA and can automate the reporting process.
   - *Applicable Benchmark Source* – AWWA QualServe.

2. Total Water Quality Complaints (Discoloration, Taste/Odor, Request Analysis, Air In Lines, Other) (Per 1000 Customers)
   - *Current Status* – The District currently tracks and reports water quality complaints.
   - *Reporting Guidelines* – Monthly with a rolling 12 month average.
   - *Data Source* – CIS and LIMS (secondary source). Future CIS / GIS integration could automate the majority of the reporting.
   - *Applicable Benchmark Source* – AWWA QualServe.

3. Inadequate Water Pressure Events (Customer Water Pressure <35 PSI and or a minimum of 50 PSI at All Points in the Distribution System)

   - *Current Status* – The District does not currently report separately on low pressure events.
   - *Reporting Guidelines* – Monthly with a rolling 12 month average.
   - *Data Source–CIS* - Future CIS / GIS integration could automate the majority of the reporting.

Regulatory Compliance

1. Total Water Quality Incidents / Failures of SDWA Compliance (Primary and Secondary Standards)

   - *Current Status* – The District currently tracks and reports regulatory compliance.
   - *Reporting Guidelines* – Monthly with a rolling 12 month average.
   - *Data Source* – LIMS, SCADA (secondary source) - future LIMS/SCADA data integration could further automate reporting.

Financial and Business Operations

1. Total Percent of Non-Revenue (Unaccounted For) Water (Distribution System Water Loss)

   - *Current Status* – The District currently tracks and reports water loss.
   - *Reporting Guidelines* – Monthly with a rolling 12 month average
   - *Data Source* – CIS and SCADA. Future data warehouse could automate data collection and reporting.
   - *Applicable Benchmark Source* – AWWA QualServe.

2. O&M Cost Ratios (O&M cost per account and per MGD processed)

   - *Current Status* – The District currently tracks and reports O&M cost for treatment and distribution.
   - *Reporting Guidelines* – Monthly with a rolling 12 month average.
   - *Data Source* – Antero and GBA CMMS applications. Data collection enhancements to the work order process, as recommended to adopt the short term maintenance key performance indicators, will facilitate tracking, breakdown and reporting of O&M costs.
   - *Applicable Benchmark Source* – AWWA QualServe.

Operations and Maintenance

1. Planned Maintenance Ratios (scheduled vs. unscheduled) for Distribution, Pump Stations, Tanks and Plants

   - *Current Status* – The District currently tracks work order types for preventative and corrective maintenance. Additional definition is needed for predictive maintenance and to separate "corrective" work orders resulting from a scheduled PM.
   - *Reporting Guidelines* – Monthly with a rolling 12 month average.
   - *Data Source* – Antero and GBA CMMS applications. Data collection enhancements to the work order process, as recommended to adopt the short term maintenance key performance indicators, will facilitate tracking, breakdown and reporting of O&M costs.
   - *Applicable Benchmark Source* – AWWA QualServe.

2. Total Miles of Water Mains Flushed (Planned to Actual and Percent of System Per Year)

   - *Current Status* – The District currently tracks and reports system flushing.
   - *Reporting Guidelines* – Annually as flushing is generally performed from March to November.
   - *Data Source* – GIS and GBA CMMS. GIS conversion to geodatabase will facilitate integration with GBA and can automate the reporting process.
   - *Additional Considerations* – May want to track other related measures such as cost per mile, MG of water used for flushing, etc.

Table 2-6 denotes some of the AWWA QualServe benchmarks that might be considered.

Table 2-6.
Examples AWWA QualServe Benchmarks

AWWA Benchmark Category	Midwest - 2006			National - 2006		
	Top Q	Med Q	Bot Q	Top Q	Med Q	Bot Q
Technical Quality Complaints (per 1,000 customers)	2.1	4.4	9.3	2.2	6.0	8.4
Water Loss (%)	7.5%	9.7%	12.8%	6.0%	9.5%	14.2%
Distribution System Integrity (breaks & leaks / 100mi / yr)	11.9	36.5	61.1	14.9	32.9	61.9
O&M Cost (per account)	$195	$243	$349	$208	$276	$418
O&M Cost (per MG processed)	$1,138	$1,414	$1,841	$1,010	$1,360	$2,202
Planned Maintenance Ratios: (% hours)	87.3%	70.6	46.2	81.7%	67.4%	52.0%
Planned Maintenance Ratios: (% cost)	80.2%	68.5%	39.2%	76.4%	60.6%	45.5%

Also listed below are some additional measures that could be considered for ***future AMP efforts***. We recommend that the District put in place an annual review process to ensure measures are accurate, valuable, and achieving desired outcomes. During this review process, measures can be added or enhanced as necessary to support asset management and other District-wide improvement efforts.

- Worst Served Customers (System Areas With Highest Number of Breaks/Leaks, Pressure Complaints, and/or Water Quality Complaints)
- Unplanned Supply Interruption Index (Average Minutes Per Year Per Customer)
- System Reinvestment Rate for Distribution and Treatment Plants (Expenditures For Rehabilitation, Replacement, and Renewal as a Percentage of Asset Value)
- Total Overtime Expenditure as a Percent of Base Labor (For Treatment and Distribution)

3. Information Systems Assessment and Technology Master Plan

3.1. Introduction

The Northern Kentucky Water District (the District) has determined that information systems and access to the data they contain will play a key role in supporting the successful implementation of an Asset Management Program. The Information Technology Master Plan provides a road-map for the District to follow to 1) make recommendations for a phased approach to implementing changes required to current IT systems to support the Asset Management Program and 2) develop IT governance and an information systems framework to support the District's core business processes.

This document describes major findings and recommendations related to the development and implementation of the Asset Management Program from the IT perspective. Through implementation of the recommendations, supporting business strategies through integrated information services will allow users to effectively collect, manipulate, and report on data in a manner which supports and enforces critical business processes.

3.2. Overview

The IT Information Technology Review Task is closely aligned with the development of the Asset Management Plan. Consistent with the District's "Information Technology Master Plan", the project approach and its summary recommendations are guided by the Districts current core business processes, near- and long-term strategic business goals, and are aligned with information needs of departments within the organization.

Key IT systems related to core business process and management of assets were evaluated for this project:

- Geographic Information Systems (GIS)
- Computerized Maintenance Management Systems (CMMS)/Work Order Systems
- Customer Information Systems (CIS) and Billing
- Laboratory Information Management System (LIMS)
- Supervisory Control and Data Acquisition (SCADA)
- Financial Information System (FIS)

3.3. Approach

The GIS and CMMS systems were evaluated at a detailed level. An overview evaluation was performed for the SCADA, FIS, CIS and LIMS systems, as well as the District's data communication infrastructure.

The overall information systems assessment included the following tasks.

- Information Systems Assessment
- Business Process Inventory
- Systems and Data Assessment
- IT Projects Planning
- IT Governance Recommendations Development

3.3.1. Information Systems Assessment

The objective of this task was to develop an understanding of the District's current information systems and technology infrastructure along with organizational needs for information and data. Information was gathered about the needs of the District through an extensive interview process, the data was summarized, and the information was used in subsequent assessment and planning tasks. Interviewees described use of IT systems in their day-to-day activities, answered any questions that arose about processes, and were asked directed questions intended to:

- Document and understand the information needs of all of the District's staff.
- Gain perspective on the role IT currently plays within the District.
- Identify "gaps" where current IT systems do not meet the current need for information management or overall business process support.
- Identify barriers to the deployment of new IT system and/or the integration of current systems.
- Identify areas where quick wins can be achieved.
- Support planning for a phased approach to IT investments and improvements to support asset management and overall business goals.

The interviews results are summarized in the interview summary Section 3.4.

3.3.2. Business Process Inventory

The objectives of this task were to:

- Develop an understanding of the Districts business processes and their relationship to asset management.
- Document the District's major business processes and related data.

This enabled the project team to understand the current and possible future interactions between IT and business functions. This information was used in latter phases to better assess the adequacy of existing IT systems, helping to identify where system enhancements or additions would provide the most benefit.

The business processes were also used for project prioritization, defining how each process related to the recommended projects, and determining the level of District staff involvement in project implementation and support.

3.3.3. Systems and Data Assessment

The objective of this task was to perform an assessment of current information systems and the IT infrastructure.

The task consisted of three components of information systems within the District.

- Asset Data
- Information Management Systems
- Information Technology Infrastructure

The Asset Data assessment focused on existing data for above ground and below ground assets, with regard to "data ownership". Data ownership refers to which information system is the "system or record", who is responsible for the quality of data within the system of record and how is the data made available to those within the District who use the data for work process, analysis and reporting (stewardship). The output of the asset data assessment task is recommendations for changes required to support the asset management program going forward.

The Information Management Systems assessment focused on two (2) key areas: functional fitness and technical fitness. The "functional fitness" of an IT system is the measure of *how well* the system supports the required work processes and business processes within the organization. The "technical fitness" of an IT system is a measure of the overall *technical capability* of the system, and the vendor's strength in the marketplace.

The output of the task was a fitness assessment in the form of observations and a Fitness Diagram, which depicts the relative capabilities of each system.

The Information Technology Infrastructure evaluation reviewed the data communications infrastructure that supports computing between clients (computer users) and the applications (application servers), in terms of access to information systems, and the speed at which data are processed. The infrastructure is comprised of Local Area Networks (LANs), which enable communications within a location (such as a building) and Wide Area Networks (WAN), which enable communications between locations. The evaluation of the data communications infrastructure was performed in the context of typical requirements to support the Districts "Best of Breed" approach to selection and deployment of information management systems. The assessments were used in combination with the business process inventory to define the gaps between the current and future organizational needs and the existing systems' capabilities to meet these needs.

3.3.4. IT Projects Planning

The objective of this task was to create a plan for IT related projects to be performed by the District over the next several years. The IT projects were compiled into an IT Projects Recommendation which contains key information about the projects, including in what order and when to execute the projects, an opinion of project cost and hours required for District staff.

3.3.5. IT Governance Recommendations Development

The objective of this task was to develop recommendations for improving IT governance, management and support at the District. This task emphasized equipping the District with the concepts and tools to accomplish continuous improvements in these areas over the next several years. These processes and tools will be leveraged during the implementation of the recommended IT Master Plan projects.

3.4. Summary of Recommendations

A phased approach in which immediate asset management and identified improvements in core business processes are supported through consolidation, enhancement and integration of existing IT systems, with strategic initiatives addressed through new and replacement IT systems implementation, is recommended.

Subsequent to re-alignment and/or replacement of existing IT systems, and integration of key systems to support core business processes, the District should proceed with the implementation of a Data Reporting or Business Intelligence system to leverage its operational data for strategic purposes.

3.4.1. Geographic Information Systems Environment

Lack of a mature Geographic Information Systems (GIS) technology environment hinders effective data management, prevents effective system integration and subsequent development of a Business Intelligence (BI) environment. For example, the continued use of Shape files as the basis for the GIS technical architecture has led to hundreds of inconstancies between the GIS and Distribution Work Order System. The ESRI GIS should be transitioned to a "GeoDatabase" structure, and data for the underground assets reconciled between the CMMS and GIS.

3.4.2. Data Communications Infrastructure Environment

The District acknowledges the need to improve overall Wide Area Network data communications. The reliability and speed of the WAN are of critical importance in the context of accessing information systems that contain data needed to support the asset management program. These systems are currently located at difference facilities that are interconnected by the WAN. The District is currently executing on initiatives to improve data communications between geographically dispersed locations. The District should continue to achieve improvements in its overall data communications capabilities.

3.4.3. Computerized Maintenance Management Systems Environment

The District currently maintains separate computerized maintenance management work order system (CMMS) applications for above-ground assets (Antero AllMax) and below-ground assets (gba Master Series). Additionally, condition and criticality data is maintained via an AwwaRF information system; this information should be integrated into Antero AllMax immediately. In the near term, the District should continue to maintain the separate systems for above- and below-ground assets, however consideration should be given to consolidation to one CMMS in the long term as the CMMS marketplace matures.

3.4.4. Critical Systems Integration

Lack of effective system integration hinders efficient data access and information sharing to support asset management decisions. Lack of key system integration (e.g. GIS and CIS) also impacts the efficiency of customer service. For example, customer calls must be manually coordinated between Customer Services and Distribution, because Distribution work order information (GBA Master Series CMMS) is not accessible from CIS. Water quality test billing and testing results must be manually coordinated between Customer Services and Water Quality, because the LIMS system is not accessible from CIS. The District should implement systems integrations between the CIS, GIS, LIMS, CMMS and SCADA systems to both support the asset management program and improve key business processes.

3.4.5. Asset Data System of Record

Important to the success of an asset management program is to define which information systems are the "system of record" for asset-specific data. Defining the system of record implies a stewardship of the data within the designated system. Recommendations are provided for optimizing data management for above- and below ground assets between the District's current systems, which are critical to the asset management program including: Microsoft Great Plains financial information, Antero AllMax work order management, and gba Master Series work order management systems.

3.5. Summary of Recommended Projects

The following sections will serve as a high-level strategic roadmap for the District as it implements the projects recommended by this memorandum, to be included in the IT master plan. These projects are proposed and can be modified in content and/or order of implementation by the District. Since this plan covers a long span of time, it is expected that priorities will change and other projects arise that will require the District to make changes to this plan.

3.5.1. Recommendations for Immediate Action

The "Foundation" project recommendations presented in Table 3-1 are suggested prior to commencement of specific IT projects. Implementation of these recommendations will provide immediate support for asset-related management activities, as well as streamline core business processes and prepare the District for IT improvements. Tables 3-2 through 3-4 present the near-term, mid-term, and long-term IT project recommendations.

Table 3-1.
Foundation Projects

Project Focus	Task	Justification
Infrastructure	Continue to improve WAN data communications reliability and speed between locations.	Success of IT improvements will be contingent on reliable access to decentralized information systems from all departments within the District.
System Upgrades/Enhancements	Update Antero CMMS with AwwaRF & other asset data.	Consolidation is required to insure reliable access to accurate above-ground asset performance data, and Antero CMMS as the "system of record" for physical and performance data for above ground assets.
	Convert ESRI GIS to GeoDatabase	Required to support key integration between GIS and CMMS to insure below-ground asset physical data reliability and accuracy, and reduce burden to IT staff.
Strategies/Process Improvements	Reconcile inventory control methods.	Standardization on an inventory control method will eliminate accounting and budgeting disparity between FIS, CIS and CMMS information systems.
	Define approach for access to information systems and data on SCADA network	Access to data in LIMS and SCADA systems part of future IT recommendations to support asset management and to streamline key business processes.

Table 3-2.
Near Term IT Projects

Project Focus	Task	Justification
System Upgrades/Enhancements	Integrate ESRI GIS with gbaMS CMMS	Required to consolidate physical attribute data and establish ESRI GIS as "system of record" for distribution asset physical data.
	Close key operational gaps in CIS and LIMS applications	Continue to improve system functional capabilities and align with key District business processes.
	Integrate LIMS with Industrial SQL server	Automate collection of process data to support streamlining of regulatory reporting.
	Evaluate major new release of Antero CMMS to determine appropriate deployment strategy	Determine potential benefit of upgrading to new, major release of Antero CMMS, to further improve system support of asset management programs.
	Evaluate major release of Infinity CIS to determine appropriate deployment strategy	Determine potential benefit of upgrading to new release of CIS Infinity to streamline business processes and improve customer support.
Strategies/Process Improvements	Implement approach for access to information systems and data on SCADA network	Establish foundation for integration of key information systems to support asset management program and streamline business processes.

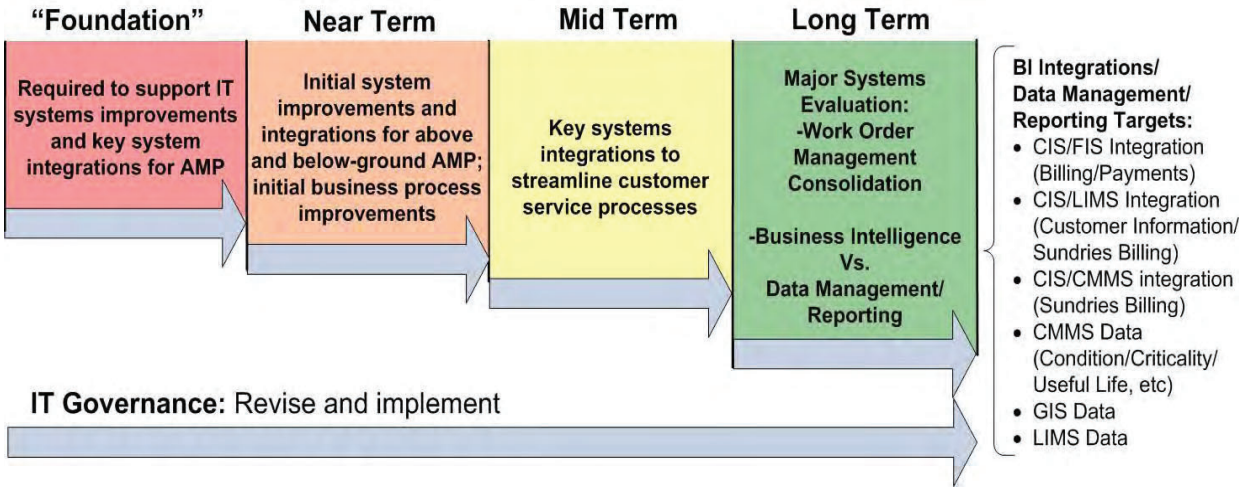
Table 3-3.
Mid Term IT Projects

Project Focus	Task	Justification
System Upgrades/Enhancements	Integrate GIS with CMMS and additional Distribution work order themes; integrate with CIS	Improve customer service by providing access to key Distribution system field activities.
	Revise existing Distribution CMMS interfaces via APIs	Standardize current integration using vendor-supported methodologies that will be supported in future system upgrades and reduce burden on IT staff.
	Implement additional functionality in Antero (assuming upgrade)	Streamline data and work processes using new/revised system capabilities.
	Integrate LIMS with CIS for service address and billing information.	Improve customer billing functions be consolidating all aspects of customer support and billing into single system.

Table 3-4.
Long Term IT Projects

Project Focus	Task	Justification
Strategies/Process Improvements	Evaluate need for either Business Intelligence or Data Management/Reporting services system.	Deferring decision to long term provides sufficient time for the District to evaluate specific requirements for further systems integration and data reporting.
	Evaluate additional GIS integrations to support "self-serve" mapping.	Significantly reduce IT staff burden on Map/GIS related activities.
System Upgrades/Enhancements	Integrate CIS/LIMS with BI or Data Management/Reporting.	Integrate CIS and LIMS for consolidation of billing and to support streamlining customer inquiries.

3.5.2. Project Schedule



3.5.3. Project Budget

The following budget for the overall IT recommendations implementation presented in Table 3-5 is based on our opinion of estimated external costs to the District. These estimates will be further refined during the early phase of each project.

Table 3-5.
Total Projected External Costs

	Project Name	Year 1	Year 2	Year 3	Year 4	Year 5	Years 5+
Foundation	WAN improvements	$20,000	$5,000	$5,000	$5,000	$5,000	$5,000
	Antero-update with AwwaRF data	$20,000	$2,000	$0	$0	$0	$0
	Convert to ESRI GeoDatabase	$150,000	$15,000	$0	$0	$0	$0
	Reconcile Inventory Control Methods	$30,000	$3,000	$0	$0	$0	$0
	SCADA network data communications approach	$5,000	$0	$0	$0	$0	$0
	Implement IT Issues Tracking System	$10,000	$1,000	$1,000	$1,000	$1,000	$1,000
Near Term	GIS/CMMS integration	$0	$120,000	$12,000	$0	$0	$0
	CIS/LIMS gaps closure	$0	$80,000	$8,000	$0	$0	$0
	LIMS/Industrial SQL integration	$0	$80,000	$8,000	$0	$0	$0
	Antero new release deployment strategy	$0	$10,000	$0	$0	$0	$0
	CIS Infinity new release deployment strategy	$0	$10,000	$0	$0	$0	$0
	Implement SCADA network data communications strategy	$0	$50,000	$5,000	$0	$0	$0
Mid Term	GIS/CMMS/CIS integration	$0	$0	$100,000	$10,000	$0	$0
	Revise CMMS Interfaces	$0	$0	$80,000	$8,000	$0	$0
	Upgrade Antero with Revised Functionality	$0	$0	$80,000	$8,000	$0	$0
	LIMS/CIS Integration	$0	$0	$50,000	$5,000	$0	$0
Long Term	BI/Data Reporting Evaluation and Implemetation	$0	$0	$0	$35,000	$200,000	$10,000
	CMMS Consolidation	$0	$0	$0	$20,000	$100,000	$10,000
	Totals	$235,000	$376,000	$349,000	$92,000	$306,000	$26,000

For the overall IT master plan implementation effort to be successful, a large amount of District participation is required. The District will need to work closely with consultants and software vendors to define system requirements, review designs, perform acceptance tests, and be trained on the systems. Also, once the systems are in place, the District will need to provide user and system support.

The total overall level of effort for implementation and support is described Table 3-6 below and detailed further in the specific project sections below.

Table 3-6.
Total Projected Internal Labor Hours

	Project Name	Year 1	Year 2	Year 3	Year 4	Year 5	Years 5+
Foundation	WAN improvements	220	100	100	100	100	100
	Antero-update with AwwaRF data	530	1400	1000	1000	1000	1000
	Convert to ESRI GeoDatabase	1240	2300	1500	1500	1500	1500
	Reconcile Inventory Control Methods	620	300	300	300	300	300
	Implement IT Issues Tracking System	810	520	300	300	300	300
	SCADA network data communications approach	280	400	100	100	100	100
Near Term	GIS/CMMS integration	0	590	1000	650	650	650
	CIS/LIMS gaps closure	0	280	280	280	280	280
	LIMS/Industrial SQL integration	0	380	350	300	300	300
	Antero new release deployment strategy	0	240	520	360	720	720
	CIS Infinity new release deployment strategy	0	280	670	1300	1300	1300
	Implement SCADA network data communications strategy	0	180	100	100	100	100
Mid Term	GIS & CMMS/CIS integration	0	0	1030	620	300	300
	Revise CMMS Interfaces	0	0	320	100	100	100
	Upgrade Antero with Revised Functionality	0	0	320	250	150	150
	LIMS/CIS Integration	0	0	750	520	260	260
Long Term	BI/Data Reporting Evaluation	0	0	0	800	4100	800
	CMMS Consolidation	0	0	0	600	2200	600
	Totals	3700	6970	8640	9180	13760	8860

3.5.4. Minimum, Moderate & Aggressive Options

Options for IT Project Spending are outlined in this section as "Minimum", "Moderate" and "Aggressive".

The minimum option for IT Project Spending includes those projects that must be executed in order that the District's information systems can adequately support an effective asset management program for both above and below ground assets. IT projects intended to improve core business processes and the implementation of a Business Intelligence or Data Management/Reporting system are deferred.

The moderate option for IT Project Spending includes those projects required to support an effective asset management program, as well as those needed to improve core business processes and lead to the implementation of either a Business Intelligence or Data Management/Reporting system. In the moderate approach, IT projects supporting the above and below ground asset management programs occur in years one and two, while those to improve core business processes occur starting in year three as demonstrated in Table 3-7.

Table 3-7.
IT Projects Costs and Schedule for the Moderate Approach Option

IT Project Groups	IT Projects for Capital Improvement Program – Planning Years					
	Year 1	Year 2	Year 3	Year 4	Year 5	Years 5+
Foundation	$235,000	$26,000	$6,000	$6,000	$6,000	$6,000
Near Term	0	$350,000	$33,000	0	0	0
Mid Term	0	0	$310,000	$31,000	0	0
Long Term	0	0	0	$55,000	$300,000	$20,000

The aggressive option moves all IT projects required to support the above and below ground asset management program into the first year, and accelerates the implementation of business process improvement to begin in years one and two.

3.5.5. IT Governance

The overall implementation of an IT Governance process is recommended over the next 3 to 5 years to facilitate the ongoing management and implementation of it projects and initiatives.

The term "IT Governance" refers to an integrated approach for best practices in the overall cost effective management of information technology in support of an organization's mission and business objectives. Recommendations for the implementation of an overall IT governance framework can be obtained from sources such as the IT Governance Institute and other research within the industry. The fundamental underlying principles of sound IT governance are to identify the key decision areas within the organization and then to involve stakeholders in the decision process in the most appropriate way. Key IT decision areas, as suggested by Weil and Ross in their book "IT Governance" should include the following:

- IT Principles: clarifying the business role of information technology within the organization.
- IT Architecture: defining system standards and integration strategies.
- IT Infrastructure: defining communication, network and hardware requirements and standards.
- Business Application Needs: developing the business case for purchased and internally developed applications.
- IT Investment Project Portfolio Management: Selecting, prioritizing, scheduling and funding IT improvements.

In addition to these five areas, we are also recommending NKWD include "IT Support" as a key focus area defined as the internal support need for network, hardware and all software applications.

As a first step in the overall development of IT Governance, it is our recommendation that the District implement a system to track IT service issues. Implementation of such a system would allow the District to more efficiently:

- Address key issues identified around IT staff workload and scheduling
- Facilitate staffing plan in anticipation of recommended major IT initiatives
- Identify opportunities for outsourcing
- Support development of baseline IT staff performance metrics and subsequent measurement against desired performance levels.

3.6. Existing Conditions

The District uses a "best-of-breed" approach to selection of IT systems, which has resulted in the implementation of products from multiple vendors, representing various system architectures. The selected products support operational requirements within the department very well, however some functional gaps exists. The functional gaps have been identified, and in some cases action is underway to resolve them. Some application

implementations have been identified as not optimal, and measures are underway to improve system functionality.

Due to various factors including cost of integration services and physical network boundaries, there is a limited amount of integration between systems. This impedes access to data contained within the system to those outside the departmental boundary. Without further integration, the current systems cannot provide information for current operational processes, and cannot support strategic business analysis.

With few exceptions, IT product selections were initiated and conducted within the department which required the system. In some cases the IT department was involved with the needs definition, selection, implementation, training and support; and in some cases they were not.

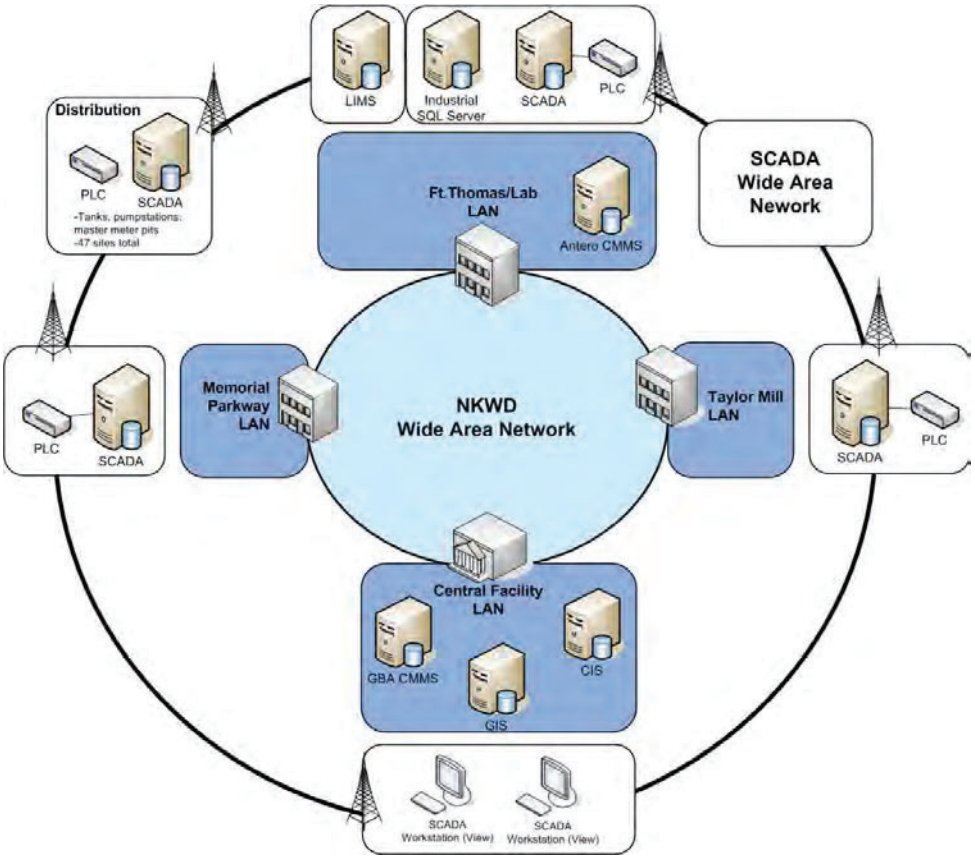
The following applications are currently in use at the District, and were discussed during the stakeholder interviews:

- Geographic Information System/Mapping: ESRI ArcGIS v9.2
- Computerized Maintenance Management System for above ground assets (water treatment plants and pumpstations): AllMax Antero v4
- Computerized Maintenance Management System for below ground assets (distribution): George Butler Associates Master Series v6.7.1.
- Customer Information System/Billing: Advanced Utility Systems CIS Infinity v2
- Laboratory Information Management System: Accelerated Tech Sample Master v8.0.0.3
- Supervisory Control And Data Acquisition: InTouch Wonderware v8.02 with Industrial SQL Server.
- Financial Information System: Microsoft Great Plains Dynamics

Hardware systems supporting these applications reside on one of two data communication networks. The main data communications network, which includes wide-area connectivity between the District's main facilities, or the SCADA network, which interconnects the SCADA system locations at the Water Treatment Plants and Distribution facilities, as well as the Central Facility building.

Figure 3-1 depicts systems, applications and their physical and network locations:

Figure 3-1: NKWD Wide Area Network



The District data communications infrastructure consists of two physical networks; one supporting data communications and telecommunications, the other supporting controls systems (SCADA) systems. Information systems that reside on the SCADA network are not currently available for integration. For example, the Laboratory Information Management System (LIMS) is physically located on the SCADA network, inhibiting data sharing and integration with other IT systems.

3.7. Interview Summary

The following are summaries of interviews with District staff pertaining to the IT governance, information technology infrastructure and key IT systems. Current conditions, functionality, planned improvements and key issues are detailed.

3.7.1. IT Governance/Management

Current Conditions

- IT department staff provides assistance to all other departments when assistance is requested. The IT department staff size and workload limits the availability of IT staff to participate in IT projects, over and above day-to-day support.
- Although the District and IT department are interested in opportunities for outsourcing services, there is no information to support where outsourcing would be most effective. There is currently no system in place for IT issues tracking.
- A limited number of custom integrations have been developed and implemented for data synchronization between gbaMS and CIS. These integrations are difficult to maintain between incremental upgrades to gbaMS.
- The IT Department is responsible for maintaining the water distribution infrastructure data in the GIS, as well as all map-related maintenance and information distribution. Mapping processes are many and extensive, as demonstrated in the IT Master Plan section that documents the Districts mapping processes.
- The IT department participates in a limited extent with other departments in selecting and implementing information systems.

Planned Improvements

- The Voice/Data communications network is going to be replaced in the near term. This will lead to improvements in overall data communications between District locations, chiefly the Water Quality Laboratory and the Central Facility. It is anticipated that the District will identify a new telecommunications vendor as part of the replacement system.
- The IT department is planning to integrate gbaMS and the Laserfiche document management system.
- The IT department is involved with the implementation of an Automatic Meter Read system.
- The IT department is involved in the implementation of online bill presentment and customer account information, to be integrated with the CIS.

- The IT department has begun implementation of Spatial Data Engine (SDE) for the GIS, which is understood to be preliminary to integration with gbaMS distribution work order tracking system.
- The IT department is planning to improve overall GIS data in terms of completeness, accuracy and quality.

Key Issues

- Limited authority in IT decisions across District departments leads to difficultly in determining staffing requirements, and makes enterprise IT systems stewardship difficult. The IT department authors and maintains an IT Master Plan, which includes policies as to how departmental IT systems are implemented; however enforcement of the policy is difficult.
- IT projects are sometimes cut from operating budget due to size and business drivers.
- The demand for IT services is increasing, while the number of staff in the IT department is decreasing.
- Increase in backlog of IT-related work is decreasing staff effectiveness. The District needs a way to track IT issues and projects to facilitate better work load management and provide metrics for staffing and outsourcing.
- There is currently no "Helpdesk" function provided by the IT department.
- District departments initiate and implement IT systems with limited IT staff involvement.
- There exist duplicate functional IT systems in use in the District, leading to duplicate and redundant sources of data, with no standards for "system of record"; this makes sharing data a challenge.
- There is currently no process to identify and evaluate what IT functions and/or services could be outsourced.
- Existing data integrations between gbaMS, CIS and GIS are difficult to maintain. Undocumented changes in new releases of gbaMS tend to break existing integrations and impede data mining.
- The District is highly dependent on gbaMS, however vendor support is declining, and the quality of the gbaMS product is decreasing with each release. GBA is not forthcoming with specific information about changes in pending releases.
- GIS spatial entity attribute data is dependent on accuracy of data in gbaMS, however execution of field work orders takes precedence over mapping. Inaccuracy of GIS data feature location; accuracy of attribute data contingent on GBA. Mapping is low priority within the District; priority is work orders.

- There is a need to fully document the current GIS architecture and maintenance processes. Additionally, integrations between the GIS and scanned mapping data are needed.

3.7.2. Customer Information System/Billing System (CIS)

Current Functionality

- The Customer Information System/Billing System (CIS) manages all aspects of customer information including contact information, service address, billing address, consumption, billing, payment receipting, service order history, outstanding bad debt, and bankruptcy history for residential, industrial, and commercial accounts. The CIS is also used handle billing sundries for Distribution field services and Water Quality Laboratory charges for sample analysis. The CIS contains the District's meter inventory; meter history data is maintained and available in the CIS.
- The CIS has standard operational reports, reports for the PSC, and has a flexible reporting engine for specialized reports. Reports can be exported data to Excel for reporting, PSC reports for example.
- The CIS is the system of record for service address data, which is exported nightly to gbaMS.
- Customer work order history is available in CIS. The Service Order Module in the CIS is used to manage work orders for turn on/turn off, meter replacements and service line leaks, which are serviced by the Customer Service Department field crews. The CIS supports automated service order generation, but this feature is not currently implemented. Field supervisors schedule and print service orders on a daily basis, customer service representatives complete open service orders in CIS from hard copies that are returned by the field crews. Customer Service emails field crews with turn-ons, whoever is assigned to turn-ons for the day performs the work. Service orders that are required to close out billing cycles (e.g. meter re-reads) are a priority.
- The CIS supports user configured parameter-based exception reporting on meter read data.

Planned Improvements

- Bill payment and move-out requests will be available to customers via online service.
- Extending categories in CIS for customer call type will allow for better metrics and reporting on customer calls.
- Communications with field trucks via existing laptops will be improved in order that crews can receive email in the field.

Key Issues

- The District will be upgrading to CIS Infinity Version 3, to improve application architecture, functionality, and performance.
- The Customer Service Department is working to optimize CIS Infinity, and have budgeted for the software vendor to assist in streamlining work processes in CIS, and implement interfaces (e.g. Great Plains) and advanced functionality.
- Integration between CIS and the telecommunications system has been budgeted for five years but the project has been deferred.
- Customer information, sundries billing, work order information, and field work information contained in different systems (gbaMS and LIMS) needs to be consolidated and/or integrated with CIS in order to provide better customer service. Integrations between CIS and GBA and CIS and LIMS are needed to improve customer service by reducing call times and call hand-offs, to resolve issues with service orders passed to the Distribution group and entered in GBA, and water quality data in LIMS for example.
- A central dispatcher position is needed to coordinate field/distribution work orders.
- The meter shop is not currently using CIS to track meter repair records, thus meter failures are not traceable back to manufacturer/batch data contained in the CIS.

3.7.3. Distribution CMMS (George Butler Associates Master Series - gbaMS)

Current Functionality

- The GBA Master Series work order management application is used by Distribution Department to track work orders pertaining to distributed, buried assets, and track all water shutdowns. The District currently uses the Water Inventory Module, Work Module, Inventory Module, General Module (street listing), and Equipment Module (trucks and other equipment). The Flow Testing and Flushing modules were recently obtained. GBA is accessible and its Reporting is simple and accessible. GBA licensing supports 25 concurrent users; the software is installed on 64 District computers. There are about fifteen daily users, and five "power" users; there are currently no mobile users. Reports are easy to obtain and report data is easy to format.
- A Facilitator in the Distribution Department handles calls throughout the day and coordinates crew movement – scheduling requires flexibility. Work is prioritized; water loss and safety related work orders take precedence.
- The backlog of work, based on hours of labor, is tracked in GBA; Distribution tries to stay under 2500 hours, using contract work to bring down the hours backlog. The backlog normally peaks in September. Hours associated with hydrant flushing are

tracked in GBA – what hydrants were flushed is tracked by a DOS program, developed in-house.

Planned Improvements

- Implement the GBA Hydrant Flushing module and migrate preventative maintenance program into GBA.

Key Issues

- GBA provides upgrades to Master Series every year, but GBA is not forthcoming with improvements and changes to application, making it difficult for the District to decide whether or not to upgrade. The architecture of the current GBA customization and integrations makes it difficult to upgrade without revising the integrations, and custom reports (75 in all) need to be re-written each time application is upgraded.
- The District perceives that GBA is diversifying to other verticals, spending less time and effort on municipal utilities, that GBA support has diminished over the last several years, and that GBA is no longer responsive to the needs of the District and other municipal utilities.
- Additional customization of GBA screens is desired, but GBA customization is expensive.
- The District would like to barcode physical inventory, but this is not currently supported by GBA. GBA has indicated they would provide support for bar coding for the last three years but have not delivered the functionality.
- Inventory adjustments are being tracked manually using paper-based forms, as GBA does not support interim inventory status for items moved to field trucks (considered out of inventory), and unused parts are not returned to stock. This leads to inaccuracies in inventory reporting from GBA. The inventory control method is not synchronized with the financial system inventory method, leading to disparity between what financial system cost of inventory used versus GBA cost of inventory used.
- The District would like to implement field laptops to update work order data while in the field, but they do not have Mobile Manager. 90% of current field crew are capable of performing field updates.
- Work order hours are not maintained in the system properly, as the time between work order entry and completion is not tracked, some work is not entered into GBA, and there is not sufficient staff to enter work order data from field forms into GBA. This makes work hour data unreliable for reporting and analysis purposes.
- The cleaning and lining program is not tracked as preventative maintenance in GBA, as it is performed by a contractor.

- The District is three years behind entering physical attribute data collected through field work order forms into the GIS maps of distributed assets.

3.7.4. Water Treatment CMMS (AllMax Antero)

Current Functionality

- AllMax Antero is used by plant maintenance staff as a work order management system for above-ground assets at plants and pump stations. The application is used to generate work orders and preventative maintenance for plant equipment, generate preventative maintenance work orders for equipment. There are currently 354 preventative maintenance schedules in Antero. Monthly maintenance reports are generated in Antero. Palm Pilots, some with barcode scanners, are integrated with the Antero application.
- The Antero "Message Board" feature is useful to see what's happening pertaining to plant operations.

Planned Improvements

- The integration of Antero with data from the SCADA network to capture run-times and other equipment information monitored in the SCADA system.

Key Issues

- Antero does not include an inventory tracking module. The District is not yet tracking labor resources or consumables through Antero.
- Asset identifiers differ between Antero and the AWWARF tool, making the correlation of data between these information systems difficult.
- Antero does not support equipment hierarchy, only equipment grouping.
- Antero is currently on the Central Facility network, and cannot be integrated with the SCADA systems, which resides on the SCADA network.

3.7.5. Geographic Information System (GIS)

Current Functionality

- The ESRI GIS provides District-wide access maps representing distribution system assets, with some physical attribute data that is synchronized from GBA. Additional mapping capabilities are provided through links to scanned strip maps and

engineering drawings. Additionally, the GIS is used in conjunction with the billing system to show water usage and demand.

Planned Improvements

- Complete mapping of all water mains in the GIS.
- Update to provide all distribution system pipe ages, lengths and diameters to support the hydraulic model.
- Replace the underlying "Shape" file architecture with the ESRI GeoDatabase (GDB).

Key Issues

- Not all of the Districts mains are identified and mapped in GIS; however the effort to do so is nearly complete.
- The District needs to elevate the priority of entering physical attribute data information collected in the field into the GIS. There is limited certainty that all recognized changes are updated into the GIS. The geocoded break data is thought to be only 60% complete.
- The accuracy of currently used GPS technology is 20', not 3-5' as previously thought; it is not understood if this can be rectified, and the District may not be able to use GPS data from hydrants to update maps, due to accuracy issues.
- There are major differences in the spreadsheet used to capture pipe type, size, length, creating difficulty when trying to reconcile the major differences between the GIS and the spreadsheet.

3.7.6. Laboratory Information Management System (LIMS)

Current Functionality

- The Laboratory Information Management System is used by Water Quality for water sample data management for over 300 sample sites, water quality complaints, compliance and regulatory reporting, process chemical inventory, and invoicing for contract laboratory services that represent 10% to15% of the work performed by the Water Quality Laboratory. Daily testing includes 50 to 60 biological samples; the lab averages 60 samples per day. The lab also performs water quality testing for individuals who are not customers of the District.
- The LIMS was installed in January of 2007 by the software vendor Accelerated Technology Laboratories, with whom the district holds a "Gold Support System" level support contract. The LIMS application server is currently connected to the SCADA network, and is not accessible from the Central Facility.
- The LIMS can be used to develop pricing for water sample testing.

- The lab staff is responsible for executing system backup procedures, as established by the IT department.
- Reports are generated from the LIMS on a monthly basis. "Canned" reports can be tweaked for more specific purposes.
- Billing for customer water quality tests is tracking in a separate dBase database. Laboratory staff uses the CIS for customer verification and to lookup customer address information.

Planned Improvements

- Complete the integration of laboratory instruments for direct data transfer into the LIMS.
- Develop programming within LIMS to incorporate lab data QA/QC processes, eliminating need to perform the procedures external to the LIMS application.
- Complete development of LIMS reports.
- Configure LIMS to support high accuracy tracking of consumables.

Key Issues

- The lab would like to automate the transfer of residuals data collected by the SCADA system into the LIMS.
- Plant operators perform water quality testing as part of their rounds, some of which is duplicated by the lab. Water quality data collected by operators is entered into Excel spreadsheets.
- QA/QC is performed external to the LIMS application using Excel; procedures will be performed in LIMS when the LIMS supports QA/QC procedures within the application.
- The LIMS system has a limit of 99 sample entries per day, which has been attained only once. Additional sample data entry is deferred to the next day.
- The lab would like to move to electronic reporting to the State. The State requires hard copies of reports to be kept for 10 years at lab.
- LIMS will have to be updated on a yearly basis; however it has not been verified that there will be support for Vista.
- Customization of LIMS is expensive.
- There is no coordination on reporting between the Laboratory, Operations and Maintenance, and Distribution; all departments are doing separate reporting.
- AllMax Operator 10 is being evaluated for support of data management related to information collected during operator rounds and water quality testing performed by operations.

3.7.7. Supervisory Control and Data Acquisition (SCADA)

Current Functionality

- InTouch Wonderware v 8.02 with Industrial SQL server is implemented as the Supervisory Control and Data Acquisition system. Process control is performed via logic programmed into Programmable Logic Controllers (PLCs). Each Water Treatment Plant has its own redundant SCADA servers, and there is a separate server for the distribution system. The SCADA network is interconnected over the wide area via 64Kbps interconnections between plants. Industrial SQL Server is used to collect plant process data. There are a total of 19 SCADA workstations, of which 2 are located in the Central Facility, and can be used for viewing current process statuses. Reports are generated automatically and delivered in Excel format.
- The Fort Thomas Water Treatment Plant and the Distribution system are currently operating automatically via the SCADA; operators monitor operations and can intervene if necessary. Alarm functions notify operations of the status of key data points; audible alarms are configured for key operations at the plants, and for critical alarms there is an alarm dialer. Some power measurements are also recorded in the SCADA.
- Filter washes are performed automatically, but operators will occasionally practice filter washes should it need to be done manually.
- The SCADA includes 20 remote monitoring 20 sites for CL2, PH and turbidity, of which 10 sites are also monitored for corrosion.
- The SCADA is programmed to indicate potential issues in the distribution system that result in interruption of service. When this occurs it is considered an emergency situation; customer service is notified, or Distribution is notified to enter a work order.
- IT currently has no role in supporting the SCADA system.

Planned Improvements

- A plant automation project is currently underway at the Memorial Park Water Treatment Plant.
- The SCADA data communications infrastructure is being transitioned from Allen-Bradley Data Highway Plus to Transmission Control Protocol/Internet Protocol over Ethernet.

Key Issues

- The Taylor Mill Plant requires work before it can be automated.

- The District is evaluating a newer version of Wonderware and add-ons for implementation.
- There is currently no condition monitoring for pump control, pressure control, motor temperature or vibration.
- Engineering does not use SCADA reporting capabilities to obtain process data – they use "easier" alternative methods to get data in an Excel format.
- There is a desire to develop automated data transfer between the SCADA system and the plant computerized maintenance management system (Antero).
- There is currently no mechanism to maintain a cross-reference between SCADA tags and the asset registry.

3.7.8. Financial Information Systems (FIS)

Current Capabilities

- The FIS is used to track 184 construction projects.

Planned Improvements

- Knowledge management initiative, developing library of procedures.
- GASB 34 depreciation study.

Key Issues

- Direct un-posted batch from CIS to Dynamics is possible but not automated.
- Inventory reconciliation between FIS and CMMS (gbaMS).
- No formal IT governance.
- Previous AMP recommends $1M per year IT spending.
- Fixed asset registry contains 4,000 records, don't match 1-to-1 with other systems that have asset registration.

3.8. Findings and Recommendations

3.8.1. Overview of Findings

The District has several issues regarding the use of information systems and data to support the asset management program implementation. The impact of these issues can be tied to immediate, short-term and long-term goals of the Asset Management Program.

What's working:

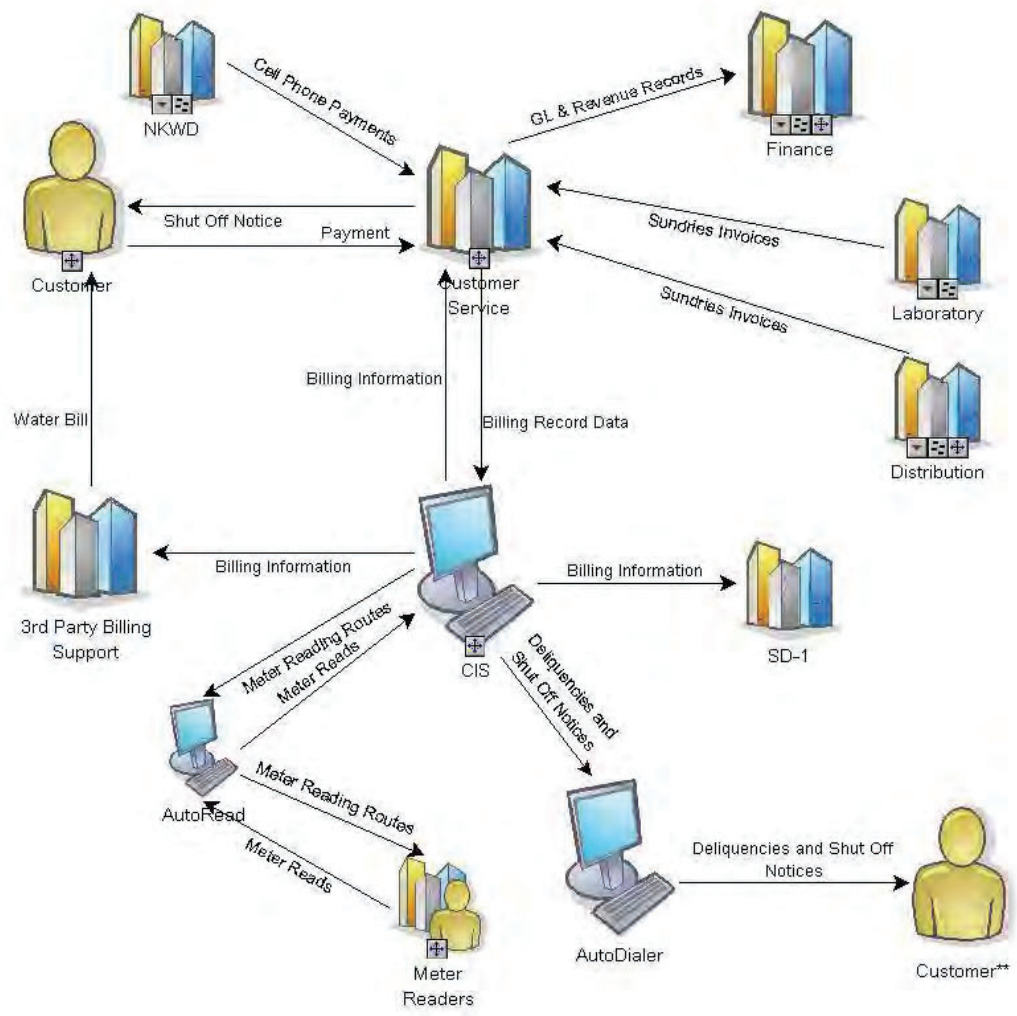
- Departmental-level IT Systems, with some operational gaps
- Limited cross-system integrations

What's not working:

- Enterprise infrastructure for data communications
- Inter-departmental access to data
- Timely access to data
- Data accuracy/data update through current work processes
- Extended integrations between key information systems

A basic representation of the relationship between the various departmental systems is depicted in Figure 3-2:

Figure 3-2: Current Relationship between Systems



3.8.2. Specific Findings

Geographic Information Systems Environment

Lack of a mature Geographic Information Systems (GIS) environment prevents effective system integration and development of a reliable and accurate data information system to support the buried asset management program. For example, the continued use of Shape files as the basis for the GIS technical architecture has led to hundreds of inconstancies between the GIS and Distribution Computer Maintenance Management System (CMMS). The GIS in its current state support integrations with the other systems, or support self-service mapping functions.

Critical Systems Integration

Lack of effective system integration hinders efficient data access and information sharing to support asset management decisions. Lack of key system integration (e.g. GIS and CIS) also impacts the efficiency of customer service. For example, customer calls must be manually coordinated between customer services and Distribution, because Distribution work order information (GBA Master Series CMMS) is not accessible from CIS.

Access to Data

While departmental work processes and information requirements are generally served quite well with department-specific IT solutions, the current state of the Districts IT systems does not adequately provide access for cross-departmental information needs.

The ability to access timely and accurate information is a critical requirement for an effective Asset Management Program. It is more generally a requirement for all District employees whose goal is to provide high quality, high level service and satisfaction for both external and internal customers in an efficient way.

Execution of Strategic IT Projects

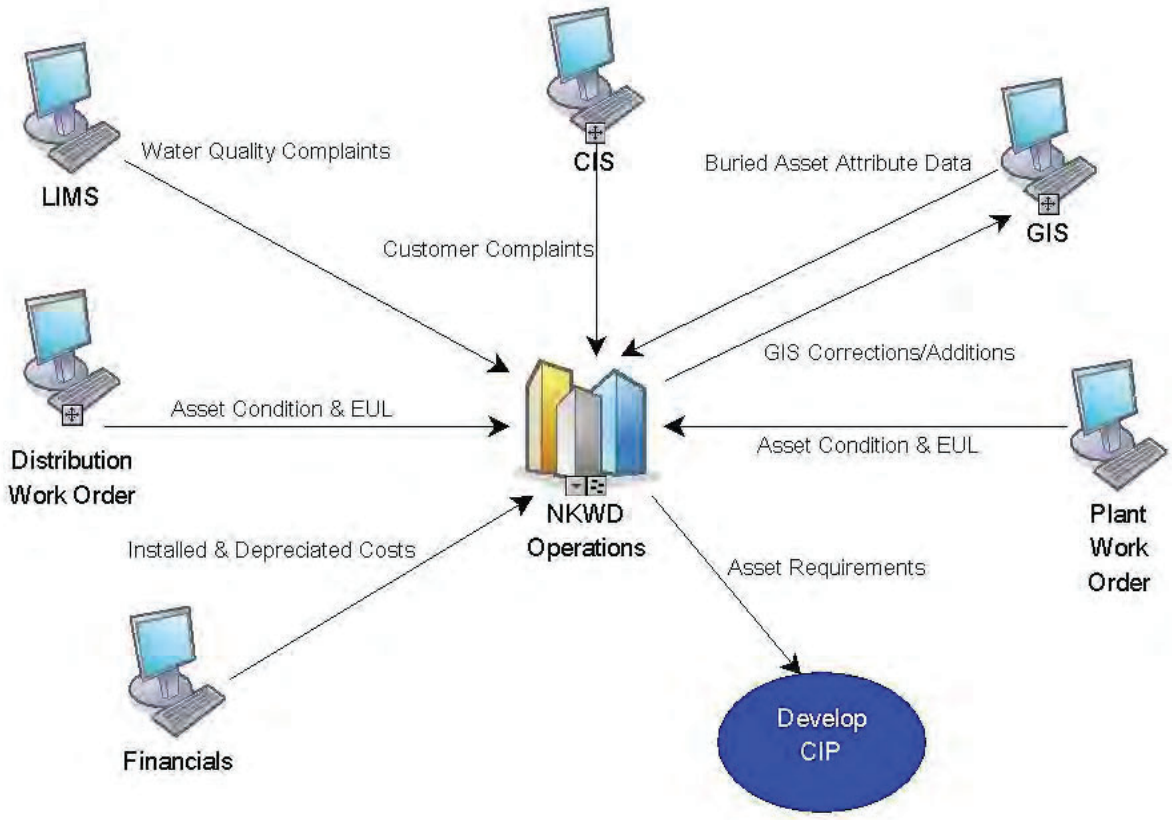
To date, the District has made the vast majority of its IT investments in systems that provide operational support. Going forward, pursuant to both improved operational efficiencies and the District's strategic objectives, the District must transition its approach to IT investments. A number of IT projects have been identified and included in the IT Master Plan, however there is little action towards execution of the projects. This is somewhat due to the back log of work for the IT department staff, as well of lack of definition in the IT Master Plan that would direct the selection of what "enterprise" IT projects (those that impact the entire organization, not just a department within the organization) to pursue, when selected IT projects should be done, and who accepts responsibility for successful IT project execution. A revision to the existing IT Governance should be authored and in place at the District to facilitate the execution of IT projects.

3.8.3. Recommended Areas of Focus

Recommendations regarding changes to IT systems are driven primarily by the data and the functionality required to support the Asset Management Program. Additionally, optimization of District business processes and work processes, with an understanding that the District would like to implement Data Management/Reporting or Business Intelligence system in the future, impact the recommendations.

A basic representation of the relationship between IT systems and the development of capital projects is depicted here in Figure 3-3:

Figure 3-3: Relationship between IT Systems and Development of Capital Projects



Virtually all major IT systems contribute to the development of the capital improvements budget for projects related to rehabilitation of existing assets as well as new asset requirements.

The overall business environment is significantly complex. The current use of IT systems primarily serves department-level functional needs, with very little integration between systems.

The following areas were identified as immediate, short and long term projects for improvement of IT systems and IT system integrations to support operational business processes and future strategic business requirements.

The actions recommended as "Foundation" typically address those things that are prerequisite to support an asset management program. These actions also prepare the District to effectively and efficiently execute on near-, mid- and long-term recommendations.

"Foundation" Recommendations (Immediate):

- Improve technical architecture of the Geographic Information System.
- Close functional gaps in departmental applications, as determined by the individual departments.
- Consolidate above-ground asset performance, criticality and condition data into one system.
- Define approach for accessing information systems data, where the information systems do not reside on the main data communications network.
- Reconcile inventory control methods.
- Establish IT governance to support IT Principals and Investments related activities, specifically those pertaining to the execution of enterprise IT projects; update the IT Master Plan. Implement IT Issues Tracking application District-wide.

Near-Term:

- Integrate ESRI GIS with gbaMS CMMS.
- Close key operational gaps in CIS and LIMS applications.
- Integrate LIMS and Industrial SQL Server.
- Evaluate major new release of Antero CMMS to determine appropriate deployment strategy.
- Implement approach for access to information systems and data on SCADA network.

Mid-Term:

- Integrate GIS with CMMS with additional Distribution work order themes; integration with CIS.
- Revise existing Distribution CMMS interfaces via APIs.
- Implement additional functionality in Antero (assuming upgrade).
- Integrate LIMS with CIS for service address and billing information.

Long-Term:

- Evaluate additional GIS integrations to support "self-service" mapping.
- Evaluate need for Business Intelligence vs. Data Management and Reporting system.
- Consolidate CMMS systems, or replace one or both.
- Implement Business Intelligence/Management Reporting system.

3.8.3.1. Systems and Data Assessment

Important to the success of an asset management program is to define which information systems are the "system of record" for asset-specific data. Defining the system of record implies a stewardship of the data within the designated system. Table 3-8 outlines current and recommended systems of record for the types of asset data required to support an asset management program.

Table 3-8.
Asset Data System of Record

Attribute Type	Asset Type	System of Record	
		Current	Recommended
Physical Attributes			
Asset ID	Above Ground	AwwaRF	Great Plains or Antero [1]
	Below Ground	GIS	GIS[2]
All Other Physical Attributes	Above Ground (e.g. equipment nameplate data)	AwwaRF and Antero	Antero
	Below Ground (e.g. pipe size, material, lining, etc.)	GIS and gbaMS	GIS[2]
Performance Attributes			
Work Orders (type, time, cost)	Above Ground	Antero	Antero
	Below Ground	gbaMS	gbaMS
Test Results	Above Ground	Antero (partial)	Antero
	Below Ground	gbaMS (partial)	gbaMS
Hydraulic	Below Ground	H20Net	GIS[2]
Financial Attributes			
Install Date	Above Ground	AwwaRF and Antero	Great Plains or Antero [3]
	Below Ground	GIS	GIS[2]
Install Cost	Above Ground	AwwaRF and Antero	Great Plains or Antero [3]
	Below Ground	None	GIS[2]
Useful Life	Above Ground	AwwaRF and Antero	Great Plains or Antero [3]
	Below Ground	None	gbaMS
Asset Management Attributes			
Condition	Above Ground	AwwaRF	Antero
	Below Ground	None	gbaMS
Criticality	Above Ground	AwwaRF	Antero
	Below Ground	None	GIS

Notes:
[1]A common Asset ID is recommended. Either Antero or Great Plains could be the system of record. Antero provides a field "AssetNo", which could be utilized.
[2]A geodatabase is required for GIS to be the system of record.
[3]Financial attribute data is required in both Antero and Great Plains and will need to be maintained concurrently prior to initiating system integration.

3.8.3.2. IT Information Systems Assessment

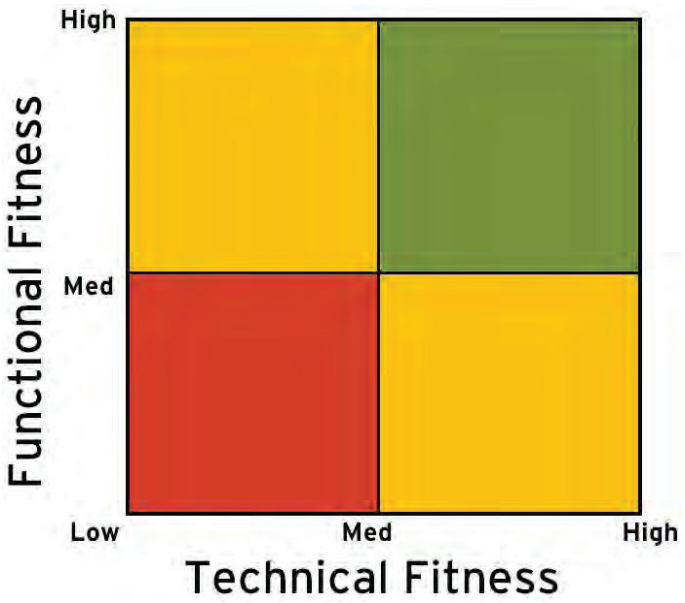
The purpose of this task was to perform an assessment of current information systems and the IT infrastructure. The output of the task is this fitness assessment in the form of

observations and a Fitness Diagram, which depicts the relative capabilities of each system. Red Oak acquired data about the current information technology infrastructure (networks, hardware), and information systems (major software applications) used by the District through a series of interviews with all operational departments at the District. The data gathered was then used to evaluate the current functional performance of each system, as well as comparing against industry best practices.

The assessment process evaluates criteria in two main categories: functional fitness and technical fitness.

The "functional fitness" of an IT system is the measure of *how well* the system supports the required work processes and business processes within the organization. The "technical fitness" of an IT system is a measure of the overall *technical capability* of the system, and the vendor's strength in the marketplace.

Example Fitness Assessment Diagram



The fitness diagram uses the following scale in its assessment.

High: In-line with industry best practices.
Medium: Adequate to support current District operational requirements.
Low: Inadequate in one or more significant functional and/or technical capabilities.

Functional Fitness

The fitness diagram ranks functional fitness on the vertical axis from "Low" to "High". A ranking of "Low" can indicate:

- A poorly implemented system
- A failure by the system to meet one or more critical work and/or business processes
- One or more gaps in a systems ability to maintain required data
- A system that is not widely accepted by users

A ranking of "High" indicates:

- That the system that is well implemented
- That the system supports all critical work and business processes
- That the system meets all requirements for storing and managing required data
- That the system has a high level of user-acceptance

Technical Fitness

The fitness diagram ranks technical fitness on the horizontal axis from "Low" to "High". A ranking of "Low" indicates:

- Poor or obsolete application and database architecture
- Diminishing vendor support (for the application or the computer hardware)
- Lack of scalability and/or integration tools

A ranking of "High" indicates:

- A solid technical architecture
- High availability of hardware and software support
- Integration tools are available and based on industry standards
- Continued commitment by the vendor to the municipal utility market

Information systems are ranked based on these and other factors; the ranking places the information system in one of four quadrants. Actions to be taken depend on which quadrant the system falls into:

Upper-Right (Green) Quadrant

Systems with high functional and technical fitness are ranked into the upper-right quadrant, indicating little if any action is required regarding system improvements. These systems support required work processes and represent sound technical architecture and vendor strength.

Lower-Left (Red) Quadrant
Systems that fall into the lower left quadrant are considered to be functionally and technically poor. These systems are typically targeted for replacement, but can be assessed for potential functional and technical improvements.

Upper-Left or Lower-Right (Yellow) Quadrants
Systems that fall into the upper-left or lower-right quadrants are evaluated as to what improvements need be made to move the system towards the upper-right quadrant.

Summary of Results

Two IM Fitness evaluations are provided for each system:

- Current Fitness: Support for current operational and business processes, without regard to requirements to support the asset management program.
- Asset Management Fitness: How well the system will support requirements of the asset management program going forward, and what if any, actions, need to be taken to update the system.

Specific actions needed to support streamlining current business processes and future data reporting/business intelligence system implementations are also identified. In some cases, operational gaps have already been identified at the department level, and there is activity underway to address the gaps. These are indicated in the assessment of the systems shown in Table 3-9.

Table 3-9.
IT Information Systems Assessment

	Functional		Technical	
System	**Current**	**Asset Management**	**Current**	**Asset Management**
CIS	High	Med-Low	Med-High	Med-Low
CMMS – Antero	Med-High	Low	Med-High	Low
CMMS – Master Series	Med-Low	Low	Med-High	Low
GIS	Low	Low	Low	Low
LIMS	Med-High	Med-High	Med-High	Low

3.8.3.3. Geographic Information System (ESRI)

Mission

Support engineering, field and customer service related operations by providing information regarding the location and physical attributes of spatial assets.

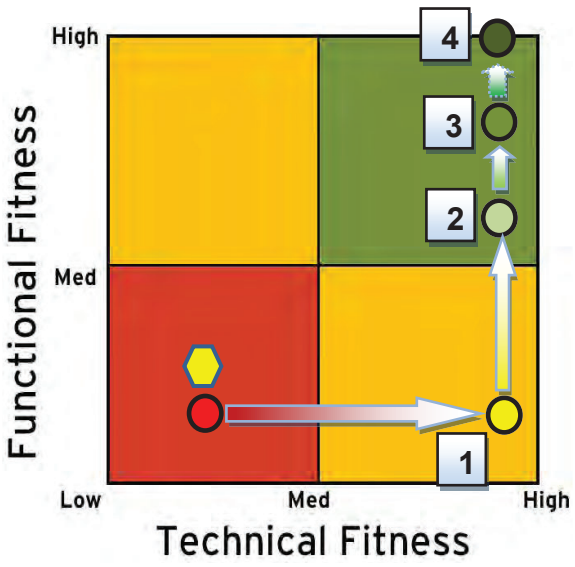
- Current Issues and Drivers
  - Current system architecture limits integration options.
  - Physical attribute information in the GIS is not up to date.
  - Physical attribute information is duplicated in the Distribution work order tracking system.
  - The GIS is not currently integrated with other key systems.
  - Many manual, labor intensive processes to fulfill map requests.
- Recommended Areas of Focus
  - Improve system architecture to support integrations.
  - Consolidate physical attribute information for underground assets in the GIS; increase priority of GIS data management.
  - Integrate immediately with gbaMS system;
  - Consolidate multiple sources of information into the GIS (paper maps, scanned documents, spreadsheet data).

Current Functional:	Low	
Current Technical:	Low	
Asset Management Functional:	Low	
Asset Management Technical:	Low	

Recommendations

1. **Foundation**: Convert current GIS architecture to ESRI GeoDatabase. It is our understanding that an effort is underway to support the transition to GeoDatabase.
2. **Near-term**: Integrate GIS GeoDatabase with Distribution CMMS, and transition buried asset physical attribute data to GIS.
3. **Mid-Term**: Further integrate GIS/CMMS with CIS to provide data regarding field work and outages.
4. **Long-Term**: Integration with other spatial related data, such as strip maps and record and as-built drawings. This will provide the foundation for "self-service" map capabilities.

GIS Fitness Assessment Diagram



Comments

The technical fitness of the GIS will improve significantly with the transition to ArcSDE/GeoDatabase. This will enable integration with gbaMS, and then gbaMS GIS functionality can be extended to the enterprise, to be integrated with other information systems such as the CIS. This will cause improvement in overall functional fitness, as well as the opportunity to streamline and improve customer service processes.

Improvement in the technology architecture needs to be supported by improvement in the processing of physical attribute information associated with distributed assets. Work processes to update attribute data must become a high priority to maintain GIS reliability.

Quick Wins

- Implement ArcSDE/GeoDatabase on Microsoft SQL database to significantly improve the technical fitness of the GIS.
- Complete the updating of mains data, as this will be required for support near-term development of asset management plan.

Long Term

- Integration with key information systems (CMMS and CIS) to significantly improve GIS functional capability, improve customer service work processes, and streamline business processes.

3.8.3.4. Laboratory Information Management System (Accelerated Technologies)

Mission

Support the storage, processing and reporting of laboratory generated information, and process information pertaining to regulatory requirements; primary source of regulatory reports.

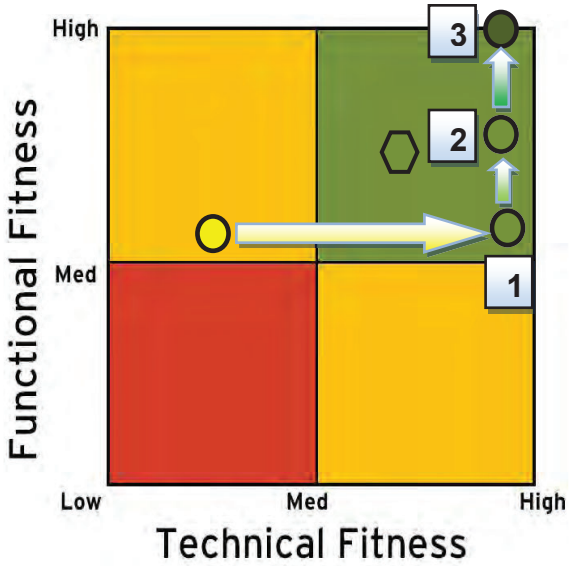
- Current Issues and Drivers
  - QA/QC performed outside of LIMS application. It is our understanding that the District is working with the software vendor to resolve this key operational gap.
  - The LIMS isolated from the enterprise information systems network, as it resides on the SCADA network.
  - The LIMS is not integrated with District CIS for access to customer address information; LIMS laboratory results are not available to CIS.
- Recommended Areas of Focus
  - QA/QC, and analysis – close operation gaps.
  - Complete instrumentation integration.
  - LIMS integration with SCADA and CIS.

Current Functional:	High	
Current Technical:	High	
Asset Management Functional:	Med-High	
Asset Management Technical:	Low	

Recommendations

1. **Foundation**: Define approach for access to information systems and data on the SCADA network (LIMS). Continue to close key operational gaps, particularly those that impact data quality control; complete integration with instrumentation and operational data systems (SCADA).
2. **Near-term**: Implement information access approach as defined.
3. **Mid-Term**: Integrate with CIS to reconcile service address and billing data.
4. **Long-Term**: Integrate key LIMS data (water quality testing/quality complaints, treatment costs) with BI/Data Management and Reporting system.

LIMS Fitness Assessment Diagram



Comments

The LIMS system tracks client interaction for water sample testing and billing. The physical location of the system on the SCADA network impedes access to information between the LIMS system and other systems such as the Customer Information System.

Quick Wins

- Continue to close operational gaps as defined at the departmental level, particularly those that are related to data integrity.
- Automate collection and storage of chemical usage data from the SCADA system in the LIMS database.

Long Term

- Integrate with CIS to provide access to water quality data to customer service functions. Integrate customer information in CIS into LIMS for tracking customer contact and billing data.

3.8.3.5. CMMS – Water Treatment Plants (AllMax Antero)

Mission

Track, plan and schedule maintenance actions, manage labor resources, manage inventory, manage assets and their warranties, provide information to financial and accounting, optimize the efficiency of field resources for above-ground assets at water treatment plants and pump stations.

- Current Issues and Drivers
  - A critical system required to implement a robust asset management program and to track District performance.
  - Hours associated with maintenance work orders are not tracked.
  - Not fully integrated with equipment reliability data.
- Recommended Areas of Focus
  - Identify and close operational gaps per asset management program.

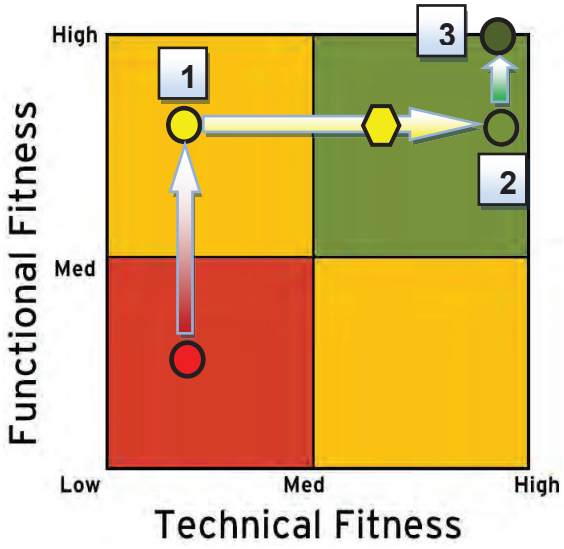
Current Functional:	Med-High	
Current Technical:	Med-High	
Asset Management Functional:	Low	
Asset Management Technical:	Low	

Recommendations

1. **Foundation**: Fully populate available data fields with information from AwwaRF tool. Create functions to enforce criticality and physical data rules.

2. **Near-term**: Evaluate major release of Antero, which will include an overall architecture change to be database neutral and web-based. Determine appropriate implementation and deployment activities.
3. **Mid-Term**: Implement additional functionality provided in new version of Antero (assuming upgrade).
4. **Long-Term**: Integrate key CMMS data (equipment operation costs, asset useful life and condition data) with Business Intelligence/Data Management and Reporting system.

Plant Work Order Fitness Assessment Diagram



Comments

Antero supports the District's requirements for above-ground equipment maintenance very well, and the application is well accepted by District staff. Its technical architecture will significantly improve with the next major release, which will support advanced integration and functional capabilities.

Quick Wins

- Move asset condition and criticality data from AwwaRF into Antero.

Long Term

- Implement next major release, use additional capabilities to streamline data management and implement integrations with other key systems.
- Evaluate potential consolidation of above- and below-ground maintenance management into one information system.

3.8.3.6. CMMS – Distribution (George Butler Associates Master Series)

Mission

Track, plan and schedule maintenance actions, manage labor resources, manage inventory, manage assets and their attributes, provide information to financial and accounting, optimize the efficiency of field resources for the water distribution network.

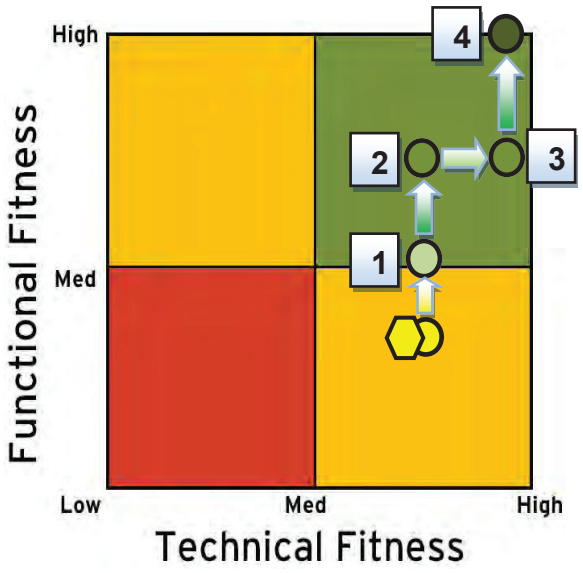
- Current Issues and Drivers
  - A critical system required to implement a robust asset management program and to track District performance.
  - Configuration/customization is expensive – impedes system improvements.
  - Some functions are difficult to use.
  - Users are dissatisfied with usability and functionality.
- Recommended Areas of Focus
  - Appropriate level of investment for integration with CIS and GIS, to optimize current business processes.
  - Investigate replacement with commercial CMMS, in conjunction with possible consolidation with CMMS for above ground assets.

Current Functional:	Med- Low	
Current Technical:	Med-High	
Asset Management Functional:	Low	
Asset ManagementTechnical:	Low	

Recommendations

1. **Foundation**: Reconcile inventory control methodology to be consistent for financial reporting and budgeting; update and reconcile distributed asset inventory and attributes.
2. **Near-term**: Integrate CMMS with GIS, publishing asset attribute data and work order location and status information via the GIS.
3. **Mid-Term**: Revise existing interfaces using vendor provided APIs; develop work order themes for presentation in GIS.
4. **Long-Term:** Integrate key CMMS data (equipment operation costs, asset useful life and condition data) with Business Intelligence/Data Management and Reporting system.

Distribution Work Order Fitness Assessment Diagram



Comments

Although it lacks broad-based acceptance and user support at the District, gbaMS still represents a technically sound CMMS with broad acceptance and a large user base in the municipal utility market. Integration with GIS will facilitate consolidation of physical attribute data in the GIS, eliminating the need for the data to be updated in both systems. Integrating with other systems, such as the CIS for service address data will also reduce the burden of manual data transfer and reconciliation processes currently facilitated by IT staff.

Quick Wins

- Reconcile inventory costing/control with Financial for alignment of equipment operation cost determination.

Long Term

- Evaluate potential consolidation of above- and below-ground maintenance management into one information system.

3.8.3.7. CIS (Advanced Utility Systems)

Mission

Track information related to customers such as service address, water consumption, billing and payment records. Perform bill generation based on rate schedules and

consumption, and supports payment receipting. Provides work order management for services from the meter to the house.

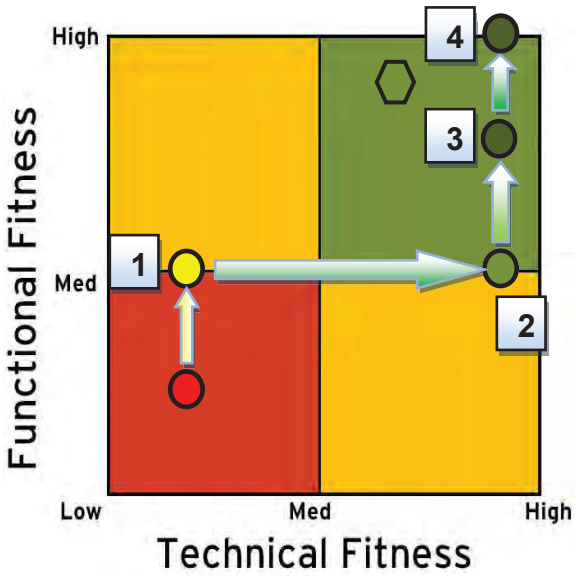
- Current Issues and Drivers
  - Not currently integrated with other key systems.
  - Operational gaps include work order management, customer self-service. It is our understanding these issues are currently being addressed at the department level.
  - Pending system upgrade may delay integration to other systems
- Recommended Areas of Focus
  - CIS integration with FIS, GIS, LIMS and Distribution CMMS.

Current Functional:	High	
Current Technical:	Med-High	
Asset Management Functional:	Med-Low	
Asset Management Technical:	Med-Low	

Recommendations

1. **Foundation:** Continue to work to close key operational gaps, execute on current initiative to streamline work business processes through additional application configuration. Pursue development of web-based customer service options such as online bill presentment and payment.
2. N**ear-term:** Evaluate major new release of CIS Infinity to determine appropriate deployment strategy.
3. **Mid-term:** Implement new version of CIS Infinity, integrate with GIS/CMMS, FIS and LIMS systems.
4. **Long-term:** Integrate with BI/Data Management and Reporting System.

CIS Fitness Assessment Diagram



Comments

Implementation of the new release of CIS Infinity will provide an opportunity to incorporate key integrations with LIMS, CMMS/GIS and FIS systems. In conjunction with efforts underway to optimize the configuration of CIS to support streamline business process and implement customer self-service options via the web current, there is potential to significantly improve the customer service experience while reducing time required to handle service calls and perform the exchange of financial data between the CIS and FIS.

Quick Wins

- Close operational gaps in CIS work processes.
- Optimize CIS system configuration to streamline customer service functions.

Long Term

- Upgrade to new version of CIS, implementing interfaces with FIS, GIS/CMMS and LIMS systems.

3.8.3.8. IT Infrastructure

Mission

Support the overall computing and networking environment.

- Current Issues and Drivers
  - Transitioning to integrated data/telecommunications – telecommunications is initial priority
  - IT Infrastructure requires reconfiguration to provide access to key information systems
- Recommended Areas of Focus
  - Resolve performance-related issues to support cross-system integrations
  - Connectivity between physical networks
  - Access to key IT systems

Recommendations

1. **Immediate:** Provide access to information systems and data between physical networks.
2. **Near-term:** Continue to improve building-to-building network performance.

IT Infrastructure Fitness Assessment Diagram

Comments

There is a perception that the data communications network is not sufficiently supported outside of the District main facility, and particularly to the Water Treatment Plants and laboratory. This has caused "localization" of systems, where a system is located at a

physical location, not in the data center. Overall performance of the data communications network is considered poor by users at the outlying areas.

Quick Wins

- Enable enterprise wide access to all key information systems on the SCADA network
- Continue reliability and performance improvements

Long Term

- Consider outsourcing the wide- and local area network support to optimize efficiency of IT organization.

3.9. IT Projects Overview

Prioritization of projects is based on the timeline for implementation of the Asset Management Program. Those projects required to support above-ground asset management are considered the highest priority (Foundation Projects); projects required to support buried asset management and improved work processes are considered next priority (Near Term Projects). Projects intended to support strategic initiatives and improve overall organizational performance are considered long-term.

The overall project identification and prioritization considered the following key drivers in the areas of asset management and customer services:

Asset Management Plan: goals and drivers

- Improve asset data quality and reliability.
- Simplify work flow to reduce IT burden to support GIS Integration
- Optimized data storage management
- Manage R&R program data with no increase in staff
- Optimize R&R for most effective, least cost program.

Customer Service: goals and drivers

- Efficiency gains in logging timely and reporting status to customers.
- Greatly reduce customer “hand-offs”
- Greatly reduce call backs

- Improve response time

Foundation Projects (within 1 year):

- Infrastructure:
  - Continue to improve WAN data communications reliability and speed between locations.
- System Upgrades/Enhancements:
  - Update Antero CMMS with AwwaRF and other asset data for above ground assets.
  - Convert ESRI GIS to GeoDatabase.
- Strategies/Process Improvements
  - Reconcile inventory control methods.
  - Define approach for access to information systems and data on SCADA network.

Near Term IT Projects:

- System Upgrades/Enhancements
  - Integrate ESRI GIS with gbaMS CMMS.
  - Close key operational gaps in CIS and LIMS applications.
  - Integrate LIMS with Industrial SQL Server.
  - Evaluate major new release of Antero CMMS to determine appropriate deployment strategy.
  - Evaluate major release of CIS Infinity to determine appropriate deployment strategy.
- Strategies/Process Improvements
  - Implement approach for access to information systems and data on SCADA network.

Mid Term IT Projects:

- System Upgrades/Enhancements
  - Integrate GIS with CMMS and additional Distribution work order themes; integrate with CIS.
  - Revise existing Distribution CMMS interfaces via APIs.
  - Implement additional functionality in Antero (assuming upgrade).

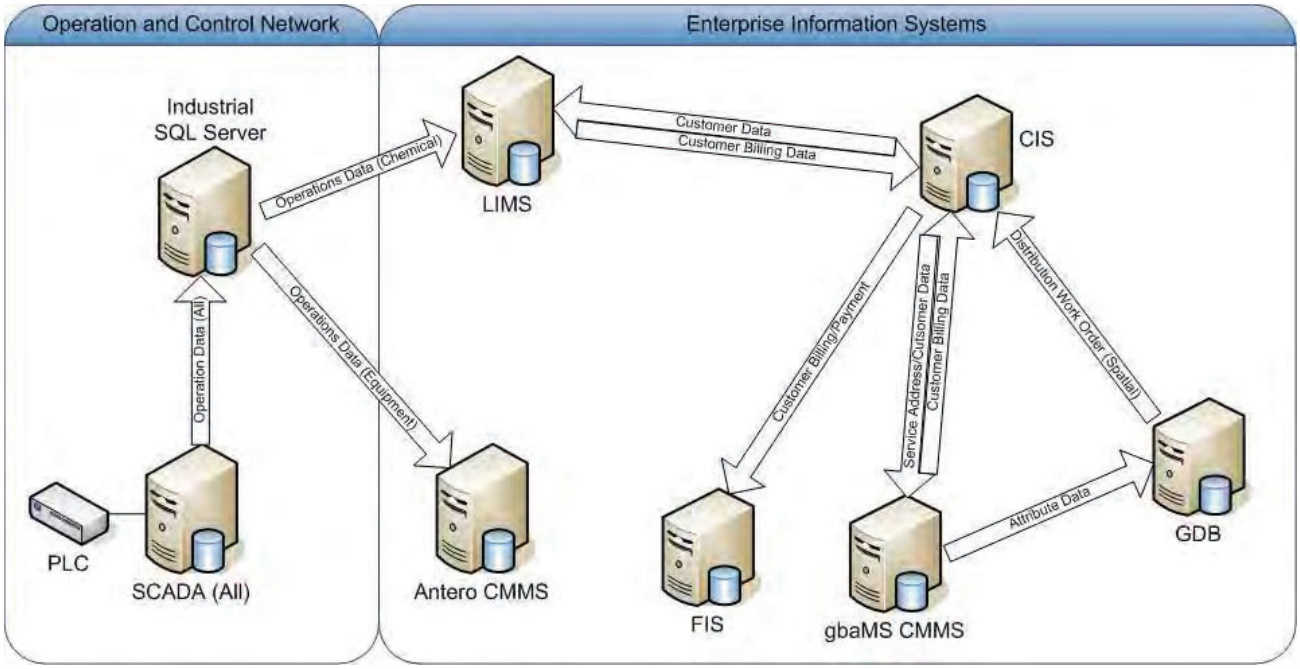
- Integrate LIMS with CIS for service address and billing information.

Long Term IT Projects:

- Strategies/Process Improvements
  - Evaluate need for either Business Intelligence or Data Management/Reporting services system.
  - Evaluate additional GIS integrations to support "self-serve" mapping.
- System Upgrades/Enhancements
  - Integrate CIS/LIMS with BI or Data Management/Reporting.

Figure 3-4 demonstrates a high level data integration diagram.

Figure 3-4: High Level Data Integration Diagram



3.10. IT Project Details

This section provides details for each of the projects indicated in the IT Projects Overview. A project description, suggested performance measures and benchmarks, and

estimate of temporary and permanent resources required to support the project are provided.

3.10.1. Foundation Projects

WAN Improvements

Project Description
Continue the improvements to the data communications infrastructure to support increased performance and reliability of data communication between District locations.

Suggested Performance Measures and Benchmarks
Improvements to the WAN communications will be considered successful if the following criteria are met:

- Staff perception of the Districts wide area data communications capabilities improves.
- Staff perception of the District IT department's ability to support remote locations improves.
- Integrations between systems at different locations are implemented and perform adequately.

Estimated Resource Requirements
Continued WAN performance and reliability improvements will require the following resources from the District:

- Temporary Resources – During Implementation
  - Project Oversight 120 hours
  - Implementation 100 hours
- Permanent Resources – Post Implementation

  First Year:
  - System Support 2 hours per week

  Subsequent Years:
  - System Support 2 hours per week

Antero Data Update Project

Project Description
The condition and criticality data for above ground assets that currently resides in the AwwaRF application, and other physical, condition and criticality data pertaining to above-ground assets will be transferred into the Antero application, where it will be maintained long-term.

Suggested Performance Measures and Benchmarks

The Antero Data Update Project will be considered successful if the following criteria are met:

- All data currently in AwwaRF is transferred to Antero.
- Antero is configured to enforce data rules.
- Antero users maintain condition and criticality data for existing and new assets ongoing.
- The condition and criticality data is available for reporting and analysis.

Estimated Resource Requirements

The Antero Data Update Project will require the following resources from the District:

- Temporary Resources – During Implementation
  - Project Oversight 250 hours
  - Implementation 280 hours
- Permanent Resources – Post Implementation

  First Year:
  - Data Management 8 hours per week
  - User Support 16 hours per week
  - System Support 2 hours per week

  Subsequent Years:
  - Data Management 8 hours per week
  - User Support 8 hours per week
  - System Support 2 hours per week

3.10.2. GeoDatabase Conversion

Project Description

The conversion of the GIS architecture to GeoDatabase will enable integrations with the gbaMS CMMS and CIS systems. Integration with gbaMS will inherently increase the amount and reliability of data within the GIS to support field and customer related operations. This project will also seek to allow the GIS to serve as the portal to most of the District's information through the appropriate level of integration. It is recognized that this effort has been ongoing for some time and this project will seek to continue the efforts and allow for a higher degree of focus going forward.

Suggested Performance Measures and Benchmarks
The conversion to GeoDatabase will be considered successful if the following criteria are met:

- All data deemed necessary by the GIS users is contained within the system.
- Data is at least 98% accurate.
- The GIS is accessible by all identified users.
- Integrations with CMMS and CIS are technically feasible.

Estimated Resource Requirements
The GeoDatabase Conversion Project will require the following resources from the District:

- Temporary Resources – During Implementation
  - Project Oversight 600 hours
  - Implementation 640 hours
- Permanent Resources – Post Implementation

  First Year:
  - Data Management 8 hours per week
  - User Support 32 hours per week
  - System Support 4 hours per week

  Subsequent Years:
  - Data Management 8 hours per week
  - User Support 16 hours per week
  - System Support 4 hours per week

3.10.3. Reconcile Inventory Control Methods

Project Description
Revise the configuration and use of information systems in which inventory is carried and used in day-to-day operations to implement of a common inventory control method (LIFO, FIFO or average cost) in all information systems that are reconciled annually for financial reporting and budgeting.

Suggested Performance Measures and Benchmarks
The reconciliation of inventory control methods will be considered successful if the following criteria are met:

- All information systems that carry inventory implement the same inventory control method.
- Inventory reconciliation between information systems (e.g. reconcile inventory costs between FIS and CMMS) is accurate without significant data processing outside of the application.

Estimated Resource Requirements

The Inventory Control Reconciliation will require the following resources from the District:

- Temporary Resources – During Implementation
  - Project Oversight 200 hours
  - Implementation 420 hours
- Permanent Resources – Post Implementation

  First Year:
  - Data Management 4 hour per week
  - User Support 1 hour per week
  - System Support 1 hour per week

Subsequent Years:
- Data Management 4 hour per week
- User Support 1 hour per week
- System Support 1 hour per week

3.10.4. Implement IT Issues Tracking

Project Description

The implementation of an information system to document the use of IT services in for day-to-day support and IT project initiatives.

Suggested Performance Measures and Benchmarks

The implementation of an issue tracking system will be considered successful if the following criteria are met:

- Sufficient information is gathered that clearly defines ongoing IT resource utilization within the District differentiating between tactical (systems support) and strategic (projects/initiatives).

- Data collected in the information system can be used to identify outsourcing opportunities (cost of services).
- Data collected in the information system can be used to identify staffing requirements.
- Data collected in the information system can be used to identify staff knowledge requirements.
- Data collected in the information system supports reporting on metrics defined in the IT Master Plan (service level).

Estimated Resource Requirements

The implementation of an IT Issues Tracking system will require the following resources from the District:

- Temporary Resources – During Implementation
  - Project Oversight 250 hours
  - Implementation 480 hours
- Permanent Resources – Post Implementation

  First Year:
  - Data Management 2 hours per week
  - User Support 6 hours per week
  - System Support 2 hours per week

  Subsequent Years:
  - Data Management 1 hour per week
  - User Support 1 hour per week
  - System Support 1 hour per week

3.10.5. SCADA Network Data Communications Approach

Project Description

This project will primarily be an internal evaluation, with some external expertise, to determine the best approach for making information systems data that resides on the SCADA network available for integration with systems that reside on the District network. The results of this evaluation will be an actionable plan that includes costs associated with the implementation of the most desirable solution.

Suggested Performance Measures and Benchmarks

- The selected solution supports system and data integration between systems on the SCADA network and the District network.
- Systems on the SCADA network can be relocated to the District network as necessary.
- The solution is acceptable to all stakeholders.
- The solution includes key service levels and measurable metrics for the implemented solution.

Estimated Resource Requirements

The implementation of an IT Issues Tracking system will require the following resources from the District:

- Temporary Resources – During Evaluation
  - Project Oversight 200 hours
  - Plan Acceptance 80 hours
- Temporary Resources – Implementation
  - Project Oversight 200 hours
  - System Support 4 hours per week
- Post Implementation – First and Subsequent Years:
  - System Support 2 hours per week

3.10.6. Near-Term Projects

GIS/gbaMS Integration Project

Project Description

The GIS/gbaMS integration will link the spatial features in the GIS to corollary data in the gbaMS system.

Suggested Performance Measures and Benchmarks

The GIS/gbaMS Integration Project will be considered successful if the following criteria are met:

- The physical attribute data associated with distributed assets is contained and maintained within the GIS.
- All known good physical attribute data has been fully reconciled to the GIS, and is known to be accurate.

- Performance attribute data associated with distributed assets is contained and maintained with the CMMS.
- Manual processes to reconcile data between the GIS and CMMS have been eliminated, and IT staff hours related to GIS/CMMS data reconciliation has been significantly reduced.

Estimated Resource Requirements

The GIS/gbaMS Integration Project will require the following resources from the District:

- Temporary Resources – During Implementation
  - Project Oversight 250 hours
  - Implementation 340 hours
- Permanent Resources – Post Implementation

  First Year:
  - Data Management 2 hours per week
  - User Support 8 hours per week
  - System Support 2 hours per week

  Subsequent Years:
  - Data Management 2 hours per week
  - User Support 2 hours per week
  - System Support 2 hours per week

CIS/LIMS Gap Closure

Project Description

The District Customer Service and Water Quality Departments are currently pursuing improvements in the CIS and LIMS systems to close functional gaps to better align the information systems with departmental business processes. These improvements are generally implemented through minor system reconfiguration, and possibly update training for department level staff, and are generally funded with relatively small discretionary budget amounts. Our recommendation is for departments to continue to identify and close these gaps.

Suggested Performance Measures and Benchmarks

The closure of gaps in the LIMS and CIS systems will be considered successful if the the following criteria are met:

- Closure of the gap results in a measureable improvement in key service level metrics.
- A specific key business process is supported or support for an existing process is improved.

Estimated Resource Requirements

The GIS/gbaMS Integration Project will require the following resources from the District:

- Temporary Resources – During Implementation
  - Project Oversight 240 hours
  - Implementation 80 hours
- Permanent Resources – Post Implementation

  First Year:
  - Data Management 2 hours per week
  - User Support 8 hours per week
  - System Support 2 hours per week

  Subsequent Years:
  - Data Management 2 hours per week
  - User Support 2 hours per week
  - System Support 2 hours per week

LIMS/Industrial SQL Integration

Project Description

The LIMS/Industrial SQL Integration project automates the entry of process data into the LIMS system to support process performance and regulatory reporting in the LIMS system.

Suggested Performance Measures and Benchmarks

The LIMS/Industrial SQL Integration will be considered successful if the following criteria are met:

- Transfer of process data from instrumentation and/or the SCADA systems to the LIMS system is fully automated, with appropriate data QA/QC procedures available in the LIMS systems.
- Data integrated from lab instrumentation and treatment process systems is integrated into process performance and regulatory reports.
- Time required to generate key reports is significantly reduced.

Estimated Resource Requirements

The LIMS/Industrial SQL Integration Project will require the following resources from the District:

- Temporary Resources – During Implementation
  - Project Oversight 100 hours
  - Implementation 280 hours
- Permanent Resources – Post Implementation

  First Year:
  - Data Management 1 hours per week
  - User Support 2 hours per week
  - System Support 1 hour per week

  Subsequent Years:
  - Data Management 1 hour per week
  - User Support 1 hour per week
  - System Support 1 hour per week

Antero New Release Deployment Strategy

Project Description

The CMMS currently used by the District to track above ground assets is scheduled to have a major upgrade in early 2009 that significantly improves the technical and functional capabilities of the application. This project will consist of an internal assessment to determine the best strategy for deployment of the Antero application update. The result of the assessment will be recommendations as to how best to move forward with the implementation of the updated application, and a project plan to include projected upgrade, implementation, support and training costs.

Suggested Performance Measures and Benchmarks

The Antero New Release Deployment Strategy will be considered successful if the following criteria are met:

- District wide agreement of the results of the assessment.
- Commitment of primary stakeholders to implement recommendations.
- Funding commitment for implementation of recommendations of the assessment.
- Key integrations with other information systems are identified and included in the update strategy and implementation plan.

Estimated Resource Requirements

The Antero New Release Deployment Strategy Project will require the following resources from the District:

- Temporary Resources – During Assessment
  - Project Oversight 160 hours
  - Plan Acceptance 80 hours
- Temporary Resources – Implementation
  - Project Oversight 200 hours
  - Implementation 320 hours
- Subsequent Years:
  - Data Management 2 hours per week
  - User Support 4 hours per week
  - System Support 1 hour per week

CIS Infinity New Release Deployment Strategy

Project Description

Advanced Utility Systems has recently released a major update to CIS Infinity. The newest version represents significant improvements in the overall technology, including client application components that improve overall application performance. This project will consist of an internal assessment to determine the best strategy for deployment of the updated application. The result of the assessment will be recommendations as to how best to move forward with the implementation of CIS Infinity v3, and a project plan to include projected upgrade, implementation, support and training costs.

Suggested Performance Measures and Benchmarks

The CIS Infinity New Release Deployment Strategy will be considered successful if the following criteria are met:

- District wide agreement of the results of the assessment.
- Commitment of primary stakeholders to implement recommendations.
- Funding commitment for implementation of recommendations of the assessment.
- Key integrations with other information systems (e.g. FIS) are identified and included in the update strategy and implementation plan.

Estimated Resource Requirements

The Antero New Release Deployment Strategy Project will require the following resources from the District:

- Temporary Resources – During Assessment
  - Project Oversight 200 hours
  - Plan Acceptance 80 hours
- Temporary Resources – Implementation
  - Project Oversight 250 hours
  - Design Review 420 hours
- Subsequent Years:
  - Data Management 8 hours per week
  - User Support 4 hours per week
  - System Support 1 hour per week

Implement SCADA Network Communication Strategy

Project Description

This project implements the strategy for SCADA network data communications strategy as determined in the first year "Foundation" projects task.

Suggested Performance Measures and Benchmarks

The implementation of the data communication strategy will be considered successful if the following criteria are met:

- The solution supports criteria for intra-application data and system integration.

- The solution meets criteria for service levels and performance metrics.

Estimated Resource Requirements
Implementation of the SCADA network communication strategy will require the following resources from the District:

- Temporary Resources – During Implementation
  - Project Oversight 100 hours
  - System Acceptance 80 hours
- Subsequent Years:
  - System Support 1 hour per week

3.10.7. Mid-Term Projects

GIS & CMMS/CIS Integration

Project Description
This project will fully integrate the distribution work order tracking system (gbaMS) and the distribution GIS. Additionally, the project will integrate the CIS so as to provide key information regarding field work order activity within the CIS user environment.

Suggested Performance Measures and Benchmarks
The integration of the distribution work order management system and the GIS will be considered successful if the following criteria are met:

- The physical attribute data for distributed assets is fully contained in the GIS, and management of the data is performed through a single information system.
- Manual reconciliation processes for distribution physical attributes have been eliminated.
- All field data pertaining to distributed assets has been entered into the GIS.
- The physical attribute data is available via the CMMS, and the work order data is available in the GIS.
- Distribution field work order status data is linked to customer information in CIS.
- The status of work orders is readily available from within the CIS.
- Map themes representing current work order locations and planned outages are readily available within the CIS.
- Billing and payment receipting for Distribution field services work is accomplished entirely through the CIS.

- Customer service hand-offs have been reduced.
- The length of customer service calls reduced.

Estimated Resource Requirements

The LIMS/Industrial SQL Integration Project will require the following resources from the District:

- Temporary Resources – During Implementation
  - Project Oversight 590 hours
  - Implementation 440 hours
- Permanent Resources – Post Implementation

  First Year:
  - Data Management 2 hours per week
  - User Support 8 hours per week
  - System Support 2 hour per week

  Subsequent Years:
  - Data Management 2 hour per week
  - User Support 2 hour per week
  - System Support 2 hour per week

Revise CMMS Interfaces

Project Description

This project will replace existing interfaces between the CMMS and other information systems with interfaces developed using standard application programming interfaces (APIs).

Suggested Performance Measures and Benchmarks

The revision of the CMMS interfaces will be considered successful if the following criteria are met:

- All SQL-based interfaces and their corollary functionality have been revised and implemented using application APIs.
- All manual procedures to integrate data to and from the CMMS have been eliminated.
- The developed interfaces survive incremental upgrades to the CMMS.
- IT staff burden to develop, operate and support CMMS data integrations are reduced.

Estimated Resource Requirements

The project to revise the CMMS interfaces will require the following resources from the District:

- Temporary Resources – During Implementation
  - Project Oversight 120 hours
  - Revise interfaces 120 hours
  - Implementation 80 hours
- Permanent Resources – Post Implementation

  First Year:
  - Interface Support 2 hours per week

  Subsequent Years:
- Interface Support 2 hours per week

Antero Functional Improvements

Project Description

Assuming the Antero work order tracking application has been updated to the newest release, this project will identify opportunities to significantly improve the applications functional support for the above ground asset management program. The project will identify gaps in data validation, operational, and/or reporting capabilities of the application, and resolve them through application configuration, customization, and report development.

Suggested Performance Measures and Benchmarks

The project will be considered successful if the following criteria are met:

- New functionality in Antero has been identified and implemented, where the functionality improves work processes, data quality and data reliability.
- All data and functional requirements to support the Districts above-ground asset management program are supported by the Antero application.
- Access to data and information needed for decision support is readily available all users.

Estimated Resource Requirements

The project to update the functional capability of Antero will require the following resources from the District:

- Temporary Resources – During Implementation

- Project Oversight 120 hours
- Implementation 200 hours

- Permanent Resources – Post Implementation

  First Year:
  - User Support 4 hours per week
  - System Support 1 hour per week

  Subsequent Years:
  - User Support 2 hours per week
  - System Support 1 hours per week

CIS/LIMS Integration Project

Project Description

This CIS/LIMS integration project will provide customer service staff with immediate access to water quality data from within the CIS application. Additionally, all customer contact and billing information required to support water testing within the LIMS system will be fully integrated with the CIS, such that customer contact information and billing information reside in the CIS.

Suggested Performance Measures and Benchmarks

The CMMS Systems Replacement Project will be considered successful if the following criteria are met:

- Customer hand-offs from Customer Service to the Water Quality Lab for questions regarding water quality are significantly reduced, or eliminated altogether.
- Billing for water quality testing occurs entirely through the CIS billing and payment receipting system.

Estimated Resource Requirements

The CIS/LIMS Integration Project will require the following resources from the District:

- Temporary Resources – During Implementation
  - Project Oversight 300 hours
  - Implementation 450 hours
- Permanent Resources – Post Implementation

  First Year:
  - Data Management 4 hours per week
  - User Support 4 hours per week

- System Support 2 hours per week

Subsequent Years:

- Data Management 2 hours per week
- User Support 2 hours per week
- System Support 1 hours per week

3.10.8. Long-Term Projects

Business Intelligence/Data Reporting System Evaluation

Project Description

The Business Intelligence/Data Management & Reporting System Evaluation will determine what the best approach is for the District going forward for data management and reporting.

Estimated Resource Requirements

The Management Reporting System Implementation Project will require the following resources from the District:

- Temporary Resources – Evaluation
  - Project Oversight 200 hours
  - Evaluation/Analysis 600 hours
- Temporary Resources – Implementation
  - Project Oversight 500 hours
  - Implementation 1600 hours
- Permanent Resources – Post Implementation

  First Year:
  - User Support 16 hours per week
  - System Support 8 hours per week

  Subsequent Years:
  - User Support 8 hours per week
  - System Support 8 hours per week

CMMS Consolidation Evaluation

Project Description

This project will determine what the best approach is for the District going forward for work order management systems, whether the two systems should be maintained or consolidated.

Estimated Resource Requirements

The Management Reporting System Implementation Project will require the following resources from the District:

- Temporary Resources – Evaluation
  - Project Oversight 200 hours
  - Evaluation/Analysis 400 hours
- Temporary Resources – Implementation
  - Project Oversight 200 hours
  - Implementation 1000 hours
- Permanent Resources – Post Implementation

  First Year:
  - User Support 8 hours per week
  - System Support 4 hours per week

  Subsequent Years:
  - User Support 4 hours per week
  - System Support 4 hours per week

3.11. IT Governance, Management, and Support Plan

3.11.1. Purpose

This report outlines the recommended IT Governance process and plan for consideration by the District. The primary purposes of the plan are to:

- Familiarize the District with governance, management, and support concepts and best practices.
- Present recommendations for District decisions about IT Purpose and Vision, IT Architecture, IT Infrastructure, a Business Application Strategy, and Project Portfolio Management to be incorporated into the Districts existing IT Master Plan.
- Present recommendations for potential improvements that can be implemented in the areas of IT Governance structure, IT Policy, IT Skill Development and Staffing, and Outsourcing.

3.11.2. Definitions and Concepts

IT Governance

IT Governance encompasses the traditional roles of "management" and "support" and provides an overall framework to optimize information technology product and investment decisions. The adoption of IT Governance principles should enable the District to implement the IT improvements required to support the objectives of the asset management program in an efficient and cost effective manner.

Current Issues and Drivers

- Current staffing levels may not be sufficient in future to support expanding IT systems
- No formal process for district-wide IT decisions

Recommended Areas of Focus

- IT Planning and Resource Management
- Application Procurement, Implementation, and Vendor Management
- IT Support and Help Desk

IT Governance has been defined by the IT Governance Institute as follows:

> "IT Governance…consists of the leadership and organizational structures and processes that ensure that the organization's IT sustains and extends the organization's strategies and objectives."

In their book, "IT Governance", Weill and Ross offer a similar definition:

> "IT Governance: Specifying the decision rights and accountability framework to encourage desirable behavior in the use of IT."

Inherent in each of these definitions are the following features of IT Governance:

- Groups and individuals are formally vested with IT Governance responsibilities, including making certain decisions.
- The policies and procedures for IT Governance are defined, communicated, and managed.

- The purpose of IT Governance is to make sure IT investments are a net benefit to the organization.

According to Weill and Ross, organizations have five types of decisions to make in the governance of IT along with key questions that must be answered. They are:

- IT Principles – clarifying the business role of IT
  - What is the purpose if IT within the organization?
  - What is the overriding vision of IT?
  - What are the base principles IT should follow?
  - How will IT be funded?
- IT Architecture – defining integration and standardization requirements
  - What are the core business processes of the enterprise and how are they related?
  - What information drives these core processes and how must the data be integrated?
  - What technical capabilities should be standardized enterprise-wide to support IT efficiencies and facilitate process standardization and integration?
  - What IT support activities must be standardized enterprise-wide to support data integration?
- IT Infrastructure – determining shared and enabling services
  - What infrastructure services are most critical to achieving the enterprise's strategic objectives?
  - What infrastructure services should be implemented enterprise-wide and what are the service-level requirements of those services?
  - How should infrastructure services be purchased?
  - What is the plan for keeping underlying technologies up to date?
  - What infrastructure services should be outsourced?
- Business Application Needs – specifying the business need for purchased or internally developed applications
  - How do we assess in advance whether new business applications will be successful here?
  - How can business needs be addressed within architectural standards and when does a business need justify an exception to the standard?
  - Who will own the outcomes of each project and institute organizational changes to ensure the value?

- IT Investment Project Portfolio Management - choosing which initiatives to fund and how much to spend
  - What process changes or enhancements are strategically most important to the enterprise?
  - What are the distributions in the current and proposed IT portfolios and are these portfolios consistent with the enterprise's strategic objectives?
  - What is the relative importance of enterprise-wide versus business unit investments and do actual investment practices reflect their relative importance?

For each of the above types of decisions, an organization should define who is responsible (and accountable) for the decision, whether a group such as an IT Governance Committee, the Board of Directors (Commissioners, etc.), or a member of management.

3.11.3. Structure

The following table summarizes the suggested stakeholder roles in the five areas of IT Governance discussed above. The overall stakeholder roles in each focus area are recommended in Table 3-10:

Table 3-10.
Stakeholders and Roles

Governance Area	Executive Level	Department Level	IT Department
IT Principles	Lead	Support	Support
IT Architecture			Lead
IT Infrastructure			Lead
Business Applications		Lead	Support
IT Investment	Lead	Support	Support
IT Support	Support	Support	Lead

*Adopted from Weil and Ross

Currently defined in IT Master Plan

Key areas and responsibilities to incorporate into IT Master Plan

As a relatively small organization, the District does not have to deal with a multi-entity IT Governance arrangement. Accordingly, the recommended IT Governance structure is an "IT Governance Committee". The following are key attributes of such a structure:

- The need for such a committee, its membership, and its charter must be openly ratified by District leadership. There should be no doubt among managers and staff that the committee has been vested with a meaningful role, certain responsibilities, and decision-making rights.
- The committee will be composed of those District leaders or managers responsible for the major utility functions. Committee size should be in the range to 5 to 8 permanent members.
- The IT Governance Committee will meet as often as needed to get its work done. Typically, this means monthly meetings at first, tapering off to quarterly meetings.
- An IT Governance Committee Charter is the first order of business. It should specify:
  - The purpose of the committee
  - The members
  - The processes it oversees (see next section)
  - The decisions it makes
  - What it does not do (i.e., it does not supplant IT management in the month to month operation of the IT function)

3.11.4. IT Principles

The following IT principles support the mission, values, and culture of the District:

- The District will use automation to achieve reliable, responsive operations.

- IS will provide comprehensive, high quality information which supports customers and management.
- The District will promote consistent IT architecture and standards.
- Technology will be selected on the basis of functionality, reliability, and long life.
- The District will promote best practices for IT project management.
- IS will participate in strategic business planning.

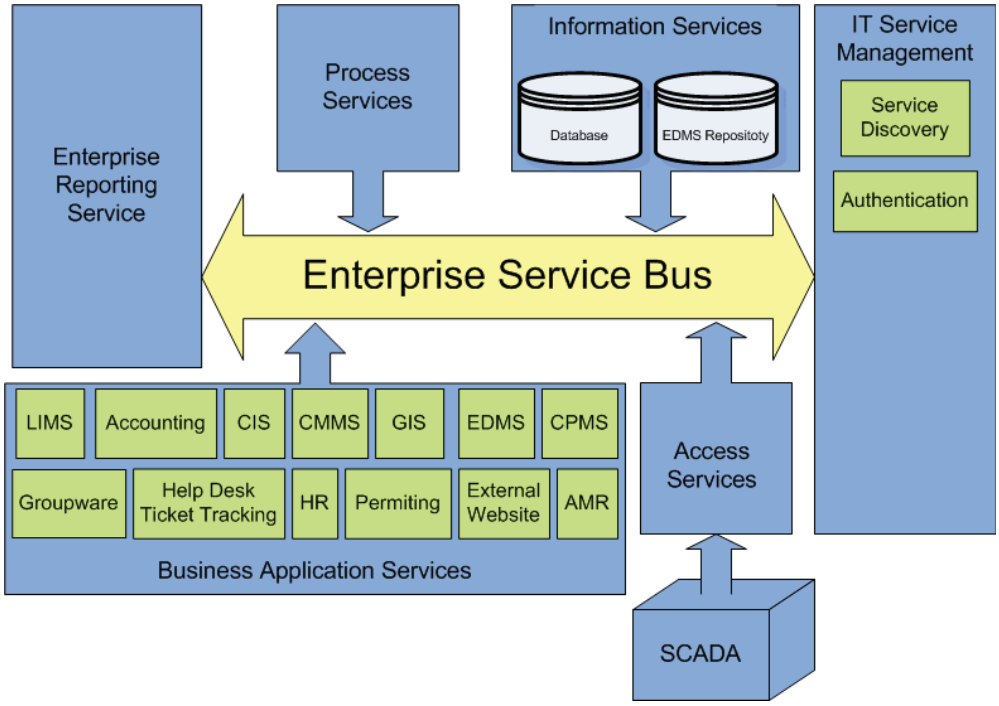
3.11.5. IT Architecture

Information technology exists within the enterprise to provide effective support of core business processes. The purpose of the IT architecture is to define the core business processes as well as the manner in which technology will support them. The Districts core business processes are 1) Bill, Collect and Redistribute Revenue, 2) Maintain Regulatory Compliance, 3) Perform Financial Management, 4) Perform Water system maintenance, and 5) Perform Water Operations.

These processes are best supported by coalesced information from a variety of sources. These information sources are well defined within the industry and can be characterized by the class of commercial system which has been deployed to provide this information. The primary information system sources are Laboratory Information Management System (LIMS), Accounting/Financial System (FIS), Customer Information System (CIS), Computerized Maintenance Management Systems (CMMS), Geographical Information System (GIS), and Supervisory Control and Data Acquisition (SCADA).

In the utility environment, the value of information systems increases when a high degree of integration can be obtained. The District does not currently have standards established for the integration of systems within the best of breed environment. Existing integrations are not optimized and present operating difficulties, particularly with systems upgrades. Near term, the District should use vendor provided interface tools, such as Application Programming Interfaces (APIs) to develop integrations, and when necessary obtain outside expertise to facilitate integrations. Long term, and in conjunction with the evaluation of a Business Intelligence environment, the District should consider standardization on a "Virtualized Service Oriented Architecture", which decouples applications, services, components and flows. This architecture is depicted graphically in Figure 3-5.

Figure 3-5: Virtualized Service Oriented Architecture to Support Business Intelligence



The elements of the system architecture are described in Table 3-11.

Table 3-11.
Elements of System Architecture

System Architecture Element	Description
Enterprise Service Bus	Enables communication between services.
Process Services	Orchestrates and automates business processes. Acts as the higher level logic which leverages other services to automate end to end business processes. (common event infrastructure)
Information Services	Proves unified management of diverse data and content.
IT Service Management	Manages and secures services, applications and resources.
Service Discovery	Assists people, process and information find the appropriate service provider to support their needs.
Authentication Services	Provides for a single point of authorization for all people and services.
Access Services	Facilitates interactions with existing applications and other external services or information sources
SCADA	Hardware and software dedicated to the supervisory control and data acquisition (SCADA) system. This equipment is not used for any other purpose, and may be arranged for redundancy and fault tolerance.
Business Application Services	A set of robust, scalable, modular applications tied into the enterprise service bus which provides specialized services directly related to business processes.
LIMS	Laboratory Information Management System
Accounting	Manages Accounting and Finance related information
CIS	Customer Information System
CMMS	Computerized Maintenance Management System
GIS	Geographical Information System
EDMS	Electronic Document Management System
CPMS	Capital Project Management System
External Website	Website available to public
Permitting	Assists in managing permits
AMR	Automated Meter Reading
Help Desk/Ticket Tracking	Assists in the tracking management of IT issues
Groupware	Integrated office and communications services such as email, calendaring, and task management
Enterprise Reporting Services	Software used to define, manage, and enable access to information to support routine operations and management level decision-making. May include a portal and performance measures dashboard.

3.11.6. IT Infrastructure

IT Infrastructure consists of the base level hardware and software used to support he overall computing and networking environment. The local area networks (LANs), wide area network (WAN) routers, network servers, desktop computers, printers, and the base level operating system software on servers and desktops all make up the IT infrastructure.

The key infrastructure components are: 1) the SCADA system and related infrastructure, 2) the SCADA WAN links connecting the Distribution and the Water Treatment Plants, 3) the LANs at the Central Facility, Water Treatment Plants and Lab, 4) the WAN links connecting the Central Facility, Water Treatment Plants, and Lab, and 5) the file and database servers. Other infrastructure components such as desktops, laptops, and printers are less critical but are recognized as fulfilling an important role in assisting the utility in achieving its mission.

IT infrastructure standards encompass the following; technology, procurement channels, deployment methods and the components for a business case to institute changes/upgrades.

3.11.7. Business Application Strategy

Water utilities have a range of information system needs that can be rarely satisfied by a single software vendor. The Enterprise Resource Planning (ERP) approach to software used by major manufacturing companies is not as appropriate for a small to mid-sized utility. Therefore the District has adopted "Best of Breed" software strategy, in which individual applications are selected on their own merit and their fit within the IT architecture from a variety of vendors.

It is unlikely that the IT Master Plan will be implemented exactly as written. Business changes, technology changes, and knowledge gained in the earliest implementations, may make the latter parts of the plan less appropriate. The IT Governance Committee provides the opportunity to "refresh" the decision process and the resulting business case for purchases/updates of key business applications. In the case of the asset management program, the decision to update to the major new release of Antero is an example of a key application decision. As the date approaches for the new release and more information is available on the cost and processes for the update, the business case can be reevaluated.

3.11.8. Project Portfolio Management Methodology

Project portfolio management is the process of managing the business application selection and implementation strategy and subsequent support in a manner which maximizes the contribution of the projects to the utility. This portfolio management approach is essential if the District is to treat IT related spending as an investment from which it expects to get a "return on investment" (ROI).

A simple portfolio management tool will help in organizing the information collected as part of the evaluation process. It is essential that costs, benefits, and risks be assessed for each proposed initiative, using consistent criteria for each.

3.11.9. IT Management and Support

Inherent in the overall IT Governance framework are the traditional roles for IT Management and IT Support. For the purposes of this plan, IT management is the planning, monitoring and day-to-day control of the IT function for the District, which includes a wide variety of activities such as:

- Planning and budgeting operating and capital expenditures
- Supervising and directing IT staff
- Managing IT improvement initiatives
- Contributing planning and design expertise on IT initiatives
- Maintaining software/hardware/service vendor relationships
- Managing operation of the network and server based systems
- Managing IT security and emergency preparedness/disaster recovery

Typical goals and objectives for IT management could include the following often conflicting elements:

- Minimize the total cost of service for the IT function
- Achieve high levels of software user satisfaction
- Provide high levels of system performance
- Minimize system downtimes
- Prevent or block breaches of physical/information security
- Stay current with software patches and upgrades
- Achieve high levels of employee skill and satisfaction

For the purposes of this plan, IT Support is defined as problem solving, repair and assistance services for information system users, including:

- Responding to user requests for help
- Correcting hardware, software or network problems affecting users
- Configuring hardware and software to optimize the user experience
- Providing training in the use of software applications

The goals and objectives of IT Support typically include the need to create an efficient, low cost IT environment, and the need to achieve a high level of user satisfaction. These two objectives are usually in conflict, which creates an ongoing challenge for IT management professionals.

IT support in many mid-size to large organizations is organized around a few basic approaches:

1. Provide tiered levels of support. Satisfy the bulk of support needs at the first level. Establish and manage a help desk and trouble tickets.
2. Carefully assign support roles to staff so that their job requirements are not inherently in conflict. Avoid assigning responsibilities to both answer the phone and fix problems at users' desks.
3. Outsource those low level functions that do not require special organizational knowledge, or knowledge of unique software applications. Manage outsourcing arrangements for an agreed level of service.
4. Measure support effectiveness and efficiency and use metrics to improve service.

3.12. Implementation Recommendations

Immediate

- Initiate IT Governance Committee in conjunction with asset management program implementation.
- Update IT Master Plan to incorporate IT Governance Committee charter.

Near- and Mid-Term

- Utilize IT Governance Committee to sponsor needed system upgrades in support of Asset Management Program (GeoDatabase, Antero upgrade, GIS/gbaMS Integration, etc.)

Long Term

- Utilize IT Governance Committee to identify and evaluate data management/reporting versus Business Intelligence services with formal business case development.

3.13. IT Skill Development and Staffing

This section describes implications for IT skill development and staffing that will be created by implementation of the IT Master Plan. In general, the IT Master Plan will likely impose the following changes on the District:

- A greater number of application integration points, processes, and transactions (in support of streamlined business processes)
- A greater number and intensity of IT projects, vendors, and service providers during large system implementations, with demands for contract management, project coordination, training, and organizational change management
- A new set of data structures, reporting tools, and management level interest in reporting

In view of these pressures on the District, the following are areas for skill development that likely will be required for current and future staff:

- SQL Server Database Administration – as the standard for the District, it will be essential to have expert resources available to troubleshoot and fix database problems, as well as solve the most complex data integration and reporting challenges. Some of the highest level SQL Server expertise may come through a contract (outsourced) arrangement.
- IT Management – The overall level of demands, both during and after implementation, will likely far exceed the current staff capabilities. Skills required include IT infrastructure planning, personnel management and development, budget preparation, spending control, technical oversight of operations and support, and vendor management.
- Project Management - familiarity with the basics of project management, and the ability to interface with contractors, will be an essential skill during large system implementation.
- Help Desk Operations - New systems and the inherent changes brought on by the IT Master Plan will create groundswells of user support requests. District support staff will need tools and techniques to handle unusually heavy loads.

Additionally, the District may wish to consider issuing a solicitation for IT services to gauge the local availability and cost of such services. Typically outsourcing of IT makes the most sense for those functions that are not unique to an organization, and for which the local market has a sufficient number of qualified service providers. Northern Kentucky Water District is in a locale that should yield a number of IT service providers who can provide responsive service.

The primary candidate functions for IT outsourcing are:

- Database Administration – This is most likely a part time need that could be satisfied by an expert individual on-call.
- Help Desk – For first level support, common applications can be supported by remote help desk personnel over the telephone.
- Computer and Network Hardware – For handling installation, troubleshooting and repair.

4. Identified Needs and Improvements

4.1. Large Capital Projects in 5-Yr CIP

The results of the asset renewal and replacement planning were combined with evaluations of alternatives to meet the District's needs in areas of increased capacity and regulatory compliance. Areas of focus for this AMP Update included:

- Raw Water Supply
- Water Treatment Plants
- Pumping Stations and Storage Tanks
- Other (including laboratory equipment)

4.1.1. Raw Water Supply Evaluation

4.1.1.1. Ohio River Pump Station No. 2

In the 2004 Asset Management Plan, NKWD identified the Ohio River Pump Station No. 2 (ORPS2) as one of the Districts' assets that was most critically in need of improvements. The 100 plus year old pump station delivers raw water to the Memorial Parkway Water Treatment Plant (MPTP). Currently, ORPS2 contains three 10 MGD pumps with one of the three being inoperable. The remaining two pumps are able to provide the necessary 10 MGD firm capacity of raw water necessary at the MPTP. To accommodate their expanding service population over the foreseeable future, NKWD has decided to upgrade the capacity at the MPTP to 15-20 MGD at some point during the duration of this planning period. The timing of this improvement depends on available treatment plant capacity pending detailed hydraulic analyses. In order to meet that increased raw water demand and address the identified physical condition of the pump station, NKWD has several alternatives to satisfy these necessary improvements. This analysis will evaluate the raw water pumping alternatives and provide preliminary capital cost estimates associated with each alternative to assist NKWD in the critical task of improving their raw water intake asset in ORPS2.

The first alternative available to the District (Alternative A) would be a complete rehabilitation and upgrade of the existing ORPS2. The renovated pump station would house two 12 MGD pumps to meet off-peak pumping capacity needs and a third 12 MGD pump would be added giving ORPS2 a future firm pumping capacity of 24 MGD. The pump station's concrete and brick have significantly deteriorated over the years and rehabilitation would be challenging and unpredictable. Numerous amounts of structural and destructive testing would have to be performed to accurately assess the condition of

the existing superstructure. It is also not conceivable to assume the continued operation of this facility during the rehabilitation process. It is very possible that ORPS2 could be out of service for almost two years during construction. Because of the building's being listed as a historical site by the AWWA, any rehabilitation and upgrade efforts must retain the historical integrity of the structure. This alternative would result in larger design fees and disclaimers associated with the unpredictability and dangers present with the task of renovating a 100 plus year old facility. Further, by providing this summary of probable costs, Malcolm Pirnie and GRW are in no way conclusively stating that a rehabilitation of this facility can actually be accomplished.

Table 4-1.
Probable Costs for Alternative A - Rehabilitate and Upgrade Existing ORPS2

Item	Cost
Structural renovation (floors, walls, roof, etc.)	$10,800,000
Protective Cofferdams in River	$1,600,000
Equipment (HVAC, electrical, etc.)	$1,800,000
Misc. Improvements (bar screens, stairs, etc.)	$2,900,000
Three 12 MGD Pumps	$2,450,000
Back-up Generator	$1,700,000
24" DIP from PS to Top of Hill	$1,700,000
24" DIP from Top of Hill to MPTP	$2,300,000
Design and Fees (40%)	$10,100,000
Subtotal	**$35,350,000**
Contingency (40%)	$14,150,000
Total	**$49,500,000**

The second alternative available to the District (Alternative B) would be to retire the existing ORPS2 and replace it with a new 24 MGD intake structure and pumping facility. The new pump station would also house three 12 MGD pumps giving the ORPS2 a firm pumping capacity of 24 MGD. A large percentage of the cost for this alternative would be in the rock excavation for the superstructure, the building of coffer dams, and the pumping equipment itself. This alternative would provide NKWD a new, reliable source of raw water in comparison to what is currently available. Since there is no retrofitting to an existing facility, this alternative provides minimal effect on current operations during construction. This alternative also provides more flexibility in design and offers a greater accuracy in estimating construction costs.

Table 4-2.
Probable Costs for Alternative B - Replace ORPS2 with a New Intake & Pumping Facility

Item	Cost
Raw Water Intake Structure and Equipment	$22,400,000
Electrical Services Updates	$500,000
Back-up Generator	$1,700,000
24" DIP from PS to Top of Hill	$1,700,000
24" DIP from Top of Hill to MPTP	$2,300,000
Design and Fees (25%)	$7,150,000
Subtotal	**$35,750,000**
Contingency (25%)	$8,900,000
Total	**$44,650,000**

The third alternative available to the District (Alternative C) would be to retire the existing ORPS2 and supply MPTP from the existing Ohio River Pump Station No. 1 (ORPS1). Currently, ORPS1 is nominally sized for six 12 MGD pumps and supplies the District's Fort Thomas Water Treatment Plant (FTTP). The FTTP has a rated capacity of 44 MGD and the firm capacity of ORPS1 is 60 MGD. Due to site constraints, a future expansion of the FTTP has not been considered. If ORPS1 is also to supply MPTP with the future treatment capacity of 15-20 MGD, then an upgrade and possible expansion of ORPS1 would be necessary to circumvent any redundancy and reliability issues. The first option considered was to upgrade the size of the existing pumps at ORPS1 therefore raising the firm capacity at the pump station to supply raw water to both treatment plants. As it currently stands, the weight of each existing pump meets or narrowly exceeds the floor loading design capacity of the pump foundation at ORPS1. Therefore, due to floor loading issues, it is not feasible to just upgrade the size of the pumps currently in ORPS1 without considering methods to increase the floor loading capacity and pipe gallery modifications. This option was not further considered due to the assumption that it is not feasible to remove ORPS1 from service to accomplish the structural and piping modifications. The second option would be to build an addition onto the current ORPS1 structure that could house three 10 MGD pumps giving ORPS1 an additional 20 MGD of firm capacity. This would provide NKWD with the capacity and reliability to now provide MPTP with raw water from ORPS1. In addition to the upgrades at ORPS1, a transmission main would need to be constructed to supply MPTP with raw water from ORPS1. This option is the basis for the costs presented below in Table 4-3. This alternative will no longer provide the District with the redundancy of having two separate raw water intake pumping sources and would require significant hydraulic modeling to ensure proper pumping operations.

Table 4-3.
Probable Costs for Alternative C - Retire ORPS2 and Supply MPWTP from Existing ORPS1

Item	Cost
Pumping Station Structure Upgrades	$17,250,000
Three 10 MGD Pumps	$1,950,000
Changes to ORPS1 Gallery Piping	$1,150,000
24" DIP from ORPS1 to ORPS2	$2,700,000
24" DIP from ORPS2 to Top of Hill	$1,700,000
24" DIP from Top of Hill to MPTP	$2,300,000
Additional Back-up Generator	$1,700,000
Electrical Services Updates	$500,000
Design and Fees (25%)	$7,300,000
Subtotal	**$36,550,000**
Contingency (30%)	$11,000,000
Total	**$47,550,000**

All estimates do not include any costs associated with easement or land acquisition. The costs for Alternatives B and C are similar, but Alternative B is being recommended because it provides more redundancy and less disruption to operations at ORPS1. However, additional detailed evaluation would needed to verify costs for these options.

4.1.1.2. Licking River Pump Station

The following level of service improvements were identified during a site visit to the Licking River Pump Station and are included in the 5-year CIP as 09-05.

- **Improvements to the Building Superstructure -** A large number of structural deficiencies that were identified in the 2004 AMP have been addressed. A number of small cracks were still visible in the concrete and brick on both the interior and exterior of the building. The current condition of the roof is unsatisfactory and operations staff indicated there is no efficient method to remove and service the station's pumps. Current openings in the roof to pull pumps are not sized properly creating difficulties when removed via crane on the Licking River. It is recommended that a new roof be installed with properly sized hatches to facilitate removal of the pumps along with a new 2-ton hoist. Hatches should double as sky lights to improve lighting inside the pump room. Ventilation inside the building is provided by one roof mounted fan and one wall fan with fresh air louvers located on the river side wall. Temperatures inside the building were slightly higher than normal with both ventilation fans running. The operations staff indicated some deterioration in some of the ladders used to maneuver alongside the exterior of the building. The District expressed interest in implementing a programmatic approach to building maintenance allowing a budgeted amount of money to be set aside each year to aide

in the rehabilitation efforts of the building. The estimated annual cost for building rehabilitation is $40,000/year. The estimated cost for roof replacement is $205,000.

- **Replacement of Sluice Gates -** Currently there are three sluice gates located at various points of the intake structure that have not been operated in several years, according to the operations staff, and need to be replaced. The majority of this work would need to be completed in wet conditions by divers. A capital cost was generated to replace the current gates as well as their corresponding electric operators. The estimated cost to replace the sluice gates is $185,000.
- **Raw Water Main Relocation -** The aerial portion of the 16" raw water main that runs across the Licking River was previously identified as a security risk in a vulnerability assessment due to the lack of redundancy. However, discussion on feasibility of building this line suggests this is not a realistic budget and it may not be possible to build a buried main at this site (affordably). This project is being removed from the budget.
- **Variable Frequency Drive Pump Upgrade and Relocation -** NKWD and its operations staff indicated strong interest in moving the existing drives and MCC out of the pump station into a newly constructed, climate controlled electrical building located on the river bank side of the walk bridge (approximately 400 feet from the pumps). This change would also correspond with installation of variable frequency drives on the remaining two pumps. These improvements would improve reliability, provide operational flexibility and result in a facility that is more easily maintained. Also, by moving the existing drives and MCC outside of the pump room, this will improve any current deficiencies in ventilation. The estimated cost for upgrading and relocating the VFD are $940,000. To perform this work the follow tasks are required:

    1. New VFD's to control current 150 Hp, 250 Hp and 350 Hp pump motors.
    2. New building to house the MCC and VFD drives.
    3. New MCC with service rated feed along with TVSS.
    4. New service feeds to the pumps out from the new building.
    5. Commissioning, tuning and debugging of the new drives.
    6. Spare parts needed for the VFD's.
    7. The demolition work needed for removal of the drives, conduit and wire, clean up, removal of the old electrical feed to the motors and MCC.
    8. Installation of the new motor (need to be at least a class F to handle the VFD requirements).
    9. New service feed to the new MCC panel.

4.1.2. Water Treatment Plant Evaluation

4.1.2.1. Memorial Parkway WTP

Regulatory

Regulatory needs at the Memorial Parkway WTP include the addition of granular activated carbon (GAC) for advanced treatment to meet the Stage 2 Disinfectant/Disinfection By-product (D/DBP) Rule and potentially a UV disinfection facility to meet the Long-Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR), or to provide an additional disinfection barrier.

Several site alternatives were analyzed and the selected alternative was to locate the GAC facility in the footprint of Sedimentation Basins No. 5 and No. 6. The following assumptions for capacity and redundancy were made in developing the basis of design for the GAC facilities:

- The GAC facility will include 6 GAC contactors, GAC feed pump station, GAC backwash system, contactor-to-waste function, combination backwash waste/contactor-to-waste equalization basin, and carbon loading/unloading facilities.
- Normal operation will provide at least a 20-minute EBCT with all contactors in-service at a maximum production rate of 20 MGD.
- Duty and standby pumps are provided for each of the pumping systems required for these facilities.
- Provisions to enable incorporation of UV disinfection at the future treatment capacity of 20 MGD.

All six GAC contactors will have the same type of equipment and operational mode as shown in Table 4-4.

Table 4-4.
Design Criteria for GAC Contractors MPTP

Parameter	Value
No. of Contactors	6
Contactor Length (feet)	34
Contactor Width (feet)	15
Surface Area per Contactor (sf)	510
GAC Media Depth (inches to top of underdrain)	144
Design Flow per Contactor at Current Design Capacity (MGD)	3.3
Surface Loading Rate at Current Design Capacity (gpm/sf)	4.5

As the preliminary design progressed, a final opinion of probable costs was developed. The cost opinion is considered a Class 3 estimate in accordance AACE and has a predicted accuracy of -20% to +30%. The detailed cost opinion is shown in Table 4-5, and includes the UV disinfection facility.

Table 4-5.
Opinion of Probable Project Costs-MPTP

Item	Capital Cost ($ Million)
GAC Facilities (Contactor building, site work, GAC PS, EQ Basin)	$18.5
UV Facility	$2.3
Contingency	$4.1
Engineering (Legal, administration)	$3.1
Total	**$28.0**

Capacity

Capacity needs at the MPTP will include an upgrade of the plant capacity from a 10 MGD to 15 MGD or 20 MGD facility sometime between 2020 and 2030. Additional coagulation, sedimentation, filter, clearwell and pumpage capacity is anticipated.

Level of Service

During a recent site visit to the MPTP facility, a number of items were identified in need of repair. The findings of this visit are described in the following paragraphs.

- **Replacement of Raw Water Reservoir suction/discharge piping -** The District indicated, during our site visit, that the original suction/discharge piping located at both existing raw water lagoons is undersized therefore creating a hydraulic bottleneck that possibly limits the capacity of the treatment plant. This piping

supplies the raw water pump station by conventional gravity methods. It is recommended that the existing suction/discharge piping be upsized and replaced to accommodate additional capacity at MPTP. Estimated cost is $285,000.

- **Dredging of Residuals in North and South Raw Water Reservoirs (2012-2013) -** The South Reservoir is currently being used as the raw water presedimentation basin and feeds the plants raw water pump station while the North Reservoir is currently being used only as a sludge and backwash holding basin. Based on comments by the operating staff, it is believed that the North Reservoir is over 80% filled with solids and when the water level reaches a certain height water spills over the dam separating the two reservoirs. Due to possible improvements to the Sludge Handling Facility and implementation of Advanced Treatment facilities at MPTP, the District expressed interest in postponing any possible improvements to the condition of both Raw Water Reservoirs past the year 2012.
- **Addition of Backup Generator -** The District expressed interest in providing MPTP with an additional back-up generator to provide the plant with a source of additional power reliability for the Actiflo® process and plant's general operations. Currently, the existing generator at MPTP only serves the lighting panels for the Filter Building, Chemical Building, Backwash Pump Station, and the Raw Water Pump Station. The generator is part of the Advanced Treatment Project AMP 09-03. The estimated cost for the addition of a backup generator is $900,000.
- **Demolition or Conversion of Current Chemical Building -** The current condition of the Chemical Building's superstructure is unsatisfactory. Visible structural defects are numerous and a large portion of the buildings upper levels have been taken out of service. Over the past several years, the District has had numerous studies completed on the possible demolition of the existing building or possible conversion of the existing building to a single story maintenance shop. Either alternative would be an acceptable recommendation since the District seeks to take some type of action towards the condition of the existing building. A specific project has not been included for this work.
- **Replacement of valve actuators on Filters 4, 5, and 6 -** Currently, the District uses pneumatic actuators for all valves involved in the filter process at MPTP. NKWD has stated they would like to replace the current pneumatic valve actuators on Filters 4, 5, and 6 with electrically controlled actuators. This is part of Advanced Treatment Project AMP 09-03.
- **Sludge Process Equipment Rehabilitation (annual programmatic budget and AMP 17-02 & 29-01) -** The residuals handling system at MPTP is currently not in operation due to numerous problems associated with the process equipment in the Sludge Handling Building. Instead of a single project to rehabilitate the residuals handling system and place it back in service, the District expressed strong interest in supplementing projects with an annual programmatic budget approach to rehab/upgrade the existing inoperable facilities. An upgrade to the following process

equipment is recommended - Sludge Press Rehab, Conveyer System Rehab, Sludge Pump Replacement, Electrical Upgrade, and Dumpster Area Rehab. Once the recommended improvements are addressed and the facility is put back in service, the current practice of using the North Raw Water Reservoir for residuals storage may be eliminated. The estimated annual cost associated with rehabilitation of the sludge process equipment is $120,000/year.

4.1.2.2. Fort Thomas WTP

Regulatory

Regulatory needs at the FTTP include the addition of granular activated carbon (GAC) for advanced treatment to meet the Stage 2 Disinfectant/Disinfection By-product (D/DBP) Rule and potentially a UV disinfection facility to meet the Long-Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) or to provide an additional disinfection barrier.

Several site alternatives were analyzed and the selected alternative was to locate the GAC facility adjacent to the existing laboratory building. The following assumptions for capacity and redundancy were made in developing the basis of design for the GAC facilities:

- The GAC facility will include 8 GAC contactors, a GAC feed pump station, GAC backwash system, contactor-to-waste function, combination backwash waste/contactor-to-waste/filter-to-waste equalization basin, and carbon loading/unloading facilities.
- Normal operation will provide at least a 20-minute EBCT with all contactors in-service at a maximum production rate of 44 MGD.
- Duty and standby pumps are provided for each of the pumping systems required for these facilities.
- Provisions to enable incorporation of UV disinfection at the current treatment capacity of 44 MGD.
- A GAC supplier will provide virgin carbon to the site and truck the spent GAC off-site.

All eight GAC contactors will have the same type of equipment and operational mode as shown in Table 4-6.

Table 4-6.
Design Criteria for GAC Contactors-FTTP

Parameter	Value
No. of Contactors	8
Contactor Length (feet)	44
Contactor Width (feet)	20
Surface Area per Contactor (sf)	880
GAC Media Depth (inches to top of underdrain)	144
Design Flow per Contactor at Design Capacity (MGD)	5.5
Surface Loading Rate at Design Capacity (gpm/sf)	4.3

As the preliminary design progressed, a final opinion of probable cost was developed. The cost opinion is considered a Class 3 estimate in accordance AACE and has a predicted accuracy of -20% to +30%. The detailed cost opinion in 2007 dollars is shown in Table 4-7, and includes the UV disinfection facility.

Table 4-7.
Opinion of Probable Project Costs-FTTP

Item	Capital Cost ($ Million)
GAC Facilities (Contactor building, site work, GAC PS, EQ Basin)	$33.5
UV Facility	$2.8
Contingency	$7.3
Engineering (Legal, administration)	$5.4
Total	**$49.0**

Capacity

There were no assets identified at the FTTP that required improvements to provide capacity for meeting future growth through the year 2030.

Level of Service

During a recent site visit to the FTTP facility, a number of items were identified in need of repair. The findings of this visit are described in the following paragraphs.

- **Repair of Concrete Flocculation/Sedimentation Basins #2 & #3 -** Visual inspection of sedimentation basins #2 & #3 showed numerous areas of deterioration in the concrete and similar deteriorations were apparent in the corresponding flocculation basins. It is recommended that the District take the necessary measures to repair the concrete as part of capital improvement planning at FTTP before the condition worsens. The estimated cost for these repairs is $900,000.

- **Improvements to Flocculation Process Equipment -** NKWD expressed interest in revising the current flocculation arrangement for three of the four existing basins. It is recommended that NKWD revise current flocculator drive arrangements in basins #1, #2 & #3 similar to the direct drive assembly in basin #4. The current two stage horizontal flocculator arrangement should be converted to a three stage vertical flocculator arrangement to alleviate current alignment issues, age, and system wear. The estimated cost associated with revising the drive arrangement on flocculation basins #1, #2 & #3 is $71,500. The estimated cost associated with revising the flocculation paddle arrangement is $42,500.
- **Addition of Protective Covers to all Four Sedimentation Basins -** NKWD expressed interest in the addition of protective covers over all four existing sedimentation basins at FTTP. This capital improvement will aide in blocking sunlight which is a proven and effective method for algae control. By covering the basins, it may no longer be necessary to feed copper sulfate to all four sedimentation basins. Upon further investigation, the cost to span the dimension with support members to cover the basin was higher than anticipated. This project will not be carried forward.
- **Replacement of Filter Backwash Tank -** During our site visit, NKWD indicated that the current condition of the underground Filter Backwash Tank is unsatisfactory and may still leak even after recent attempts to recondition the aging tank. The District expressed strong interest in replacing the existing underground tank with a slightly larger tank. A lower cost alternative, with less functionality, would be to make remedial repairs to the existing tank. The District may elect to cancel this project if the new backwash pumps installed with the Advanced Treatment Project are found to be reliable. The estimated cost for upgrading and replacing the Filter Backwash Tank is $460,000.
- **Perform Comprehensive Hydraulic Analysis of FTTP -** NKWD expressed strong interest in completing a comprehensive hydraulic analysis of the operations at FTTP. There may be hydraulic bottlenecks that are preventing the Plant from operating at its optimal capacity. One area of concern that was specifically mentioned by the District was the Filter Influent Flume.
- **Replacement of Sludge Building Interior Process Equipment -** NKWD indicated that, even though there are no current operational issues with any of the existing sludge handling process equipment, the aging equipment is quickly approaching the end of its useful life and should be considered for scheduled replacement. Two new sludge belt filter presses, conveyor system, decant valves, and repairs to the dumpster room were all specifically mentioned by the District and are recommended to be addressed as part of the capital improvements at FTTP. NKWD recommended delaying the above mentioned capital improvements until the year 2012-2013 in order to concentrate solely on Advanced Treatment improvements in the near future. The estimated cost associated with replacing the sludge belt filter press is $1,600,000 and

the estimated cost associated with replacement of the sludge press process equipment is $270,000.

4.1.2.3. Taylor Mill WTP

Regulatory

Regulatory needs at the TMTP include the addition of granular activated carbon (GAC) for advanced treatment to meet the Stage 2 Disinfectant/Disinfection By-product (D/DBP) Rule.

Both basin-style and vessel-style contactors were investigated for the GAC facility to be located west of the current treatment processes at the TMTP. Vessel-style contactors were selected and the following assumptions for capacity and redundancy were made in developing the basis of design for the GAC facilities:

- The GAC facility will include 28 GAC pressurized vessels, GAC feed pump station, GAC backwash system, contactor-to-waste function, combination backwash waste/contactor-to-waste equalization basin, and carbon loading/unloading facilities.
- Normal operation will provide at least a 20-minute EBCT with all contactors in-service at a maximum production rate of 10 MGD.
- Duty and standby pumps are provided for each of the pumping systems required for these facilities.

Twenty-eight pressurized contactors will be provided. It is anticipated that the contactors will have the following characteristics as shown in Table 4-8.

Table 4-8.
Design Criteria for GAC Contactors-TMTP

Parameter	Value
No. of Contactors	28
Contactor diameter (feet)	10
Approximate Contactor height (feet)	22
Design Flow per Contactor at Design Capacity (MGD)	0.42

As the preliminary design progressed, a final opinion of probable costs in 2007 dollars was developed. The cost opinion is considered a Class 3 estimate in accordance AACE and has a predicted accuracy of -20% to +30%. The detailed cost opinion, which includes the UV disinfection facility, is shown in Table 4-9.

Table 4-9.
Opinion of Probable Project Costs-TMTP

Item	Capital Cost ($ Million)
GAC Facilities (Contactor building, site work, GAC PS, EQ Basin)	$15.3
Contingency	$3.1
Engineering (Legal, administration)	$2.3
Total	**$20.7**

Capacity

There were no assets identified at the TMTP that required improvements to provide capacity for meeting future growth through the year 2030.

Level of Service

During a recent site visit to the TMTP facility, a number of items were identified in need of repair. The findings of this visit are described in the following paragraphs.

- **Replacement of Concrete Sedimentation, Flocculation, and Rapid Mix Basins -** Recent tests by a concrete testing company have validated the operations staff's concerns that both the north and south sedimentation basins are rapidly deteriorating. Visual inspection showed similar, but less severe, deterioration in the concrete of the adjoining flocculation and rapid mix basins. It is recommended that the District replace the concrete sedimentation, flocculation, and rapid mix basins as part of capital improvement planning at TMTP. The existing rapid mixer was last replaced in 1989 and should also be replaced with a new mixer as part of the basin replacement. The District has expressed interest in replacing the existing tube settlers in both basins but has elected to wait until replacement of the existing basins is completed. This project is combined with the Advanced Treatment Project. The estimated cost for replacing the concrete basins is $3,405,000. The estimated cost for replacing the rapid mixer is $4,500. The estimated cost for replacing the tube settler is $235,000.
- **Replacement of Sludge Building Interior Process Equipment -** NKWD indicated that, even though there are no current operation issues with any of the existing sludge handling process equipment, the aging equipment is quickly approaching the end of its useful life and should be considered for scheduled replacement. A new belt filter press, conveyor system, decant valves, and repairs to the dumpster room were all

specifically mentioned by the District and are recommended to be addressed as part of the capital improvements at TMTP. NKWD recommended delaying the above mentioned capital improvements until the year 2014 in order to concentrate solely on Advanced Treatment improvements in the near future. The estimated cost for the sludge belt filter press replacement is $800,000. The estimated cost for replacing the sludge press process equipment is $175,000.

4.1.3. Pumping Station Evaluation

Regulatory

There were no regulatory improvements identified for any of the pump stations through the year 2030.

Capacity

A pump station capacity analysis was conducted as part of the Hydraulic Model Update, see Section 1 of this report.

Level of Service

Bromley Pump Station

During a recent site visit to the Bromley Pump Station, a number of items were identified in need of repair. These items are included in the R&R portion of the CIP. The findings of this visit are described in the following paragraphs.

- **Improvements to Interior of Pump Room Building -** Unlike at the Carothers Pump Station, the renovations to the Bromley Pump Station had not been completed at the time of out site visit. It could be assumed that similar renovations would have a similar impact on the capital improvement recommendations at this pump station. According to the operations staff, the Bromley Pump Station is at the top of the District's renovations list. The current condition of the interior of the building was fair and the staff indicated no problems with daily operations of the pump station. All pumps have been recently refurbished by NKWD staff. All three concrete pump support blocks were in poor condition, with significant concrete deterioration visible at the Pump #1 support block. All non-buried piping showed extensive corrosion and, according to the operations staff, is to be painted as part of the renovations program. Piping supports underneath control valves were either non-existent or crude pieces of wood and should be addressed. One of the three pump motors in use appeared to be much older than the other two pump motors. It is recommended to phase out the old pump motor in order to standardize the existing pump motors therefore minimizing spare parts. There was not an adequate method to maneuver

around the pump room without jumping over non-buried piping. In case of an emergency, this would present safety concerns. The District expressed interest in implementing a programmatic approach to building maintenance, above and beyond the existing O&M capital budget, allowing a budgeted amount of money to be set aside each year to aide in the rehabilitation efforts of the building. The estimated annual cost for building rehabilitation is $10,000. The estimated cost associated with pump motor standardization is $50,000

- **HVAC Improvements to Pump Room -** Ventilation within the pump room is provided by a single fan located in the ceiling of the pump room. Temperatures inside the pump room were well above normal, with the fan running, during summer month operation. It should also be noted that the discharge damper was disconnected during the site visit and should be addressed. It is recommended that at least one additional ceiling fan be installed to help improve cross-flow ventilation. The fans should be operable either by a local thermostat or by manual switch. The estimated cost for HVAC improvements is $2,700.

Carothers Pump Station

During a recent site visit to the Bromley Pump Station, a number of items were identified in need of repair. These items are included in the R&R portion of the CIP. The findings of this visit are described in the following paragraphs.

- **Improvements to Interior of Pump Room Building -** Currently, NKWD is in the process of a systematic program of renovating and rehabilitating all of their distribution pump stations. The District did not divulge a schedule or criticality assessment but stated rather that the program is driven on an "as needed basis" and as O&M capital funds are made available. At the time of our site visit, the Carothers Pump Station renovations had recently been completed, therefore this pump station had little or no capital improvement needs. The current condition of the interior of the building was satisfactory and every piece of non-buried piping was painted recently and in fairly good condition. The restroom in the building was not in service and, according to the operations staff, has been that way for numerous years. The District expressed little interest in improving the operation of the stations lavatory.
- **Addition of a Back-up Generator -** NKWD expressed interest in providing this pump station with a back-up generator. Due to space limitations on the property this improvement might not be feasible. An existing generator at the FTTP will become redundant since a new generator is included as part of the recent Advanced Treatment project at that site. Therefore the old generator may possibly be moved to the Carothers Pump Station. There is discussion of also moving that same generator to service the TMPS or the Central Facilities Building. For the purposes of this planning document, it will be assumed that because of the space limitations at this site that a new nominally sized, portable generator will be purchased to satisfy this capital improvement. The estimated cost for the back-up generator is $220,000

Dudley 1040 & 1080 Pump Stations

During a recent site visit to the Bromley Pump Station, a number of items were identified in need of repair. These items are included in the R&R portion of the CIP. The findings of this visit are described in the following paragraphs.

- **Improvements to Interior Process Equipment of Pump Room Building 1080 -** The interior of the buildings was in overall good condition. All pumps have been recently rebuilt by NKWD staff within the last 4 years and all control valves have been reconditioned within the last 5 years. The operations staff indicated that all four pumps are in good operating condition. Some non-buried piping showed minor corrosion and, according to the operations staff, is scheduled to be painted. At this time, there are no identified capital improvement recommendations and any minor improvements to this pump station can be addressed within the O & M budget.
- **Improvements to Interior Process Equipment of Pump Room Building 1040 -** The current condition of the interior of the buildings was satisfactory. The operations staff indicated that all four pumps are in good operating condition and have been recently refurbished by NKWD staff within the last 7 years. The District expressed concern about the age (originally installed in 1965) and lack of efficient hydraulic performance of three of the four station's vertical can pumps. It is recommended that all three of the existing vertical can pumps be systematically replaced as part of the on-going capital improvements to this station. All non-buried piping showed minor corrosion along with small patches of moss growth and, according to the operations staff, is scheduled to be painted. NKWD also expressed interest in implementing new soft start instrumentation at this pump station for all four pumps similar to that currently in use at the 1080 station. This improvement would help cut down on peak power demand during pump run time and start-up. The estimated cost associated with pump replacement is $800,000. The estimated cost for soft start RVAC retrofit is $60,000. The estimated cost for soft start auto transformer overhaul is $240,000.
- **HVAC Improvements to Pump Room 1080 & 1040 -** During our site visit, it was observed that NKWD consistently placed the insect screens/bird screens on the inside of the existing pump station louvers. This creates an ideal spot for insects and birds to build nests between the louver blades and the screens and may create a serious health hazard associated with droppings. It is recommended that the District possibly replace these louvers with the screen on the outside. The estimated cost for louver replacement is $1,500.
- **Replacement and Upgrade of Isolation Valves for both 1040 & 1080 Tanks -** NKWD expressed strong interest in replacing isolation valves located on the inlet side of the two 5 MGD storage tanks. The operation of these isolation valves should be tied into and controlled by the District's existing SCADA system. Currently, in case

of a transmission main break, the District has no preventative measures in place to reduce the volume of water lost. The estimated cost for replacing the isolation valves and upgrading SCADA is $55,000.

4.1.4. Storage Tank Evaluation

Within the 5-Year planning window the only new tank recommended is the replacement of the Rossford Tank due to age and condition. Additional storage capacity is projected to be needed to meet future demand increases beyond the 5-year horizon as discussed in Section 1, Hydraulic Model Update. Recommendations for storage tank maintenance can be found in Section 4.2.4, Storage Tank Evaluation.

4.1.5. Other

4.1.5.1. Laboratory Equipment

The replacement of laboratory equipment was included in the evaluation of the capital improvements plan as shown in Table 4-10. The equipment was assigned a service life of either 10 or 15 years. Equipment was assumed to be replaced with the same model or equivalent. This evaluation assumed that the exact same number and type of equipment would continue to be needed throughout the planning horizon.

Table 4-10
Laboratory Equipment Replacement Schedule

Replacement Year	Purchase Year	Equipment	Make/Model	Location	Instrument Service Life	2008 Cost	Annual Replacement Cost	Final Cost (including inflation)
2008	2000	TOC Analyzer No. 1	Tekmar Fusion **	Organics Lab	10 years	$37,000		
2009	1988	Incubator No. 1	Fisher Scientific CO2 incubator/ 605	Micro Lab	15 years	$26,000		
2009	1988	Autoclave No. 1	Market Forge Sterilmatic/STME	Micro Lab	15 years	$12,000		
2009	2000	AA Varian No. 1	Spectra AA 280 **	Analytical Chemistry Lab	10 years	$75,000		
2009	1997	AA Perkin Elmer No. 1	Furnace 41102L, Flame AA analyst 400 **	Analytical Chemistry Lab	10 years	$22,000	$172,000	$172,000
2011	1996	Autoclave No. 1	Market Forge Sterilmatic/STME	Micro Lab	15 years	$12,000	$12,000	$13,230
2012	1997	Muffle Furnace No. 1	Lindberg	Wet Chem Lab	15 years	$7,000	$7,000	$8,103
2014	1999	D.I. Unit	Barnstead Infinity/D9011	Micro Lab	15 years	$4,000		
2014	2005	GC (for HAAs) No. 2	Thermo Trace GC Ultra	Organics Lab	10 years	$37,000		
2014	2005	Ion Chromatograph No. 2	Dionex	Analytical Chemistry Lab	10 years	$60,000	$101,000	$128,904
2016	2007	GC Mass Spec No. 2	Agilent GC 7890A, MS 5975C	Organics Lab	10 years	$50,000	$50,000	$70,355
2017	2008	Discrete Analyzer No. 2	OI Analytical DA3500 **	Wet Chem Lab	10 years	$58,000	$58,000	$85,692
2018	2008	TOC Analyzer No. 2	Tekmar Fusion **	Organics Lab No. 2	10 years	$37,000		
2018	2003	Muffle Furnace	Lindberg Blue	Wet Chem Lab	15 years	$7,000	$44,000	$68,258
2019	2009	AA Varian No. 2	Spectra AA 280 **	Analytical Chemistry Lab	10 years	$75,000		
2019	2009	AA Perkin Elmer No. 2	Furnace 41102L, Flame AA analyst 400 **	Analytical Chemistry Lab	10 years	$22,000		
2019	2004	D.I. Unit	Barnstead Diamond/D12651	Micro Lab	15 years	$5,000	$102,000	$166,147
2024	2009	Incubator No. 2	Fisher Scientific CO2 incubator/ 605	Micro Lab	15 years	$26,000		
2024	2009	Autoclave No. 2	Market Forge Sterilmatic/STME	Micro Lab	15 years	$12,000		
2024	2014	GC (for HAAs) No.2	Thermo Trace GC Ultra	Organics Lab	10 years	$37,000		
2024	2014	Ion Chromatograph No. 2	Dionex	Analytical Chemistry Lab	10 years	$60,000	$135,000	$280,655
2026	2011	Autoclave No. 2	Market Forge Sterilmatic/STME	Micro Lab	15 years	$12,000		
2026	2016	GC Mass Spec No.e 2	Agilent GC 7890A, MS 5975C	Organics Lab	10 years	$50,000	$62,000	$142,105
2027	2012	Muffle Furnace No.e 2	Lindberg	Wet Chem Lab	15 years	$7,000		
2027	2017	Discrete Analyzer No. 2	OI Analytical DA3500 **	Wet Chem Lab	10 years	$58,000	$65,000	$156,430
2028	2018	TOC Analyzer No. 3	Tekmar Fusion **	Organics Lab	10 years	$37,000	$37,000	$93,497
2029	2019	AA Varian No. 3	Spectra AA 280 **	Analytical Chemistry Lab	10 years	$75,000		
2029	2019	AA Perkin Elmer No. 3	Furnace 41102L, Flame AA analyst 400 **	Analytical Chemistry Lab	10 years	$22,000	$97,000	$257,370

4.1.6. Project Recommendations

A brief description of all the recommended projects in the 5-Year CIP can be found in Table 4-11 followed by a table of the project costs and projected dates when projects will be needed are presented in Table 4-12. A map of all the recommended improvements is provided as Figure 4-1.

Additionally, in order to provide options within the CIPs, multiple approaches were developed to evaluate the timing of projects, and how this timing affects the capital required to fund the AMP throughout the 20-year planning horizon. These approaches are defined below:

Minimum Approach. The minimum approach includes projects required to meet regulations and replace failing critical assets. The minimum approach also includes what is considered to be a minimum amount of funding for maintenance and repairs just to keep the facilities in operation.

Moderate Approach. The moderate approach includes projects required to meet or exceed regulations, replace aging assets at levels below highest level, and improve reliability. The moderate approach also includes funding for what is considered to be an average level of maintenance and repairs for all facilities.

Aggressive Approach. The aggressive approach includes projects required to exceed regulations, replace all categories of aging assets at highest level and significantly improve reliability at the earliest timeframe practical. The aggressive approach also includes adequate funding for maintenance and repairs required for all facilities as well as funding for unanticipated maintenance.

Appendix F contains the results of this analysis for all recommended improvements from 2009-2030.

Table 4-11.
5-Year CIP Project Description

Designation	Description
Yearly	Distribution System R&R This program involves the systematic replacement of water mains in areas which the District has experienced problems such as discolored water, poor flows, or failures.
Yearly	Coordinated Main Replacement This program involves working with various cities and agencies in the service area to replace water mains in streets that are being resurfaced. Working together saves the District restoration costs and coordinates our work with the street work.
Yearly	Mains to Unserved Areas These funds are utilized to extend water mains into unserved areas. The total project funding may include these funds along with grant funds, county funds, and surcharges to the customers.
Yearly	Annual General Facility R&R – Plants, Tanks, and Pump Stations This program involves rehabilitation and replacement of aging infrastructure and miscellaneous improvements at the treatment plants, tanks, pump stations, and regulator and meter pits. This may include improvements to address recommendations such as adding flow meters on the discharge of all pumps and gravity feed lines from FTTP and MPTP, surge suppression at pump stations, and connecting pressure regulating valves and large meter pits into SCADA.
09-01	FTTP – Advanced Treatment Project NKWD must comply with Stage 2 of the Disinfection By-Product Rule (DBPR) in April 2012. The DBPR will require all water systems to comply with a local running annual average of 80 ug\L and 60 ug|L for THM and HAA5 respectively at worst-case sampling points in the distribution system. NKWD will not be able to comply with this new regulation with the existing treatment processes at the FTTP. This project will install granular activated carbon (GAC) and ultraviolet (UV) disinfection at the FTTP. The standby generator will also be replaced.
09-02	TMTP – Advanced Treatment Project The preliminary treatment process housing the rapid mix, flocculation basins, and sedimentation basins at the TMTP are approximately 50 years old and need to be replaced because they are failing. The existing basins will be demolished and a granular activated carbon (GAC) feed pump station and emergency power generators installed in their place. The preliminary design report for advanced treatment options includes GAC at TMTP in order to meet the 2012 regulations. The ultraviolet (UV) disinfection units will be moved to the new GAC building.

Table 4-11.
5-Year CIP Project Description

Designation	Description
09-03	MPTP – Advanced Treatment Project This project will add granular activated carbon (GAC) and ultraviolet (UV) disinfection at MPTP in order to meet new regulations. The improvements will be located in the abandoned sedimentation basins. The project also includes replacing the standby power generator and upgrading filter control valves on 3 of the 6 filters as the other 3 were upgraded in 2007 with the underdrain and media installation.
09-04	FTTP Filter Renovations Industry standards recommend that filter media be changed out approximately every 20 years. The filter media in the 12 filters at FTTP is all older than 20 years and has started to exhibit performance problems. For example, 6 of the 12 filters significantly underperform, resulting in increased turbidity breakthrough and more frequent and longer backwashing. In this project the filter media will be replaced along with the surface wash system which will be replaced by an air scour system. The filters at the two other treatment plants all have air scour which reduces backwashing by about 50%, resulting in savings of finished water.
09-05	LRPS Structural Improvements, Roof Replacement, Sluice Gates, Actuators, and VFD This project will repair small cracks in the concrete and brick on the interior and exterior of the building and the ladders on the outside of the building that are deteriorating. This project will replace the roof that is in unsatisfactory condition and will upsize the hatches to facilitate removal of pumps. This project will replace the existing inoperable sluice gates that are located at multiple levels of the intake with new electrically actuated gates. The addition of a variable speed drive for increased pumping flexibility will be evaluated as well.
09-06	TMTP Valves and Actuators This project will replace aging valves and actuators in the pump station at the Taylor Mill Treatment plant.
09-07	Dudley 1040 – Pump Replacement This project will replace up to four pumps in the Dudley 1040 pump station and may add variable speed drives to two of the pumps. This station is the primary supply of water for northern Kenton County service area. The pumps were installed in 1965 and are at the end of its useful service life.

Table 4-11.
5-Year CIP Project Description

Designation	Description
09-08	Washington Trace from Twelve Mile to Hwy 1996 The proposed project involves construction of a new 12-inch water main along Oneonta and Washington Trace Roads from Stonehouse to Carthage Road in Campbell County, Kentucky. The length of this project is approx. 14,300 LF. Several new right-of-ways of easements will be needed. This project is designed to strengthen and improve the transmission system and local distribution system to meet population growth and commercial development needs. This project is designed to extend water service to additional customers, support existing water systems, improve water quality, and improve fire protection in the area. The District's Master Plan identified this as a needed hydraulic improvement.
09-09	US 27 from East Alexandria Pike to Main Street The proposed project involves constructing a new 24-inch water main along AA Highway from East Alexandria Pike to Four Mile Pike, Alexandria, Campbell County, Kentucky. The length of this project is approx. 9,700 LF. No new right-of-ways of easements will be needed. This project is designed to strengthen and improve the transmission system and local distribution system to meet population growth and commercial development needs. This project is designed to support existing water systems, improve water quality, and improve fire protection in the area. The District's Master Plan identified this as a needed hydraulic improvement.
09-14	Dolwick 1080/1040 Interconnect This project involves consructing a new 12-inch water main along Dolwich from the existing 12-inch on Dolwick to Turfway Road. This project is designed to provide a back-up feed to the Airport and the surrounding commercial and industrial area. The project will connect two different pressure zones together through a special valve.
09-15	42-inch Transmission from FTTP to Moock Road The proposed project involves constructing a new 42-inch water main along U.S. 27 and Moock Road from the FTTP to the Moock Road 36-inch in the City of Wilder and Southgate, Campbell County, Kentucky. The length of this project is approx. 8,500 LF. New right-of-ways of easements will needed. The estimated cost for the project is $2,900,000. This project will replace the existing 24-inch main which is approximately 100 years old. This project is designed to strengthen and improve the transmission system to meet population growth and commercial development needs. The District's Master Plan identified this as a needed hydraulic improvement.

Table 4-11.
5-Year CIP Project Description

Designation	Description
09-16	Siry to Flatwoods (Subdistrict F) These remaining funds from Subdistrict F will be utilized to extend water mains along Siry & Flatwoods Roads. This project will provide an additional feed to Pendleton County Water and is part of the District Hydraulic Master Plan. The total project funding will include these funds along with grant funds, county funds and surcharges. The approx. length of the project is 3.6 miles.
10-01	Dudley Discharge Redundancy – Phases 1, 2, and 3 This project involves constructing a new 36-inch/24-inch/16-inch water main through the City of Crestview Hills, Kenton County, Kentucky. This project is designed to strengthen the District's water transmission system and provide some redundancy for the District's existing 36-inch water main. The District's Master Plan Addendum for Reliability and Redundancy Analyses identified this as a needed improvement.
10-02	Stonehouse Rd (Twelve Mile Road) from KY 10 to KY 1566 The proposed project involves constructing a new 8-inch water main along Twelve Mile Road from Ky. 10 to Ky. 1566 in Campbell County, Kentucky. The length of this project is approx. 8,200 LF. No new right-of-ways of easements should be needed. This project is designed to strengthen and improve the transmission system and local distribution system to meet population growth and commercial development needs. This project is designed to extend water service to additional customers, support existing water systems, improve water quality, and improve fire protection in the area. The District's Master Plan identified this as needed hydraulic improvement.
10-06	Senour Avenue West of Clover Ridge This project involves construction a 16-inch transmission water main along Senour Road from the existing 16-inch on Senour to Taylor Mill Road. This project is designed to provide additional water to the Independence area. The District's newest Master Plan identified this as a needed improvement.
11-01	Replace PLCs at TMTP This project will replace the existing PLCs at the Taylor Mill Treatment Plant installed in 1992 that have reached the end of their useful service life. The PLCs are used to control the filter operations including normal filtering flow rates and monitoring points, filter backwash, and filter-to-waste operation.
11-02	FTTP Filter Building Improvements This project will repair the walls, windows, and coatings that are failing due to condensation in the filter bays at the FTTP.
11-07	IT Improvements – Year 1 This project includes implementation of improvents to the WAN, conversion to GeoDatabase, inventory control, and IT Tracking system.

Table 4-11.
5-Year CIP Project Description

Designation	Description
12-01	Rossford Tank The project involves the replacement of the current 300,000 gallon Rossford tank with a larger 1 million gallon tank. The District has already secured land adjoining the existing tower for the replacement tower. The existing Rossford Tank will be retired and the Lumley Tank could also be retired.
12-02	MPTP Reservoir Pump Station Suction Piping Replacement A review of the Memorial Parkway Treatment Plant by CH2MHill and later by Quest/JJG showed that the suction piping for the reservoir pumping station has deteriorated and needs to be replaced. This pipe will be upsized to facilitate future capacity expansion of the plant.
12-03	Carothers Road Pump Station Generator This project will provide backup power to the Carothers Road Pump Station which serves as the sole supply of water to the southern part of the Newport service area under normal operations. This area may be served through emergency interconnections from the Ft. Thomas system. This project will reduce our risk of being without power at this station.
12-04	FTTP Residuals Handling Improvements The residuals processing system at the Fort Thomas Treatment Plant was built in the early 1990s and the equipment is reaching the end of its service life. The preliminary concept for this project includes replacing the two existing belt filter presses, belt conveyors, and polymer feed system; adding a third dumpster bay to provide additional storage of pressed cake prior to hauling; improving HVAC to reduce condensation; adding two flow equalization tanks ahead of the presses to maintain a more constant feed consistency; upsizing the recyled water line to the reservoirs; adding a new pipe to return settled water from the sedimentation basins to the reservoirs for routine cleaning; and adding a lamella plate settler housed in a building to treat water prior to returning to the reservoirs or allowing discharge to a creek under a KPDES permit.
12-06	Burns Rd. Between Persimmon Grove & Flatwoods This project involves constructing a new 8-inch water main along Burns Road from Persimmon Grove to Flatwoods Road. This project is designed to strengthen the District's water transmission system. The District's Master Plan Addendum for Reliability and Redundancy Analyses identified this as a needed improvement.
12-07	KY 1280 Between US 27 & Burns Rd. This project involves construction a new 8-inch water main along Ky. 1280 from Burns Road to U.S. 27. This project is designed to strengthen the District's water transmission system. The District's Master Plan Addendum for Reliability and Redundancy Analyses identified this as a needed improvement.

Table 4-11.
5-Year CIP Project Description

Designation	Description
12-08	Madison Ave. Parallel 24-inch Main Between Dudley & Hands Pike This project involves constructing a new large transmission water main along Madison Pike from the existing 42-inch at Dudley Pike to Hands Pike. This project is designed to provide additional water to the Richardson Road Pump Station and Hands Pike Pump Station. The District's newest Master Plan identified this as needed improvement.
12-9	Orphanage Rd. Parallel 24-inch Main Between Redwood & Valley Plaza This project involves constructing a 24-inch transmission water main along Orphanage Road from the existing 24-inch at Horsebranch Road between Redwood School and Valley Plaza. This project is designed to provide additional water to the 1040 pressure zone. The District's newest Master Plan identified this as needed improvement.
12-10	Hands Pike Between KY16 & Edwin The proposed project involves constructing a new 12-inch water main along Hands Pike from Ky. 16 to Edwin Drive, Covington, Kenton County, Kentucky. The length of this project is approx. 2,500 LF. No new right-of–ways of easements will be needed. This project is designed to strengthen and improve the transmission system and local distribution system to meet population growth and commercial development needs. This project is designed to support existing water systems, improve quality, and improve fire protection in the area. The District's Master Plan identified this as a needed hydraulic improvement.
12-11	KY 16 Between Hands Pike & Klette Rd The proposed project involves constructing a new 12-inch water main along Ky. 16 from Hands Pike to Klette Road, Covington/Independence, Kenton County, Kentucky. The length of his project is approx. 3,000 LF. No new right-of-ways of easements will be needed. This project is designed to strengthen and improve the transmission system and local distribution system to meet population growth and commercial development needs. This project is designed to support existing water systems, improve water quality, and improve fire protection in the area. The District's Master Plan identified this as a needed hydraulic improvement.
12-15	Highland Avenue 12-inch from Kyles Lane to new reg pit near Hanser pit The proposed project involves constructing a new 12-inch water main along Highland Ave. from Kyles Lane to regulator pit at Hanser Drive in Fort Wright, Kenton County, Kentucky. New right-of-ways of easements may be needed. This project is designed to strengthen and improve the transmission system and local distribution system to meet population growth and commercial development needs. This project is designed to support existing water systems, improve water quality, and improve fire protection in the area. The District's Master Plan identified this as a needed hydraulic improvement.

Table 4-11.
5-Year CIP Project Description

Designation	Description
12-16	KY 16 from I-275 to TM Swim Club upgrade 16-inch with KDOT project This project involves constructing a new 16-inch water main along the new alignment of KY 16. This project is designed to strengthen the District's water transmission system. The District's Master Plan Addendum for Reliability and Redundancy Analyses identified this as a needed improvement.
12-17	KY 16 from TM Swim Club to TM Standpipe upgrade 16-inch with KDOT project This project involves constructing a new 16-inch water main along the new alignment of KY 16. This project is designed to strengthen the District's water transmission system. The District's Master Plan Addendum for Reliability and Redundancy Analyses identified this as a needed improvement.
12-18	IT Improvements - Year 2 This project includes implementation of improvents to the WAN, conversion to GeoDatabase, inventory control, IT Tracking system, and intergration with software systems.
13-01	FTTP Backwash Tank Replacement The existing backwash supply tank was constructed in 1936 and is a rectangular basin that is mostly buried. This structure is in need of significant concrete repair and needs to be replaced with a new tank.
13-02	Dudley - Install Isolation Valves This project will install valves to isolate the two 5 million gallon Dudley tanks in the event of a rapid loss of water such as a large water main failure. The valves would be SCADA controlled so that they would close automatically and signal the pumps at the Taylor Mill Pump Station to turn off as well.
13-03	Taylor Mill PS Pump Replacement (proposed 1, 5, 6 and 2 or 3) This project will replace four of the six pumps at the Taylor Mill Pump Station. The new pumps will replace pumps at the end of their useful service life. The proposed pumps to replace are numbers 1, 5, 6 and either 2 or 3.
13-04	LRPS New Generator & Walkbridge Upgrade This project will make improvements to the walkbridge and install standby power to the Licking River pump station which supplies water to the Taylor Mill Treatment Plant.
13-05	Improvements to FTTP Flocculation/Sedimentation Basins 2 & 3 Sedimentation basins 2 and 3 were constructed in 1936 and presently have two-stage flocculation. It is recommended to modify the basins for three-stage flocculation with vertical flocculation paddles instead of horizontal. This configuration is preferred for improving the effectiveness of removing the particulates through sedimentation. It is also recommended to replace the rakes and repair the concrete walls that are deteriorating.

Table 4-11.
5-Year CIP Project Description

Designation	Description
13-07	Low Gap Rd. Between Tollgate Rd & 8-inch Dead End The proposed project involves construction a new 8-inch water main along Low Gap Road from Ky. 9 to existing water main dead-end in the City of Alexandria, Campbell County, Kentucky. The length of this project is approx. 1,300 LF. No new right-of-ways of easements will be needed. This project is designed to strengthen and improve the transmission system and local distribution system to meet population growth and commercial development needs. This project is designed to extend water service to additional customers, support existing water systems, improve water quality, and improve fire protection in the area. The District's Master Plan identified this as a needed hydraulic improvement.
13-08	Interconnect 1080 & 1017 The proposed project involves constructing a new 12-inch water main along KY 536 (Pond Creek Road) from KY 1936 (Pond Creek Road) to Decoursey Pike in Campbell & Kenton Counties, Kentucky. The length of this project is approx. 2,000 LF. New right-of-ways of easements should be needed. This project is designed to strengthen and improve the transmission system and local distribution system to meet population growth and commercial development needs. This project is designed to support existing water systems, improve water quality, and improve fire protection in the area. This water main will need to cross the Licking River. The District's Master Plan identified this as a needed hydraulic improvement.
13-12	US 27 24-inch from Sunset to Martha Lane Collins This project involves constructing a 24-inch transmission water main along U.S. 27 from Sunset Ave. to Martha Lane Collins. This project is designed to provide additional water to the 1017 pressure zone. The District's newest Master Plan identified this as a needed improvement.
13-13	Independence Rd. Between KY17 & 12-inch Pipe This project involves constructing a new 12-inch water main along Independence Road from Ky. 17 to the existing 12-inch main. This project is designed to strengthen the District's water transmission system. The District's Master Plan Addendum for Reliability and Redundancy Analyses identified this a needed improvement.
13-14	IT Improvements - Year 3 This project includes implementation of improvents to the WAN, IT Tracking system, and intergration with software systems.
14-01	Laboratory Generator This project will install standby power to the laboratory at the Ft. Thomas Treatment Plant that performs the analyses of water for the entire system that is necessary for compliance with KDOW testing requirements.

Table 4-11.
5-Year CIP Project Description

Designation	Description
14-02	TMTP Sludge Pumps, Conveyors & Press This project will replace the existing sludge processing equipment at the Taylor Mill Treatment Plant that has reached the end of its useful service life. A new belt filter press, conveyor, decant valves and repairs to the dumpster room are recommended.
14-03	ORPS2 Replacement Design and Construction This project will replace the existing Ohio River Pump Station No. 2 that supplies water to the Memorial Parkway Treatment Plant because the existing station was built in the late 1800s and has reached the end of its useful service life. The facility has numerous structural issues that need addressed to remain in operation and would take significant work to bring into current building code compliance if altered. The first year budget includes design engineering services for all improvements and installation of two phases of raw water main. The second and third year budgets include engineering services during construction and the contractor's construction cost for the station.
14-05	36-inch Licking River Crossing This project involves constructing a new 36-inch redundancy water main across the Licking River between Kenton & Campbell Counties. This project is designed to strengthen the District's water transmission system and provide additional redundancy for the District's existing 36-inch concrete water main. The District's Master Plan Addendum for Reliability and Redundancy Analyses identified this as a needed improvement.
14-09	Vineyard (Gunkel Rd.) Between Eight Mile & Fender Rd. The proposed project involves constructing a new 8-inch water main along Gunkel Road from Eight Mile Road to Fender Road in southern Campbell County, Kentucky. The length of this project is approx. 9,000 LF. No new right-of–ways of easements will be needed. This project is designed to strengthen and improve the transmission system and local distribution system to meet population growth and commercial development needs. This project is designed to extend water service to additional customers, support existing water systems, improve water quality, and improve fire protection in the area. The District's Master Plan identified this as a needed hydraulic improvement.
14-10	IT Improvements - Year 4 This project includes implementation of improvents to the WAN, IT Tracking system, and intergration with software systems.

Table 4-11.
5-Year CIP Project Description

Designation	Description
15-04	Bromley Pump Replacement and Misc. Improvements This project will replace the existing pumps at the Bromley Pump Station that have reached the end of their useful service life. The smaller pump was installed in 1968 and the two larger pumps in 1986. The chlorine storage and feed facility will be replaced along with various electrical and security improvements, replacement of valves and actuators.
15-05	Upgrade SCADA/Instrumentation/Security Equipment at Plants and PS This project will upgrade the SCADA operating system, replace the PLCs at the plants and pump stations that were installed between approximately 1998 and 2003 as they will have reached the end of their useful life, and replace security systems that were installed primarily from the Vulnerability Assessment recommendations in the same time period.
15-07	IT Improvements - Year 5 This project includes implementation of improvents to the WAN, IT Tracking system, and intergration with software systems.
16-05	Hands Pike Pumps and Misc Improvements The pumps, motors, and motor control centers installed in 1983 will be at the end of their useful lives and due to be replaced. It is recommended the lighting, electrical, and exhaust fans be inspected and replaced if needed. As an option to improving Hands Pike, the station could be retired when the new Richardson Road Pump Station is in place (proposed 2018).
16-06	Horsebranch Road 24-inch from 36-inch to Thomas More Parkway This project involves construction of a approximately 1,800 feet of 24-inch main along Horsebranch Road to Thomas More Parkway.
17-01	Raw water line to FTTP South Reservoir This project involves replacing the 30-inch raw water main installed in 1936 feeding the south reservoir at FTTP with a new 36-inch line. This improvement will bring more water to the south reservoir.
17-02	MPTP Residuals Handling Improvements This project will allow the residuals handling building to be placed back into operation. Improvements include adding a gravity thickener to process settled process solids and solids removed from the reservoir by a dredge, installation of 3 positive displacement pumps, modifications to truck loading area roof height, conversion of the existing sludge holding tank to a holding tank for belt filter press filtrate and gravity thickener supernatant and return pumps, and electrical upgrades.

Table 4-11.
5-Year CIP Project Description

Designation	Description
17-04	SR17 From Hands Pike to Apple Drive This project involves the construction of approximately 28,000 feet of 24-inch water main along SR 17 between Hands Pike and Apple Drive. It will serve as a primary north/south water main to increase flow to both the existing Independence Tank and a new tank east of Independence.
17-08	Replace Bellevue Tank The Bellevue Tank was built around 1930 and is approaching the end of its useful service lives. Since the tank was painted in 1999, it is recommended a detailed inspection of the tanks be performed when the coatings reach 15 to 20 years old. Based on the condition of the tanks, the District will need to decide if the condition is adequate for repainting and keeping the tank in service for at least another 15 to 20 years or whether a new tank is needed.
18-01	New KY17 PS To Replace Richardson Rd. PS The pumps at Richardson Road station are currently running at much lower head than their design and will need to be replaced to meet future demand conditions. Due to limited capacity in the discharge pipe it is recommended this station be replaced with a new station at a different location along SR 17. The existing Richardson Road Pumping Station would be retired and the Hands Pike Pumping Station could also be retired.
18-02	1.0 MG Elevated Storage Tank East of Independence Based on demand projections and a storage gap analysis additional storage in the southern Kenton County area will be needed sometime between 2015 and 2020. This project consists of building a new 1.0 MG tank east of Independence.
18-03	Replace Dayton Tank The Dayton Tank was built around 1930 and is approaching the end of its useful service lives. Since the tank was painted in 2001, it is recommended a detailed inspection of the tanks be performed when the coatings reach 15 to 20 years old. Based on the condition of the tanks, the District will need to decide if the condition is adequate for repainting and keeping the tank in service for at least another 15 to 20 years or whether a new tank is needed.
18-04	US 27 Pump Station VFDs It is recommended that variable frequency drives be added to at least 2 of the pumps to reduce pressure surges in the system.
18-09	SR17 to Stephens Rd cross country 16-inch to New Tank in Independence This approximately 4,500 feet of 12-inch pipe between SR 17 and Stephens Road is needed to connect the new 1.0 MG Tank east of Independence.
18-10	24-inch on US 27 Between FTTP and Martha Layne Collins replace 16-inch It is recommended that the existing 16-inch main between the FTTP and Martha Layne Collins be replaced with a 24-inch main for approximately 16,000 feet.

Table 4-11.
5-Year CIP Project Description

Designation	Description
19-01	1.0 MG Elevated Storage Tank – Southern Campbell County Based on demand projections and a storage gap analysis, additional storage will be needed in the southern Campbell County area between 2015 and 2020. This project will construct a new 1.0 MG tank in southern Campbell County near KY 9 and Lick Hill. The Main Street Tank may need retired for water quality reasons when this new tank is in place.
19-03	New Pump Station near the existing Ripple Creek PS The existing Ripple Creek Pump Station will be unable to supply enough water to all of southern Campbell County at some time between 2020 and 2030. A new pump station is recommended at the same location or in very close proximity to the existing station.
19-07	24-inch along US 27 from Martha Layne Collins to Ripple Creek PS It is recommended a new parallel 24-inch main be constructed from Martha Layne Collins to the Ripple Creek Pumping Station. The distance is about 12,000 feet.
19-08	16-inch along AA Highway from Hwy 547 & California Cross Rd. This project involves the construction of approximately 32,000 feet of 16-inch water main along the AA Highway (KY 9) between Hwy 547 and California Cross Road that will extend transmission capacity into southern Campbell County. At this time the Main Street Tank could be retired.
19-09	36-inch Redundancy from 42-inch at Moock Rd to 36-inch Licking River Crossing This project consists of constructing 6,300 feet of 36-inch main along Moock Road and across the Licking River into Covington.
19-10	Replace Lumley Tank The tank was built in 1934 and will be at the end of its service life. The tank was last coated in 1999 and will need repainted between 2014 and 2019. This tank can be retired following the construction of the larger Rossford Tank.
20-01	Electrical Upgrades at FTTP It is anticipated that upgrades to the power supply and distribution within the plant will be needed to replace systems at the end of their useful life.
20-02	Retire TM Standpipe Build Elevated 1040 Tank The tank was last coated in 2006 and would be due to be repainted around 2021. In order to increase pressure in Taylor Mill, it is recommended the existing standpipe be retired and a new elevated tank be constructed in its place. The system would be served directly from the 1040 pressure zone be removing the Sandman PRV. The new tank would be about 175 feet tall and should be in the same general vicinity as the existing standpipe. The recommended volume is not confirmed but is estimated to be about 500,000 gallons.

Table 4-11.
5-Year CIP Project Description

Designation	Description
20-03	Pump Station Improvements at Dudley 1040 It is recommended the pumps be retrofitted with variable speed drives and the motor control centers and electrical, mechanical, and lighting systems be upgraded.
20-08	Replacement Ida Spence Tank (or retire and serve from 1040) This tank was last coated in 2005 and will need repainted around 2020. The tank is approaching the end of its useful life having been built in 1953. The tank will need replaced, or it could be retired along with Latonia Pumping Station and the area served through a regulator off the 1040 pressure zone. Some system improvements would be needed to facilitate this conversion.
21-01	Chemical Feed Systems Upgrades at TMTP It is anticipated that chemical feed systems installed in 1998 will need rehabilitated or replaced. Systems include corrosion inhibitor, coagulants, caustic soda, fluoride, polymer, sodium hypochlorite, and sodium bisulfite. Components include piping, valves, actuators, tanks, and pumps.
21-02	Filter Valves and Actuators at FTTP It is recommended the filter valves and actuators at FTTP be replaced as they will be at the end of their useful life.
21-03	Pump Station Improvements at Carothers The pumps, motors, and motor control centers and electrical systems should be replaced.
22-01	20-inch Gravity Discharge from MPTP The two 20-inch gravity discharge lines from MPTP into Newport are over 100 years old. It is recommended these mains be replaced given their importance as the sole supply to Newport and future greater dependency when on these mains when Covington is served by MPTP. The total length is estimated to be 32,000 feet of two parallel 20-inch mains.
22-02	Pump Station Improvements at Bristow Road This project consists of replacing the 3 pumps with new 4,200 gpm pumps rated at 50 feet of head. The new pumps will be better matched to demand conditions and feeding the tanks in the 1080 system. The pumps should be installed with VFDs.
23-010	Chemical Feed Systems Upgrades at FTTP It is anticipated that chemical feed systems installed in 2001 will need rehabilitated or replaced. Systems include copper sulfate, corrosion inhibitor, coagulants, caustic soda, fluoride, polymer, sodium hypochlorite, and potassium permanganate at ORPS1. Components include piping, valves, actuators, tanks, and pumps.

Table 4-11.
5-Year CIP Project Description

Designation	Description
23-02	Pump Station Improvements at Dudley 1080 It is recommended the pumps, motors, and motor control centers be replaced along with upgrades to the mechanical, electrical, and lighting systems.
24-01	Pump Station Improvements at Latonia It is recommended the pumps, motors, and motor control centers be replaced along with upgrades to the mechanical, electrical, and lighting systems.
25-01	Pump Station Improvements at Waterworks Road It is recommended the pumps, motors, and motor control centers be replaced along with upgrades to the mechanical, electrical, and lighting systems. An emergency generator will also be installed.
25-02	MPTP Expand to 20 MGD In order to meet additional demand requirements in the system, the MPTP will be used to supply water to northern Kenton County and Campbell County. Improvements will include addition of a larger raw water pump in the Reservoir Pumping Station and replacement of the existing 24-inch discharge line with a 36-inch main, addition of another ACTIFLO® train,
26-01	Pump Station Improvements and Electrical Improvements at TMTP This project will replace two of the six pumps at the Taylor Mill Pump Station. The new pumps will replace pumps at the end of their useful service life. The proposed pumps to replace are numbers 4 and either 2 or 3. Power distribution at the plant may need replaced and should be evaluated to prioritize needs.
27-05	20-inch to Connect 11th Street in Newport to 12th Street in Covington This project consists of extending one of the gravity lines from MPTP down 11th Street in Newport to supply a new pump station near the Licking River and then connecting back into the main at 12th and Wheeler in Covington. The addition of 5,700 feet of 20-inch is needed.
27-06	12-inch Parallel Main Btwn Vulcan and Lytle The addition of a 12-inch parallel main approximately 6,300 feet in length is needed between Vulcan and Lytle Roads. This main will provide additional capacity needed to serve the Industrial and Devon Tanks.
28-01	New pump station from Newport to Covington This station will utilize Memorial Parkway Treatment Plant as a second supply to serve northern parts of Kenton County along with FTTP. Currently MPTP cannot be used to supply any water to Kenton County.
28-03	24-inch Parallel Main Persimmon Grove from AA Hwy to Jerry Wright Additional transmission is needed to provide adequate turnover and maintain the South County Tank and Claryville Tank water levels under future demand. This project consists of building 16,000 feet of 24-inch parallel main along Persimmon Grove and Jerry Wright Road.

Table 4-11.
5-Year CIP Project Description

Designation	Description
28-04	16-inch Main Jerry Wright, Lickert, Old SR 4 to Claryville Tank Additional transmission is needed to provide adequate water levels in the South County Tank and Claryville Tank water levels under future demand. This project consists of constructing 9,000 feet of 16-inch along Lickert Road and Old State Route 4.
29-01	MPTP add second gravity thickener This project involves the addition of a second gravity thickener and pumps to process increased production capacity and reservoir solids at MPTP.
29-02	ORPS2 Addition of One 10 MGD Pump In order to meet increased system demands, it will be necessary to add one 10 MGD pump to the raw water pumping station.
29-04	20-inch Percival Rd from 24-inch in Banklick/Walton Nicholson to New Tank This 20-inch water main will provide flow to the new southern Kenton County Tank needed to maintain pressures in the around Walton under 2030 projected demand conditions.
29-05	1 MG Tank in Southern Kenton County near Walton Based on demand projections and a storage gap analysis, additional storage will be needed in southern Kenton County sometime by 2030. This project consists if building a new 1.0 MG tank near Walton. A check valve will be installed in Independence Road to keep Bristow Road Pumping Station from pumping directly to the Independence Tank. This valve will help supply more water to the new tank.
30-01	Chemical Feed Systems Upgrades at MPTP It is anticipated that chemical feed systems installed in 2006 will need rehabilitated or replaced. Systems include copper sulfate, corrosion inhibitor, ferric sulfate, polyaluminum chloride, caustic soda, fluoride, polymer, sodium hypochlorite, and powdered activated carbon. Components include piping, valves, actuators, tanks, and pumps. Systems will be sized to meet 20 MGD treatment capacity.
30-02	Pump Station Improvements at US 27 It is recommended the pumps, motors, and motor control centers be replaced along with upgrades to the mechanical, electrical, and lighting systems.
30-07	Replace Kenton Lands Tank The tank was built in 1954 and will be at the end of its service life. The tank was last coated in 2010 and will need repainted between 2025 and 2030.

Table 4-12
Master List of 5-Year CIP Projects 2009 – 2030

Designation	Location	Project Description	Cost
09-01	FTTP	FTTP Advanced Treatment - Design & Construction	$30,000,000
09-02	TMTP	TMTP Advanced Treatment and Generator - Design & Construction	$28,350,000
09-03	MPTP	MPTP Advanced Treatment - Design & Construction	$15,300,000
09-04	FTTP	FTTP Filter Renovations	$1,665,000
09-05	LRPS	Structural Impr., Roof Replacement, Sluice Gates, Actuators, VFD	$984,750
09-06	TMTP	Valves & Actuators	$168,300
09-07	Dudley 1040	Replace Four Pumps, 2 constant speed and 2 VFDs	$440,550
09-08	Distribution	Washington Trace from Twelve Mile to Hwy 1996	$964,970
09-09	Distribution	US27 from E. Alex Pike to Main Street/Phase 4 and 5 unfunded	$1,947,000
09-10	Distribution	Yearly 2009 Distribution System R & R	$3,100,000
09-11	Distribution	2009 Mains to Unserved Areas	$250,000
09-12	Distribution	2009 Coordinated Main Replacement	$2,000,000
09-13	Distribution	Kenton County Water Main Replacement Match	$600,000
09-14	Distribution	Dolwick 1080 / 1040 Interconnect	$850,000
09-15	Distribution	42" Transmission Main from FTTP to Moock Rd, Construction	$2,500,000
09-16	Distribution	Siry to Flatwoods (Subdistrict F)	$1,100,000
10-01	Distribution	Dudley Discharge Redundancy Imp. - Phase 1	$760,000
10-01	Distribution	Dudley Discharge Redundancy Imp. - Phase 2	$960,000
10-01	Distribution	Dudley Discharge Redundancy Imp. - Phase 3	$945,000
10-02	Distribution	Stonehouse Rd (Twelve Mile Rd) from KY 10 to KY 1566	$1,120,000
10-03	Distribution	Yearly 2010 Distribution System R & R	$3,500,000
10-04	Distribution	2010 Mains to Unserved Areas	$250,000
10-05	Distribution	2010 Coordinated Main Replacement	$2,500,000
10-06	Distribution	Senour Ave. West of Cloverridge	$750,000
10-07	Distribution	Subdistrict H Upgrade	$497,018
10-07	Distribution	Subdistrict H Surcharge	$946,670
10-08	Distribution	US27/AA Hwy/KY 547- unfunded Phase 3, 4, 5	$2,971,200
11-01	TMTP	Replace PLCs for Filters at TMTP	$350,000
11-02	FTTP	Repair Walls and Windows in FTTP Filters	$530,000
11-03	WQ&P	Annual General Facility R&R - Plants, Tanks, Pump Stations	$829,000
11-04	Distribution	Yearly 2011 Distribution System R & R	$4,000,000
11-05	Distribution	2011 Mains to Unserved Areas	$250,000

Table 4-12
Master List of 5-Year CIP Projects 2009 – 2030

Designation	Location	Project Description	Cost
11-06	Distribution	2011 Coordinated Main Replacement	$2,500,000
11-07	Distribution	Subdistrict I Surchage	$257,576
11-08	Technology	IT Improvements - Year 1	$175,000
12-01	Rossford	1.0 MG Rossford Elevated Storage Tank	$3,125,000
12-02	MPTP	MPTP PS Suction Piping	$1,000,000
12-03	Carothers	Carothers Rd. PS Generator	$386,678
12-04	FTTP	Residuals Handling Upgrade Project - Design & Construction	$6,500,000
12-05	WQ&P	Annual General Facility R&R - Plants, Tanks, Pump Stations	$928,000
12-06	Distribution	Burns Rd. Between Persimmon Grove & Flatwoods	$1,554,000
12-07	Distribution	KY 1280 Between US 27 & Burns Rd.	$357,000
12-08	Distribution	Madison Ave. Parallel 24" Main Between Dudley & Hands Pike	$2,132,000
12-09	Distribution	Orphanage Rd. Parallel 24" Main Between Redwood & Valley Plaza	$1,390,000
12-10	Distribution	Hands Pike Between KY16 & Edwin	$608,000
12-11	Distribution	KY 16 Between Hands Pike & Klette Rd	$613,000
12-12	Distribution	Yearly 2012 Distribution System R & R	$4,000,000
12-13	Distribution	2012 Mains to Unserved Areas	$250,000
12-14	Distribution	2012 Coordinated Main Replacement	$2,500,000
12-15	Distribution	Highland Avenue 12" from Kyles Lane to new reg pit near Hanser pit	$480,000
12-16	Distribution	KY 16 from I-275 to TM Swim Club upgrade 16" with KDOT project	$450,000
12-17	Distribution	KY 16 from TM Swim Club to TM Standpipe upgrade 16" with KDOT project	$350,000
12-18	Technology	IT Improvements - Year 2	$405,000
13-01	FTTP	FTTP Backwash Tank Replacement	$782,000
13-02	Dudley	Dudley - Install Isolation Valves	$345,119
13-03	TM TP PS	Taylor Mill PS Pump Replacement (proposed 1, 5, 6 and 2 or 3)	$3,731,013
13-04	LRPS	LRPS New Generator & Walkbridge Upgrade	$4,100,000
13-05	FTTP	Improvements to FTTP Flocculation/Sedimentation Basins 2 & 3	$2,784,000
13-06	WQ&P	Annual General Facility R&R - Plants, Tanks, Pump Stations	$888,000
13-07	Distribution	Low Gap Rd. Between Tollgate Rd & 8" Dead End	$375,000
13-08	Distribution	Interconnect 1080 & 1017	$1,200,000
13-09	Distribution	Yearly 2013 Distribution System R & R	$4,000,000
13-10	Distribution	2013 Mains to Unserved Areas	$250,000
13-11	Distribution	2013 Coordinated Main Replacement	$2,500,000
13-12	Distribution	US 27 24" from Sunset to Martha Lane Collins	$1,280,000
13-13	Distribution	Independence Rd. Between KY17 & 12" Pipe	$115,000
13-14	Technology	IT Improvements - Year 3	$343,000

Table 4-12
Master List of 5-Year CIP Projects 2009 – 2030

Designation	Location	Project Description	Cost
14-01	FTTP	Laboratory Generator	$237,000
14-02	TMTP	TMTP Sludge Pumps, Conveyors & Press	$1,537,000
14-03	ORPS2	ORPS2 Replacement Design and Construction	$42,250,000
14-04	WQ&P	Annual General Facility R&R - Plants, Tanks, Pump Stations	$983,000
14-05	Distribution	36" Licking River Crossing	$4,503,000
14-06	Distribution	2014 Distribution R&R	$4,000,000
14-07	Distribution	2014 Coordinated Roadway Imp./Water Main Replacement	$2,500,000
14-08	Distribution	2014 Mains into Unserved Areas	$250,000
14-09	Distribution	Vineyard (Gunkel Rd.) Between Eight Mile & Fender Rd.	$608,000
14-10	Technology	IT Improvements - Year 4	$86,000
15-01	Distribution	2015 Mains into Unserved Areas	$250,000
15-02	Distribution	2015 Water Main Replacement Program	$5,000,000
15-03	Distribution	2015 Coordinated Roadway Imp./Water Main Replacement	$2,500,000
15-04	Bromley	Bromley Pump Replacement and Misc. Improvements	$1,716,000
15-05	Plants/PS	Upgrade SCADA/Instrumentation/Security Equipment at Plants and PS	$10,172,000
15-06	WQ&P	Annual General Facility R&R - Plants, Tanks, Pump Stations	$1,007,000
15-07	Technology	IT Improvements - Year 5	$300,000
16-01	Distribution	2016 Mains into Unserved Areas	$250,000
16-02	Distribution	2016 Water Main Replacement Program	$5,250,000
16-03	Distribution	2106 Coordinated Roaday Imp./Water Main Replacement	$2,500,000
16-04	WQ&P	Annual General Facility R&R - Plants, Tanks, Pump Stations	$1,018,000
16-05	Hands Pike	Hands Pike Pumps and Misc Improvements	$700,000
16-06	Distribution	Horsebranch Road 24" from 36" to Thomas More Parkway	$800,000
17-01	FTTP	Raw water line to FTTP south reservoir	$700,000
17-02	MPTP	MPTP Residuals Handling Improvements	$4,600,000
17-03	WQ&P	Annual General Facility R&R - Plants, Tanks, Pump Stations	$1,038,000
17-04	Distribution	SR17 From Hands Pike to Apple Drive	$12,740,000
17-05	Distribution	2017 Mains into Unserved Areas	$250,000
17-06	Distribution	2017 Water Main Replacement Program	$5,500,000
17-07	Distribution	2017 Coordinated Roadway Imp./Water Main Replacement	$2,500,000
17-08	Bellevue	Replacement Bellevue Tank	$1,300,000
18-01	New PS	New KY17 PS To Replace Richardson Rd. PS	$1,900,000
18-02	New Tank	1.0 MG Elevated Storage Tank East of Independence	$4,375,000
18-03	Dayton Tank	Replace Dayton Tank	$3,700,000
18-04	US 27 PS	US 27 Pump Station VFDs	$449,000

Table 4-12
Master List of 5-Year CIP Projects 2009 – 2030

Designation	Location	Project Description	Cost
18-05	WQ&P	Annual General Facility R&R - Plants, Tanks, Pump Stations	$1,061,000
18-06	Distribution	2018 Mains into Unserved Areas	$250,000
18-07	Distribution	2018 Water Main Replacement Program	$5,750,000
18-08	Distribution	2018 Coordinated Roadway Imp./Water Main Replacement	$2,500,000
18-09	Distribution	SR17 to Stephens Rd cross country 16" to New Tank in Independence	$1,068,570
19-01	New Tank	1.0 MG Elevated Storage Tank - Southern Campbell County	$4,500,000
19-02	WQ&P	Annual General Facility R&R - Plants, Tanks, Pump Stations	$1,084,000
19-03	New PS	New Pump Station near the existing Ripple Creek PS	$2,079,000
19-04	Distribution	2019 Mains into Unserved Areas	$250,000
19-05	Distribution	2019 Water Main Replacement Program	$6,000,000
19-06	Distribution	2019 Coordinated Roadway Imp./Water Main Replacement	$2,500,000
19-07	Distribution	24" along US 27 from Martha Layne Collins to Ripple Creek PS	$5,810,000
19-08	Distribution	16" along AA Highway from Hwy 547 & California Cross Rd.	$10,330,000
19-09	Distribution	36" Redundancy from 42" at Moock Rd to 36" Licking River Crossing	$4,100,000
19-10	Lumley Tank	Replace Lumley Tank	$1,400,000
20-01	FTTP	Electrical Upgrades at FTTP	$1,000,000
20-02	TM Tank	Retire TM Standpipe Build Elevated 1040 Tank	$2,100,000
20-03	Dudley 1040 PS	Pump Station Improvements at Dudley 1040 (VFDs)	$1,275,000
20-04	WQ&P	Annual General Facility R&R - Plants, Tanks, Pump Stations	$1,110,000
20-05	Distribution	2020 Mains into Unserved Areas	$250,000
20-06	Distribution	2020 Water Main Replacement Program	$6,500,000
20-07	Distribution	2020 Coordinated Roadway Imp./Water Main Replacement	$2,500,000
20-08	Ida Spence	Replacement Ida Spence Tank (or retire and serve from 1040)	$2,121,000
21-01	TMTP	Chemical Feed Systems Upgrades at TMTP	$1,380,000
21-02	FTTP	Filter Valves and Actuators at FTTP	$650,000
21-03	Carothers	Pump Station Improvements at Carothers	$500,000
21-04	WQ&P	Annual General Facility R&R - Plants, Tanks, Pump Stations	$1,138,000
21-05	Distribution	2021 Mains into Unserved Areas	$250,000
21-06	Distribution	2021 Water Main Replacement Program	$6,500,000
21-07	Distribution	2021 Coordinated Roadway Imp./Water Main Replacement	$2,500,000
22-01	MPTP	20" Gravity Discharge from MPTP	$16,000,000
22-02	Bristow	Pump Station Improvements at Bristow Road	$600,000
22-03	WQ&P	Annual General Facility R&R - Plants, Tanks, Pump Stations	$1,163,000
22-04	Distribution	2022 Mains into Unserved Areas	$250,000

Table 4-12
Master List of 5-Year CIP Projects 2009 – 2030

Designation	Location	Project Description	Cost
22-05	Distribution	2022 Water Main Replacement Program	$6,500,000
22-06	Distribution	2022 Coordinated Roadway Imp./Water Main Replacement	$2,500,000
23-01	FTTP	Chemical Feed Systems Upgrades at FTTP	$2,295,000
23-02	Dudley 1080 PS	Pump Station Improvements at Dudley 1080	$3,600,000
23-03	WQ&P	Annual General Facility R&R - Plants, Tanks, Pump Stations	$1,190,000
23-04	Distribution	2023 Mains into Unserved Areas	$250,000
23-05	Distribution	2023 Water Main Replacement Program	$6,500,000
23-06	Distribution	2023 Coordinated Roadway Imp./Water Main Replacement	$2,500,000
24-01	Latonia PS	Pump Station Improvements at Latonia	$600,000
24-02	WQ&P	Annual General Facility R&R - Plants, Tanks, Pump Stations	$1,218,000
24-03	Distribution	2024 Mains into Unserved Areas	$250,000
24-04	Distribution	2024 Water Main Replacement Program	$6,500,000
24-05	Distribution	2024 Coordinated Roadway Imp./Water Main Replacement	$2,500,000
25-01	Waterworks PS	Pump Station Improvements at Waterworks Road (include generator)	$1,500,000
25-02	MPTP	MPTP Expand to 20 MGD - Actiflo	$7,400,000
25-03	WQ&P	Annual General Facility R&R - Plants, Tanks, Pump Stations	$1,246,000
25-04	Distribution	2025 Mains into Unserved Areas	$250,000
25-05	Distribution	2025 Water Main Replacement Program	$6,500,000
25-06	Distribution	2025 Coordinated Roadway Imp./Water Main Replacement	$2,500,000
26-01	TMTP PS	Pump Station Improvements at TMTP	$3,100,000
26-02	WQ&P	Annual General Facility R&R - Plants, Tanks, Pump Stations	$1,277,000
26-03	Distribution	2026 Mains into Unserved Areas	$250,000
26-04	Distribution	2026 Water Main Replacement Program	$6,750,000
26-05	Distribution	2026 Coordinated Roadway Imp./Water Main Replacement	$2,500,000
27-01	WQ&P	Annual General Facility R&R - Plants, Tanks, Pump Stations	$1,310,000
27-02	Distribution	2027 Mains into Unserved Areas	$250,000
27-03	Distribution	2027 Water Main Replacement Program	$7,000,000
27-04	Distribution	2027 Coordinated Roadway Imp./Water Main Replacement	$2,500,000
27-05	Distribution	20" to Connect 11th Street in Newport to 12 Street in Covington	$6,000,000
27-06	Distribution	12" Parallel Main Btwn Vulcan and Lytle	$2,500,000
28-01	New PS	New pump station from Newport to Covington	$7,000,000
28-02	WQ&P	Annual General Facility R&R - Plants, Tanks, Pump Stations	$1,342,000
28-03	Distribution	24" Parallel Main Persimmon Grove from Riley to Jerry Wright	$11,200,000
28-04	Distribution	16" Main Jerry Wright, Lickert, Old SR 4 to Claryville Tank	$3,600,000

Table 4-12
Master List of 5-Year CIP Projects 2009 – 2030

Designation	Location	Project Description	Cost
28-05	Distribution	2028 Mains into Unserved Areas	$250,000
28-06	Distribution	2028 Water Main Replacement Program	$7,500,000
28-07	Distribution	2028 Coordinated Roadway Imp./Water Main Replacement	$2,500,000
29-01	MPTP	MPTP add second gravity thickener	$1,000,000
29-02	ORPS2	ORPS2 add 1 10 MGD pump	$1,900,000
29-03	WQ&P	Annual General Facility R&R - Plants, Tanks, Pump Stations	$1,376,000
29-04	Distribution	20" Percival Rd from 24" in Banklick/Walton Nicholson to New Tank	$16,000,000
29-05	New Tank	1 MG Tank in Southern Kenton County near Walton	$7,000,000
29-06	Distribution	2029 Mains into Unserved Areas	$250,000
29-07	Distribution	2029 Water Main Replacement Program	$8,000,000
29-08	Distribution	2029 Coordinated Roadway Imp./Water Main Replacement	$2,500,000
30-01	MPTP	Chemical Feed Systems Upgrades at MPTP	$1,751,000
30-02	US 27 PS	Pump Station Improvements at US 27	$1,500,000
30-03	WQ&P	Annual General Facility R&R - Plants, Tanks, Pump Stations	$1,411,000
30-04	Distribution	2030 Mains into Unserved Areas	$250,000
30-05	Distribution	2030 Water Main Replacement Program	$8,500,000
30-06	Distribution	2030 Coordinated Roadway Imp./Water Main Replacement	$2,500,000
30-07	Kenton Lands	Replace Kenton Lands Tank	$4,600,000

Figure 4-1.
2009 – 2030 System Improvements

(Insert large map here)

4.2. Annual General Facility R&R (WQ&P)

4.2.1. Raw Water Pump Stations

4.2.1.1. Ohio River Pump Station No. 1

The following level of service improvements were identified during a recent site visit to the Ohio River Pump Station No. 1 and are included in the Annual General Facility R&R for Plants, Tanks and Pump Stations CIP.

- **Improvements to Finished Water Supply -** NKWD operations staff indicated that a reliable source and quantity of a potable water supply is not available at the ORPS1. Providing a sufficient potable water service to ORPS1 will allow the new vertical turbine pumps to be converted to potable water lubrication possibly extending pump service life. Other purposes might include use for chemical make-up water, equipment wash-down water, and rest room use. Due to slope stability issues during a possible finished water main extension, this improvement has not been viewed as a cost-effective provision by NKWD in the past. The estimated cost to provide water to the ORPS1 is $1,450,000.
- **HVAC Improvements to Electrical Equipment Room -** The electrical equipment room for the entire pump station generates a significant heat load, requiring year-round cooling to maintain the equipment at a reasonable operating temperature. Currently, there is no air conditioning in the electrical equipment room and observed temperatures inside the room were well above normal room temperature. The proposed equipment shall be an indoor air handling unit, mounted directly above the equipment room, and cooled via an outdoor condensing unit. The estimated cost for the HVAC improvements is $13,000.

4.2.1.2. Licking River Pump Station

The following level of service improvements were identified during a recent site visit to the Licking River Pump Station and are included in the 5-year CIP as 09-05.

- **Addition of Dewatering Pumps for Wet Well** - As it currently stands, the operations staff indicated there is no method available to dewater the pump stations wet well for repair and maintenance efforts. The estimated cost for adding dewating pumps is $70,000.

4.2.2. Water Treatment Plant Evaluation

4.2.2.1. Memorial Parkway Treatment Plant

Asset Renewal & Replacement

Several recent upgrades and improvements have taken place at the Memorial Parkway facility over the past couple years. Therefore, a many assets are currently considered to be included in CIP category 5. An annual R&R budget is recommended to address general facility needs related to buildings, electrical and HVAC equipment.

Level of Service

During a recent site visit to the MPTP facility, the following items were identified to improve the facility's level of service.

- **Rehabilitation of Raw Water and Electrical Conduit Piping Under Chemical Bldg -** Visual inspection of existing 24" raw water piping that feeds the Actiflo® system showed portions to be heavily corroded and in unsatisfactory condition. A large portion of the existing electrical conduit piping and a small portion of the chemical piping also were observed to be in unsatisfactory condition. The District expressed strong interest in replacing the approximate 200 feet of 24" raw water piping and implementing a yearly programmatic approach to miscellaneous electrical and chemical piping rehabilitation on the bottom floor of the Chemical Building. The estimated cost for the rehabilitation is $65,000.
- **Electrical Vulnerability Analysis with annual programmatic budget to correct deficiencies -** The District also expressed an interest in implementing a programmatic budget approach to correct any existing electrical deficiencies at MPTP and may require a full Electrical Vulnerability Analysis in the future. The estimated annual cost associated with correction of electrical deficiencies is $35,000.
- **Rehabilitation of MPTP Actiflo, Sludge, Raw Water PS, and Filter Buildings -** The current condition of the MPTP Actiflo, sludge, reservoir pump station, and filter buildings was satisfactory. Numerous necessary maintenance and general upkeep tasks were brought to our attention during our site visit including, but not limited to, repair of concrete walkways, building tuck pointing and sealing, replacement of roof flashings, window/door replacement, and numerous HVAC improvements. The District expressed interest in implementing a programmatic approach to building maintenance, above and beyond the existing O&M capital budget, allowing a budgeted amount of money to be set aside each year to aide in the rehabilitation efforts of the buildings. The estimated cost for the building rehabilitation is $95,000.
- **Replace 12 Raw and Finished Yard Piping Valves -** During our site visit, the District communicated that a total of 12 raw water and finished water valves ranging in size from 12" to 24" need replacement in the plant yard piping at MPTP. The specific location of the valves was not disclosed at this time by the District. The estimated cost for replacing the valves is $175,000.

4.2.2.2. Fort Thomas Treatment Plant

Asset Renewal & Replacement

Details of the asset R&R evaluation for the Fort Thomas WTP are included in Appendix D. The following graphic summarizes the breakdown of asset groupings for estimating the R&R portion of the CIP:

Fort Thomas WTP – Asset CIP Grouping Summary

CIP Group	Priority	Asset Quantity	Asset Percent
1 (Yrs 1-3)	Highest	21	6.0%
2 (Yrs 1-5)	High	14	4.0%
3 (Yrs 6-10)	Medium	52	14.9%
4 (Yrs 11-20)	Low	98	28.1%
5 (Beyond 20yrs)	Lowest	164	47.0%

CIP Group 1 assets at FTTP include the following processes and projects:

- Water treatment system filtration: backwash pumps
- Water treatment system filtration: backwash tank

CIP Group 2 assets at FTTP include the following processes and projects:

- Sludge pump room: new HVAC
- Raw water storage: replace valves & actuators
- Water treatment system flocculation: repair clarifiers and mixers

CIP Group 3 assets at FTTP include the following processes and projects:

- Chemical feed system: dry Copper Sulfate; pumps
- Chemical feed system: dry Powdered Activated Carbon; pumps, valves & actuators
- Chemical feed system: dry sludge polymer; pumps, valves & actuators
- Chemical feed system: liquid F/A Polymer; pumps & tanks
- Chemical feed system: OPRS1 liquid Potassium Permanganate; valves & actuators
- Site work: Security alarms & video
- Raw water system instrumentation: ORPS1; RTU, MAS, analytical & security
- Support systems control: SCADA, MAS, analytical & security
- Water treatment system flocculation: repair flocculation mixers & rakes
- Water treatment system residuals: pumps

- Water treatment system residuals: press & rake

CIP Group 4 assets at FTTP include the following processes and projects:

- Buildings: ORPS1; HVAC
- Chemical feed system: dry Copper Sulfate; tanks, valves & actuators
- Chemical feed system: dry powdered activated carbon; tanks
- Chemical feed system: dry sludge polymer; mixers & tanks
- Chemical feed system: liquid Clarion Coagulant; piping, pump, tanks, valves & actuators
- Chemical feed system: liquid corrosion inhibitor; piping, pumps, tanks, valves & actuators
- Chemical feed system: liquid F/A; mixers, piping, valves & actuators
- Chemical feed system: liquid Ferric Sulfate; piping, pumps, tanks, valves & actuators
- Chemical feed system: liquid Hydrofluorosilicic Acid; piping, pumps, tanks, valves & actuators
- Chemical feed system: liquid Potassium Permanganate; piping, pumps, tanks, valves & actuators
- Chemical feed system: liquid Sodium Hydroxide; pumps, tanks, valves & actuators
- Chemical feed system: liquid Sodium Hypochlorite; piping, pumps & tanks
- Chemical feed system: ORPS1 liquid Potassium Permanganate; mixers & piping
- Chemical feed system: ORPS1 liquid Sodium Hypochlorite; piping
- Support systems: upgrade electrical
- Water treatment system filtration: interior drain valves & actuators
- Water treatment system filtration: interior influent valves & actuators
- Water treatment system filtration: interior filtered water valves & actuators
- Water treatment system flocculation: basin clarifier

In addition to the grouped projects, an annual R&R budget is recommended to address general facility needs related to buildings, electrical and HVAC equipment.

Level of Service

During a recent site visit to the FTTP facility, the following items were identified to improve the facility's level of service.

- **Improvement to Copper Sulfate Feed System -** During our site visit, the operations staff expressed strong interest in improving the current copper sulfate chemical feed system to the flocculation/sedimentation basins. As it currently stands, the operations staff must attend to clogged or stopped up chemical feed piping almost on a daily basis. The chemical feed system is relatively new and explanations for such deficiencies might include the quality of the chemical being purchased by the District or the excessive distance from where the copper sulfate is mixed to where it is introduced into the treatment process. The capital cost of $12,500 includes the movement of the current chemical mix process closer to where it is fed into the system. This improvement might become less critical if the District chooses to cover all four sediment basins.
- **Replacement of Raw Water Valves -** During our site visit, the District communicated that a total of nine 30" raw water butterfly valves need replacement in the plant yard piping at FTTP. Two are located at the base of the dams on the old reservoir piping, five are located behind the chemical building, and the remaining two valves are located on the south side intake of the north reservoir. The estimated cost for replacing the valves is $215,000.
- **Improvements to Clearwell Control Valves (SCADA) -** NKWD expressed strong desire in upgrading to electrically actuated isolation valves located on the outlet side of the FTTP clearwells. The operation of these isolation valves should be tied into and controlled by the District's existing SCADA system. Currently, in case of a transmission main break, the District has no preventative measures in place to reduce the volume of water lost as a result of a distribution line break. Estimated cost is 38,250.
- **HVAC Improvements to HFS Room -** Ten State Standards recommends a minimum of 6 complete air changes per hour for rooms that house and mix caustic chemicals as part of the water treatment process. NKWD expressed concern that the current ventilation system in the Fluoride room at FTTP either is exactly at or below that air change standard. It is recommended that ventilation in the Fluoride room be increased by either increasing the number or size of existing fans in the room. The estimated cost associated with the HVAC improvements is $6,500.
- **HVAC Improvements to Sludge Pump Room -** The FTTP Sludge Pump Room is located below existing ground grade and houses numerous pumps creating a significant heat load inside the building. Currently, the ventilation unit in the building moves air drawn from a large louver above the doorway at the bottom of the stairwell through two exhaust fans on the other side of the room. Operations staff indicated that it is very difficult to open the door to the room when the ventilation system is operating due to the large draft that is created by the system. During our site visit, the exhaust fans were operating, along with two stationary fans, but the room temperature was greater than 85º F. It is recommended that HVAC improvements would include one 150-ton outdoor air-cooled chillers and an 8,000

CFM rooftop air-handling unit, along with the associated ductwork. The estimated cost associated with the HVAC improvements is $110,000.

- **Rehabilitation of FTTP Sludge and Filter Buildings -** The current condition of the FTTP sludge, chemical, and filter buildings was good. Numerous necessary maintenance and general upkeep tasks were brought to our attention during our site visit including, but not limited to, building tuck pointing, replacement of roof flashings, patching and painting of walls, and tile/skylight/door replacement. NKWD indicated that the roof on the sludge building was specifically in need of replacement. The District expressed interest in implementing a programmatic approach to building maintenance, above and beyond the existing O&M capital budget, allowing a budgeted amount of money to be set aside each year to aide in the rehabilitation efforts of the buildings. The estimated cost annual costs associated with the building rehabilitation is $55,000/year. The estimated cost for replacing the roof on the sludge building only is $145,000.
- **Rehabilitation of FTTP Lab and Chemical Buildings -** A new roof for the Lab was specifically mentioned during discussions with the operating staff and should be addressed. The District expressed interest in implementing a programmatic approach to building maintenance, above and beyond the existing O&M capital budget, allowing a budgeted amount of money to be set aside each year to aide in the rehabilitation efforts of the buildings. The estimated cost annual costs associated with the building rehabilitation is $30,000/year. The estimated cost for replacing the roof on the lab building is $125,000.

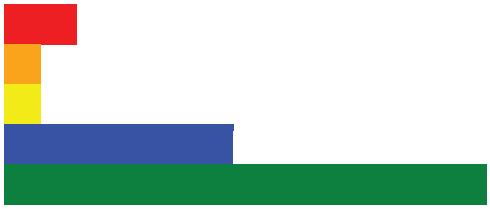
4.2.2.3. Taylor Mill Treatment Plant

Asset Renewal & Replacement

Details of the asset R&R evaluation for the Taylor Mill WTP are included in Appendix D. The following graphic summarizes the breakdown of asset groupings for estimating the R&R portion of the CIP:

Taylor Mill WTP – Asset CIP Grouping Summary

CIP Group	Priority	Asset Quantity	Asset Percent
1 (Yrs 1-3)	Highest	19	7.8%
2 (Yrs 1-5)	High	10	4.1%
3 (Yrs 6-10)	Medium	13	5.3%
4 (Yrs 11-20)	Low	60	24.5%
5 (Beyond 20yrs)	Lowest	143	58.4%



CIP Group 1 assets at TMTP include the following processes and projects:

- Filter building: new HVAC
- Filter building: new roof
- Flocculation & sedimentation basin: repair basins and install settling tubes
- Water treatment system rapid mix & coagulation: repair mixer

CIP Group 2 assets at TMTP include the following processes and projects:

- Raw water system: LRPS gates
- Water treatment system rapid mix & coagulation: repair rapid mix basin
- Water treatment system residuals: pumps
- Water treatment system residuals: conveyer & press
- Water treatment system residuals: tank

CIP Group 3 assets at TMTP include the following processes and projects:

- Chemical feed system: dry sludge polymer; pumps, valves & actuators
- Chemical feed system: liquid Sodium Hydroxide; pumps
- Raw water system instrumentation: LRPS; RTU
- Support systems control: SCADA & analytical

CIP Group 4 assets at TMTP include the following processes and projects:

- Chemical feed system: liquid Potassium Permanganate; piping, pumps, valves & actuators
- Chemical feed system: dry Copper Sulfate/PAC; piping, valves & actuators
- Chemical feed system: dry sludge polymer; mixers & tanks
- Chemical feed system: liquid corrosion inhibitor; piping, pumps, tanks, valves & actuators
- Chemical feed system: liquid Ferric Sulfate; piping, pumps, tanks, valves & actuators
- Chemical feed system: filter aid polymer; mixer, piping, pumps, tanks, valves & actuators
- Chemical feed system: liquid Hydrofluorosilicic Acid; piping, pumps, tanks, valves & actuators

- Chemical feed system: liquid Hyperion Coagulant; piping, pumps & tanks
- Chemical feed system: liquid Sodium Bisulfite; pumps & tanks
- Chemical feed system: liquid Sodium Hydroxide; piping, pumps, tanks, valves & actuators
- Chemical feed system: liquid Sodium Hypochlorite; piping & pumps

In addition to the grouped projects, an annual R&R budget is recommended to address general facility needs related to buildings, electrical and HVAC equipment.

Level of Service

During a recent site visit to the TMTP facility, a number of items were identified in need of repair. The findings of this visit are described in the following paragraphs.

- **Rehabilitation of TMTP Sludge, Chemical and Filter Buildings -** The current condition of both the TMTP sludge and filter buildings was satisfactory. Numerous necessary maintenance and general upkeep tasks were brought to our attention during our site visit including, but not limited to, repair of concrete walkways, building tuck pointing, replacement of roof flashings, and fencing/guide rail replacement. The roof on the sludge building was stated to be in excess of twenty years old and has received little maintenance since it was installed. It is recommended that a new roof be installed as part of the capital improvements at TMTP. The District expressed interest in implementing a programmatic approach to building maintenance, above and beyond the existing O&M capital budget, allowing a budgeted amount of money to be set aside each year to aide in the rehabilitation efforts of the buildings. The estimated annual cost associated with building rehabilitation is $40,000/year. The estimated cost for replacement of the sludge building roof is $190,000.

4.2.3. Pumping Station Evaluation

Asset Renewal & Replacement

Details of the asset R&R evaluation for the Pumping Stations are included in Appendix D. The following graphic summarizes the breakdown of asset groupings for estimating the R&R portion of the CIP:

Distribution Pumping Stations – Asset CIP Grouping Summary

CIP Group	Priority	Asset Quantity	Asset Percent
1 (Yrs 1-3)	Highest	21	6.6%
2 (Yrs 1-5)	High	7	2.2%
3 (Yrs 6-10)	Medium	77	24.1%
4 (Yrs 11-20)	Low	122	38.2%
5 (Beyond 20yrs)	Lowest	92	28.8%

CIP Group 1 assets at the Pump Stations include the following processes and projects:

- Bristow Road PS: Sodium Hypochlorite
- Taylor mill PS: valves & actuators
- US 27 PS: valves & actuators

CIP Group 2 assets at the Pump Stations include the following processes and projects:

- All group 2 assets for the Pump Stations fall into the general facilities R&R budget for miscellaneous building systems, electrical and HVAC replacements.

CIP Group 3 assets at the Pump Stations include the following processes and projects:

- Bristow Rd. PS instrumentation: Analytical, MAS, RTU & security
- Bromley PS instrumentation: Analytical, MAS, RTU & security
- Bromley PS pumps: repair motors and pumps
- Bromley PS chemical feed: Sodium Hypochlorite
- Carothers Rd. PS instrumentation: Analytical, MAS, RTU & security
- Dudley 1040 PS instrumentation: Analytical
- Dudley 1040 PS: pumps, repair motors and pumps
- Dudley 1080 PS instrumentation: Analytical, MAS & RTU
- Dudley 1080 PS chemical feed: Sodium Hypochlorite tanks
- Hands Pike PS instrumentation: Analytical, RTU & security
- Hands Pike PS: pumps, repair motors and pumps
- Latonia PS instrumentation: Analytical, MAS, RTU & security
- Richardson Rd. PS instrumentation: Analytical, RTU & security
- Richardson Rd. PS: pumps, repair pumps

- Ripple Creek PS instrumentation: Analytical, MAS, RTU & security
- Taylor Mill PS: pumps, repair motors and pumps
- US 27 PS instrumentation: MAS, RTU & security
- Waterworks Rd. PS instrumentation: Analytical, RTU & security
- West Covington PS instrumentation: Analytical, MAS, RTU & security

CIP Group 4 assets at the Pump Stations include the following processes and projects:

- Bristow Rd. PS: electrical, fire protection, instrumentation & chemical feed
- Bromley PS: electrical, instrumentation, chemical feed, valves & actuators
- Carothers Rd. PS: electrical & instrumentation
- Dudley 1040 PS: electrical & instrumentation
- Dudley 1080 PS: electrical, instrumentation & pumps
- Hands Pike PS: electrical & instrumentation
- Latonia PS: electrical & instrumentation
- Richardson Rd. PS: electrical & instrumentation
- Ripple Creek PS: electrical, instrumentation & pumps
- Taylor Mill PS: electrical & pumps
- US 27 PS: electrical, instrumentation & pumps
- Waterworks Rd. PS: electrical, instrumentation, valves & actuators
- West Covington PS: electrical, instrumentation, chemical feed, valves & actuators

In addition to the grouped projects, an annual R&R budget is recommended to address general facility needs related to buildings, electrical and HVAC equipment.

4.2.4. Storage Tank Evaluation

Asset Renewal & Replacement

Details of the asset R&R evaluation for the Storage Tanks are included in Appendix D. The following graphic summarizes the breakdown of asset groupings for estimating the R&R portion of the CIP:

Distribution Storage Tanks – Asset CIP Grouping Summary

CIP Group	Priority	Asset Quantity	Asset Percent
1 (Yrs 1-3)	Highest	1	1.2%
2 (Yrs 1-5)	High	2	2.4%
3 (Yrs 6-10)	Medium	57	69.5%
4 (Yrs 11-20)	Low	8	9.8%
5 (Beyond 20yrs)	Lowest	14	17.1%

CIP Groups 1 and 2 assets at the Tanks include the following processes and projects:

- New Rossford Tank

CIP Group 3 assets at the Tanks include the following processes and projects:

- Independence Tank instrumentation: RTU, security & MAS
- South Newport Tank instrumentation: RTU, analytical, security & MAS
- Taylor Mill Standpipe instrumentation: RTU, security & MAS
- Industrial Road Tank instrumentation: RTU, security & MAS
- Aqua Dr. Tank instrumentation: RTU, analytical, security & MAS
- Barrington Rd. Tank instrumentation: RTU & security
- Bellevue Tank instrumentation: RTU, analytical, security & MAS
- Dayton Tank instrumentation: RTU, security & MAS
- Devon Tank instrumentation: RTU, analytical, security & MAS
- John's Hill Tank instrumentation: RTU, security & MAS
- Kenton Lands Tank instrumentation: RTU, analytical, security & MAS
- Lumley Tank instrumentation: RTU, security & MAS
- Main St. Tank instrumentation: RTU, security & MAS
- South County Tank instrumentation: RTU, analytical & MAS
- Rossford Tank instrumentation: RTU, security & MAS
- Ida Spence Tank instrumentation: security & MAS
- Bellevue Tank: new tank
- Dayton Tank: new tank
- Ida Spence Tank: new tank
- Kenton Lands Tank: new tank

- Lumley Tank: new tank

CIP Group 4 assets at the Tanks include the following processes and projects:

- John's Hill Rd. Tank: new tank, valves & actuators
- Rossford Tank: new tank, valves & actuators
- Main St. Tank: revitalize tank, valves & actuators
- Kenton Lands: valves & actuators
- Lumley Tank: valves & actuators

In addition to the grouped projects, an annual R&R budget is recommended to address general facility needs related to buildings, electrical, HVAC equipment painting assessment, and coatings.

Tank Inspection and Maintenance Schedule

Over the last several years, NKWD has been very diligent about conducting regular condition assessments of the distribution storage facilities, and performing any needed re-painting or repairs in a timely manner. In order to help continue this successful program, and as part of the AMP, a suggested schedule has been developed for the District to plan and direct on-going cleaning and painting, repairs and rehabilitation, as well as routine inspections.

The program of tank inspections and rehabilitation projects listed was developed based on the previous work the District has performed on the tanks. In most cases, new, properly installed coating systems will last 15 to 20 years. In general, it is recommended that the tanks have maintenance inspections performed about every five years in order to stay abreast of their condition and properly plan for rehabilitation. Detailed inspections, as described above, are anticipated as the coating systems approach the end of their expected service life and planning for re-painting of the tanks becomes appropriate.

Table 4-13 provides the recommended scheduling of the tank maintenance program for these activities. As is outlined in the table, NKWD should plan to continue conducting detailed and regular maintenance inspections, and performing re-painting and renovation projects. The table shows re-painting projects every 20 years, but the outcome of the detailed inspection at approximately 15 years may indicate the need for a more extensive renovation project. The year of the re-painting or renovation project may also move up or back depending on the findings of the inspection. Generally the District paints two tanks a year to keep the number of out-of-service facilities limited, with one painted in

the spring and one in the fall. The following describes the nature of these inspections and rehabilitation tasks, as designated in the table.

Detailed Inspection:	Conduct a detailed examination of the tank coating systems, safety and structural items, the tank site, and other accessories or appurtenances. The inspection is intended to provide specific data for the purpose of preparing specifications and bidding documents for a rehabilitation project. The renovations and/or painting should be scheduled as conditions warrant.
Maintenance Inspection:	Conduct visual inspection of the tank, coating systems, accessories, and tank site. The inspection is intended to monitor general status of tank. Perform any maintenance as appropriate.
Re-Painting Project:	Clean, repair, or replace coating systems and other appurtenances as necessary. This type of rehabilitation is intended as a periodic maintenance project.
Renovation Project:	Coating systems replaced, structural and safety items modified as appropriate and to meet current codes, other accessories repaired or replaced as needed. This is intended to be a major renovation project, critical to extending service life of facility.

As listed in Table 4-11 the tank inspection and rehabilitation efforts are designated as follows:

Detailed Inspection	DI
Maintenance Inspection	MI
Re-Painting Project	RP
Renovation Project	RV

Table 4-13.
NKWD Tank Inspection and Maintenance Schedule

Year	Aqua Drive	Barrington	Bellevue[1]	Bromley	Claryville	Dayton[2]	Devon	Dudley	Ida Spence	Independence	Industrial	John's Hill	Kenton Lands	Lumley[3]	Main Street[4]	South County	Rossford[5]	South Newport	Taylor Mill[6]
2009			MI											MI					
2010				DI				MI	MI		DI		RP						
2011		RP				MI	MI												MI
2012																		DI	
2013	MI				MI					MI		MI			DI	MI	DI		
2014			DI											DI					
2015				RP				DI	MI		RP		MI						
2016		MI				DI	DI												MI
2017																		RP	
2018	DI				MI					MI		MI			RP	MI	RP		
2019			RP											RP					
2020				MI				RP	DI		MI		MI						
2021		MI				RP	RP												DI
2022																		MI	
2023	RP				DI					DI		DI			MI	DI	MI		
2024			MI											MI					
2025				MI				MI	RP		MI		DI						
2026		DI				MI	MI												RP
2027																		MI	
2028	MI									RP		RP			MI		MI		
2029			MI		RP									MI		RP			
2030				MI				MI	MI		DI		RP						

[1] Bellevue Tank may be replaced in 2017
[2] Dayton Tank may be replaced in 2018
[3] Lumley Tank may be retired or replaced in 2019
[4] Main Street Tank may be retired in 2019
[5] Rossford Tank may be replaced in 2012
[6] Taylor Mill Standpipe may be replaced in 2020

Table 4-14 summarizes the hydraulic gradient and capacity of each tank along with the year the tank was constructed, the year the tank was last re-painted, and the estimated year for its replacement based on an approximate 75-year estimated useful life of the tank along with a 15-year to 20-year coating life for its most recent re-painting project. It should be noted that through regular maintenance and inspection, the District is able to extend the life of most tanks well beyond the 45 year life assumed for depreciation and possibly longer than 75 years for its expected service life. Tanks may be retired or replaced earlier than the dates listed in the table, if they are undersized to meet future demands or hydraulic improvements make the tanks obsolete.

Both tanks in the 829 pressure zone, the Bellevue and Dayton Tanks, were built around 1930 and are approaching the end of their useful service lives. Since the tanks were painted in 1999 and 2001, it is recommended a detailed inspection of the tanks be performed when the coatings reach 15 to 20 years old. Based on the condition of the tanks, the District will need to decide if the condition is adequate for re-painting and keeping the tank in service for at least another 15 to 20 years or whether a new tank is needed.

The Ida Spence Tank was last coated in 2005 and will need re-painted around 2020. The tank is approaching the end of its useful life having been built in 1953. The tank will need replaced or, if condition is satisfactory, re-painted. The Ida Spence Tank could be retired along with Latonia Pumping Station and the area served through a regulator off the 1040 pressure zone. Some system improvements would be needed to facilitate this conversion. The District will need to determine its preference for serving this area.

The Kenton Lands Tank was painted in 2010 and will be due for another coating between 2025 and 2030. It is recommended that a detailed inspection be performed when the coating gets to 15 to 20 years of age to determine if the tank can continue to remain in service for another 15 to 20 years or whether a new tank is needed.

Table 4-14.
Tank Summary

Tank	Hydraulic Zone	Capacity (MG)	Year Built	Year of Last Coating	Estimated Year to Replace
Aqua	1017	2.0	1990	2003	>2030
Barrington	1040	1.0	1972	1997	>2030
Bellevue	829	0.6	1930	1999	2014 – 2019
Bromley	763	3.0	1967	1993	>2030
Claryville	1017	0.75	2008	2008	>2030
Dayton	829	0.5	1930	2001	2014 – 2019
Devon	1080	2.0	1990	2001	>2030
Dudley 1040	876	5.0	1964	2000	>2030
Dudley 1080	876	5.0	1990	2000	>2030
Ida Spence	1003	0.5	1953	2005	2020
Independence	1080	1.0	1982	2003	>2030
Industrial	1080	0.5	1962	1994	>2030
Johns Hill	1017	0.5	1958	1998	>2030
Kenton Lands	1040	0.5	1954	2010	2030
Lumley	1017	0.275	1934	1999	2014 – 2019
Main Street	1017	0.3	1998	1998	>2030
Rossford	1017	0.3	1958	1998	2012- 2014
S. Newport	965	1.0	1972	1997	>2030
South County	1017	1.0	1976	2008	>2030
Taylor Mill	1010	0.33	1961	2006	> 2030

4.2.5. Annual General Facility R&R Projects

Table 4-15 presents a summary of all the recommended projects included in the annual general facility R&R from 2011-2030 followed by Table 4-16 which shows the estimated costs for increases to 2008 O&M budgets that will be required from 2009-2030.

Table 4-15
Annual General Facility R&R 2011 through 2030

Year	Location	Project Description	Cost
2011	Laboratory	Replacement of Lab Equipment	$58,000
	FTTP	Annual General Facility R & R Program - FTTP	$72,080
	TMTP	Annual General Facility R & R Program - TMTP	$55,120
	MPTP	Annual General Facility R & R Program - MPTP	$80,560
	PS	General Facility R&R for Raw and Finished Pump Stations	$368,000
	Tanks	General Facility R&R for Tanks	$195,000
	Subtotal 2011		**$829,000**
2012	Laboratory	Replacement of Lab Equipment	$60,000
	TMPS	Taylor Mill PS Repair Control & Relief Valve	$71,500
	FTTP	Annual General Facility R & R Program - FTTP	$74,800
	TMTP	Annual General Facility R & R Program - TMTP	$57,200
	MPTP	Annual General Facility R & R Program - MPTP	$83,600
	PS	General Facility R&R for Raw and Finished Pump Stations	$380,000
	Tanks	General Facility R&R for Tanks	$200,000
	Subtotal 2012		**$928,000**
2013	FTTP	Annual General Facility R & R Program - FTTP	$78,200
	TMTP	Annual General Facility R & R Program - TMTP	$59,800
	FTTP	Replacement of Lab Equipment	$62,000
	MPTP	Annual General Facility R & R Program - MPTP	$87,400
	PS	General Facility R&R for Raw and Finished Pump Stations	$392,000
	Tanks	General Facility R&R for Tanks	$208,000
	Subtotal 2013		**$888,000**
2014	FTTP	Annual General Facility R & R Program - FTTP	$105,000
	TMTP	Annual General Facility R & R Program - TMTP	$80,000
	MPTP	Annual General Facility R & R Program - MPTP	$114,000
	FTTP	Replacement of Lab Equipment	$64,000
	PS	General Facility R&R for Raw and Finished Pump Stations	$405,000
	Tanks	General Facility R&R for Tanks	$215,000
	Subtotal 2014		**$983,000**

Table 4-15
Annual General Facility R&R 2011 through 2030

Year	Location	Project Description	Cost
2015	FTTP	Annual General Facility R & R Program - FTTP	$106,000
	TMTP	Annual General Facility R & R Program - TMTP	$82,000
	MPTP	Annual General Facility R & R Program - MPTP	$115,000
	FTTP	Replacement of Lab Equipment	$64,000
	PS	General Facility R&R for Raw and Finished Pump Stations	$418,000
	Tanks	General Facility R&R for Tanks	$222,000
	Subtotal 2015		**$1,007,000**
2016	FTTP	Annual General Facility R & R Program - FTTP	$107,000
	TMTP	Annual General Facility R & R Program - TMTP	$83,000
	MPTP	Annual General Facility R & R Program - MPTP	$116,000
	FTTP	Replacement of Lab Equipment	$64,000
	PS	General Facility R&R for Raw and Finished Pump Stations	$420,000
	Tanks	General Facility R&R for Tanks	$228,000
	Subtotal 2016		**$1,018,000**
2017	FTTP	Annual General Facility R & R Program - FTTP	$108,000
	TMTP	Annual General Facility R & R Program - TMTP	$84,000
	MPTP	Annual General Facility R & R Program - MPTP	$117,000
	FTTP	Replacement of Lab Equipment	$64,000
	PS	General Facility R&R for Raw and Finished Pump Stations	$430,000
	Tanks	General Facility R&R for Tanks	$235,000
	Subtotal 2017		**$1,038,000**
2018	FTTP	Annual General Facility R & R Program - FTTP	$109,000
	TMTP	Annual General Facility R & R Program - TMTP	$84,000
	MPTP	Annual General Facility R & R Program - MPTP	$119,000
	FTTP	Replacement of Lab Equipment	$64,000
	PS	General Facility R&R for Raw and Finished Pump Stations	$443,000
	Tanks	General Facility R&R for Tanks	$242,000
	Subtotal 2018		**$1,061,000**

Table 4-15
Annual General Facility R&R 2011 through 2030

Year	Location	Project Description	Cost
2019	FTTP	Annual General Facility R & R Program - FTTP	$110,000
	TMTP	Annual General Facility R & R Program - TMTP	$85,000
	MPTP	Annual General Facility R & R Program - MPTP	$120,000
	FTTP	Replacement of Lab Equipment	$64,000
	PS	General Facility R&R for Raw and Finished Pump Stations	$456,000
	Tanks	General Facility R&R for Tanks	$249,000
	Subtotal 2019		**$1,084,000**
2020	FTTP	Annual General Facility R & R Program - FTTP	$112,000
	TMTP	Annual General Facility R & R Program - TMTP	$86,000
	MPTP	Annual General Facility R & R Program - MPTP	$121,000
	FTTP	Replacement of Lab Equipment	$64,000
	PS	General Facility R&R for Raw and Finished Pump Stations	$470,000
	Tanks	General Facility R&R for Tanks	$257,000
	Subtotal 2020		**$1,110,000**
2021	FTTP	Annual General Facility R & R Program - FTTP	$114,000
	TMTP	Annual General Facility R & R Program - TMTP	$87,000
	MPTP	Annual General Facility R & R Program - MPTP	$123,000
	FTTP	Replacement of Lab Equipment	$64,000
	PS	General Facility R&R for Raw and Finished Pump Stations	$485,000
	Tanks	General Facility R&R for Tanks	$265,000
	Subtotal 2021		**$1,138,000**
2022	FTTP	Annual General Facility R & R Program - FTTP	$115,000
	TMTP	Annual General Facility R & R Program - TMTP	$88,000
	MPTP	Annual General Facility R & R Program - MPTP	$125,000
	FTTP	Replacement of Lab Equipment	$64,000
	PS	General Facility R&R for Raw and Finished Pump Stations	$499,000
	Tanks	General Facility R&R for Tanks	$272,000
	Subtotal 2022		**$1,163,000**

Table 4-15
Annual General Facility R&R 2011 through 2030

Year	Location	Project Description	Cost
2023	FTTP	Annual General Facility R & R Program - FTTP	$116,000
	TMTP	Annual General Facility R & R Program - TMTP	$89,000
	MPTP	Annual General Facility R & R Program - MPTP	$127,000
	FTTP	Replacement of Lab Equipment	$64,000
	PS	General Facility R&R for Raw and Finished Pump Stations	$514,000
	Tanks	General Facility R&R for Tanks	$280,000
	Subtotal 2023		**$1,190,000**
2024	FTTP	Annual General Facility R & R Program - FTTP	$117,000
	TMTP	Annual General Facility R & R Program - TMTP	$90,000
	MPTP	Annual General Facility R & R Program - MPTP	$128,000
	FTTP	Replacement of Lab Equipment	$64,000
	PS	General Facility R&R for Raw and Finished Pump Stations	$530,000
	Tanks	General Facility R&R for Tanks	$289,000
	Subtotal 2024		**$1,218,000**
2025	FTTP	Annual General Facility R & R Program - FTTP	$118,000
	TMTP	Annual General Facility R & R Program - TMTP	$92,000
	MPTP	Annual General Facility R & R Program - MPTP	$129,000
	FTTP	Replacement of Lab Equipment	$64,000
	PS	General Facility R&R for Raw and Finished Pump Stations	$545,000
	Tanks	General Facility R&R for Tanks	$298,000
	Subtotal 2025		**$1,246,000**
2026	FTTP	Annual General Facility R & R Program - FTTP	$120,000
	TMTP	Annual General Facility R & R Program - TMTP	$94,000
	MPTP	Annual General Facility R & R Program - MPTP	$131,000
	FTTP	Replacement of Lab Equipment	$64,000
	PS	General Facility R&R for Raw and Finished Pump Stations	$562,000
	Tanks	General Facility R&R for Tanks	$306,000
	Subtotal 2026		**$1,277,000**

Table 4-15
Annual General Facility R&R 2011 through 2030

Year	Location	Project Description	Cost
2027	FTTP	Annual General Facility R & R Program - FTTP	$122,000
	TMTP	Annual General Facility R & R Program - TMTP	$96,000
	MPTP	Annual General Facility R & R Program - MPTP	$133,000
	FTTP	Replacement of Lab Equipment	$64,000
	PS	General Facility R&R for Raw and Finished Pump Stations	$579,000
	Tanks	General Facility R&R for Tanks	$316,000
	Subtotal 2027		**$1,310,000**
2028	FTTP	Annual General Facility R & R Program - FTTP	$124,000
	TMTP	Annual General Facility R & R Program - TMTP	$98,000
	MPTP	Annual General Facility R & R Program - MPTP	$135,000
	FTTP	Replacement of Lab Equipment	$64,000
	PS	General Facility R&R for Raw and Finished Pump Stations	$596,000
	Tanks	General Facility R&R for Tanks	$325,000
	Subtotal 2028		**$1,342,000**
2029	FTTP	Annual General Facility R & R Program - FTTP	$126,000
	TMTP	Annual General Facility R & R Program - TMTP	$100,000
	MPTP	Annual General Facility R & R Program - MPTP	$137,000
	FTTP	Replacement of Lab Equipment	$64,000
	PS	General Facility R&R for Raw and Finished Pump Stations	$614,000
	Tanks	General Facility R&R for Tanks	$335,000
	Subtotal 2029		**$1,376,000**
2030	FTTP	Annual General Facility R & R Program - FTTP	$128,000
	TMTP	Annual General Facility R & R Program - TMTP	$102,000
	MPTP	Annual General Facility R & R Program - MPTP	$139,000
	FTTP	Replacement of Lab Equipment	$64,000
	PS	General Facility R&R for Raw and Finished Pump Stations	$633,000
	Tanks	General Facility R&R for Tanks	$345,000
	Subtotal 2030		**$1,411,000**
2011 - 2030 TOTAL			**$24,359,000**

Table 4-16
Increases to 2008 O&M Budget – 2009 through 2030

Year	Location	Description	Cost
2009	Independence Tank	Tank Inspection Program Independence Tank	$5,000
		Subtotal 2009	**$5,000**
2010	Kenton Lands Tank	Tank Inspection Program Kenton Lands Tank	$5,250
	Barrington Tank	Tank Inspection Program Barrington Tank	$5,250
		Subtotal 2010	**$11,000**
2011	John's Hill Tank	Tank Inspection Program John's Tank	$5,000
		Subtotal 2011	**$5,000**
2012	ORPS2	Structural Analysis	$110,000
	Distribution	Pipe and Soils Analysis Program	$30,000
	Ida Spence Tank	Tank Inspection Program Ida Spence Tank	$6,000
		Subtotal 2012	**$146,000**
2013	Dudley 1040 Tank	Tank Inspection Program Dudley 1040 Tank	$6,000
	Dudley 1080 Tank	Tank Inspection Program Dudley 1080 Tank	$6,000
	Distribution	Pipe and Soils Analysis Program	$31,000
	ORPS1	Surge Analysis Study	$65,000
	MPTP	2013 GAC Replacement and Maintenance Costs MPTP	$635,000
	FTTP	2013 GAC Replacement and Maintenance Costs FTTP	$2,304,000
		Subtotal 2013	**$3,047,000**
2014	Distribution	Pipe and Soils Analysis Program	$32,000
	Tanks	Tank Inspection Program	$6,000
	Tanks	Tank Maintenance Program	$550,000
	TMTP	2014 GAC Replacement at TMTP	$692,000
	MPTP	GAC Replacement and Maintenance Costs MPTP	$650,000
	FTTP	GAC Replacement and Maintenance Costs FTTP	$2,375,000
		Subtotal 2014	**$4,273,000**

Table 4-16
Increases to 2008 O&M Budget – 2009 through 2030

Year	Location	Description	Cost
2015	Tanks	Tank Inspection Program	$6,000
	Tanks	Tank Maintenance Program	$565,000
	Distribution	Pipe and Soils Analysis Program	$33,000
	TMTP	GAC Replacement at TMTP	$712,000
	MPTP	GAC Replacement and Maintenance Costs MPTP	$675,000
	FTTP	GAC Replacement and Maintenance Costs FTTP	$2,445,000
		Subtotal 2015	**$4,436,000**
2016	Tanks	Tank Inspection Program	$6,000
	Tanks	Tank Maintenance Program	$585,000
	Plants	Capacity Analysis Study	$165,000
	Distribution	Pipe and Soils Analysis Program	$34,000
	Technology	IT Maintenance	$27,500
	TMTP	GAC Replacement at TMTP	$734,000
	MPTP	GAC Replacement and Maintenance Costs MPTP	$695,000
	FTTP	GAC Replacement and Maintenance Costs FTTP	$2,518,000
		Subtotal 2016	**$4,765,000**
2017	Tanks	Tank Inspection Program	$6,000
	Tanks	Tank Maintenance Program	$600,000
	Distribution	Pipe and Soils Analysis Program	$35,000
	Technology	IT Maintenance	$28,000
	TMTP	GAC Replacement at TMTP	$756,000
	MPTP	GAC Replacement and Maintenance Costs MPTP	$715,000
	FTTP	GAC Replacement and Maintenance Costs FTTP	$2,593,000
		Subtotal 2017	**$4,733,000**

Table 4-16
Increases to 2008 O&M Budget – 2009 through 2030

Year	Location	Description	Cost
2018	Tanks	Tank Inspection Program	$6,500
	Tanks	Tank Maintenance Program	$620,000
	Distribution	Pipe and Soils Analysis Program	$36,000
	Technology	IT Maintenance	$29,000
	TMTP	GAC Replacement at TMTP	$779,000
	MPTP	GAC Replacement and Maintenance Costs MPTP	$736,000
	FTTP	GAC Replacement and Maintenance Costs FTTP	$2,670,000
		Subtotal 2018	**$4,877,000**
2019	Tanks	Tank Inspection Program	$6,500
	Tanks	Tank Maintenance Program	$638,000
	Distribution	Pipe and Soils Analysis Program	$37,000
	Technology	IT Maintenance	$30,000
	TMTP	GAC Replacement at TMTP	$800,000
	MPTP	GAC Replacement and Maintenance Costs MPTP	$760,000
	FTTP	GAC Replacement and Maintenance Costs FTTP	$2,750,000
		Subtotal 2019	**$5,022,000**
2020	Tanks	Tank Inspection Program	$7,000
	Tanks	Tank Maintenance Program	$656,000
	Distribution	Pipe and Soils Analysis Program	$38,000
	Technology	IT Maintenance	$31,000
	TMTP	GAC Replacement at TMTP	$826,000
	MPTP	GAC Replacement and Maintenance Costs MPTP	$780,000
	FTTP	GAC Replacement and Maintenance Costs FTTP	$2,833,000
		Subtotal 2020	**$5,171,000**

Table 4-16
Increases to 2008 O&M Budget – 2009 through 2030

Year	Location	Description	Cost
2021	Tanks	Tank Inspection Program	$7,000
	Tanks	Tank Maintenance Program	$676,000
	Distribution	Pipe and Soils Analysis Program	$39,000
	Technology	IT Maintenance	$32,000
	TMTP	GAC Replacement at TMTP	$851,000
	MPTP	GAC Replacement and Maintenance Costs MPTP	$804,000
	FTTP	GAC Replacement and Maintenance Costs FTTP	$2,918,000
		Subtotal 2021	**$5,327,000**
2022	Tanks	Tank Inspection Program	$7,000
	Tanks	Tank Maintenance Program	$696,000
	Distribution	Pipe and Soils Analysis Program	$40,000
	Technology	IT Maintenance	$33,000
	TMTP	GAC Replacement at TMTP	$877,000
	MPTP	GAC Replacement and Maintenance Costs MPTP	$828,000
	FTTP	GAC Replacement and Maintenance Costs FTTP	$3,000,000
		Subtotal 2022	**$5,481,000**
	Tanks	Tank Maintenance Program	$717,000
	Distribution	Pipe and Soils Analysis Program	$41,000
	Technology	IT Maintenance	$34,000
	TMTP	GAC Replacement at TMTP	$903,000
	MPTP	GAC Replacement and Maintenance Costs MPTP	$854,000
	FTTP	GAC Replacement and Maintenance Costs FTTP	$3,096,000
		Subtotal 2023	**$5,653,000**

Table 4-16
Increases to 2008 O&M Budget – 2009 through 2030

Year	Location	Description	Cost
2024	Tanks	Tank Inspection Program	$8,000
	Tanks	Tank Maintenance Program	$739,000
	Distribution	Pipe and Soils Analysis Program	$42,000
	Technology	IT Maintenance	$35,000
	TMTP	GAC Replacement at TMTP	$990,000
	MPTP	GAC Replacement and Maintenance Costs MPTP	$879,000
	FTTP	GAC Replacement and Maintenance Costs FTTP	$3,189,000
		Subtotal 2024	**$5,882,000**
2025	Tanks	Tank Inspection Program	$8,000
	Tanks	Tank Maintenance Program	$761,000
	Distribution	Pipe and Soils Analysis Program	$43,000
	Technology	IT Maintenance	$36,000
	TMTP	GAC Replacement at TMTP	$958,000
	MPTP	GAC Replacement and Maintenance Costs MPTP	$905,000
	FTTP	GAC Replacement and Maintenance Costs FTTP	$3,285,000
		Subtotal 2025	**$5,996,000**
2026	Tanks	Tank Inspection Program	$8,000
	Tanks	Tank Maintenance Program	$784,000
	Distribution	Pipe and Soils Analysis Program	$44,000
	Technology	IT Maintenance	$37,000
	TMTP	GAC Replacement at TMTP	$987,000
	MPTP	GAC Replacement and Maintenance Costs MPTP	$932,000
	FTTP	GAC Replacement and Maintenance Costs FTTP	$3,383,000
		Subtotal 2026	**$6,175,000**

Table 4-16
Increases to 2008 O&M Budget – 2009 through 2030

Year	Location	Description	Cost
2027	Tanks	Tank Inspection Program	$8,500
	Tanks	Tank Maintenance Program	$807,000
	Distribution	Pipe and Soils Analysis Program	$45,000
	Technology	IT Maintenance	$38,000
	TMTP	GAC Replacement at TMTP	$1,016,000
	MPTP	GAC Replacement and Maintenance Costs MPTP	$960,000
	FTTP	GAC Replacement and Maintenance Costs FTTP	$3,485,000
		Subtotal 2027	**$6,360,000**
2028	Tanks	Tank Inspection Program	$8,500
	Tanks	Tank Maintenance Program	$832,000
	Distribution	Pipe and Soils Analysis Program	$46,000
	Technology	IT Maintenance	$39,000
	TMTP	GAC Replacement at TMTP	$1,047,000
	MPTP	GAC Replacement and Maintenance Costs MPTP	$989,000
	FTTP	GAC Replacement and Maintenance Costs FTTP	$3,590,000
		Subtotal 2028	**$6,552,000**
2029	Tanks	Tank Inspection Program	$9,000
	Tanks	Tank Maintenance Program	$857,000
	Distribution	Pipe and Soils Analysis Program	$48,000
	Technology	IT Maintenance	$40,000
	TMTP	GAC Replacement at TMTP	$1,078,000
	MPTP	GAC Replacement and Maintenance Costs MPTP	$1,019,000
	FTTP	GAC Replacement and Maintenance Costs FTTP	$3,697,000
		Subtotal 2029	**$6,748,000**

Table 4-16
Increases to 2008 O&M Budget – 2009 through 2030

Year	Location	Description	Cost
2030	Tanks	Tank Inspection Program	$9,000
	Tanks	Tank Maintenance Program	$882,000
	Distribution	Pipe and Soils Analysis Program	$50,000
	Technology	IT Maintenance	$41,000
	TMTP	GAC Replacement at TMTP	$1,111,000
	MPTP	GAC Replacement and Maintenance Costs MPTP	$1,050,000
	FTTP	GAC Replacement and Maintenance Costs FTTP	$3,808,000
		Subtotal 2030	**$6,951,000**
2009 - 2030 TOTAL			**$3,214,000**

4.3. Evaluation of Programs

4.3.1. Above Ground Assets

4.3.1.1. Antero CMMS Overview

The District utilizes the Antero computerized maintenance management system (CMMS) as provided by All MAX for asset and work order management at the plants.

Attribute Data Requirements

The following attribute classifications are required in a CMMS to support an asset management program incorporating reliability centered maintenance (RCM) practices and effective useful life (EUL) principles for comprehensive rehabilitation and replacement (R&R) planning:

Physical/Performance Attributes

Uniquely identify the asset and its capabilities. These attributes are assigned when the asset is placed in service and generally do not change over the life of the asset.

Financial Attributes

Define the initial cost and expected replacement cost of the asset. The replacement cost is updated on a periodic basis as required to reflect economic conditions and could be a calculated value based on initial cost and the appropriate escalation factor (e.g. inflation, ENR cost index, etc.) in accordance with established financial policies.

Asset Management Attributes

Define the criticality, condition, performance capabilities and expected useful life of the assets. Criticality is assigned when the asset is placed in service and reviewed / updated based on changes in operation (e.g. process changes, capacity upgrades, etc.). Condition and expected useful life are updated periodically based on inspection results and operational observations.

The following tables summarize the status for each of the three attribute classifications as they relate to the current capabilities and utilization of the Antero CMMS.

Table 4-17.
Antero CMMS Physical/ Performance Attributes

Attribute	Description	Exists	In Use
Asset ID	Provides the unique identifier for the asset and is required for integration of asset data with other systems.	Yes	No 100% NULL
Name	Descriptive name familiar to utility staff, which is used in reporting.	Yes	Yes 0% NULL
Manufacturer	Support replacement parts ordering and warranty issues.	Yes	No 84% NULL
Model No.		Yes	No 83% NULL
Serial No.		Yes	No 86% NULL
Nameplate	Information on size, material capacity, performance, etc.	Yes	Yes
Type	Indicates application (e.g. sludge pump) useful for categorizing assets for effective useful life estimates	Yes	Yes 6% NULL
Others	Other attributes as provided in the CMMS	See Appendix G	

Physical Attributes - Details

- Asset ID: Antero field is called "AssetNo". All records are NULL.
- Name: Antero uses the following fields to identify an asset:
  - "EquipNo" – no NULL values. No duplicates are allowed in this field and it is the unique identifier for the asset
  - "Description" – 3 NULL values
- Manufacturer: Antero provides two fields to assign a manufacturer to an asset as follows (both fields go to the same look-up table):
  - "MfgID" – 796 NULL values. 84% of the assets do not have assigned manufacturers.

- "VendorID" – 693 NULL values. 73% of the assets do not have assigned vendors.

- Model Number: Antero field is "ModelNo" and 786 records are NULL. 83% of the assets do not have a model number.
- Serial Number: Antero field is "SerialNo" and 818 records are NULL. 86% of the assets do not have a serial number.
- Equipment Type: Antero provides a look-up table for equipment type. 56 records in the equipment table are NULL. 6% of assets do not have an assigned type.

Table 4-18.
Antero CMMS Financial Attributes

Attribute	Description	Exists	In Use
Install Year	Required for depreciation, effective useful life evaluation and R&R capital planning.	Yes	No
Install Cost		Yes	No
Replace Cost		No	N/A

Financial Attributes - Details

- Install Year: Antero provides two fields:
  - "DatePurch" – 943 NULL values. 99% of the assets do not have a purchase date assigned.
  - "DateInService" – 942 NULL values. 99% of the assets do not have a date in service assigned. This field is most appropriate for use as the actual install year.
- Install Cost: Antero field is "PurchPrice" and 946 records are NULL. 99% of the assets do not have a purchase price assigned.
- Replace Cost: Antero does not provide such a field. However, there is a field for "SalvageVal", which could be used for the replacement cost. Currently all records are NULL.

Table 4-19.
Antero CMMS Asset Management Attributes

Attribute	Description	Exists	In Use
Criticality	Consequence of failure – updated based on process or operational changes at the utility.	No	See Details
Physical Condition	Current state of repair. Updated periodically from inspections with frequency based on criticality.	No	No
Performance Condition	Current state of performance. Updated based on operational observations and planning.	No	No
Effective Life	Varies with condition, use and environment. Reviewed and updated with condition.	Yes	No

Asset Management Attributes - Details

- Criticality: Antero does not provide this field. There is a field "EqPriority", which could be utilized for asset criticality. Currently this field is populated via a look-up list from 1 to 9 with a default value of 0. This field is utilized and there are no NULL records. There are 76 records (8%) with the default value of 0.
- Physical Condition: Antero does not provide this field.
- Performance Condition: Antero does not provide this field.
- Effective Life: Antero field is "LifeExpectancy" and 948 records are NULL. 99+% of the assets do not have an effective life assigned.

4.3.1.2. Work Order Management Overview

Effective work order management should include the following as a minimum:

- Work orders must be assigned to an asset or group of assets – not issued as general facility work orders.
- Work orders should be prioritized when created and the prioritization should relate back to asset criticality.
- Data collected about the asset and the work performed should be sufficient to support the recommended reporting for key performance indicators (KPIs) – see below.
- Work orders should have an estimated completion date and estimates for labor time and costs to support overall scheduling, budgeting and tracking of backlog.
- Type of work and the cost of the work should be recorded. Work subcontracted should be tracked separately and assigned to specific assets.

Table 4-20.
Antero CMMS Work Order Types

WO Type	Description	Status
Predictive Maintenance (PdM)	Sub-types should be defined for the predictive tools utilized (e.g. vibration monitoring, thermography, etc.)	PdM WO type is not defined. The current PIP includes some PdM activities.
Preventative Maintenance (PM)	Sub-types should be defined for the standard PM tasks performed (e.g. lubrication, calibration, etc.)	"Scheduled" WO type is defined with PM tasks
Corrective Maintenance (CM)	Sub-types should be provided to indicate if maintenance was scheduled or unscheduled.	CM WO type is defined. Scheduled and Unscheduled also defined.

Table 4-21.
Antero CMMS Work Order Cost Data

Cost	Description	Status
Labor	Hours and costs by labor category.	Available for all WO types
Material	Spare parts from inventory and any other consumables.	Available for all WO types
Equipment	Tools, vehicles and other equipment utilized in the work.	A "miscellaneous cost" field is available for all WO types

Table 4-22.
Antero CMMS Work Order Tracking

Tracking	Description	Status
Date Due	Assign an expected completion date when WO is created to track overdue work and backlog	Available for all WO types
Estimated Labor / Cost	Provide an overall estimate of effort to complete the work, which can then be compared to actual.	Not available
Priority	Assign a priority level for completion when the WO is created. The priority should consider the asset criticality rating.	Priority is available, but does not relate to asset criticality.
Status Updates	Provide for entry of status updates while work order is open.	Available for all WO types

Work Order Details

The work order information provided included a historical back-up table containing over 18,000 work order records completed since 2001 and a current database with 234 work order records from August 2007 through January 2008. The current database was utilized for the work order evaluation as it would be most representative of current practices.

Work Order Types, Assignment & Priority

Antero currently defines the following work order types:

- Scheduled
- Unscheduled
- Corrective
- Emergency
- Other

All work orders in Antero are assigned to a specific asset (equipment item). Of the 234 records in the sample database, 185 (79%) have an assigned work type "other".

There is a look-up table to define specific tasks – currently 96 work tasks are available. There are 190 (81%) of the 234 records with assigned work tasks.

Antero provides a priority field with available values from 1-9. All 234 work orders in the current database have an assigned priority.

Work Order Costs

Antero provides the ability to track the following costs against work orders:

- Part costs
- Labor costs
- Miscellaneous costs

Of the 234 records in the sample database, 88 (38%) have labor hours assigned. Antero provides a "Labor_Class" look-up table where individual labor rates can be entered. The wage field is blank, which results in no costs being assigned to the labor hours. The part costs and miscellaneous costs fields are empty in the sample database. There are no fields available to enter estimated costs.

Work Order Tracking

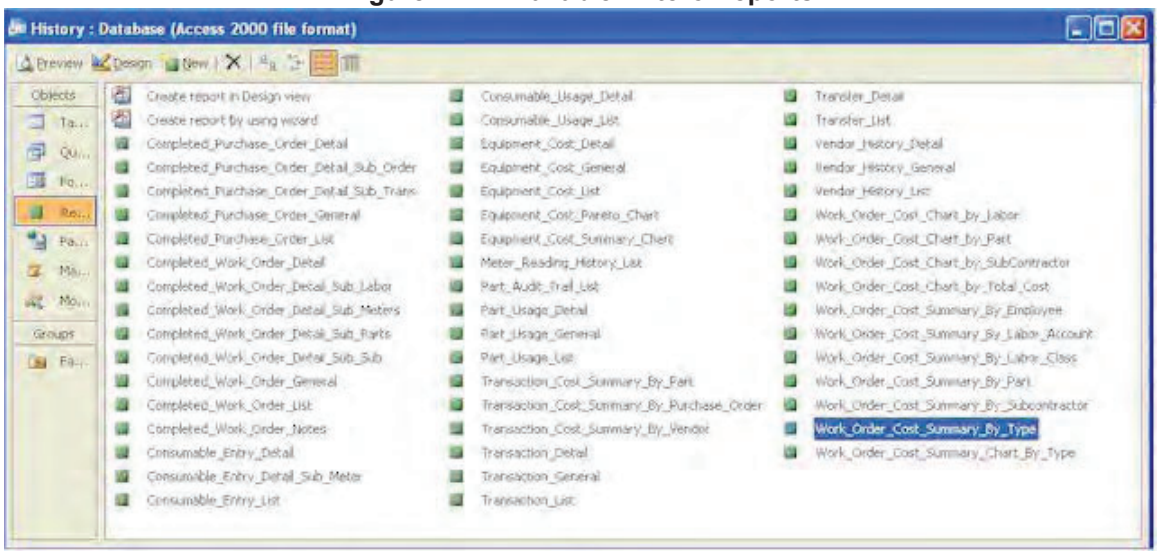
Antero provides a "DateDelinquent" field to indicate when work orders are due. Of the 234 records in the sample database, 135 (58%) do not have a delinquent date assigned. There is a "StatusInfo" field available, which contains an entry for 4 of the 234 work orders.

Reporting & Key Performance Indicators

Reports

The Antero CMMS provides for flexible reporting capabilities and the sample database included over 40 configured reports. The current reports available from Antero do a thorough job of tracking work order completion and costs by type for each asset. The figure below shows all the available reports in the sample database provided.

Figure 4-2: Available Antero Reports



Key Performance Indicators (KPIs)

The following table summarizes key performance indicators (KPIs), which can be used to support a variety of work processes related to work order management, maintenance program monitoring, equipment effective useful life estimates and rehabilitation & replacement (R&R) planning. The column for "KPI Status" indicates the following:

- "C" - The District can currently report on the KPI based on data fields available within Antero.
- "ST" – The District cannot currently report on the KPI, but should do so in support of the above ground asset R&R program. The KPIs recommended for short-term implementation relate mostly to asset reliability and effective useful life evaluation (EUL) and will provide the foundation for an overall reliability centered maintenance (RCM) program. Adoption of these KPI's will require some modification to the Antero CMMS.
- "LT" – The District cannot currently report on the KPI, but should consider adopting the measure as the asset management program develops. These KPIs generally relate to developing a formalized reliability centered maintenance program (RCM), implementing predictive maintenance (PdM) practices, the overall planning and

scheduling of maintenance activities, tracking estimated versus actual labor efforts and cost and the overall optimization of resources.

Table 4-23.
Antero CMMS Work Order Tracking

KPI Type	KPI Description	KPI Status	Work Process Supported (see bottom for codes)							
			P&S	WO Mgmt	PdM	RCM	PM	I&P	EUL	R&R
Financial	Maintenance Cost per Estimated Replacement Value of Asset	ST							X	X
Efficiency and Effectiveness	Labor hours Spent on Corrective Jobs per Total Labor hours Worked	C	X							
	Overtime Hours Worked per Total Hours	C	X							
	PM WOs per Total WOs	C	X	X			X			
	CM WOs per Total WOs	C	X	X						
	Equipment Uptime	ST				X				
	Downtime Caused by Breakdown per Total	L T				X			X	X
Tactical	Number of WOs Completed with Greater than 20% above Estimated Labor	L T	X	X						
	PM WOs Completed per PM WOs Scheduled	C					X			
	Total Value of Stock Items Issued per Total Inventory Value	C						X		
	Maintenance Hours Scheduled per Total Maintenance Hours Worked	C	X	X						
	WOs Overdue per Total WOs	C	X	X						
Functional	Estimated PM Cost per Actual PM Cost	L T	X							
	Mean-Time-Between Failures (MTBF)	ST				X			X	X
	Mean-Time-To-Repair (MTTR)	L T	X			X			X	
	Number of PMs Overdue per Total Number of PMs Outstanding	C	X			X	X			
	Number of PdMs Overdue per Total Number of PdMs Outstanding	L T	X		X	X				
	Total Number of WOs Generated from PM Inspections per Total Number of WOs	ST				X	X		X	X
	Maintenance Labor Costs on WOs per Total Maintenance Labor Costs	C		X						
	Maintenance Material Costs on WOs per Total Maintenance Material Costs	C		X						
	Maintenance Labor Costs Planned per Total Maintenance Labor Costs	L T	X							
	Maintenance Material Costs Planned per Total Maintenance Material Costs	L T	X							
	Maintenance Employees per Number of Supervisors	L	X	X		X				

KPI Type	KPI Description	KPI Status	Work Process Supported (see bottom for codes)							
			P&S	WO Mgmt	PdM	RCM	PM	I&P	EUL	R&R
		T								
	Maintenance Employees per Number of Maintenance Planners	L T	X	X		X				
	Hours of PdM per Total Maintenance Hours	L T			X	X				
	PdM Costs per Total Maintenance Costs	ST			X	X				
KPI Codes	C – Current Capability; ST – Short Term Recommendation; LT – Long Term Recommendation									
Work Process Codes	P&S - Planning and Scheduling; WO - Work Order; PM- Preventative Maintenance; PdM – Predictive Maintenance; RCM – Reliability Centered Maintenance; I&P Inventory & Procurement; EUL – Effective Useful Life; R&R – Renewal & Replacement									

4.3.1.3. Antero Evaluation

The O&M program for above ground assets (water treatment plants, pump stations and storage tanks) is managed through the Antero CMMS tool utilizing a combination of predictive, preventative and regularly scheduled work orders. In addition to the work order types discussed below, a total of 85 task types are currently configured. Appendix G contains the complete list of current Antero work order task types along with the assignments of each task to the various assets at each water treatment plant and pumping station.

Overall, these task types represent a good balance between predictive and preventative maintenance. Specific recommendations include the following:

- *Tracking of Predictive Maintenance:* Consider separate work order types for all predictive maintenance tasks (e.g. similar to the PUMPVIB task defined for pump vibration monitoring), which will allow the District to track the return on investment over time and better evaluate the benefits of expanding the PdM program, either internally or through outside contracting.
- *Tracking of Corrective Maintenance Performed as Part of a PM:* Track corrective maintenance (CM) identified and completed as a result of a scheduled PM, which is a recommended key performance indicator for overall effectiveness of a maintenance program.

The minimal Antero updates to support an effective above ground asset R&R program include the following:

Data Fields and Data Population - Minimal additional data required in Antero include the following:

- Criticality – There is the potential to utilize the existing "EqPriority" field.
- Physical Condition – create new field and import data from AwwaRF assessment tool.
- Performance Condition – create new field and populate.
- Effective Life – populate existing field "LifeExpectancy"
- Install Year – populate existing field "DateInService"
- Install Cost – populate existing field "PurchPrice"
- Replace Cost – consider utilizing the existing field "SalvageVal"

Work Order Types - The following work order types are required:

- Predictive Maintenance (PdM) – Consider utilizing the existing work order type "scheduled" and adding predictive tasks (e.g. thermography, vibration monitoring, etc.) to the "tasks" table.
- Condition Update – Asset condition and effective useful life will need to be update by periodic inspections and /or testing.

Reports (KPIs) – The following minimal additional reporting is required:

- Asset condition versus effective useful life by criticality
- Maintenance cost per asset replacement value
- Mean time between asset failures

Following is an example of the type of report, which shows "oldest-worst" assets (e.g. worst condition with highest effective useful life expended). A similar report could be generated from Antero, if the related tables were available for asset condition and the available financial and asset management attribute fields were populated.

Figure 4-3: Above Ground Asset R&R Planning

Northern Kentucky Water District

Above Ground Asset R&R Planning

Equip ID	Description	Location	Install Date	EUL	EUL%	Criticality	Physical Condition	Performance Condition	Priority
782	Flocculator 2 Basin 1	FTTP	1/8/1990	15	121%	2	5	3	16
780	Flocculator 1 Basin 1	FTTP	1/8/1990	15	121%	2	4	3	14
783	Flocculator 3 Basin 1	FTTP	1/8/1990	15	121%	2	3	2	10
790	Flocculator 2 Basin 3	FTTP	5/8/1992	15	106%	2	2	2	8
787	Flocculator 2 Basin 2	FTTP	5/8/1992	20	79%	2	3	4	14
789	Flocculator 1 Basin 3	FTTP	5/8/1992	20	79%	2	2	2	8
786	Flocculator 1 Basin 2	FTTP	5/8/1992	20	79%	2	2	2	8
795	Flocculator 3 Basin 4	FTTP	6/1/1994	20	69%	2	1	2	6
794	Flocculator 2 Basin 4	FTTP	6/1/1994	20	69%	2	1	2	6
793	Flocculator 1 Basin 4	FTTP	6/1/1994	20	69%	2	1	2	6

Other Considerations:

Other considerations and user needs regarding Antero were documented during the staff interviews and discussions. AllMAX, the vendor for the Antero software, is planning a major new release in the 2009-10 timeframe (see Section 3 for a discussion of the overall information technology evaluation). The remaining considerations from our discussions, which should be part of the evaluation on the new AllMAX product, include the following:

- Inventory management: An integrated inventory management program with the CMMS (GBA and Antero) and the financial system (Great Plains) will improve the inventory reconciliation issues currently experienced (e.g. parts used to stock trucks are not taken from inventory until used on a work order).
- File Management: The ability to manage multiple file (e.g. photos, inspection sheets, drawings, SOGs, etc.) associated with assets.

Both are important issues for consideration in the overall CMMS upgrade, but will not have a fatal impact on NKWD's ability to implement and sustain the overall asset management program.

Pump Inspection Program

The Pump Inspection Program (PIP) provides scheduled Tier 2 predictive maintenance for pumping systems including: raw water, high service and distribution pump stations. The PIP work is performed via a combination of in-house expertise and selective outsourcing.

In addition to general inspection, the predictive maintenance (PdM) activities include the following:

- Vibration Analysis
- Oil Analysis
- Laser Alignment
- Physical Assessment/Reconditioning
- Hydraulic Testing

Vibration Analysis: Vibration readings are taken on all large/critical pumping units, including all raw water pumps and booster pumps. The ORPS pumps, Taylor Mill booster and High Service, and Dudley Pumps are monitored monthly and all others are monitored quarterly. The work is done in house with hand held vibration monitors. Vibration readings are compared to baseline readings, and amperage, flow and pressure are considered. Deviations from the baseline are considered when determining whether or not a pump should be pulled for Physical Assessment/Reconditioning.

Oil Analysis: The District outsources oil analysis of all raw water and booster station motors. The oil in all large motors is changed semi-annually (unless motor has synthetic oil, which requires yearly change), while oil analysis is conducted annually. Lab personnel draw oil samples which are shipped to Harper Oil for analysis. Some samples are also sent to an independent lab for analysis. Harper Oil summarizes findings of the oil analysis in a report and provides recommendations for further inspection or lubricant change if warranted. The oil analysis has resulted in a switch from conventional oil to synthetic oil in several motors, thereby reducing overall maintenance and reconditioning costs. The oil analysis is a key indicator for whether or not a pump/motor should be pulled for Physical Assessment and Reconditioning.

Laser Alignment: Laser alignment/re-alignment is performed in-house on all critical horizontal pumps on a semi-annual basis. Pumps include Latonia and the Fort Thomas sludge pumps.

Physical Testing/Reconditioning: The District outsources physical testing/reconditioning of approximately 1 to 2 pumps per year. This work is performed as part of a 3 – year general services contract with a general Contractor. Reynolds, Inc. currently holds the contract for the next three year period. Pumps are selected by the District for physical testing/reconditioning based on maintenance history, vibration analysis, oil analysis and unit criticality. The Contractor produces a findings report with recommendations based on the physical inspection.

Hydraulic Testing: This hydraulic testing program was added to the PIP in 2007. The District outsources hydraulic testing of candidate pumps. The goal of this testing is to verify pump operating conditions and to identify pump performance issues associated with hydraulic changes. As part of the contract, system operating parameters are reviewed, including suction and discharge pressures and pump operation (flow, pressure, efficiency, etc.) to determine possible system issues impacting pump performance and ultimately pump maintenance requirements.

Instrumentation O & M Program

The current approach to instrumentation O&M also incorporates some reliability centered maintenance and effective useful life principles. For example, there are equipment replacement protocols, which are based on experience with certain types of equipment (e.g. turbidimeters, PLCs, flow meters, level transmitters, etc.). The group initiated the first "experiment" to begin sending work orders directly to hand held units (Palm Pilots) in lieu of a hard copy printout. Instrumentation also initiated the practice of technicians entering and completing their own work orders. Both initiatives should improve efficiency for the decentralized work force.

Water Treatment O & M Challenges and Opportunities

The District is doing an excellent job with the overall maintenance program implementation, tracking and reporting. Based on the staff interviews, the following key challenges exist within the overall O&M program for above ground assets, which should be addressed within the framework of the continuing asset management program development:

O & M Data Management

The Antero CMMS generally performs well for the above ground assets in terms of work order management and general reporting. Specific areas of improvement for Antero to better support an overall asset management program are presented in Section C.6.2 below. In addition, specific improvements to IT infrastructure and evaluation of new product releases are discussed in the IT Master Plan. Other key challenges for operational data management include the following:

- Integration of SCADA and CMMS*:* Staff indicated a benefit from SCADA data integration with the CMMS (e.g. equipment run-time and vibration), which would automate the use-based and condition-based portions of the overall maintenance program. Currently, there is no way to get vibration monitoring results, done via handheld units, into Antero and all data is managed in Excel. Run time data needs to be manually recorded from SCADA and then entered into Antero.

- Implementation of Operator 10 Software: The District is in discussions with AllMAX (the software vendor for the Antero CMMS) to fully implement their Operator 10 product for management and reporting of plant operations data. Currently, operator log sheets are maintained in Excel. Operator 10 will provide built in data QA/QC and the capabilities for standardized reporting of results – both internal and compliance.
- Access to SOGs: There is no electronic link to SOGs or custom field in Antero to notify someone that a SOG exists for a particular PM. It is up to the maintenance person to know and look it up.

Predicting of Equipment Failures

The example presented involved a recent, unanticipated failure of traveling screens. The overall concern is the potential inability to get funding for unanticipated failures into the annual budgeting process. In the case of the traveling screens, the timing of the failure relative to the budget cycle was fortunate and replacement funding was secured for 2008, but this will not always be the case. The recommendation to adopt an effective useful life (EUL) approach will result in a more consistent and confident evaluation of when to schedule and budget for asset renewal and replacement prior to equipment failure.

4.3.2. Below Ground Assets

4.3.2.1. Water Distribution System Reliability Evaluation

This section of the report provides an analysis of NKWDs water distribution system assets with a focus on overall system reliability. The information we examined confirmed many of the overall issues and trends that were identified in the 2004 Asset Management Program. Since 2004 The District has successfully implemented a focused effort to improve the quality and availability of asset attribute information in the GIS. The District should be commended for these successful efforts, which have allowed us to analyze rehabilitation and renewal needs in more detail. In addition, these improvements will provide ongoing benefit to the District in support of asset management programs, policies, and practices. Highlights of improvements since the 2004 AMP include:

- Dramatic improvement in installation date data for water mains, which are now available for 95% of the system when previously only 30% were available.
- Ability to analyze additional pipe classes, notably the ability to distinguish between ductile and cast iron including wrapped and unwrapped ductile iron, and lined and unlined cast iron. This is significant as these pipe classes represent the majority of the distribution system. In addition, the various subclasses exhibit different

performance characteristics, which are critical to developing an optimized R&R program.

- Inclusion of Taylor Mill and other recently acquired water distribution system assets.

The remainder of this section provides additional analysis to support specific recommendations for water main rehabilitation and replacement needs and address issues related to system reliability and quality.

4.3.2.2. System Inventory

For the preparation of this report, the following information was collected and reviewed:

- Distribution System GIS Data
- GBA Data for Distribution Main Breaks
- May 2004 Asset Management Program

NKWD maintains information regarding water mains and related appurtenances in a GIS database. The GIS includes information on diameters and lengths of all mains in the system. Currently the District has a total of 1,218 miles of transmission, distribution, and service pipes sized from 1 to 42 inches in diameter. The age of the District's piping ranges from 1875 to pipe that was recently installed. The 2008 replacement cost for the entire distribution system is estimated to be approximately $772 million.

The District's water mains are constructed of a variety of pipe materials, including: transite (asbestos cement), polyvinyl chloride (PVC) pipe, cast iron pipe (CIP), copper, ductile iron pipe (DIP), polyethylene, steel, and concrete. Within these material types pipe is categorized in the GIS and GBA databases as: lined with cement mortar or epoxy, unlined, or unknown if lined. Based on recommendations from the 2004 Asset Management Plan (AMP), the District has improved attribute data including separate classifications for DIP and CIP as well as indicating whether pipe is lined and/or coated.

NKWD has also made a concerted effort to update installation dates for their mains, which are now available for 95-percent of the distribution system. This is a significant improvement from the 2004 AMP, when installation dates were available for only 30-percent of the distribution system.

One class of piping that does not currently have accurate installation dates is piping installed prior to 1900, for which the GIS database identifies with null installation date entries. The GBA break data does, however, correctly list the installation dates from the 1800's. NKWD should work to rectify this discrepancy between GIS and GBA to

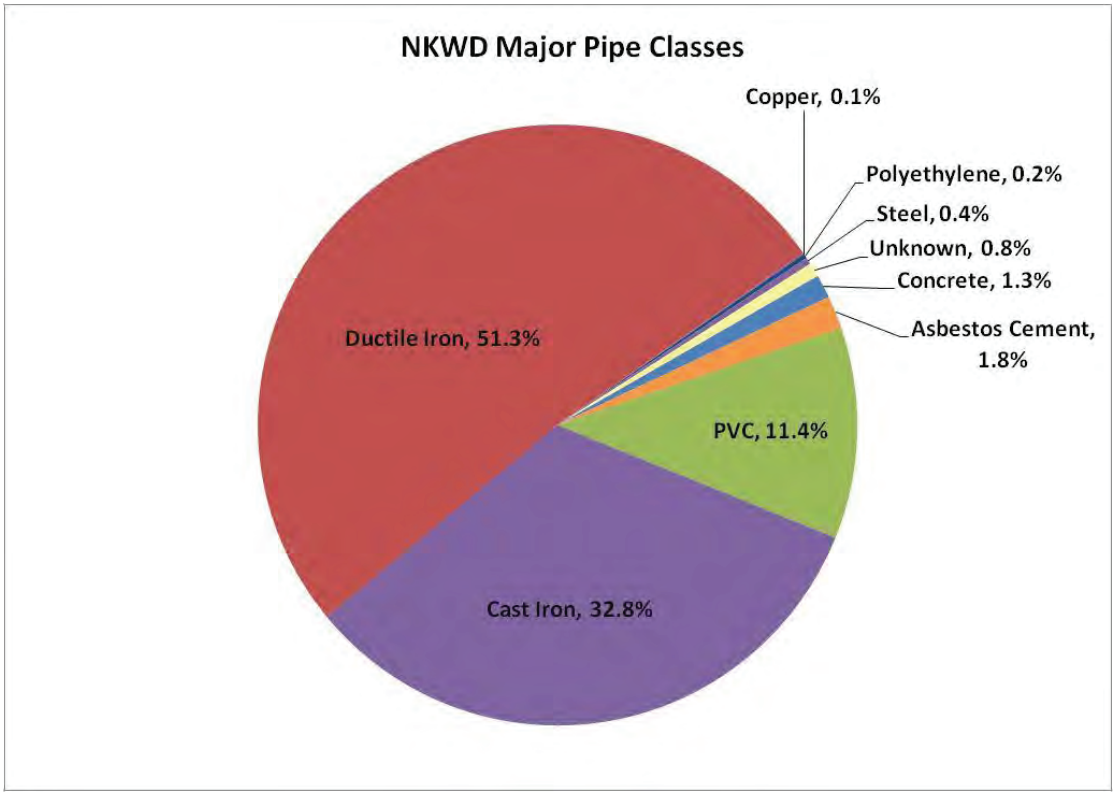
improve the accuracy of the installation dates as pipe age is a significant consideration in R&R planning.

In addition, some materials are still identified as unknown in GIS and GBA. NKWD should continue to work to identify these pipes for more accurate breakage information. It should be noted that asbestos cement and transite are currently tracked separately in NKWD's GBA system. There are also entries for ductile iron pipe, unwrapped ductile iron pipe, and wrapped ductile iron pipe. NKWD should modify their databases so these materials are listed consistently in the future (e.g., ductile iron pipe should be either wrapped or unwrapped).

NKWD should also work to improve the consistency of the pipe material lining entries. The lining field contains entries such as unlined, null (assumed for this report as unknown if lined), mortar, and epoxy. Appendix H, Table 1 lists all of the pipe materials currently in the CIP. If categorized correctly all of the 'unknown if lined' pipe would fold into the category of lined or unlined. As can be seen in Table 1 in the appendix, there are numerous categories of pipe listed due to the lack of information on linings and coatings.

The major pipe classes in the NKWD can be grouped as copper, polyethylene, steel, unknown, concrete, asbestos cement/ transite, PVC, CIP, and DIP. The relative percentages of pipe classes in the distribution system are similar to the numbers reported in the 2004 Asset Management Plan. Over 50-percent of the pipe in the NKWD distribution system is fabricated of ductile iron. Cast iron comprises one third of all distribution system pipe and PVC pipe contributes to 11-percent. The remaining materials: asbestos cement/ transite, concrete, copper, polyethylene, steel, and unknown, comprise less than 5-percent of the distribution system. Figure 4-4 presents the pipe classes and their relative percentages within the NKWD distribution system. As noted earlier, the ability to identify ductile iron from cast iron represents a significant improvement from 2004. To profile the size of distribution mains, 6 and 8-inch diameter mains constitute 65 percent system. 24-percent of the mains are 12-inch diameter or greater, while 10-percent of the mains are 4-inch diameter or less. Larger diameter piping, between 24 and 42 inches in diameter, comprises only 4-percent of the distribution system length.

Figure 4-4: Above Ground Asset R&R Planning



Water Main Breaks & Leaks

Water main break and leak data is tracked in NKWD's GBA system. Within GBA the break identification number, repair type, pipe diameter, pipe material, pipe lining, break indication, soil type, break type, pipe depth, break community/user description, break pipe identification, break number, cause of break, work order comments, and report date are tracked for each break in the system. Within these data there are inconsistencies observed in how the fields are populated. For example, the break description, material type, and lining are not consistently recorded. Also, many break pipe identifications and break pipe numbers have null or negative numbers.

Table 4-20 presents all water main breaks and leaks for the District from 1997 through 2007. For this analysis all breaks caused by a third party have been removed. The average number of breaks and leaks per year was 418 from 1997 to 2007, resulting in an overall break and leak rate of 34.4 per 100 miles per year over the past 10 years. As compared to the average annual breaks of 349 and a break rate of 34.9 breaks per year per 100 miles reported in the 2004 AMP, the break and leak rate has risen to 41.2 per 100 miles per year over the past 5 years. Table 4-21 shows the number of breaks only.

Table 4-24
NKWD Number of Water Main Leaks and Breaks

Table 2: NKWD Number of Water Main Leaks & Breaks													
	1	2	3	4	5	6	7	8	9	10	11	12	
Year	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
2007	64	122	21	11	23	39	38	76	87	78	75	45	679
2006	27	38	19	23	40	31	49	42	32	44	44	41	430
2005	54	23	37	27	27	28	62	60	29	46	51	78	522
2004	62	37	20	20	23	28	32	49	38	34	32	60	435
2003	93	40	27	21	21	24	50	32	27	29	32	47	443
2002*	49	19	19	15	24	26	40	64	63	45	42	69	475
2001*	47	14	23	23	24	31	21	23	24	33	21	26	310
2000*	58	36	8	17	17	14	29	28	16	21	29	50	323
1999*	36	10	16	10	21	20	35	48	70	59	32	82	439
1998*	15	15	11	16	16	12	16	21	28	24	22	17	213
1997*	33	14	14	21	22	22	30	32	45	44	31	26	334
Average	49	33	20	19	23	25	37	43	42	42	37	49	418

*Data from 1997 - 2002 taken from 2004 Asset Management Plan

Table 4-25.
NKWD Number of Breaks Only

Year	Breaks & Leaks from AM Reports (* Data from 2004 Report)	Breaks Only from NKWD Internal Reports
2007	679	589
2006	430	305
2005	522	399
2004	435	356
2003	443	376
2002*	475*	403
2001*	310*	298
2000*	323*	312

Figure 4-5 presents the average monthly main leaks and breakages over the past 10 years, presented in 5 year increments. This shows significant overall increases in the average number of monthly occurrences between the two five year periods, particularly in the months of January, February, June, July, August, and November. The summertime occurrences are typically linked to changes in the soil due to higher temperatures and excess runoff. The wintertime breaks and leaks are typically attributed to cold temperatures and freeze thaw cycles. Although some increase in breakages in normal, these additional monthly leaks and breaks range from 15 to 34 breaks higher per month than the values reported in the 2004 AMP.

Figure 4-5: Average Monthly Water Main Breaks and Leaks

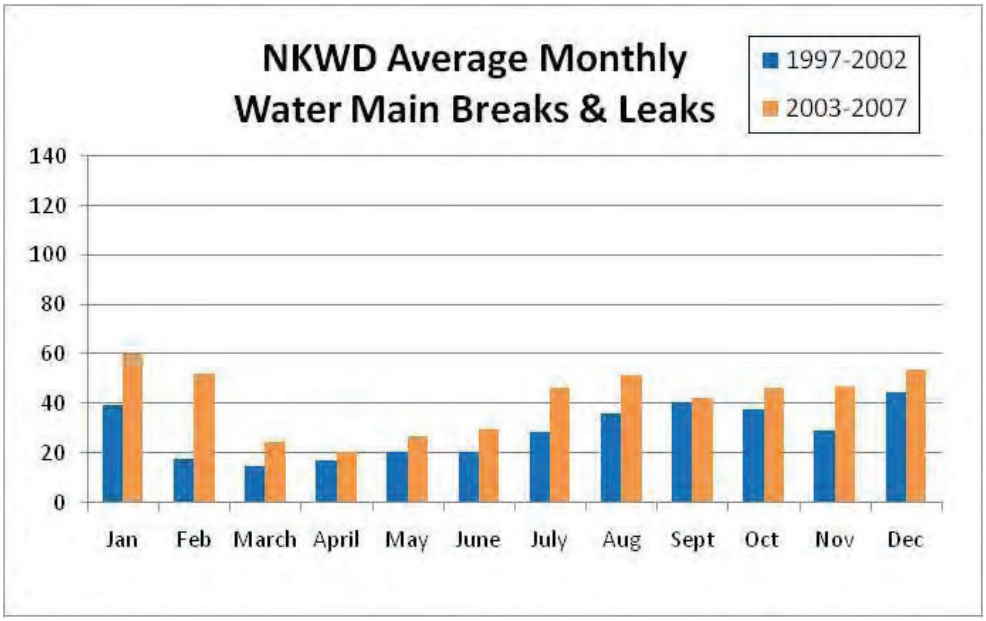
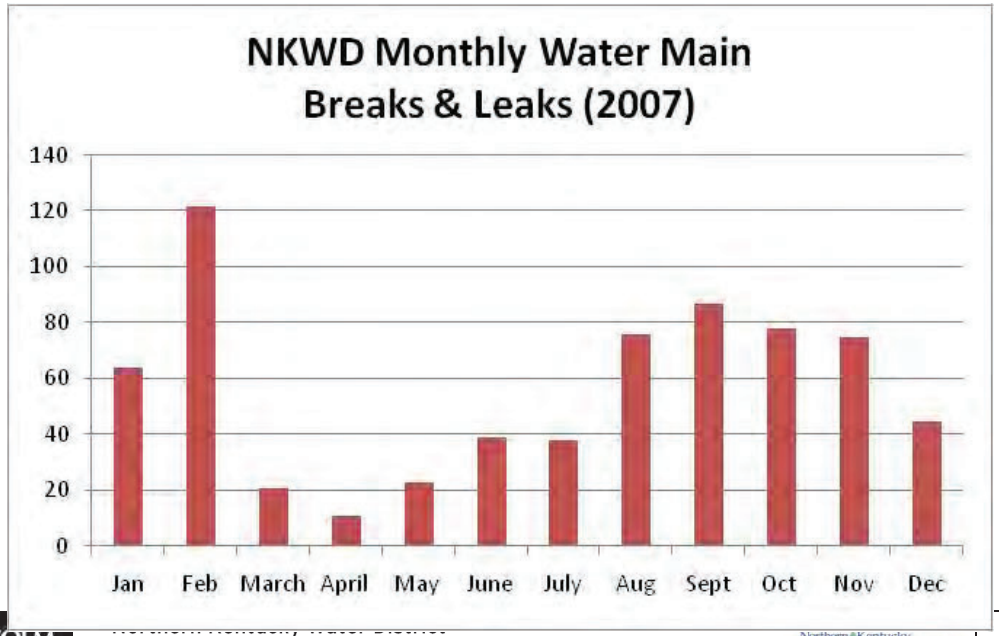


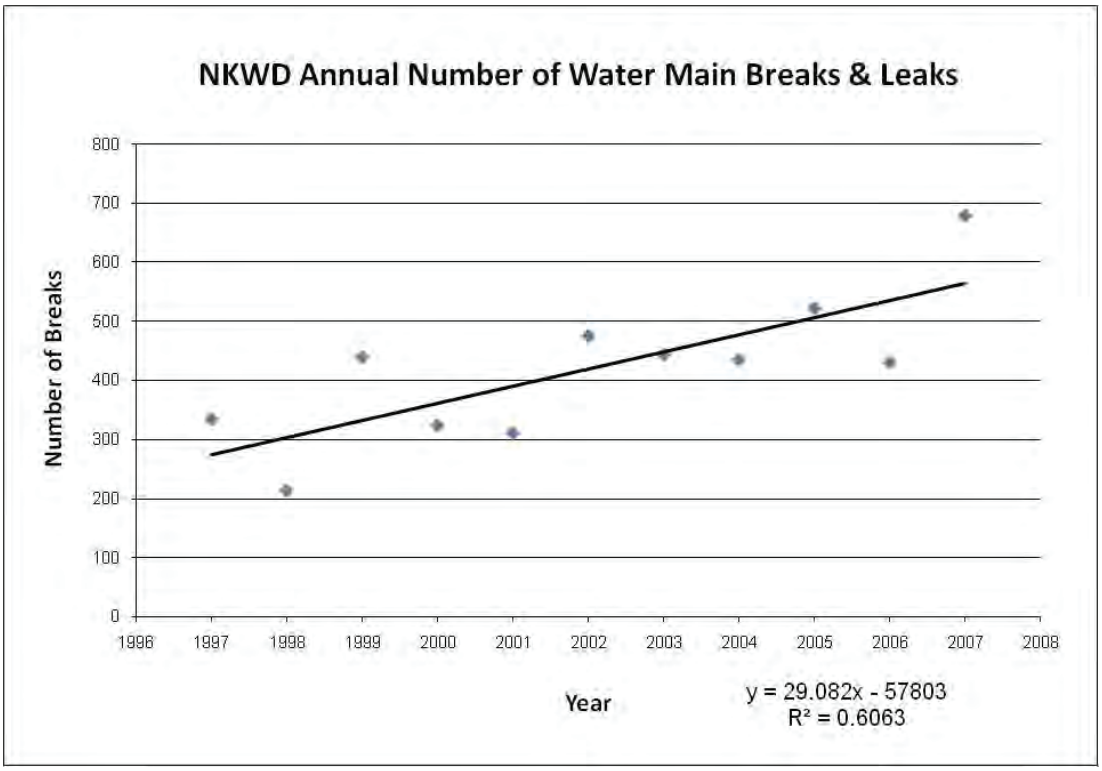
Figure 4-6 presents the average monthly main leaks and breakages experienced in the year 2007. These data show significant increases in breakage rates, with the highest leak and breakage rate of 122 experienced in February. The months of August through November experienced higher than normal breakage rates, while the remaining months are consistent with the previous figures. The breakages experienced in 2007 posed a significant burden to NKWD staff for main repair and replacement.

Figure 4-6: Average Monthly Water Main Breaks and Leaks (2007)



As demonstrated by Figure 4-7 on average, the number of water main breaks and leaks per year is increasing. Figure 4-7 summarizes the observed trend. While there is some data variability, the annual number of breaks and leaks appears to be increasing at a rate of 29 breaks per year. The current breaks and leaks rate demonstrates an increase from the rate of 25 breaks per year, reported in the 2004 AMP. At this rate the average number of breaks and leaks per year will double from the current value of 418 to 836 breaks and leaks in the year 2016. The 2004 AMP predicted the break and leak rate would double to approximately 700 breaks and leaks per year by 2018.

Figure 4-7: Annual Number of Water Main Breaks and Leaks

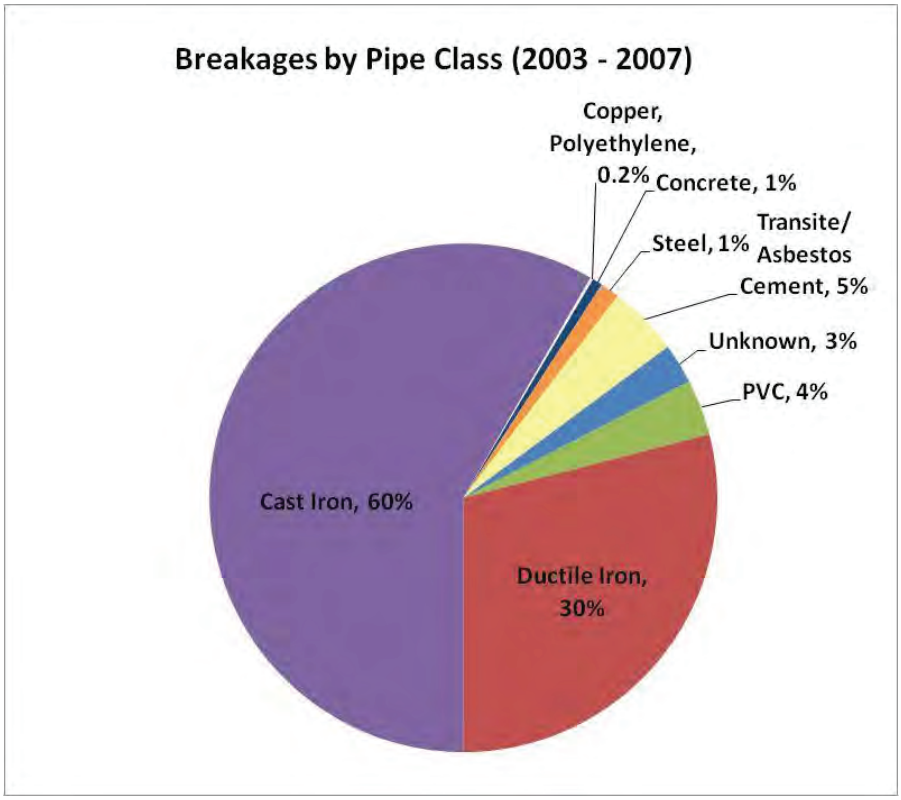


Should this trend continue, the District will need to consider a more aggressive strategy.

Water main breaks are categorized in NKWD's GBA system as circumferential, longitudinal, circumferential and longitudinal, blowout, joint, split at corporation, sleeve, other, and unknown. Over the past 5 years, the major breakage types have been circumferential (28-percent), longitudinal (25-percent), and blowout (25-percent). These percentages are similar to what was observed in the 2004 AMP.

Figure 4-8 demonstrates breakages by pipe class. Almost 60-percent of pipe breaks over the past 5 years have occurred within the cast iron pipe category, and 90-percent of all pipe breaks over the past 5 years have been experienced in either ductile or cast iron pipe. Within cast iron, lined pipe experiences fewer breakages than unlined and unknown if lined mains. 82-percent of all cast iron breaks are categorized as circumferential, blowout, or longitudinal. Ductile iron main breaks contribute to 30-percent of all main breaks within the past 5 years, which is an increase from the 4-percent reported in the 2004 AMP. This drastic increase is likely due to the assumptions made in the 2004 AMP regarding the amount of ductile iron pipe in the system. The largest contributor to these breaks is unwrapped ductile iron with cement mortar lining, which comprises over 70-percent of ductile iron pipe breaks. 82-percent of the ductile iron breaks fall under the categories of circumferential, blowout, or longitudinal pipe breaks.

Figure 4-8: Distribution Pipe Breaks by Pipe Class



Pipe break data for PVC and polyethylene pipe classifications, showed that that these comprise only 4-percent of all system breakages, down from the 8-percent reported in the 2004 AMP. PVC pipe breaks are more substantial as compared to polyethylene, with 97-percent of all breaks in this table found in PVC pipe. The majority of PVC breakages are experienced in pipe identified as PVC, not C900 PVC. 75-percent of PVC break types

may be classified as longitudinal, blowout, and joint. Polyethylene pipe breakages have been infrequent over the past 5 years and were not reported in the 2004 AMP.

Pipe breakage data for unknown pipe material, asbestos cement/ transite, concrete, copper, and steel represents only 6-percent of pipe breakages overall. The most substantial breakages are witnessed in the unknown pipe material classification. NKWD should attempt to identify these unknown materials for future analysis. Transite/asbestos cement is the next largest contributor to breakages within this category, comprising 30-percent. The most common break classifications for transite/ asbestos cement are circumferential, split at corporation, joint, and blowout. Steel pipe contributes to 19-percent of the breakages, with pipe blowout listed as the most common breakage type. The remaining pipe materials comprise 11-percent of all breakages in this table, and only 0.7-percent of all system breakages. Tables 2A, 2B, and 2C detailing the pipe break analysis described above are provided in Appendix H. Figures 1, 2, and 3 in Appendix H, show pipe materials by location.

To allow comparison of pipe material breakages, the break data discussed previously were normalized by the number of miles of main in the system for each material type.

The total normalized break rate for both cast iron and ductile iron pipe is 44.8 breaks per 100 miles per year, which has increased from the 34.6 breaks per 100 miles per year value reported in the 2004 AMP. The normalized break rate for all cast iron pipe is 76.6 breaks per 100 miles per year. The most significant breakages of cast iron are experienced in pipe with cement mortar lining.

The average normalized break rate for c iron pipe is 24.4 breaks per 100 miles per year. The highest break rates are experienced with cast iron unwrapped pipe. This trend occurs for the majority of materials presented in this table. Outside of these anomalies, the highest break rates per 100 miles belong to cast iron pipe with unknown lining, unlined cast iron pipe, and unwrapped ductile iron with cement mortar lining.

The normalized break rate for all PVC pipe is 13.4 breaks per 100 miles per year, which is lower than the 21.5 breaks per 100 miles per year reported in the 2004 AMP. Polyethylene pipe experiences roughly 20 breaks per 100 miles per year.

We also analyzed pipe breakage data for unknown pipe material, asbestos cement/ transite, concrete, copper, and steel. The highest normalized breakage rate by pipe classification is found in the unknown pipe material, with 145.6 breaks per 100 miles per year. This material is closely followed by steel, with 143 breaks per 100 miles per year. The normalized break rate for steel has dropped from 250 breaks per 100 miles per year in the 2004 AMP. This change is likely due to the District's decision to replace much of the steel piping in the distribution system, as noted in the 2004 AMP. Asbestos

cement/transite has an increased normalized break rate from 36.7 breaks per 100 miles per year to 47.3. Concrete pipe has also increased from 6.8 breaks per 100 miles per year to 22. Copper has a breakage rate of 49.1 breaks per 100 miles per year and was not tracked in the 2004 AMP. Tables 3A, 3B, 3C detailing the normalized analysis described above are provided in Appendix H.

Corrosion Control

Typical causes for main breaks and leaks are electrolysis, corrosion, poor bedding materials, third party damage, and various load and stress conditions. The 2004 AMP recommended that NKWD develop a better understanding of the causes for main breakages. As a result, NKWD began tracking the break indication type in the GBA system and typically categorizes the breaks as corrosion, electrolysis, or corrosion and electrolysis. There are many breaks for which the cause of the breakage is not documented. NKWD should continue to improve their main break work order tracking system to include specific information on the breakage type.

As mentioned above, corrosion is a major contributor to water main breakages. As part of this evaluation, Malcolm Pirnie has developed a GIS map to demonstrate corrosion problem areas in the system. The NKWD Corrosion Indicated Maps are included in Appendix H as Figures 4, 5 and 6 and presents areas with corrosion indicated, electrolysis and corrosion indicated, electrolysis indicated, and pipes with excellent, good, and fair condition.

The 2004 AMP recommended that NKWD develop a program to collect and analyze pipe and soil samples at main break locations to the extent possible. Using ring, coupon, and soil samples the District can further identify the cause of a break and can use this information to improve preventative maintenance procedures. Additional efforts, such as soil corrosivity mapping would also be beneficial to NKWD to aid in targeted preventative maintenance efforts. The 2004 AMP suggests that samples taken from the field testing program could be used to help develop corrosion mapping for the NKWD system. Malcolm Pirnie believes it would be beneficial for NKWD to initiate a field testing program and corrosion mapping to provide diagnostic evidence on the cause of breakages and to aid in preventative maintenance efforts.

Another strategy NKWD may use to mitigate corrosion related breakages is the use of cathodic protection systems. Cathodic protection ranges from the use of sacrificial, galvanic anodes to the application of impressed current systems. Galvanic anodes may be installed to reduce corrosion potential in areas with highly corrosive soils. The operation of sacrificial anodes is typically effective only in low resistivity, high conductivity soils. Sacrificial anodes have low installation and minimal maintenance

costs; however they may require replacement after several years of service. Impressed current systems are more robust and are typically used for the protection of long reaches of pipeline or large structures. These systems are more suitable for high resistivity soils and have higher installation and maintenance costs. Prior to the installation of corrosion protection devices NKWD should consult with a corrosion protection specialist for specific guidance on the effectiveness of retrofitting existing pipe with cathodic protection. Field testing to determine soil types and the appropriate siting of cathodic protection devices will also be required.

Distribution System Reliability

The 2004 Asset Management Plan recommended a break rate of 25 to 30 breaks per 100 miles per year as a comparative target. In 2006 AWWA completed a national benchmarking survey of utilities, which indicated that the median national break and leak rate was 32.9 breaks per 100 miles per year. The District's rate from 1997 to 2007, 34.4 breaks per 100 miles per year, is currently in excess of these benchmarks. The 2004 AMP system wide break rate was reported as 34.9 breaks per 100 miles per year. Over the past 5 years, the break rate was 41.2 breaks per 100 miles, which indicates the increasing trend of distribution main breakages. Based on this information, the District would need to reduce breaks by roughly 27-percent to bring this rate to the 30 breaks per 100 miles per year as recommended in the 2004 AMP.

Table 4-26.
Distribution System Reliability by Pipe Class

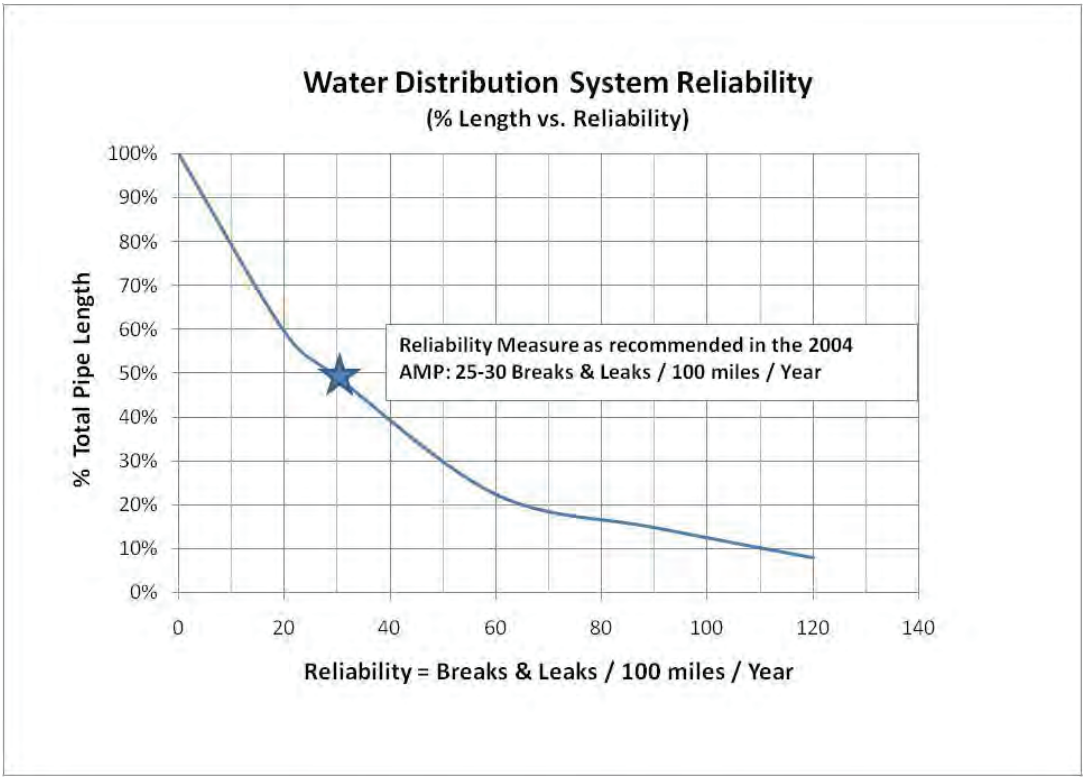
Pipe Class	Avg. Annual Breaks 2003-07	Miles of Main	Breaks & Leaks / 100 Miles / Year
Unknown	13.4	9.2	145.6
Steel	6.4	4.5	143.0
Cast Iron	306.4	400.1	76.6
Copper	0.4	0.8	49.1
Asbestos Cement	10.2	21.6	47.3
Ductile Iron - unwrapped	140.4	441.3	31.8
Concrete	3.4	15.5	22.0
Polyethylene	0.6	3.0	19.9
PVC	18.6	138.5	13.4
Ductile Iron - wrapped	11.8	183.7	6.4
Total System	**512.0**	**1218.2**	**42.0**

Table 4-22 (summarized above from Table 4 in Appendix H) demonstrates the overall reliability of the distribution system piping by pipe material classes. Overall, the unknown pipe material category demonstrates the lowest reliability with 145.6 breaks per 100 miles per year. Although a small part of the total system, NKWD should attempt to

categorize these pipes to better determine breakage trends in the future. Steel pipe experiences the second worst reliability for the 4.5 miles of line in the system. Cast iron is the next most problematic pipe material for the NKWD system with a break rate of 76.6 breaks per 100 miles per year. Break rates gradually decrease with copper, asbestos cement/ transite, ductile iron, concrete, polyethylene, and PVC. Since cast iron and ductile iron pipe comprise over 80-percent of all system piping, these materials should be targeted for R&R improvements. Table 4 provided in Appendix H presents the reliability by installation decade of DIP and CIP to determine where problem areas exist. The largest break and leak rates are observed with cast iron pipe installed in the 1970's. Higher breakage rates are demonstrated in unwrapped ductile iron from the 1980's as compared to other installation dates of ductile iron.

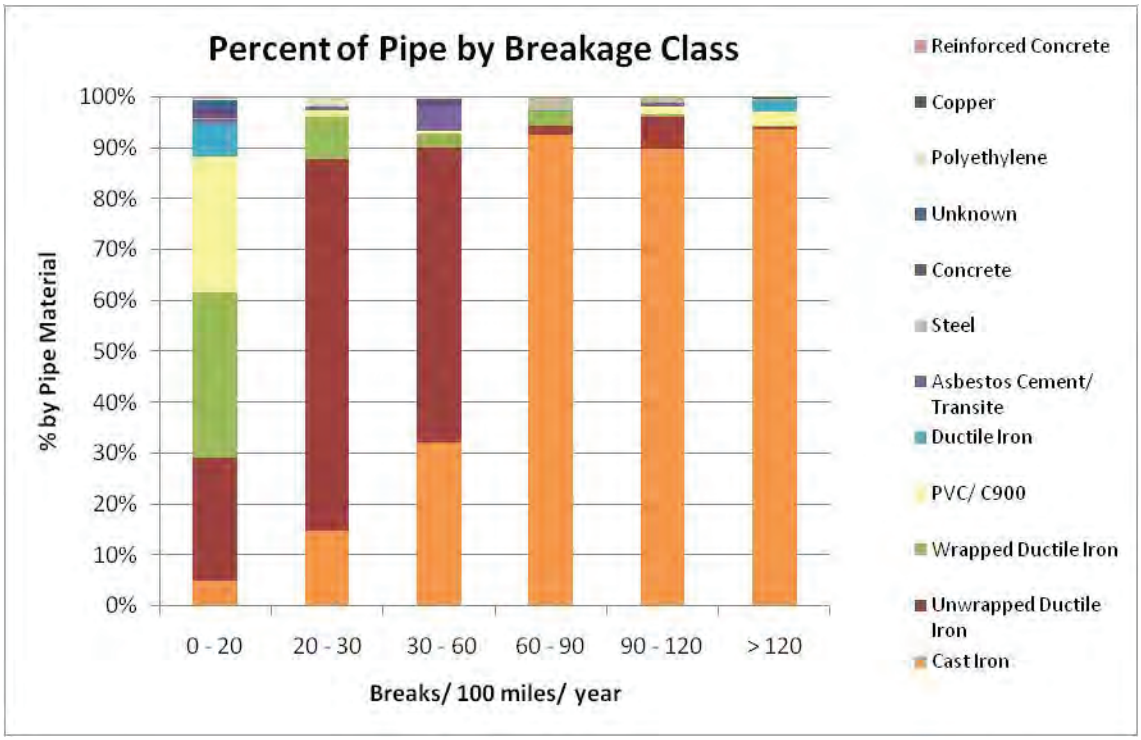
Figure 4-9, the Water Distribution System Reliability graph, offers more insight into the system break and leak data. The graph presents discernable differences in slope associated with the normalized break rate and percent of total pipe length. A consistent slope is observed from 0 to 20 breaks per 100 miles per year, then from 20 to 30, 30 to 60, 60 to 90, and 90 to 120. The flatter section of this curve, from 25 to 60 breaks per 100 miles per year represents a significant challenge for NKWD and an opportunity for targeted improvements.

Figure 4-9: Water System Distribution Reliability



To further assess pipe material reliability, the data were broken into six different breakage rate groupings as defined by the curve above. Figure 4-10 presents the percent of breakages by pipe class for each break rate grouping.

Figure 4-10: Pipe Breakage Percent by Pipe Class



0 to 20 breaks per 100 miles per year

Most breaks and leaks are found in wrapped ductile iron closely followed by PVC and unwrapped ductile iron. These breaks are infrequent, and less than the 2004 AMP recommendation of 30 breaks per 100 miles per year. This breakage category includes 40-percent of the distribution system pipe.

20 to 30 breaks per 100 miles per year

73-percent of breakages are found in unwrapped ductile iron pipe, followed by cast iron pipe with roughly 15-percent of breakages in this category. Wrapped ductile iron, PVC, and polyethylene are smaller contributors to this breakage grouping. This category represents 10-percent of the distribution system length. Similar to the previous category, these breakages are less than the recommended rate of 30 breaks per 100 miles per year.

30 to 60 breaks per 100 miles per year

58-percent of leaks and breaks are found in unwrapped ductile iron, followed by cast iron at 32-percent. This represents 27-percent of the distribution system length. This category is an area for targeted improvements within the NKWD system, as the breakage rate exceeds the recommended value of 30 breaks per 100 miles per year. Preventative maintenance efforts should be dedicated to anticipating these breakages, in particular for

unwrapped ductile iron and cast iron pipe within the system of the problematic ages. Asbestos cement/ transite and concrete are also bad actors within this grouping.

60 to 90 breaks per 100 miles per year
93-percent of breaks and leaks are found in cast iron pipe in this category. Although this break rate represents a smaller portion of the system, these breakages are significant and are cause for targeted preventative maintenance for cast iron, steel, and wrapped ductile iron pipe. This category includes 8-percent of the distribution system pipe.

90 to 120 breaks per 100 miles per year and Greater than 120 breaks per 100 miles per year
For these categories 90 to 94-percent of breaks are found in cast iron pipe. Unwrapped ductile iron, ductile iron, steel, and asbestos cement/ transite are smaller contributors to breakages within this category. This grouping represents a small proportion of the distribution system, roughly 15-percent. However, this category also represents the most critical piping for R&R improvements.

4.3.2.3. Water Main Replacement Program

Current Water Main Replacement Program

The District currently utilizes a weighted-criteria approach to prioritize water main projects, which was developed in conjunction with the 2004 AMP (Main Replacement / Rehabilitation Program Development; May 25, 2005). The current program utilizes the following criteria:

- Physical Parameters:
  - Size
  - Age
  - Material
  - Soil Corrosivity
- Functional Parameters
  - Discolored Water
  - Water Main Breaks
  - Blowoffs
  - Joint Leaks
- Impact Parameters
  - Street Work
  - Available Flow

- Critical Areas
- Road Class

Each category is assigned a weight and the various criteria within the categories are also assigned a weight. The scoring process is such that the maximum possible score calculates to 100. Efforts are ongoing to automate the scoring process via database procedures.

Recommended Modifications to Current Program

The conversion to a geodatabase GIS environment will greatly improve the District's ability to apply decision criteria to the water distribution system. Similar to the above ground asset R&R program, a risk-based approach, which incorporates criticality and condition, is recommended for the water distribution system.

Water main criticality, defined as the consequence of failure, is recommended to include the following considerations:

- Customer Impacts: A measure of the number of customers impacted by a water main break.
- Social & Indirect Economic Impacts: A measure of disruption to large customers, business districts, hospitals and other important water customers.
- Direct Financial Impacts: A measure of the difficulty and associated cost of repair resulting from water main size and/or location (e.g. commercial area versus rural area).

A simple 1 (no impact), 2 (moderate impact) and 3 (high impact) weighted criteria scoring system is recommended as the first application. The total water main criticality score (maximum of 3) would be calculated as follows:

$$\textit{Water Main Criticality} = (Cr1 \times W1) + (Cr2 \times W2) + (Cr3 \times W3)$$

Later, the scoring can be expanded to a broader range if necessary to achieve more differentiation in water main classification. The GIS in combination with the updated hydraulic model could be utilized to assign criticality to the complete water distribution system.

Water main condition is recommended to include the following considerations:

- Hydraulic Condition: A measure of the ability to meet current and potential future capacity needs.

- Performance Condition: A measure of the ability to meet targeted level of service goals for quality (e.g. customer complaints for discolored water).
- Physical Condition: A measure of actual reliability (e.g. breaks and leaks per 100 mi per year). Pipe class reliability and soil characteristics should also be included in the scoring system to account for age, material and the potential for corrosion.

A scoring system from 1 (very good) to 5 (very poor) is recommended to match with the system utilized for the above ground assets. The various categories could be weighted if desired to give more emphasis to physical condition issues (this is the approach utilized in the current program). The total water main condition score (maximum of 15) would then be calculated as follows:

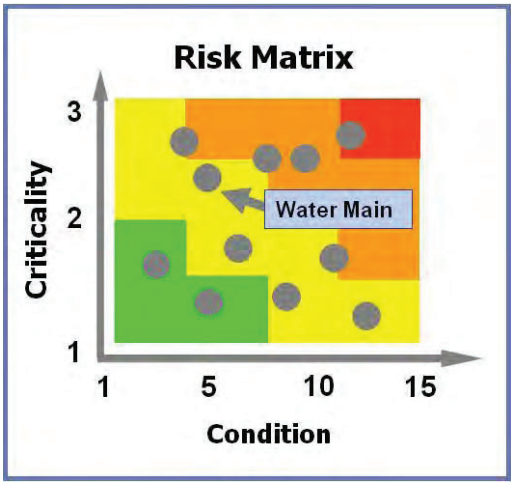
$$Water\ Main\ Condition = (Cn1 \times W1) + (Cn2 \times W2) + (Cn3 \times W3)$$

The water main risk can then be calculated as follows:

$$Risk = Condition \times Criticality$$

The results of the risk based approach can also be represented graphically as indicated in the adjacent figure.

The GIS in combination with the break data from GBA Master Series and the results of the hydraulic model could be utilized to rate the complete distribution system.



The risk based approach builds on the weighted-criteria approach currently in place with the ability to separately identify and rank condition (probability) factors and criticality

(consequence) factors, which is aligned with an overall asset management approach as utilized for the above ground assets.

The adoption of system-wide service levels are recommended to track the effectiveness of the overall water main replacement program, including the following categories:

- Distribution System Water Loss: % non-revenue water
- Water Distribution System Integrity: breaks & leaks / 100 mi / year
- System Renewal & Replacement Rate: % per year

These measures all have AWWA benchmark data reported nationally, regionally and by number of customers served. In addition to utilizing the AWWA benchmark numbers as a guide, the District should first establish internal improvement goals aligned with the age and physical characteristics of its distribution system as part of the next AMP update. For example, the target reliability (e.g. break rate) selected by the District should consider the AWWA benchmark numbers as a guide, but must also consider the unique characteristics of the system such as the significant quantity of older pipes and contributed assets. The suggested target of 30 breaks / 100 mi / year from the 2004 AMP could be too aggressive given current budget constraints and need for other significant expenditures at the water treatment plants (e.g. GAC and UV projects).

Table 4-23 presents information to aid in targeted improvements within the distribution system. The length of main that should be replaced and installation cost to reduce the breakage rate are presented. The analysis shows that if all pipe with greater than 120 breaks per 100 miles per year were replaced (95.4 miles total); the system reliability would increase to 31.9 breaks per 100 miles per year. Similarly, replacing all the pipe with greater than 90 breaks per 100 miles per year (180.64 miles) would improve overall system reliability to 25.8 breaks per 100 miles per year.

Table 4-27.
Distribution System Replacement Costs vs. Reliability Targets
Distribution System Replacement Costs vs. Reliability Targets

Assumed cost per foot installed price for pipe replacement	$	120.00
Replaced Length: >120 breaks/100 miles/yr (miles)		95.4
Break Rate (breaks/100 miles/yr)		31.9
Total Cost:	$	60,431,280
Replaced Length: >120 - 90 breaks/100 miles/yr (miles)		180.64
Break Rate (breaks/100 miles/yr)		25.8
Total Cost:	$	114,455,040
Replaced Length: >120 - 60 breaks/100 miles/yr (miles)		272.65
Break Rate (breaks/100 miles/yr)		21.1
Total Cost:	$	172,750,080

To achieve overall system reliability of 30 breaks per 100 miles per year, as recommended in the 2004 AMP, the District would need to replace 121.2 miles of main with an approximate cost of $76.8 million.

Summary Recommendations

Based on the analysis and discussions presented above, Malcolm Pirnie has identified several key insights and recommendations:

- To achieve performance in line with the 2004 AMP target reliability, the District would need to reduce main breaks by roughly 27-percent to bring system break rate to 30 breaks per 100 miles per year. However, the system wide reliability target of 30 could be too aggressive. The national AWWA benchmark of 32.9 or higher should be considered for the minimum approach, based on available budget.
- The R&R program should focus on the most unreliable cast iron pipe, while also performing strategic replacement of ductile iron and steel pipe.
- Implement a strategic cathodic protection program to extend useful life of distribution system as directed by corrosion engineering professionals.
- To support ongoing planning and the next AMP update, continue to identify unknown pipe materials and linings in system. Improve consistency of data entries for materials (e.g., asbestos cement and transite should be listed as the same material type; ductile iron should be identified as wrapped or unwrapped; lining types should be identified for null entries).
- Update GIS with correct installation dates for pipes with null entries (in particular for pipes installed prior to 1900).

- Correct inconsistencies in gba Master Series (pipe identification and numbering, ensure for future work orders all fields are populated). This will be accomplished via the GIS/gba Master Series integration discussed in the IT Master Plan.

4.3.2.4. Water Distribution O&M Programs

Current District programs considered in this AMP Update include the following:

- Flushing Program
- Valve Exercising (limited to large diameter valves)
- Leak Detection
- Main Break/Leak Repair

Flushing Program

Flushing occurs from March to November with all lines 8-inch and smaller generally flushed twice annually. Overall, the flushing program, combined with the main lining and replacement programs, have reduced unexplained dirty water calls from an average of 600/year to around 100/year. The main driver for the flushing program has now become the potential for low chlorine residual and maintenance of reduced dirty water calls. It is also a recommended practice by Kentucky Division of Water.

Challenges with the flushing program include the following:

- Flushing must be coordinated with 30 different fire departments with the final schedule for the year published in February.
- The Distribution system has many "trouble spots" for low chlorine caused by "dead ends", which need to be flushed more than twice a year:
  - Approximately 370 dead ends (long rural lines) exist in the system. Some are flushed 3-4 times a year due to low chlorine readings.
  - There are approximately 12, which are flushed every 2 weeks.
  - Two sites use Hydroguard (automated) flushing, which was recommended as an alternative for consideration in the 2004 AMP.

The District does not perform unidirectional flushing (UDF). The higher velocities achieved with UDF, and potential combination with other techniques such as air scouring, will provide a more thorough cleaning when compared to traditional flushing. However, UDF is a much more labor intensive process and given the magnitude of "dead ends", the benefits would probably not provide the return on the additional investment. The exception could be in the river cities, which do not have the long dead end pipe runs.

Based on the significant improvement currently seen in the reduced number of dirty water calls, the recommendation is to further defer the UDF program.

In addition to the routine flushing program, the District has a total of 12 continuously running blow-offs and 2 automated flushing devices (which run on timers) in the system. The water usage is estimated based on pressure and duration and tracked via an Excel spreadsheet. Total estimated loss from the blow-offs was estimated at between 1% and 2% in 2004. The drop off in dirty water calls supports the benefit of the permanent blow-offs. However, one significant drawback to the permanent blow-offs is the cost of the water disposal. The 2004 AMP reported an annual cost of $181,966 paid to Sanitation District No.1 for disposal of the blow-off water to the sewer system. The current cost is between $30,000 and $40,000, which has been achieved through more efficient management and elimination of blow-offs through system improvements. It does not appear that the District can totally avoid the cost of blow-off water disposal, while still meeting its objective to maintain dirty water call incidents at an acceptable level. The 2004 AMP recommended consideration of automated blow-off systems, which operate on a defined cycle rather than continuously discharging water. The recommendation for this AMP update is to coordinate the decision for automated blow-offs with the overall water main R&R program. Areas of the system, which require blow-offs, but are not targeted for short term water main R&R, could be candidates for conversion to an automated style blow-off.

Leak Detection Program

The District previously acquired the specialized equipment and training necessary for effective leak detection, which is currently performed on an ad-hoc basis as necessary to meet specific needs. Initiating a leak detection program was a recommendation from the 2004 AMP. In 2007, lost water was estimated to be 11.3% (AWWA national median quartile benchmark for 2006 is 9.5%). The rate allowed by the Kentucky Public Service Commission is 15%. The recommendation for this AMP Update is to undertake a leak detection program in preparation for the overall water main R&R program. The leakage data should be utilized to further differentiate and prioritize water main R&R decisions.

Valve Exercise Program

The District no longer dedicates a crew to valve exercising. Currently, large valves (16” and larger) are exercised every two years. The recommendation for this AMP Update is to consider reinstating the valve exercising program on a limited basis, subject to resource availability, with focus on the most reliable water mains, which will not be targeted for replacement.

Water Main Break / Leak Repair

The District currently tracks extensive data regarding water main break / leak repair via the GBA Master Series computerized maintenance management system (CMMS). AWWA G200-04 *Distribution Systems Operation and Management* recommends the following data be collected in regards to a main break / leak: pipe location, pipe material, pipe size, apparent type of leak or break, visual assessment of surrounding soil type, pipe depth, assessment of saturation conditions and proximity to water table. The following table summarizes the data collection efficiency in terms of "null values" currently in the GBA Master Series database for the historical water main breaks:

Table 4-28.
Water Main Break / Leak Repair Data Collection Efficiency Compared to AWWA G-200

Data Recorded by NKWD	Data Collection Efficiency
Pipe Material	98%
Pipe Size	97%
Type of Break / Leak	98%
Pipe Depth	74%
Soil Type	94%
Soil Condition (e.g. saturated)	4%

The above table indicates that the District should improve data collection regarding observed soil condition to supplement the soil type data.

In addition to the data recommended by AWWA G200, the District also collects valuable data regarding pipe interior condition, pipe exterior condition, type of repair, time to repair, shutdown requirements, shutdown hours, valves turned, water loss and road surface type. A complete summary of the water main break / leak data recorded by the District is included with the GBA Master Series documentation in Appendix I.

All of this data provides the District everything necessary to complete the overall reliability study on the Distribution system and to support the implementation of a focused renewal and replacement (R&R) program. The conversion to a geodatabase and complete integration of the GIS with the GBA Master Series (as discussed in the IT Master Plan) is necessary for the District to fully leverage the available data in support of the R&R program.

Distribution System O & M Challenges and Opportunities

Based on the staff interviews, the following key challenges exist within the overall distribution system O&M program, which should be addressed within the framework of the continuing asset management program development:

Distribution System Mapping

The following key issues were discussed in regards to mapping of the distribution system:

- Distribution system mapping is not complete and maps are not accurate. Many areas do not have detailed strip maps.
- The District maintains GPS technology (handheld and backpack units) and utilized these tools to locate all hydrants in 2007 as part of the flushing program. The overall results were unsatisfactory with known spatial discrepancies approaching 20-ft. An acceptable discrepancy would be less than 3-ft.
- GIS is utilized as the record of origin. There is also an Excel spreadsheet utilized to capture physical pipe attributes (type, size, length). The spreadsheet and GIS are then reconciled on an annual basis. However, a defined "field change" procedure is not in place to update the GIS.

The issues surrounding distribution system mapping are recommended to be given a very high priority within the asset management program. The overall goal would be to achieve a "trusted" system GIS inventory, which can then serve as the foundation for the upcoming water main R&R program. The District has made great progress in filling the GIS inventory gaps identified in the 2004 AMP Report and has exhausted the available return on investment from capturing GIS pipe inventory in an "ad-hoc" fashion as part of other routine programs (e.g. flushing and main break repairs). A focused, final push is recommended to complete the overall GIS. The data capturing needs to be coordinated with the recommendations of the IT Master Plan for conversion to a geo-database. A standard operating guideline (SOG) is required to define the process for future GIS updates. Lastly, the District's contract specifications need to be modified to define the requirements for the electronic delivery of true "as-built" information from Contractors engaged in water main construction such that the level of effort of District staff is minimized in updating the GIS and the CMMS with new asset information.

Standard Operating Guidelines

Staff felt that existing standard operating guidelines (SOGs) for the water distribution operation and maintenance were not as detailed nor are they kept current in the same manner as the SOGs for the treatment plants.

The recommended approach to updating the SOGs is to first develop an overall priority, which rates each SOG in terms of "frequency" (how often they occur) and "intensity" (the number or people and/or level of effort) to perform the activity. From this ranking, the District will be able to identify the most important SOGs to update and will also probably indentify some SOGs, which are no longer required. The next step in the process is to identify additional O&M activities, which do not have current SOGs, and also rank them by frequency and intensity. For example, the SOG for regular GIS updates (as discussed above) would fall into this category. When the prioritized list of outdated and missing SOGs is compiled, the District can then assign responsibility for update / creation along with overall upkeep. A three year target to update / create all necessary SOGs seems an appropriate goal.

Level of Overtime

It is apparent from the staff interviews that folks felt somewhat strained in 2007, which saw a significant increase in the number of water main breaks (primarily due to dry weather) with a large resulting increase in overtime. Overtime through September of 2007 was over 13,000 hours. The previous high for a complete year was approximately 12,000 hours. Note that a similar concern was indicated for the water treatment O&M where there is currently 2887 OT hours for 2007, which represents a large increase from previous years.

Considering the magnitude of the upcoming capital program for the GAC additions and the need to comprehensively address water main R&R in the next three to five years, a minimal staffing review is recommended.

4.3.3. Summary of Recommendations for Additional Studies

4.3.3.1. ORPS1 Surge Analysis

Perform Surge Analysis and Valve Conversion - Perform a computer model surge analysis to verify that the existing surge relief valve will perform as intended following a power failure. Convert the existing surge relief valve from a pressure relief design to a surge relief design. This recommendation should only be done after the modeled surge analysis is performed to ensure that the capital cost of modifying the existing valve is justified. It is also recommended that NKWD add sediment protection features to the surge valve to help prevent possible clogging due to silt.

4.3.3.2. Plant Capacity Analysis

Additional recommendations for the existing system include a capacity analysis at TMTP, FTTP, and MPTP to determine the true capacity of these plants. Although each plant has a rated capacity that has been used for the design of its treatment processes, the

capacity in the field has never been tested. A concern has been raised by District staff that some of these plants may not be able to achieve rated capacity. This information will be critically important to determine as future decisions are made as to the timing of the MPTP expansion as well as the extent of blending options available to meet the Stage 2 DBP rule using FTTP and TMTP water.

4.3.3.3. Corrosion Control Soil Testing

Implement a program to perform field corrosion testing at main break locations or other areas of concern and develop mapping using field data in order to support ongoing analysis and project prioritization. The program should start at $30,000 per year and escalate annually for inflation. Monitoring of cathodic protection systems installed with new water mains will also be needed.

4.3.3.4. Structural Analysis of ORPS 2

The pump station's concrete and brick have significantly deteriorated over the years and any rehabilitation would be challenging and unpredictable. Furthermore, because of the building being considered as a historical site, any rehabilitation and upgrade efforts may need to retain the historical integrity of the structure. A structural analysis of building foundation, flooring, and walls is therefore recommended. Numerous amounts of structural and destructive testing are recommended to be preformed to accurately assess the condition of the existing superstructure and requisite rehabilitation.

4.3.3.5. Evaluation of Electrical Systems

An evaluation of the power distribution systems at all 3 treatment plants is recommended. If an electrical failure were to occur inside the plant, this would result in the crippling of the treatment and supply process and potentially impacting the quality and quantity of water delivered to the District's customers.

5. Funding Strategy

5.1. Development of Strategy

The Asset Management Program is intended to be a comprehensive source of guidance for the District in the planning and implementation of various programs and improvements to properly respond to customers' needs, changing regulatory requirements, and aging infrastructure systems. These competing areas of needs must be satisfied and accomplished while continuing to operate the utility in a sound fiscal manner that maximizes the return for the money spent and minimizes the resulting rate impacts on the customers.

The primary guide for plotting the District's course is the 5-Year Capital Improvement Plan (CIP) which outlines significant projects that should be implemented and the timeline for their accomplishment. The current CIP includes projects to address needs identified through year 2030. It is important to understand that the implementation of projects constantly evolves depending on numerous drivers such as regulatory changes, customer viewpoints, rate making strategy, resources to implement projects, and actual water consumption. The conclusions and recommendations that are part of this report should be reviewed at regular intervals to ensure that they keep pace with the latest trends.

5.1.1. Scenarios

With the first Asset Management Program report, the District developed and has since effectively used an approach for analyzing the potential impact on rates. This approach considers three scenarios for implementing the recommended improvements: Aggressive, Minimal, and Moderate.

Aggressive – In this scenario all projects are built at the ideal time, if economic constraints did not exist.

Minimal – This scenario would meet system demand and regulatory requirements but would not include system reliability and other items important to consumer confidence and customer care because it provides limited rehabilitation and replacement funding even though this ignores deterioration of the infrastructure. It also removes funding for extending water service to new customers.

Moderate – This scenario is intended to balance needs with practical financial limitations that exit. Timing of projects is important to maintain a desirable level of customer service.

The estimated total costs for these scenarios for 5-Year CIP projects between 2009 and 2030 are as follows:

Minimal	$382,424,000
Moderate	$567,318,000
Aggressive	$737,978,000

The Moderate approach results in a cost reduction of 23% over the Aggressive approach, while the Minimal approach would result in a reduction of 48% over the Aggressive approach.

The proposed cost reductions for the Minimal approach would be as follows:

- Delete the "Annual Water Main Replacement" projects from 2009 through 2030 for a total reduction of $126,850,000. We would continue with the program for "Coordinated Water Main Replacement" that sets aside monies for coordinating projects with cities at $2,500,000 a year.
- Delete "Annual Mains into Unserved Areas" for $250,000 each year for a total reduction of $5,500,000.
- Eliminate back-up power generators at Carothers Road Pump Station, Licking River Pump Station, and FTTP Laboratory for a reduction of $4,724,000.
- Cancel projects for upgrading systems and improving technology for SCADA and IT for a total reduction of $11,395,000.
- Eliminate ten water transmission system redundancy projects for a total reduction of $17,098,000.
- Defer tank replacement of aging tanks by rehabilitating instead of replacing Bellevue, Dayton, Lumley, Taylor Mill, Ida Spence and Kenton Lands for a total reduction of $10,722,000.
- Cancel or defer 7 projects to improve hydraulics or system operations for a total reduction of $4,107,000.

The total reductions would be $180 million over the Moderate approach. Deferring or canceling projects is a difficult decision that must be weighed against many factors. It is anticipated the District will carefully consider their options as part of the annual budgeting and rate making process.

The $170 million differences in cost between the Moderate and Aggressive approach are attributed to:

- Increasing funding for "Annual Mains into Unserved Areas" for a total of $27,500,000 through 2030. The funding for unserved areas would be increased from $250,000 to $1,500,000 each year. To extend water to the unserved areas of the system requires 183 miles of new water main for a total estimated cost of $57 million (current cost of rural water mains is $60 per lineal foot). It is also known that a pump

station and potentially a small tank would be needed to serve customers situated at higher elevations, but these costs are not yet included in the number above.

- The number of households per mile range from a high of about 25 to less than 1 customer. The District will seek grants and funding assistance to deliver water to these customers. The District uses a monthly surcharge to the water bill that is paid by the customer as a contribution for service. The customer pays a portion of the cost of the water main with the maximum amount being $30 a month for 25 years or a total of $9,000 (and this amount may be less). If the maximum surcharge were collected for the 1,667 unserved homes, then the customers would pay about $15 million or roughly $650,000 a year. Without additional financial assistance from grants, the Moderate approach will take approximately 65 years to complete at $900,000 a year ($250,000 from District and $650,000 from customer). Increasing District's funding to $1,500,000 will reduce the amount of time to complete the projects to about 25 years.
- Increasing "Coordinated Main Replacement by a total of $143,150,000. The accelerated funding for main replacement would bring the budget to the full amount proposed in this plan.

5.1.2. Summary of Costs

The total costs by year for the 5-Year CIP and the annual O&M costs are presented in the table below for the planning period.

Table 5-
Yearly Costs for Projects and O&M

Year	5-Year CIP, Million Dollars			O&M, Million Dollars
	Minimal	Moderate	Aggressive	
2009	$15.47	$22.17	$26.32	$23.43
2010	$23.08	$29.50	$33.25	$23.45
2011	$26.08	$30.51	$34.26	$23.47
2012	$45.73	$53.16	$57.41	$23.63
2013	$17.30	$28.69	$33.44	$26.55
2014	$12.92	$22.60	$27.85	$27.80
2015	$22.40	$38.12	$42.87	$27.99
2016	$21.39	$27.69	$32.69	$28.34
2017	$21.58	$28.63	$33.88	$28.34
2018	$11.35	$21.05	$26.55	$28.50
2019	$26.30	$38.05	$43.80	$28.68
2020	$5.88	$16.85	$23.11	$28.85
2021	$6.17	$12.92	$20.17	$29.04
2022	$20.26	$27.01	$35.26	$29.22
2023	$9.59	$16.34	$25.59	$29.42
2024	$4.32	$11.07	$21.32	$29.68
2025	$12.65	$19.40	$30.65	$29.83
2026	$6.88	$13.88	$25.88	$30.04
2027	$10.50	$17.75	$30.50	$30.26
2028	$25.64	$33.39	$46.64	$30.49
2029	$29.78	$38.03	$51.78	$30.72
2030	$7.16	$20.51	$34.76	$30.96
Total	**$382.42**	**$567.32**	**$737.98**	**-**

5.2. Financial Analysis

A major component of any Asset Management Program and CIP program is the financial impact on the District and its rate payers. Rate payers continue to signal a disdain for any rate increase in the new economy post the 2008 "Financial Meltdown". Projects require obtaining funds, which in turn may result in a rate increase to provide revenue to sufficiently service the debt. The political climate continues to perpetuate the belief that utilities should continue to operate and provide services without raising rates and in many cases to lower rates through efficiency. This is the challenging climate in which the

District must address the multiple issues of aging infrastructure, increased uncontrollable operating costs, and unfunded regulatory mandates.
The climate has drastically redefined what is meant by "customer rate shock" to include almost any rate increase. As a result, it will be incumbent on the District to analyze and prioritize any project to demonstrate the need and potential return each project will provide. The following sections attempt to evaluate the financial impact of CIP scenarios knowing that the longer the projection horizon the more difficult to forecast the outcomes in a climate of such uncertainty.

5.2.1. Assumptions

The District prepared a rate analysis on each of the three scenarios presented. For a direct comparison of alternatives, the same set of assumptions was applied to each scenario. The assumptions discussed below are the basis for the financial analysis and estimates discussed, understanding the volatility and unknowns in general economic conditions over such a long horizon.

- Growth – From 2010 to 2030, the demands based on local planning information were projected to increase about 10.5 mgd as shown in the table below. Historical growth previously experienced in the suburban and rural areas has been adversely affected in recent years by the increases in fuel costs that have made living further from cities and jobs less attractive combined with other economic factors. The future of this historical type of growth is at best unknown and at worst unachievable. The projected average day demand for 2010 (prepared in 2008) was 30.9 mgd, but the actual average day demand was only 28.8 mgd.
- In the new economic environment, growth has come to a halt as evidenced by the District's declining number of customers and consumption. This trend is in direct correlation to the housing industry, with the huge inventory of existing homes on the market, along with increasing efforts to conserve water. It is believed that conservation is driven by a combination of factors including more efficient appliances and plumbing fixtures, plus an increased awareness of the value of water that may prompt consumers to fix leaks and use less water. For these reasons, a significant increase in revenue is not expected to result from growth and was not included in the analysis. Future rate analyses will need to revisit this assumption as the present economic uncertainties become quantified.

Table 5-2
Growth Projections

Year	Project Water Demands		Actual Water Demand
	Average Day (mgd)	Percent Increase	Average Day (mgd)
2010	30.9	-	28.8
2015	33.7	34.0%	-
2020	36.6		-
2025	39.0		-
2030	41.4		-

- Inflation – A review of the District's historical expense trends, the Consumer Price Index, and the knowledge that operational adjustments have and will be made due to a challenging economic climate have provided a 1.5% inflation factor for this analysis. This increase is supported by the following rationale:
  - Labor and Benefits - the District anticipates some increases in staffing levels for the addition of the Advanced Treatment projects along with increases in health insurance benefits.
  - Chemical costs and power - these will likely rise because of increased purchase prices from the suppliers.
- Granular Activated Carbon – in addition to the annual increases in costs due to inflation, the District will experience a major adjustment in O&M costs in year 2013 for about $3.8 million for beginning the regeneration or replacement of carbon.

5.2.2. Capital Financing

The District uses a combination of debt, grants (when available), and cash from the Internal Repair and Replacement (IRR) budget to finance major necessary capital improvements. Debt instruments include open-market revenue bonds, Kentucky Infrastructure Authority low interest loans, and Bond Anticipation Notes (BANs). The regulatory process conducted by the Kentucky Public Service Commission (PSC) requires approval before long-term debt may be issued and is part of a rate case. The District has customarily utilized BANS as temporary financing that does not require PSC approval in order to start projects in advance of the approval for permanent long term financing. The PSC does issue Certificates of Public Convenience and Necessity for major projects approving the project in advance of the request for permanent financing. The following assumptions apply for projects requiring the issuance of long term debt:

- Interest Rate – 3% for BANs and 5.5% for long-term debt
- Tenure – 2 years for BANs and 25 years for revenue bonds

- Issuance Costs – 2% for BANs and 3% for long-term debt

Annual repairs and replacements are typically cash financed and are satisfied from the IRR cash. This cash is funded after the normal Operating and Maintenance expenses are provided for as well as funding the Debt Service Fund to service the long term debt payments and maintaining adequate cash balances. For estimation purposes, this is approximately the annual depreciation expense, although, through efficiency, the District could potentially increase this amount. Over the planning horizon, the amount available for cash financing major capital projects starts at $1,000,000 and increases by $500,000.

5.2.3. Revenue Adjustments

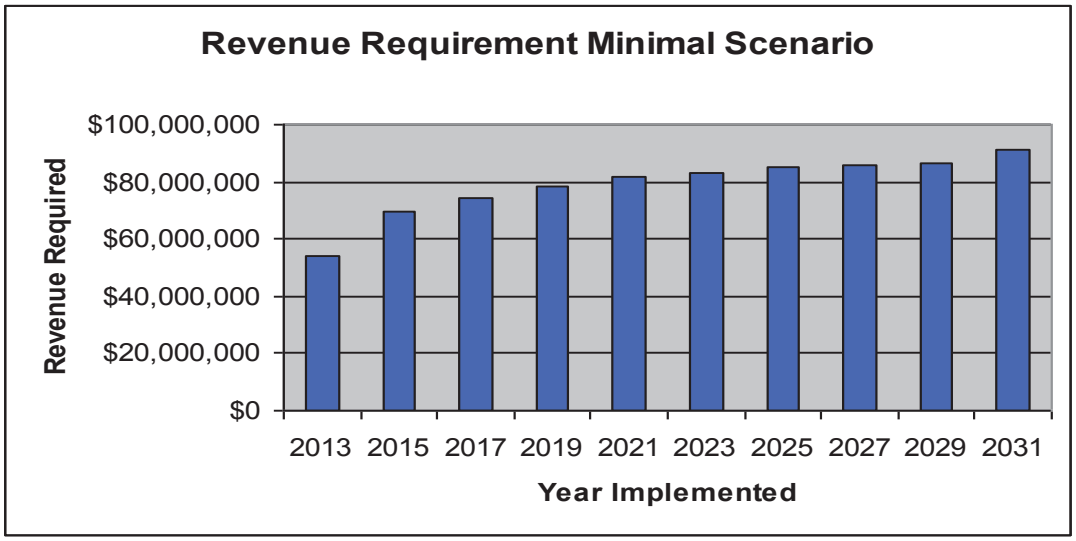
In general, the District files approximately every two years for rate adjustments to provide for Operation and Maintenance Expense increases, service additional long term debt acquired by paying off BANS, and changes in depreciation as a result of adding infrastructure. The approval process has become more streamlined through electronic filing and a proactive approach to the PSC process. Revenue adjustments are effective in the analysis for 9 months of the year implemented.

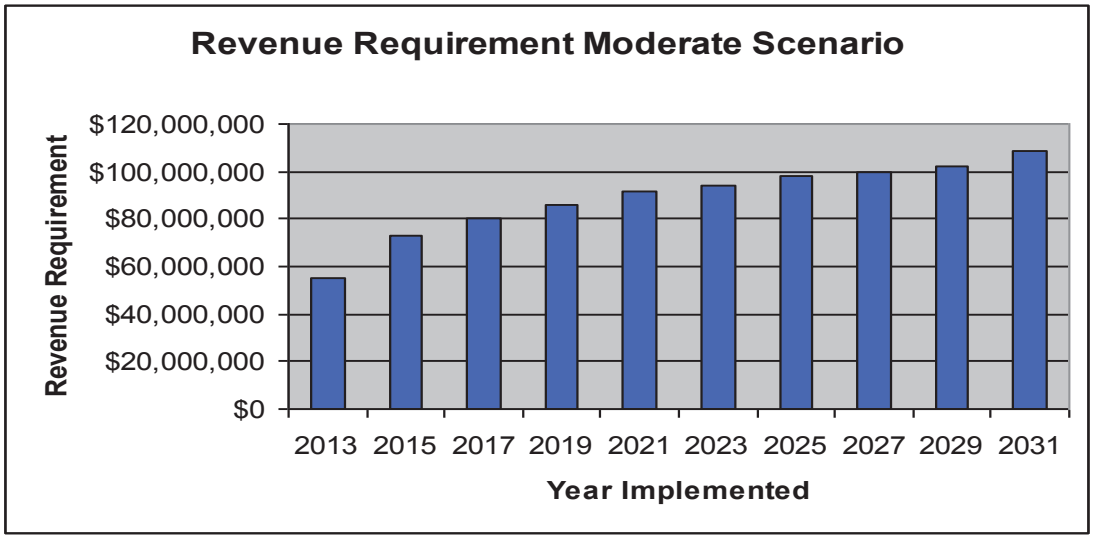
5.3. Operating and Capital Flow of Funds

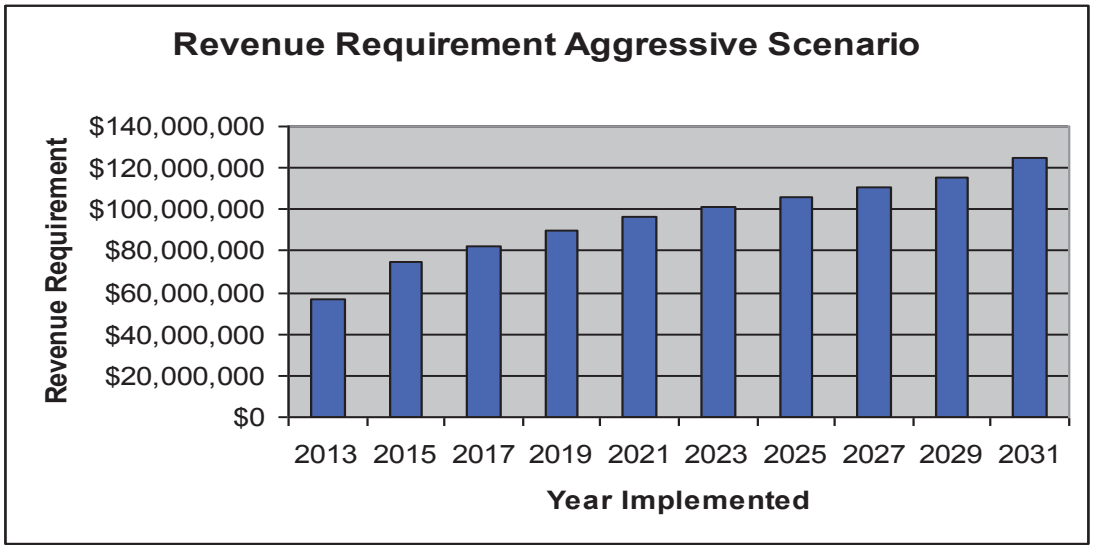
This analysis of the utility revenue requirements addresses the cash requirements for operations and maintenance expense, principal and interest satisfying debt service requirements, capital improvements funded from revenues, and sufficient deposits to reserve funds. All of these issues are addressed while maintaining compliance with the covenants to bond holders, financing agents or District policies.

The Capital Improvement Program Financing Plan allows for end-of-year balances to continue projects prior to obtaining temporary financing funds. The Operating Fund Financing Plan in conjunction with the capital plan attempts to level the adjustments so the customers are not subject to the negative consequences of rate shock.

The following figures illustrate the effect the various scenarios have on revenue requirements and ultimately rates.


Revenue Requirement Minimal Scenario
Revenue Required
$100,000,000
$80,000,000
$60,000,000
$40,000,000
$20,000,000
$0
2013 2015 2017 2019 2021 2023 2025 2027 2029 2031
Year Implemented


Revenue Requirement Moderate Scenario
Revenue Requirement
$120,000,000
$100,000,000
$80,000,000
$60,000,000
$40,000,000
$20,000,000
$0
2013 2015 2017 2019 2021 2023 2025 2027 2029 2031
Year Implemented


Revenue Requirement Aggressive Scenario
Revenue Requirement
$140,000,000
$120,000,000
$100,000,000
$80,000,000
$60,000,000
$40,000,000
$20,000,000
$0
2013 2015 2017 2019 2021 2023 2025 2027 2029 2031
Year Implemented

5.4. Summary

Reviewing the results of the analysis highlights several key issues as the District moves forward into an uncertain future. The Operational and Maintenance cost increase with the introduction of the Granular Activated Carbon process and the resulting replacement of spent carbon, is illustrated in the large revenue requirement increase in all the scenarios when the 2014 rate case results are implemented in 2015. As would be expected, the intensity of capital projects and the resulting debt service is the primary difference in the revenue requirements projected in each of the scenarios. At the beginning of the analysis period and subsequent to the 2010 rate case, the average monthly residential bill based on 6,000 gallons of consumption was $40.99. At the conclusion of the analysis period, the average monthly residential bills in year 2031 for each of the scenarios are as follows:

Minimal Scenario	$76.99
Moderate Scenario	$91.67
Aggressive Scenario	$105.21

The average yearly increase is 3.85% for Minimal, 6.18% for Moderate, and 7.83% for Aggressive. The actual yearly increases will vary based on the particular projects being implemented and other cost factors prevailing at the time. While it is certain the District will not implement the Aggressive scenario, it is prudent for the District as a viable service provider to implement projects listed in the Minimal scenario. The District will continually scrutinize O&M costs to dampen the impacts of implementing necessary capital projects.

The takeaways from this analysis are that many of the factors considered are unknown and highly volatile. The time frame alone in this time of drastic change and uncertainty makes it very difficult to project with any sense of reality and accuracy.

Projecting what exactly will be needed and the cost to construct and implement are educated estimates at best. The current economic conditions we now face are in many ways new territory that we have little precedent to guide us into the future. The ability and desire of the rate payers to absorb higher bills to support the efforts necessary to address the increasing operation and maintenance expense, the aging infrastructure, and unfunded mandates is tenuous at this time with limited prospects to improve in the future.

In this environment, the District must keep in mind methods of operating to best represent the needs of all the stakeholders while keeping its focus on the primary mission of providing a safe water supply to meet the needs of the customer base. The District must move ahead with caution and use the rate payers' resources to the best of its abilities to provide the most basic of resources and to assure the vitality of our community.

N
W E
S

1 inch = 4,000 feet

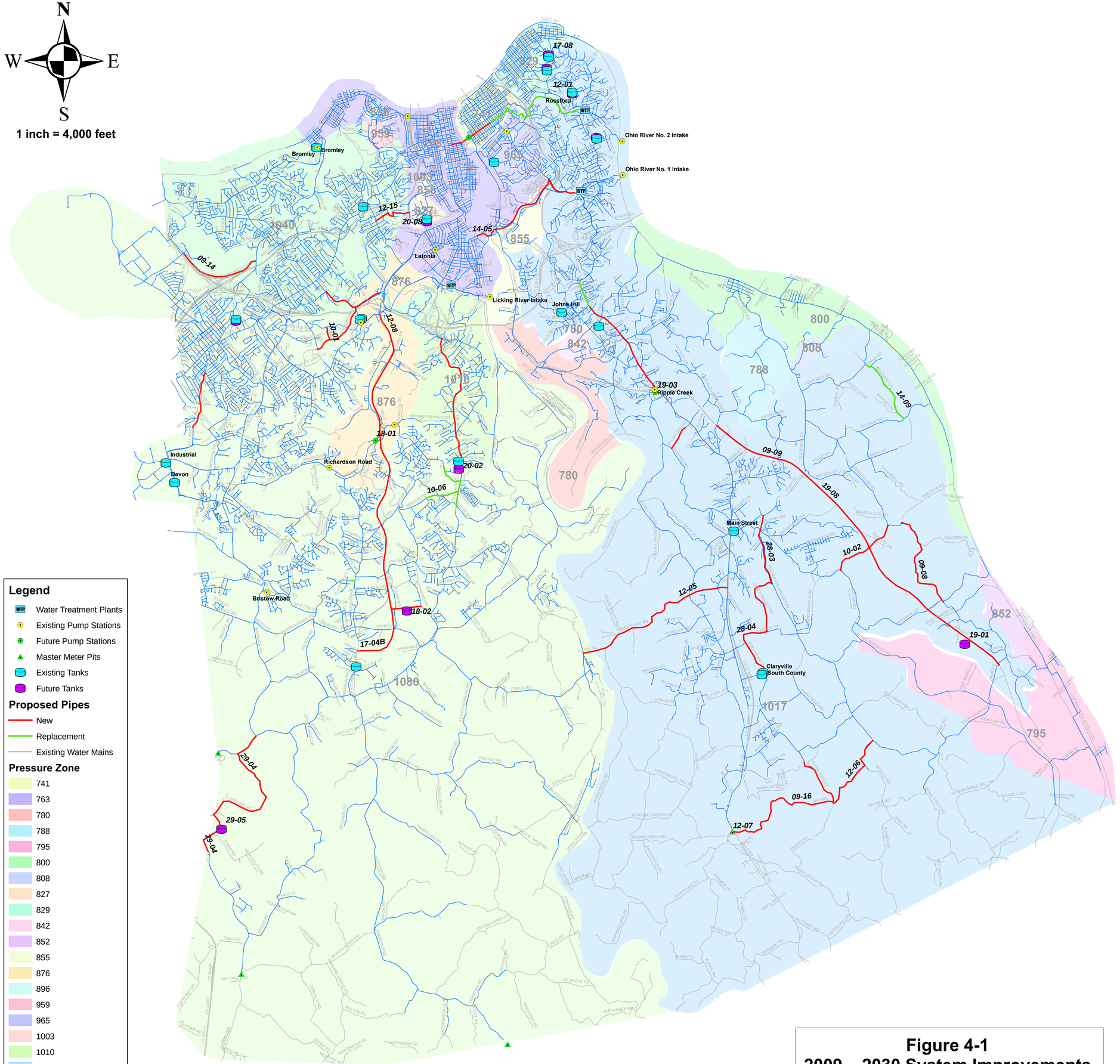


Figure 4-1
2009 – 2030 System Improvements

Tank and Pump Station Projects

Ref No	Location	Project Description	Cost
		Raw Water and Finished Water Pump Stations	
09-05	LRPS	Structural Impr., Roof Replacement, Sluice Gates, Actuators, VFD	$984,750
09-07	Dudley 1040	Replace Four Pumps, 2 constant speed and 2 VFDs	$440,550
12-03	Carothers	Carothers Rd. PS Generator	$386,678
13-02	Dudley	Dudley - Install Isolation Valves	$345,119
13-03	TM TP PS	Taylor Mill PS Pump Replacement (proposed 1, 5, 6 and 2 or 3)	$3,731,013
13-04	LRPS	LRPS New Generator & Walkbridge Upgrade	$4,100,000
14-03	ORPS2	ORPS2 Replacement Design and Construction	$42,250,000
15-04	Bromley	Bromley Pump Replacement and Misc. Improvements	$1,716,000
16-05	Hands Pike	Hands Pike Pumps and Misc Improvements	$700,000
17-08	Bellevue	Replacement Bellevue Tank	$1,300,000
18-01	New PS	New KY17 PS To Replace Richardson Rd. PS	$1,900,000
18-04	US 27 PS	US 27 Pump Station VFDs	$449,000
19-03	New PS	New Pump Station near the existing Ripple Creek PS	$2,079,000
20-03	Dudley 1040 PS	Pump Station Improvements at Dudley 1040 (VFDs)	$1,275,000
21-03	Carothers	Pump Station Improvements at Carothers	$500,000
22-02	Bristow	Pump Station Improvements at Bristow Road	$600,000
23-02	Dudley 1080 PS	Pump Station Improvements at Dudley 1080	$3,600,000
24-01	Latonia PS	Pump Station Improvements at Latonia	$600,000
25-01	Waterworks PS	Pump Station Improvements at Waterworks Road (generator)	$1,500,000
26-01	TMTP PS	Pump Station Improvements at TMTP	$3,100,000
28-01	New PS	New pump station from Newport to Covington	$7,000,000
29-02	ORPS2	ORPS2 add 1 10 MGD pump	$1,900,000
30-02	US 27 PS	Pump Station Improvements at US 27	$1,500,000
		Storage Tanks	
12-01	Rossford	1.0 MG Rossford Elevated Storage Tank	$3,125,000
18-02	New Tank	1.0 MG Elevated Storage Tank East of Independence	$4,375,000
18-03	Dayton Tank	Replace Dayton Tank	$3,700,000
19-01	New Tank	1.0 MG Elevated Storage Tank - Southern Campbell County	$4,500,000
19-10	Lumley Tank	Replace Lumley Tank	$1,400,000
20-02	TM Tank	Retire TM Standpipe Build Elevated 1040 Tank	$2,100,000
20-08	Ida Spence	Replacement Ida Spence Tank (or retire and serve from 1040)	$2,121,000
29-05	New Tank	1 MG Tank in Southern Kenton County near Walton	$7,000,000
30-07	Kenton Lands	Replace Kenton Lands Tank	$4,600,000

Water Main Projects

Ref No	Project Description	Cost
09-08	12" Washington Trace from Twelve Mile to Hwy 1996	$964,970
09-14	12" Dolwick 1080 / 1040 Interconnect	$850,000
09-15	42" Transmission Main from FTTP to Moock Rd, Construction	$2,500,000
09-16	8" Siry to Flatwoods (Subdistrict F)	$1,100,000
10-01	36" Dudley Discharge Redundancy Imp. - Phase 1, 2, 3	$2,665,000
10-02	12" Stonehouse Rd (Twelve Mile Rd) from KY 10 to KY 1566	$1,120,000
10-06	12" Senour Ave. West of Cloverridge	$750,000
12-06	8" Burns Rd. Between Persimmon Grove & Flatwoods	$1,554,000
12-07	8" KY 1280 Between US 27 & Burns Rd.	$357,000
12-08	24" Madison Ave. Parallel 24" Main Between Dudley & Hands Pike	$2,132,000
12-09	24" Orphanage Rd. Between Redwood & Valley Plaza	$1,390,000
12-10	12" Hands Pike Between KY16 & Edwin	$608,000
12-11	12" KY 16 Between Hands Pike & Klette Rd	$613,000
12-15	12" Highland Avenue from Kyles Lane to new reg pit near Hanser pit	$480,000
12-16	16" KY 16 from I-275 to TM Swim Club upgrade 16" with KDOT project	$450,000
12-17	16" KY 16 from TM Swim Club to TM Standpipe with KDOT project	$350,000
13-07	8" Low Gap Rd. Between Tollgate Rd & 8" Dead End	$375,000
13-08	12" Interconnect 1080 & 1017	$1,200,000
13-12	24" US 27 from Sunset to Martha Lane Collins	$1,280,000
13-13	12" Independence Rd. Between KY17 & 12" Pipe	$115,000
14-05	36" Licking River Crossing	$4,503,000
14-09	8" Vineyard (Gunkel Rd.) Between Eight Mile & Fender Rd.	$608,000
16-06	24" Horsebranch Road from 36" to Thomas More Parkway	$800,000
17-04	24" SR17 From Hands Pike to Apple Drive	$12,740,000
18-09	16" SR17 to Stephens Rd cross country to New Tank in Independence	$1,068,570
19-07	24" along US 27 from Martha Layne Collins to Ripple Creek PS	$5,810,000
19-08	16" along AA Highway from Hwy 547 & California Cross Rd.	$10,330,000
19-09	36" Redundancy from 42" at Moock Rd to 36" Licking River Crossing	$4,100,000
27-05	20" to Connect 11th Street in Newport to 12 Street in Covington	$6,000,000
27-06	12" Parallel Main Btwn Vulcan and Lytle	$2,500,000
28-03	24" Parallel Main Persimmon Grove from Riley to Jerry Wright	$11,200,000
28-04	16" Main Jerry Wright, Lickert, Old SR 4 to Claryville Tank	$3,600,000
29-04	20" Percival Rd from 24" in Banklick/Walton Nicholson to New Tank	$16,000,000

Treatment Plant Projects

Ref No	Project Description	Cost
	Fort Thomas Treatment Plant	
09-01	FTTP Advanced Treatment - Design & Construction	$30,000,000
09-04	FTTP Filter Renovations	$1,665,000
11-02	Repair Walls and Windows in FTTP Filters	$530,000
12-04	Residuals Handling Upgrade Project - Design & Construction	$6,500,000
13-01	FTTP Backwash Tank Replacement	$782,000
13-05	Improvements to FTTP Flocculation/Sedimentation Basins 2 & 3	$2,784,000
14-01	Laboratory Generator	$237,000
17-01	Raw water line to FTTP south reservoir	$700,000
20-01	Electrical Upgrades at FTTP	$1,000,000
21-02	Filter Valves and Actuators at FTTP	$650,000
23-01	Chemical Feed Systems Upgrades at FTTP	$2,295,000
	Memorial Parkway Treatment Plant	
09-03	MPTP Advanced Treatment - Design & Construction	$15,300,000
12-02	MPTP PS Suction Piping	$1,000,000
17-02	MPTP Residuals Handling Improvements	$4,600,000
22-01	20" Gravity Discharge from MPTP	$16,000,000
25-02	MPTP Expand to 20 MGD - Actiflo	$7,400,000
29-01	MPTP add second gravity thickener	$1,000,000
30-01	Chemical Feed Systems Upgrades at MPTP	$1,751,000
	Taylor Mill Treatment Plant	
09-02	TMTP Advanced Treatment, Basins and Generator	$28,350,000
09-06	TMTP Valves & Actuators	$168,300
11-01	Replace PLCs for Filters at TMTP	$350,000
14-02	TMTP Sludge Pumps, Conveyors & Press	$1,537,000
21-01	Chemical Feed Systems Upgrades at TMTP	$1,380,000
	Plants, Tanks, and Pump Stations	
15-05	Upgrade SCADA/Instrumentation/Security Equipment	$10,172,000
-	Annual General Facility R&R - Plants, Tanks, Pump Stations	$22,617,000

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Stacey Kampsen

Q.22. Provide a copy of the utility's most recent depreciation schedule. The schedule should include a list of all facilities by account number, service life and accrual rate for each plant item, the methodology that supports the schedule, and the date the schedule was last updated.

A.22. Please refer to NKWD's Application, Exhibit G, Tax Asset Detail 1/1/21 to 12/31/21. When an asset is placed in service, the NARUC useful life is considered in the context of the actual useful life for that asset. The assets that are placed in service at NKWD are technical in nature, and while an asset is appropriately coded to a certain account number, the actual useful life of the asset that is being capitalized may not be in line with the NARUC specified useful life.

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Kim Clemons

Q.23. Provide a complete description of the utility's Other Post-Employment Benefits package(s) provided to its employees.

A.23. NKWD does not provide any post-employment benefits packages to its employees.

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Stacey Kampsen

Q.24. Provide a complete description of the financial reporting and ratemaking treatment of the utility's pension costs.

A.24. NKWD participates in the County Employees Retirement System (CERS) nonhazardous plan administered by the Kentucky Public Pensions Authority (KPPA). NKWD contributions are paid on creditable compensation earned by each employee eligible for membership in the system. Employer contribution rates effective for the historical test year were 24.06% for January 1, 2021 through June 30, 2021 and 26.95% for July 1, 2021 through December 31, 2021. For ratemaking purposes, NKWD has included pro forma pension contributions utilizing a rate of 26.87% based on an average of 26.95% effective July 1, 2021 and the rate of 26.79% effective July 1, 2022. The average rate of 26.87% was applied to pro forma wages resulting in pension costs of $3,100,440.

NKWD is required to report its proportionate share of the CERS nonhazardous collective net pension liability, and its proportionate share of the net Other Postemployment Benefit (OPEB) liability. See below for an excerpt from NKWD's 2021 Audited Financial Statements, page 36.

Plan Information for December 31, 2021 Financial Statements

Pension Liabilities, Pension Expense, and Deferred Outflows of Resources and Deferred Inflows of Resources Related to Pensions

At December 31, 2021, the District reported a liability of $22,419,617 for its proportionate share of the net pension liability. The net pension liability was measured as of June 30, 2021, and the total pension liability used to calculate the net pension liability was determined by an actuarial valuation as of June 30, 2020. The total pension liability was rolled-forward from the valuation date to the plan's fiscal year end, June 30, 2021, using generally accepted actuarial principles. The District's proportion of the net pension liability was based on the District's share of contributions to the pension plan relative to the contributions of all participating employers. At December 31, 2021, the District's proportion for the non-hazardous system was 0.351637% which was an increase of 0.011928% from its proportion measured as of December 31, 2020.

For the year ended December 31, 2021, the District recognized pension expense of $1,029,997. At December 31, 2021, the District reported deferred outflows of resources and deferred inflows of resources related to pensions from the following sources:

	Deferred Outflows of Resources	Deferred Inflows of Resources
Net difference between projected and actual earnings on pension plan investments	$ -	$ 2,988,159
Difference between expected and actual experience	257,446	217,598
Changes of assumptions	300,898	-
Changes in proportion and difference between employer contributions and proportionate share of contributions	961,977	-
District contributions after measurement date	1,033,048	-
Total	$ 2,553,369	$ 3,205,757

The pension expense of $1,029,997 recognized in relation to NKWD's proportionate share of the CERS collective net pension liability is NOT included in NKWD's costs for ratemaking purposes.

Please also refer to NKWD's application, Exhibit J, 2021 Audit Report for additional description of the financial reporting of the utility's pension costs.

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Kim Clemons

Q.25. Provide detailed descriptions of all early retirement plans or other staff reduction programs the utility has offered its employees during either the test year or intends to offer. Include all cost-benefit analyses associated with these programs.

A.25. NKWD has not offered nor intends to offer such a plan or program.

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Lindsey Rechtin / Kim Clemons

Q.26. Provide all current labor contracts and the most recent labor contracts previously in effect.

A.26. NKWD does not have any union agreements or collective bargaining agreements for its employees. NKWD's only employment contracts are with its former President/CEO Ron Lovan and current President/CEO Lindsey Rechtin. Those contracts are attached as Exhibit 26-1.

Northern Kentucky Water District

EXHIBIT 26-1

EXTENSION TO MEMORANDUM OF UNDERSTANDING

This **EXTENSION TO MEMORANDUM OF UNDERSTANDING** ("Extension") is made and entered into this 21st day of July, 2022 by and between Northern Kentucky Water District, 2835 Crescent Springs Road, Erlanger, Kentucky 41017 ("District"), and Lindsey Rechtin , 631 Braddock Ct. Edgewood, KY 41017 ("Employee").

In consideration of the mutual covenants herein contained, the parties agree to extend the Memorandum of Understanding subject to the following terms:

1. EMPLOYMENT. The District hereby agrees to appoint the current Employee to the position of President/CEO for a term beginning August 1, 2022 through December 31, 2022. Employee will exclusively devote Employee's full business time and attention to the District and the performance of the duties, will faithfully perform the duties in a diligent and proper manner to the best of Employee's abilities, and will always conduct themselves so as to advance the best interests of the District. Employee will abide by all policies of the District, which are applicable to employees generally. Employee will report to, and receive advice, supervision and direction from the Board of Commissioners.

2. COMPENSATION. Employee shall be compensated on a weekly basis at an annual salary of $190,000 in accordance with and consideration of the Memorandum of Understanding entered into on July 15, 2022 from which deductions for income tax and other payroll withholding shall be made.

3. BENEFITS. Employee will be entitled to all benefits offered to District Employees, as such benefits may be amended from time to time.

4. TERMINATION. the District may immediately terminate Employee from all employment with the District "for cause" at any time. The term "for cause" shall include, but not be limited to the following:

- ~~Continued failure on the part of Employee, without the consent of the District, to perform substantially~~ the duties of the position as designated and assigned by the District (other than any failure resulting from temporary incapacity due to illness);
- Habitual failure to follow the District's policies and procedures;
- Conviction of a felony or any crime involving dishonesty or moral turpitude;
- Permanent disability, incapacity or death;
- Dishonesty, willful misconduct, breach of fiduciary duty, intentional failure to perform stated duties, or willful violation of any law, rule, or regulation; and
- Material violation of the terms herein.

5. NO GUARANTEE OF FUTURE EMPLOYMENT. The District makes no guarantee of future employment with District as its President and Chief Executive Officer beyond the scope of this Extension. Should the Employee satisfactorily complete (in the District's sole discretion) the employment term, the District does agree to negotiate in good faith an employment agreement with the Employee for continued employment as the District's President and Chief Executive Officer. Said terms to negotiate include:

- Reimbursement amounts for Continuing Education and Professional Development;
- Termination and Notice of Termination clauses;
- Paid Time Off accrual;
- Reimbursement of vehicle usage expenses; and
- Other terms deemed necessary by the parties.

The parties by signing below have executed this Extension To Memorandum of Understanding and agree that any rules of interpretation or construction against the party that prepared or drafted the document shall not apply:

DISTRICT:

By_____
Name: Joseph Koester
Title: Chairman

EMPLOYEE:

By: Lindsey Rechtin
Name: Lindsey Rechtin

MEMORANDUM OF UNDERSTANDING

This **MEMORANDUM OF UNDERSTANDING** ("MOU") is made and entered into this 15th day of July 2021 by and between Northern Kentucky Water District, 2835 Crescent Springs Road,Erlanger, Kentucky 41017 ("District"), and

Lindsey Rechtin [NAME],

631 Braddock Court, Edgewood, KY 41017, [ADDRESS] ("Employee").

In consideration of the mutual covenants herein contained, the parties agree as follows:

1. EMPLOYMENT. In anticipation of the retirement of the District's current President and Chief Executive Officer, beginning August 1, 2021, through August 1st, 2022, ("Interim/Transitional Employment Period"), the District hereby agrees to appoint the current Employee to the interim/transitional position of Incoming President/CEO and V.P. of Finance and Support Services.

Employee, in addition to assisting and completing Employee's currently assigned duties, shall train with and assist the current President and Chief Executive Officer in performing the duties of President and Chief Executive Officer. Employee will exclusively devote Employee's full business time and attention to the District and the performance of the duties, will faithfully perform the duties in a diligent and proper manner to the best of Employee's abilities, and will always conduct themselves so as to advance the best interests of the District. Employee will abide by all policies of the District, which are applicable to employees generally. Employee will report to, and receive advice, supervision and direction from the President and Chief Executive Officer.

2. COMPENSATION. Employee shall be compensated on a weekly basis at an annual salary level that the Employee currently earns ($146,806) from which deductions for income tax and other payroll withholding shall be made. Said compensation shall increase at various dates during the Interim/ Transitional Employment Period as outlined in the table below:

Date	Annual Salary Amount
August 1, 2021	$160,000
February 1, 2022	$175,000
August 1, 2022	$190,000

3. BENEFITS. Employee will be entitled to all benefits offered to District Employees, as such benefits may be amended from time to time.

4. TERMINATION. The parties understand and agree that employment for this interim/transitional position may be terminated for any reason, or no reason at all, at any time, by either party. During the Interim/Transitional Employment Period, if employment for this position is terminated by either party, Employee can return to previously held position with District upon written notice. Notwithstanding, the District may immediately terminate Employee from all employment with the District "for cause" at any time. The term "for cause" shall include, but not be limited to the following:

- Continued failure on the part of Employee, without the consent of the District, to perform substantially the duties of the position as designated and assigned by the District (other than any failure resulting from temporary incapacity due to illness);
- Habitual failure to follow the District's policies and procedures;
- Conviction of a felony or any crime involving dishonesty or moral turpitude;
- Permanent disability, incapacity or death;
- Dishonesty, willful misconduct, breach of fiduciary duty, intentional failure to perform stated duties, or willful violation of any law, rule, or regulation; and
- Material violation of the terms herein.

5. NO GUARANTEE OF FUTURE EMPLOYMENT. The District makes no guarantee of future employment with District as its President and Chief Executive Officer. Should the Employee satisfactorily complete (in the District's sole discretion) the Interim/Transitional Employment Period, the District does agree to negotiate in good faith employment with the Employee for employment as the District's President and Chief Executive Officer. Said terms to negotiate include:

- Reimbursement amounts for Continuing Education and Professional Development;
- Termination and Notice of Termination clauses;
- Paid Time Off accrual;
- Reimbursement of vehicle usage expenses; and
- Other terms deemed necessary by the parties.

The parties by signing below have executed this Memorandum of Understanding and agree that any rules of interpretation or construction against the party that prepared or drafted the document shall not apply:

DISTRICT:

By: Douglas C. Wagner
Name: Douglas C. Wagner
Title: Chairman

EMPLOYEE:

By: Lindsey Rechtin
Name: Lindsey Rechtin

EMPLOYMENT AGREEMENT

This Employment Agreement (hereinafter, the "Agreement") is made and entered into effective as of the 31st day of January, 2022 by and between the **NORTHERN KENTUCKY WATER DISTRICT**, a water district organized and operating under the provisions of Chapter 74 of the Kentucky Revised Statutes (hereinafter, the "District") and **CHARLES RONALD LOVAN** (hereinafter, "Executive").

WHEREAS, the District desires to continue to employ Executive as its President and Chief Executive Officer, and

WHEREAS, Executive desires to continue to serve the District as its President and Chief Executive Officer; and

WHEREAS, the District and Executive have agreed to the terms and conditions under which Executive will continue to serve the District as its President and Chief Executive Officer and desire to memorialize the terms and conditions in writing;

NOW, THERFORE, in consideration of the premises and the mutual covenants and agreements contained herein and other good and valuable consideration, the receipt and sufficiency of which are expressly acknowledged, the District and Executive hereby agree as follows:

1. Employment and Duties.

The District hereby appoints and confirms the employment of Executive as its President and Chief Executive Officer. Executive hereby accepts such appointment and confirmation of employment. Executive will devote his full business time and attention to the District and the performance of his duties hereunder, will faithfully perform his duties in a diligent and proper manner to the best of his abilities, and will conduct himself at all times so as to advance the best interests of the District. Executive will abide by all policies of the District which are applicable to employees generally. Executive, as President and Chief Executive Officer, will report to, and receive advice, supervision and direction from, the Board of Commissioners of the District and will be responsible and have authority for all of the managerial and operational functions of the District, including the management of personnel, assets, finances and capital improvements. Executive's duties and responsibilities shall include, but not be limited to, those set forth on Exhibit A attached hereto.

2. Compensation.

In consideration of Executive's services, the District shall pay and provide to Executive an annualized salary of Three Hundred Twenty Thousand Dollars ($320,000), from which deductions for income tax and other payroll withholding shall be made. At least once each year,

the Board of Commissioners of the District will review and evaluate the performance of Executive and meet with Executive to discuss his performance. The District will not reduce Executive's annualized salary during the term of this Agreement and will provide Executive with an annual percentage increase in his annualized salary no less than the average annual percentage increase provided to all other employees of the District. For clarification purposes, and by way of only one hypothetical example, assuming there are a total of 150 other employees at the time of calculation, with 20 employees receiving a 1% increase, 65 employees receiving a 2% increase, and 65 employees receiving a 3% increase, Executive's annual percentage increase will be no less than 2.3% (*i.e.*, [20 x 1] + [65 x 2] + [65 x 3] = 345; 345 divided 150 = 2.3). In addition, the District, in its sole discretion, may further increase Executive's annualized salary each year based upon Executive's performance.

3. Benefits.

Executive will be entitled to all benefits offered to District employees, as such benefits may be amended from time to time. These benefits include participation in the County Employees Retirement System and health care and dental care coverage as provided under District policies. In addition to the benefits offered to District employees generally, the benefits listed on Exhibit B attached hereto will be provided to Executive by the District.

4. Term and Termination.

(a) The term of Executive's employment under this Agreement will commence on January 31, 2022 and will extend through August 1, 2022.

(b) If the District decides not to extend or renew this Agreement, the District will provide Executive with written notice of such decision at least sixty (60) days prior to the expiration date specified in Section 4(a) above, or any continuation thereof. In the absence of such notice, the District will continue to provide Executive with the salary and benefits described in this Agreement for such period of time beyond the expiration date specified in Section 4(a), or any continuation thereof, as will ensure that Executive receives his salary and benefits for a period of at least sixty (60) days after receiving written notice that his employment will not be renewed or extended.

(c) Notwithstanding anything in Section 4(a) to the contrary, and subject to the notice and cure period described herein, the District may terminate Executive's employment for cause. For purposes of this Agreement, the term "cause" shall include, but not be limited to, the following:

(i) the continued failure on the part of Executive, without the consent of the District, to perform substantially his duties hereunder as designated and assigned by the District (other than any such failure resulting from incapacity due to illness);
(ii) habitual failure to follow the District's policies and procedures;
(iii) Executive's conviction of a felony or any crime involving dishonesty or moral turpitude;

(iv) Executive's dishonesty in performing his duties;
(v) any material violation by Executive of the terms of this Agreement; or
(vi) Executive's addiction to drugs or alcohol that negatively affects job performance.

The District will provide Executive with a minimum of ten (10) days written notice of Executive's termination for cause and the basis for termination, during which period Executive may respond to the District regarding the basis for termination. In addition, with respect to items (i), (ii) and (v) above, the District may only terminate Executive's employment under this Agreement following Executive's failure to cure the basis for termination for cause within thirty (30) business days after receipt of written notice of the basis for termination for cause.

(d) Should the District terminate Executive's employment under this Agreement without cause prior to the expiration date specified in Section 4(a), the District will continue to pay Executive for the remainder of the term, as applicable, either, (i) Executive's full annualized salary in the event Executive is not re-employed; or (ii) the difference between the Executive's annualized salary and any lesser annualized salary from new employment in the event Executive is re-employed. The District will cease paying Executive any and all of his annualized salary if Executive receives an annualized salary from new employment that is equal to or higher than his annualized salary with the District. The District also will continue to provide Executive with medical and dental coverage and with the Disability Insurance benefit and the Life Insurance benefit listed in Exhibit B attached hereto (but no other benefits) until the expiration of the term specified in Section 4(a) or until such benefits are replaced through new employment, whichever occurs first.

(e) In the event Executive elects to terminate his employment during the term of this Agreement, Executive shall provide the District with a minimum of ninety (90) days written notice prior to Executive's desired termination date. Notwithstanding the foregoing, such 90-day notice shall not be required in the event of permanent physical disability or serious medical condition, mutual agreement of the parties, or while the District remains in breach of this Agreement following the District's failure to cure the basis for breach within thirty (30) business days after receipt of written notice of the breach.

5. Defense and Indemnity.

The District will defend and indemnify Executive against all claims, actions and judgments arising from Executive's employment under this Agreement, whether occurring before or after the termination of Executive's employment under this Agreement, except for those claims, actions or judgments caused by gross negligence, recklessness or intentional misconduct of Executive.

6. Governing Law, Form and Service of Process.

This Agreement will be governed by and construed in accordance with the laws of the Commonwealth of Kentucky. All actions, suits and other proceedings with respect to this Agreement will be brought only in a court of competent jurisdiction in either Campbell County,

Kentucky or Kenton County, Kentucky. In any such action, suit or proceeding, such court shall have personal jurisdiction over all of the parties hereto, and service of process upon them under any applicable statutes, laws and rules will be deemed valid and good.

7. Severability.

The invalidity, illegality or unenforceability of any provision of this Agreement will not affect the validity, legality or enforceability of the remainder of this Agreement, and this Agreement will be reformed to the extent necessary to effectuate the foregoing.

8. Assignment.

This Agreement will be binding upon and inure to the benefit of the parties hereto and their respective heirs, successors and assigns. Notwithstanding the foregoing, Executive may not assign any of his rights or obligations hereunder without the prior written consent of the District.

9. Amendment.

This Agreement may be amended only by a written document signed by the District and Executive.

10. Waiver.

No waiver of any provision of this Agreement will be effective unless in writing and signed by the party making the waiver. No valid waiver of any provision will constitute a waiver of any other provision or a continuing waiver. No delay or omission in exercising any right hereunder will constitute a waiver of such right or any other right.

11. Entire Agreement.

This Agreement constitutes the entire agreement between the parties and supersedes all prior and contemporaneous agreements, representations and understandings of the parties, whether oral or written, with respect to the subject matter stated herein.

12. Termination of Prior Agreements.

All prior employment agreements between the District and Executive, including the Employment Agreement dated as of January 31, 2021, are terminated.

13. Headings.

The headings of the Sections in this Agreement are inserted for convenience of reference only and are not intended to be a part and shall not affect the instruction or interpretation of this Agreement.

14. **Acknowledgment.**

Executive acknowledges that he has thoroughly read and understands this Agreement and has received a copy of it for his permanent files.

IN WITNESS WHEREOF, this Agreement is executed in triplicate, each copy being considered an original, by and on behalf of the District and Executive, as of the date first above written.

EXECUTIVE

Charles Ronald Lovan

NORTHERN KENTUCKY WATER DISTRICT

Doug Wagner
Chairman, Board of Commissioners

Attachments:
Exhibit A, Duties and Responsibilities
Exhibit B, Benefits

EXHIBIT A

EMPLOYMENT AGREEMENT

DUTIES AND RESPONSIBILITIES

The President and Chief Executive Officer of the Northern Kentucky Water District will lead and manage the District in the accomplishment of the goals, objectives and strategic planning established in cooperation with the Board of Commissioners. The duties and responsibilities of the President and Chief Executive Officer include the following:

(a) Plan, develop, organize, direct and evaluate the District's operational functions within the legal and environmental framework dictated by the Kentucky Public Service Commission, the Kentucky Division of Water, the U.S. Environmental Protection Agency and other appropriate regulatory agencies.

(b) Oversee the development and implementation of a comprehensive community involvement/marketing/public relations program for the purpose of creating a positive and visible presence in the Northern Kentucky community.

(c) Oversee the capital budget and District expenditures and the timely and accurate analysis of budgets and financial reports that will assist the Board and District staff in managing their responsibilities.

(d) Serve as a mentor to the District staff and oversee the professional growth and development of the District staff.

(e) Provide strategic input and leadership on decision-making issues affecting the organization.

(f) Communicate regularly with the Board of Commissioners and keep the Commissioners fully informed of all pending issues.

(g) Evaluate the District's structure for continual improvement in the efficiency and effectiveness of the District as well as the professional growth and development of the District Staff.

(h) Enhance and/or develop, implement, and enforce policies and procedures that will improve the overall operation and effectiveness of the District.

(i) Along with the District's staff, associate with local, state, regional and national organizations, serving on key committees where possible, with the purpose of building alliances and relationships that will help the District achieve its goals.

EXHIBIT B

EMPLOYMENT AGREEMENT

BENEFITS

The President and Chief Executive Officer (hereinafter, "Executive") will be entitled to the following benefits in addition to those benefits provided to District employees generally:

(a) Disability Insurance: The District will pay directly or reimburse Executive for actual disability insurance premiums on his existing disability policies.

(b) Paid Time Off: Executive shall be considered to have had twenty-five (25) years of service for the purpose of determining Paid Time Off.

(c) Life Insurance: The District will provide term life insurance coverage to Executive in the amount of one year's salary.

(d) Extension of Medical Coverage: To the extent permitted by law, the District will allow Executive to extend his coverage under the District's healthcare policy for a maximum of thirty-six (36) months after leaving the District's employment, with the cost of the premium for such coverage and any additional charge related thereto being borne solely by Executive.

(e) Automobile Allowance: The District will provide Executive with an automobile allowance of One Thousand One Hundred and 00/100 Dollars ($1,100.00) per month for Executive's purchase or lease of a 4-door, full-size automobile. Executive will be required to obtain insurance with reasonable policy limits set by the District and to arrange for the naming of the District as an additional insured. All insurance, maintenance and fuel expenses for the automobile will be paid by Executive.

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Kim Clemons/Stacey Kampsen

Q.27. Provide the information requested in Schedule H for budgeted and actual numbers of full- and part-time employees, regular wages, overtime wages, and total wages by employee group, by month, for the three most recent calendar years, and the test year. Explain any variance exceeding 5 percent.

A.27. NKWD submits the attached and incorporated hereto Exhibit 27-1.

EXHIBIT 27-1

Schedule H
Northern Kentucky Water District
Case No. 2022-00161
Monthly Payroll Variance Analysis

Month/Year	Employee Group	Number of Full-Time Employees		Number of Part-Time Employees		Monthly Budget			Monthly Actual			Variance Percentage		
		Budgeted	Actual	Budgeted	Actual	Reg.[1]	OT[1]	Total	Reg.	OT	Total	Reg.[1]	OT[1]	Total
Jan-19	Exempt	30	29	0	0									
Jan-19	Non-Exempt	130	127	8	3									
Total		**160**	**156**	**8**	**3**			**$931,339**	**$715,821**	**$32,449**	**$748,270**			**-19.7%**
Feb-19	Exempt	30	29	0	0									
Feb-19	Non- Exempt	130	127	8	4									
Total		**160**	**156**	**8**	**4**			**$678,679**	**$620,148**	**$54,069**	**$674,217**			**-0.7%**
Mar-19	Exempt	30	29	0	0									
Mar-19	Non-Exempt	130	123	8	4									
Total		**160**	**152**	**8**	**4**			**$804,291**	**$675,309**	**$54,323**	**$729,632**			**-9.3%**
Apr-19	Exempt	30	29	0	0									
Apr-19	Non-Exempt	130	123	8	3									
Total		**160**	**152**	**8**	**3**			**$729,375**	**$678,432**	**$43,613**	**$722,045**			**-1.0%**
May-19	Exempt	30	29	0	0									
May-19	Non-Exempt	130	122	8	5									
Total		**160**	**151**	**8**	**5**			**$764,515**	**$687,283**	**$56,969**	**$744,252**			**-2.7%**
Jun-19	Exempt	30	29	0	0									
Jun-19	Non-Exempt	130	121	8	6									
Total		**160**	**150**	**8**	**6**			**$741,648**	**$727,133**	**$53,872**	**$781,005**			**5.3%**
Jul-19	Exempt	30	29	0	0									
Jul-19	Non-Exempt	130	125	8	6									
Total		**160**	**154**	**8**	**6**			**$772,626**	**$711,599**	**$52,559**	**$764,158**			**-1.1%**
Aug-19	Exempt	30	29	0	0									
Aug-19	Non-Exempt	130	123	8	6									
Total		**160**	**152**	**8**	**6**			**$770,247**	**$686,940**	**$76,863**	**$763,803**			**-0.8%**
Sep-19	Exempt	30	29	0	0									
Sep-19	Non-Exempt	130	124	8	5									
Total		**160**	**153**	**8**	**5**			**$734,660**	**$678,545**	**$62,134**	**$740,679**			**0.8%**
Oct-19	Exempt	30	29	0	0									
Oct-19	Non-Exempt	130	124	8	5									
Total		**160**	**153**	**8**	**5**			**$757,120**	**$691,472**	**$60,944**	**$752,416**			**-0.6%**
Nov-19	Exempt	30	29	0	0									
Nov-19	Non-Exempt	130	125	8	3									
Total		**160**	**154**	**8**	**3**			**$803,303**	**$745,198**	**$54,168**	**$799,366**			**-0.5%**
Dec-19	Exempt	30	29	0	0									
Dec-19	Non-Exempt	130	124	8	3									
Total		**160**	**153**	**8**	**3**			**$696,485**	**$888,361**	**$50,032**	**$938,393**			**34.7%**
TOTAL 2019								**$9,184,288**	**$8,506,240**	**$651,996**	**$9,158,236**			**-0.3%**

Schedule H
Northern Kentucky Water District
Case No. 2022-00161
Monthly Payroll Variance Analysis

Month/Year	Employee Group	Number of Full-Time Employees		Number of Part-Time Employees		Monthly Budget			Monthly Actual			Variance Percentage		
		Budgeted	Actual	Budgeted	Actual	Reg.[1]	OT[1]	Total	Reg.	OT	Total	Reg.[1]	OT[1]	Total
Jan-20	Exempt	31	28	0	0									
Jan-20	Non-Exempt	133	123	8	2									
Total		**164**	**151**	**8**	**2**			**$879,475**	**$690,937**	**$56,799**	**$747,736**			**-15.0%**
Feb-20	Exempt	31	28	0	0									
Feb-20	Non-Exempt	133	124	8	3									
Total		**164**	**152**	**8**	**3**			**$742,887**	**$674,618**	**$49,252**	**$723,870**			**-2.6%**
Mar-20	Exempt	31	28	0	0									
Mar-20	Non-Exempt	133	123	8	3									
Total		**164**	**151**	**8**	**3**			**$816,958**	**$709,813**	**$41,899**	**$751,712**			**-8.0%**
Apr-20	Exempt	31	28	0	0									
Apr-20	Non-Exempt	133	122	8	3									
Total		**164**	**150**	**8**	**3**			**$790,501**	**$692,204**	**$29,840**	**$722,044**			**-8.7%**
May-20	Exempt	31	28	0	0									
May-20	Non-Exempt	133	121	8	3									
Total		**164**	**149**	**8**	**3**			**$801,569**	**$726,112**	**$37,713**	**$763,825**			**-4.7%**
Jun-20	Exempt	31	27	0	0									
Jun-20	Non-Exempt	133	122	8	3									
Total		**164**	**149**	**8**	**3**			**$775,524**	**$861,038**	**$37,223**	**$898,261**			**15.8%**
Jul-20	Exempt	31	27	0	0									
Jul-20	Non-Exempt	133	122	8	3									
Total		**164**	**149**	**8**	**3**			**$830,690**	**$705,984**	**$55,378**	**$761,362**			**-8.3%**
Aug-20	Exempt	31	26	0	0									
Aug-20	Non-Exempt	133	120	8	2									
Total		**164**	**146**	**8**	**2**			**$824,831**	**$693,993**	**$49,253**	**$743,246**			**-9.9%**
Sep-20	Exempt	31	26	0	0									
Sep-20	Non-Exempt	133	120	8	2									
Total		**164**	**146**	**8**	**2**			**$822,372**	**$682,398**	**$44,507**	**$726,905**			**-11.6%**
Oct-20	Exempt	31	26	0	0									
Oct-20	Non-Exempt	133	123	8	2									
Total		**164**	**149**	**8**	**2**			**$861,041**	**$693,888**	**$57,542**	**$751,430**			**-12.7%**
Nov-20	Exempt	31	27	0	0									
Nov-20	Non-Exempt	133	124	8	1									
Total		**164**	**151**	**8**	**1**			**$886,436**	**$751,361**	**$41,034**	**$792,395**			**-10.6%**
Dec-20	Exempt	31	27	0	0									
Dec-20	Non-Exempt	133	124	8	1									
Total		**164**	**151**	**8**	**1**			**$661,472**	**$782,296**	**$57,413**	**$839,709**			**26.9%**
TOTAL 2020								**$9,693,756**	**$8,664,642**	**$557,853**	**$9,222,495**			**-4.9%**

Schedule H
Northern Kentucky Water District
Case No. 2022-00161
Monthly Payroll Variance Analysis

Month/Year	Employee Group	Number of Full-Time Employees		Number of Part-Time Employees		Monthly Budget			Monthly Actual			Variance Percentage		
		Budgeted	Actual	Budgeted	Actual	Reg.[1]	OT[1]	Total	Reg.	OT	Total	Reg.[1]	OT[1]	Total
Jan-21	Exempt	34	31	0	0									
Jan-21	Non-Exempt	131	128	7	1									
Total		**165**	**159**	**7**	**1**			**$797,029**	**$753,860**	**$37,490**	**$791,350**			**-0.7%**
Feb-21	Exempt	34	32	0	0									
Feb-21	Non-Exempt	131	129	7	2									
Total		**165**	**161**	**7**	**2**			**$716,218**	**$712,623**	**$45,644**	**$758,267**			**5.9%**
Mar-21	Exempt	34	31	0	0									
Mar-21	Non-Exempt	131	126	7	2									
Total		**165**	**157**	**7**	**2**			**$772,816**	**$751,384**	**$33,945**	**$785,329**			**1.6%**
Apr-21	Exempt	34	31	0	0									
Apr-21	Non-Exempt	131	127	7	2									
Total		**165**	**158**	**7**	**2**			**$767,571**	**$717,167**	**$39,929**	**$757,096**			**-1.4%**
May-21	Exempt	34	32	0	0									
May-21	Non-Exempt	131	129	7	2									
Total		**165**	**161**	**7**	**2**			**$811,687**	**$820,540**	**$37,428**	**$857,968**			**5.7%**
Jun-21	Exempt	34	31	0	0									
Jun-21	Non-Exempt	131	129	7	2									
Total		**165**	**160**	**7**	**2**			**$844,973**	**$897,756**	**$34,008**	**$931,764**			**10.3%**
Jul-21	Exempt	34	32	0	0									
Jul-21	Non-Exempt	131	128	7	3									
Total		**165**	**160**	**7**	**3**			**$822,650**	**$762,802**	**$50,521**	**$813,323**			**-1.1%**
Aug-21	Exempt	34	31	0	0									
Aug-21	Non-Exempt	131	126	7	3									
Total		**165**	**157**	**7**	**3**			**$826,508**	**$770,503**	**$45,253**	**$815,756**			**-1.3%**
Sep-21	Exempt	34	32	0	0									
Sep-21	Non-Exempt	131	124	7	5									
Total		**165**	**156**	**7**	**5**			**$814,528**	**$750,192**	**$49,407**	**$799,599**			**-1.8%**
Oct-21	Exempt	34	31	0	0									
Oct-21	Non-Exempt	131	123	7	5									
Total		**165**	**154**	**7**	**5**			**$825,570**	**$754,061**	**$52,232**	**$806,293**			**-2.3%**
Nov-21	Exempt	34	31	0	0									
Nov-21	Non-Exempt	131	121	7	5									
Total		**165**	**152**	**7**	**5**			**$872,271**	**$839,883**	**$36,114**	**$875,997**			**0.4%**
Dec-21	Exempt	34	32	0	0									
Dec-21	Non-Exempt	131	117	7	3									
Total		**165**	**149**	**7**	**3**			**$893,256**	**$648,273**	**$47,403**	**$695,676**			**-22.1%**
TOTAL 2021								**$9,765,077**	**$9,179,043**	**$509,375**	**$9,688,418**			**-0.8%**

[1]NKWD does not budget Regular and OT payroll; therefore, only Budget Totals are provided.

Variances of total budgeted payroll to total actual payroll for each year do not exceed 5%.
Monthly variances exceeding 5% are mainly driven by payroll charged to capital projects, vacancies, and the unpredictable timing of responding to situations such as main breaks and customer service inquiries.

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Kim Clemons

Q.28. For each employee group, state the amount, percentage increase, and effective dates for general wage increases and, separately, for merit increases granted or to be granted in the past two calendar years and the test year.

A.28. NKWD states for all employees that it determines the amount to budget for salary increases by reviewing each employee on payroll at the time the budget is prepared. The labor budget is typically prepared during the September/October time frame. At that time, an employee roster is generated and compared to the prior year employee roster, and then the prior year's performance ranking is applied to the current year roster, and any adjustments needed for new employees are considered. As the O&M budget is developed, various percentage scenarios are created so that the projections can assume the proposed budgeted dollars for the upcoming year. Additional factors such as economic climate, and current and anticipated salary increases proposed by other agencies are considered. The dollar value for salary increases is presented as part of the budget presentation. During the budget presentation, the board is asked to approve the overall budget, and not the specific rankings at that time because performance evaluations have not been given. As part of NKWD's pay-for-performance system, performance evaluations are completed for each employee, and all rankings are returned to Human Resources. Once the known performance evaluation data is completed, various percentage increase scenarios are generated and reviewed to not exceed the previously board-approved budgeted amount in total. Staff reports back to the Board the salary increases that were implemented for all performance evaluations at a subsequent board meeting.

Year	Percentage Increase Based on Overall Evaluation Rating				Effective Date
	Exemplary	Commendable	Meets Standards	Needs Improvement	
2021 (test year)	3.5%	3%	2.5%	0.00%	January 2, 2022
2020	4%	3.5%	3%	0.00%	January 3, 2021
2019	4%	3.5%	3%	0.00%	December 29, 2019

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Kim Clemons

Q.29. For the test year and three most recent calendar years, provide a schedule reflecting the job title, duties and responsibilities of each executive officer, the number of employees who report to each officer, and to whom each officer reports, and the percentage annual increase and the effective date of each increase. For employees elected to executive officer status since the test year in the utility's most recent rate case, provide the salaries for the persons they replaced.

A.29. NKWD submits the following:

Calendar Year 2021						
Name	**Job Title**	**Duties and Responsibilities**	**Number of Employees that Report**	**Reports to**	**Percentage Annual Increase**	**Effective Date of Increase**
Ron Lovan	President/CEO	Exhibit 29-1	165 Full-time employees	Board of Commissioners	3.5%	January 31 2022
Lindsey Rechtin	VP of Finance and Support Services	Exhibit 29-2	82 Full-time employees	President / CEO	3.5%	January 2, 2022
Amy Stoffer (formerly Kramer)	VP of Engineering, Production and Water Quality	Exhibit 29-3	73 Full-time employees	President / CEO	3.5%	January 2, 2022

Calendar Year 2020						
Name	**Job Title**	**Duties and Responsibilities**	**Number of Employees that Report**	**Reports to**	**Percentage Annual Increase**	**Effective Date of Increase**
Ron Lovan	President/CEO	Exhibit 29-1	164 Full-time employees	Board of Commissioners	3.5%	January 31, 2021
Lindsey Rechtin	VP of Finance and Support Services	Exhibit 29-2	44 Full-time employees	President / CEO	3.5%	January 3, 2021
Amy Stoffer (formerly Kramer)	VP of Engineering, Production and Water Quality	Exhibit 29-3	114 Full-time employees	President / CEO	3.5%	January 3, 2021

Calendar Year 2019						
Name	**Job Title**	**Duties and Responsibilities**	**Number of Employees that Report**	**Reports to**	**Percentage Annual Increase**	**Effective Date of Increase**
Ron Lovan	President/CEO	Exhibit 29-1	160	Board of Commissioners	3.5%	January 31, 2020
Lindsey Rechtin	VP of Finance and Support Services	Exhibit 29-2	42 Full-time employees	President / CEO	5%	December 29, 2020
Amy Stoffer (formerly Kramer)	VP of Engineering, Production and Water Quality	Exhibit 29-3	113 Full-time employees	President / CEO	4%	December 29, 2020

Please note that executive officers are not elected and that no changes to the executive officers have occurred since NKWD's most recent rate case except that on August 1, 2022 Lindsey Rechtin started as President/CEO replacing Ron Lovan who retired on July 31, 2022. The position of Vice President of Finance and Support Services is vacant at the time of this filing but is expected it to be filled in the coming months.

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Stacey Kampsen and Kim Clemons

Q.30. Provide, in the format provided in Schedule I, the following information for the utility's compensation and benefits, for the three most recent calendar years and the test year. Provide the information individually for each corporate officer and by category for Directors, Managers, Supervisors, Exempt, Non-Exempt, Union, and Non-Union Hourly. Provide the amounts, in gross dollars, separately for total company operations and jurisdictional operations.

a. Regular salary or wages.

b. Overtime pay.

c. Excess vacation payout.

d. Standby/Dispatch pay.

e. Bonus and incentive pay.

f. Any other forms of incentives, including stock options or forms of deferred compensation (specify).

g. Other amounts paid and reported on the employees' W-2 (specify).

h. Healthcare benefit cost.

(1) Amount paid by the utility.

(2) Amount paid by the employee.

i. Dental benefits cost.

(1) Amount paid by the utility.

(2) Amount paid by the employee.

j. Vision benefits cost.

(1) Amount paid by the utility.

(2) Amount paid by the employee.

k. Life insurance cost.

(1) Amount paid by the utility.

(2) Amount paid by the employee.

l. Accidental death and disability benefits.

(1) Amount paid by the utility.

(2) Amount paid by the employee.

m. Defined Benefit Retirement cost.

(1) Amount paid by the utility.

(2) Amount paid by the employee.

n. Defined Contribution – 401(k) or similar plan cost. Provide the amount paid by the utility.

o. Cost of any other benefit available to an employee, including fringe benefits (specify).

A.30. NKWD submits the attached Exhibit 30-1. NKWD states it does not have categories for union and non-union.

Northern Kentucky Water District

EXHIBIT 30-1

Exhibit 30-1
Schedule I
Northern Kentucky Water District
Case No. 2022-00161
Analysis of Compensation and Benefit Data, in gross dollars
For the 12 Months Ended December 31, 2021 (Test Year)

Employee Categories	Compensation by Category							Subtotal All Compensation
	Regular Salary or Wages	Overtime Pay	Excess Vacation Payout	Standby/ Dispatch Pay	Bonus and Incentive Pay	Other forms of Incentives (including stock options or deferred compensation)	Other Amounts Paid and Reported on W-2*	
Joseph Koester (Board Member)	6,000.00	-	-	-	-	-	-	6,000.00
Douglas Wagner (Board Member)	6,000.00	-	-	-	-	-	-	6,000.00
Fred Macke (Board Member)	6,000.00	-	-	-	-	-	-	6,000.00
Clyde Cunningham (Board Member)	6,000.00	-	-	-	-	-	-	6,000.00
Jody Lange (Board Member)	6,000.00	-	-	-	-	-	-	6,000.00
Nicholas Winnike (Board Member)	1,500.00	-	-	-	-	-	-	1,500.00
Total Corporate Officers	31,500.00	-	-	-	-	-	-	31,500.00
Executives	625,937.88	-	26,991.20	-	-	-	17,532.40	670,461.48
Directors	131,575.90	-	5,055.20	-	-		41.56	136,672.66
Managers	823,971.79	-	23,766.89	-	-		3,006.37	850,745.05
Supervisors	750,658.05	1,966.12	18,272.60	-	-		2,310.33	773,207.10
Exempt	751,132.13	2,262.85	37,510.42	-	-		1,669.14	792,574.54
Non-Exempt	5,797,346.20	505,145.69	109,856.21	48,031.00	-		68,695.79	6,529,074.89
Total Other Categories	8,880,621.95	509,374.66	221,452.52	48,031.00	-	-	93,255.59	9,752,735.72
Total Amounts	8,912,121.95	509,374.66	221,452.52	48,031.00	-	-	93,255.59	9,784,235.72

* Other includes Third Party Sick, Auto Allowance, Bump Pay, Disability Insurance, Insurance Waiver, Rest Pay and Stipend.

Exhibit 30-1
Schedule I
Northern Kentucky Water District
Case No. 2022-00161
Analysis of Compensation and Benefit Dat
For the 12 Months Ended December 31

Employee Categories	Benefit Type							
	Healthcare Benefit		Dental Benefit		Vision Benefit		Life Insurance	
	Utility	Employee	Utility	Employee	Utility	Employee	Utility	Employee
Joseph Koester (Board Member)	-	-	-	-	-	-	-	-
Douglas Wagner (Board Member)	-	-	-	-	-	-	-	-
Fred Macke (Board Member)	-	-	-	-	-	-	-	-
Clyde Cunningham (Board Member)	-	-	-	-	-	-	-	-
Jody Lange (Board Member)	-	-	-	-	-	-	-	-
Nicholas Winnike (Board Member)	-	-	-	-	-	-	-	-
Total Corporate Officers	-	-	-	-	-	-	-	-
Executives	67,083.12	8,635.20	1,470.56	188.76	-	604.76	4,680.70	397.80
Directors	10,305.48	542.40	289.68	27.56	-	88.40	205.92	-
Managers	193,394.28	28,913.68	8,528.35	551.00	-	1,007.73	1,302.86	486.32
Supervisors	210,274.20	28,161.96	16,280.56	617.24	-	1,124.76	1,171.56	755.90
Exempt	194,355.81	21,300.42	17,915.59	532.43	-	1,504.64	1,163.24	92.56
Non-Exempt	2,361,534.86	297,218.63	122,360.93	6,582.80	-	16,227.08	9,056.71	10,952.82
Total Other Categories	3,036,947.75	384,772.29	166,845.67	8,499.79	-	20,557.37	17,580.99	12,685.40
Total Amounts	3,036,947.75	384,772.29	166,845.67	8,499.79	-	20,557.37	17,580.99	12,685.40

Exhibit 30-1
Schedule I
Northern Kentucky Water District
Case No. 2022-00161
Analysis of Compensation and Benefit Dat
For the 12 Months Ended December 31

Employee Categories	Accidental Death and Disability Benefit		Defined Benefit Retirement Costs		Defined Contribution Plan - Utility Contribution	Other Benefit Available	Total Compensation and Benefits	
	Utility	Employee	Utility	Employee			Utility	Employee
Joseph Koester (Board Member)	-	-	-	-	-	-	6,000.00	-
Douglas Wagner (Board Member)	-	-	-	-	-	-	6,000.00	-
Fred Macke (Board Member)	-	-	-	-	-	-	6,000.00	-
Clyde Cunningham (Board Member)	-	-	-	-	-	-	6,000.00	-
Jody Lange (Board Member)	-	-	-	-	-	-	6,000.00	-
Nicholas Winnike (Board Member)	-	-	-	-	-	-	1,500.00	-
Total Corporate Officers	-	-	-	-	-	-	31,500.00	-
Executives	7,839.27	3,670.80	153,151.61	31,366.07	-	-	904,686.74	44,863.39
Directors	1,640.36	-	33,575.11	6,567.50	-	-	182,689.21	7,225.86
Managers	7,767.72	-	193,650.47	42,752.30	-	-	1,255,388.73	73,711.03
Supervisors	5,236.76	-	191,129.77	38,111.77	-	-	1,197,299.95	68,771.63
Exempt	5,188.96	-	192,712.95	42,682.75	-	-	1,203,911.09	66,112.80
Non-Exempt	40,298.51	-	1,603,551.98	344,845.31	-	-	10,665,877.88	675,826.64
Total Other Categories	67,971.58	3,670.80	2,367,771.89	506,325.70	-	-	15,409,853.60	936,511.35
Total Amounts	67,971.58	3,670.80	2,367,771.89	506,325.70	-	-	15,441,353.60	936,511.35

Exhibit 30-1
Schedule I
Northern Kentucky Water District
Case No. 2022-00161
Analysis of Compensation and Benefit Data, in gross dollars
For the 12 Months Ended December 31, 2020

Employee Categories	Compensation by Category							Subtotal All Compensation
	Regular Salary or Wages	Overtime Pay	Excess Vacation Payout	Standby/ Dispatch Pay	Bonus and Incentive Pay	Other forms of Incentives (including stock options or deferred compensation)	Other Amounts Paid and Reported on W-2*	
Joseph Koester (Board Member)	6,000.00	-	-	-	-	-	-	6,000.00
Patricia Sommerkamp (Board Member)	4,500.00	-	-	-	-	-	-	4,500.00
Douglas Wagner (Board Member)	6,000.00	-	-	-	-	-	-	6,000.00
Fred Macke (Board Member)	6,000.00	-	-	-	-	-	-	6,000.00
Clyde Cunningham (Board Member)	6,000.00	-	-	-	-	-	-	6,000.00
Jody Lange (Board Member)	6,000.00	-	-	-	-	-	-	6,000.00
Total Corporate Officers	34,500.00	-	-	-	-	-	-	34,500.00
Executives	586,762.63	-	5,740.80	-	-	-	27,604.17	620,107.60
Directors	108,184.89	-	4,014.40	-	-	-	17.17	112,216.46
Managers	648,113.21	-	11,315.28	-	-	-	840.18	660,268.67
Supervisors	735,477.61	-	19,956.40	-	-	-	807.45	756,241.46
Exempt	756,812.35	20,172.01	13,142.40	906.00	-	-	986.63	792,019.39
Non-Exempt	5,564,074.66	537,681.39	85,394.38	51,193.80	-	-	61,617.25	6,299,961.48
Total Other Categories	8,399,425.35	557,853.40	139,563.66	52,099.80	-	-	91,872.85	9,240,815.06
Total Amounts	8,433,925.35	557,853.40	139,563.66	52,099.80	-	-	91,872.85	9,275,315.06

* Other includes Third Party Sick, Auto Allowance, Bump Pay, Disability Insurance, Insurance Waiver, Rest Pay and Stipend.

Exhibit 30-1
Schedule I
Northern Kentucky Water District
Case No. 2022-00161
Analysis of Compensation and Benefit Data, in g
For the 12 Months Ended December 31, 2020

Employee Categories	Benefit Type							
	Healthcare Benefit		Dental Benefit		Vision Benefit		Life Insurance	
	Utility	Employee	Utility	Employee	Utility	Employee	Utility	Employee
Joseph Koester (Board Member)	-	-	-	-	-	-	-	-
Patricia Sommerkamp (Board Member)	-	-	-	-	-	-	-	-
Douglas Wagner (Board Member)	-	-	-	-	-	-	-	-
Fred Macke (Board Member)	-	-	-	-	-	-	-	-
Clyde Cunningham (Board Member)	-	-	-	-	-	-	-	-
Jody Lange (Board Member)	-	-	-	-	-	-	-	-
Total Corporate Officers	-	-	-	-	-	-	-	-
Executives	67,083.12	8,635.20	1,590.86	185.64	-	594.76	4,643.91	537.78
Directors	10,305.48	542.40	1,589.32	27.56	-	88.40	162.24	48.49
Managers	156,902.40	22,954.56	5,647.96	436.80	-	687.96	979.94	752.14
Supervisors	199,687.20	25,515.12	4,402.70	562.64	-	1,209.52	1,131.78	3,146.26
Exempt	216,596.30	26,558.72	10,359.31	613.90	-	1,348.77	1,099.41	3,726.52
Non-Exempt	2,282,508.24	280,224.75	99,426.53	6,316.03	-	15,256.02	8,558.56	14,872.86
Total Other Categories	2,933,082.74	364,430.75	123,016.68	8,142.57	-	19,185.43	16,575.84	23,084.05
Total Amounts	2,933,082.74	364,430.75	123,016.68	8,142.57	-	19,185.43	16,575.84	23,084.05

Exhibit 30-1
Schedule I
Northern Kentucky Water District
Case No. 2022-00161
Analysis of Compensation and Benefit Data, in g
For the 12 Months Ended December 31, 2020

Employee Categories	Accidental Death and Disability Benefit		Defined Benefit Retirement Costs		Defined Contribution Plan - Utility Contribution	Other Benefit Available	Total Compensation and Benefits	
	Utility	Employee	Utility	Employee			Utility	Employee
Joseph Koester (Board Member)	-	-	-	-	-	-	6,000.00	-
Patricia Sommerkamp (Board Member)	-	-	-	-	-	-	4,500.00	-
Douglas Wagner (Board Member)	-	-	-	-	-	-	6,000.00	-
Fred Macke (Board Member)	-	-	-	-	-	-	6,000.00	-
Clyde Cunningham (Board Member)	-	-	-	-	-	-	6,000.00	-
Jody Lange (Board Member)	-	-	-	-	-	-	6,000.00	-
Total Corporate Officers	-	-	-	-	-	-	34,500.00	-
Executives	6,390.43	3,630.90	136,618.84	29,599.91	-	-	836,434.76	43,184.19
Directors	966.32	-	25,991.05	5,401.34	-	-	151,230.87	6,108.19
Managers	5,412.06	-	155,692.33	35,063.44	-	-	984,903.36	59,894.90
Supervisors	4,893.60	-	161,732.90	34,321.53	-	-	1,128,089.64	64,755.07
Exempt	4,749.36	-	187,056.09	43,451.70	-	-	1,211,879.86	75,699.61
Non-Exempt	37,581.83	-	1,466,512.79	332,744.72	-	-	10,194,549.44	649,414.38
Total Other Categories	59,993.60	3,630.90	2,133,604.00	480,582.64	-	-	14,507,087.93	899,056.34
Total Amounts	59,993.60	3,630.90	2,133,604.00	480,582.64	-	-	14,541,587.93	899,056.34

Exhibit 30-1
Schedule I
Northern Kentucky Water District
Case No. 2022-00161
Analysis of Compensation and Benefit Data, in gross dollars
For the 12 Months Ended December 31, 2019

Employee Categories	Compensation by Category							Subtotal All Compensation
	Regular Salary or Wages	Overtime Pay	Excess Vacation Payout	Standby/ Dispatch Pay	Bonus and Incentive Pay	Other forms of Incentives (including stock options or deferred compensation)	Other Amounts Paid and Reported on W-2*	
Joseph Koester (Board Member)	6,000.00	-	-	-	-	-	-	6,000.00
Patricia Sommerkamp (Board Member)	6,000.00	-	-	-	-	-	-	6,000.00
Douglas Wagner (Board Member)	6,000.00	-	-	-	-	-	-	6,000.00
Fred Macke (Board Member)	6,000.00	-	-	-	-	-	-	6,000.00
Clyde Cunningham (Board Member)	6,000.00	-	-	-	-	-	-	6,000.00
David Spaulding (Board Member)	2,400.00	-	-	-	-	-	-	2,400.00
Jody Lange (Board Member)	2,000.00	-	-	-	-	-	-	2,000.00
Total Corporate Officers	34,400.00	-	-	-	-	-	-	34,400.00
Executives	562,465.42	-	2,797.60	-	-	-	17,851.12	583,114.14
Directors	-	-	-	-	-	-	-	-
Managers	828,453.83	-	24,898.18	-	-	-	597.93	853,949.94
Supervisors	558,750.88	-	9,738.80	-	-	-	439.02	568,928.70
Exempt	600,260.54	62.88	4,243.65	-	-	-	370.10	604,937.17
Non-Exempt	5,605,979.88	651,933.25	47,926.29	51,758.00	-	-	45,139.58	6,402,737.00
Total Other Categories	8,155,910.55	651,996.13	89,604.52	51,758.00	-	-	64,397.75	9,013,666.95
Total Amounts	8,190,310.55	651,996.13	89,604.52	51,758.00	-	-	64,397.75	9,048,066.95

* Other includes Third Party Sick, Auto Allowance, Bump Pay, Disability Insurance, Insurance Waiver, Rest Pay and Stipend.

Exhibit 30-1
Schedule I
Northern Kentucky Water District
Case No. 2022-00161
Analysis of Compensation and Benefit Data, in gros
For the 12 Months Ended December 31, 2019

Employee Categories	Benefit Type							
	Healthcare Benefit		Dental Benefit		Vision Benefit		Life Insurance	
	Utility	Employee	Utility	Employee	Utility	Employee	Utility	Employee
Joseph Koester (Board Member)	-	-	-	-	-	-	-	-
Patricia Sommerkamp (Board Member)	-	-	-	-	-	-	-	-
Douglas Wagner (Board Member)	-	-	-	-	-	-	-	-
Fred Macke (Board Member)	-	-	-	-	-	-	-	-
Clyde Cunningham (Board Member)	-	-	-	-	-	-	-	-
David Spaulding (Board Member)	-	-	-	-	-	-	-	-
Jody Lange (Board Member)	-	-	-	-	-	-	-	-
Total Corporate Officers	-	-	-	-	-	-	-	-
Executives	69,879.12	8,994.48	6,434.75	188.76	-	502.86	4,618.30	516.88
Directors	-	-	-	-	-	-	-	-
Managers	205,025.74	28,655.63	14,720.07	540.71	-	754.83	1,262.95	712.93
Supervisors	189,477.96	24,768.72	16,956.71	510.64	-	848.13	866.58	2,310.86
Exempt	182,294.65	22,384.32	20,213.38	459.67	-	953.70	920.40	3,154.67
Non-Exempt	2,367,822.73	291,268.15	123,566.85	6,169.43	-	13,196.71	8,472.37	13,862.81
Total Other Categories	3,014,500.20	376,071.30	181,891.76	7,869.21	-	16,256.23	16,140.60	20,558.15
Total Amounts	3,014,500.20	376,071.30	181,891.76	7,869.21	-	16,256.23	16,140.60	20,558.15

Exhibit 30-1
Schedule I
Northern Kentucky Water District
Case No. 2022-00161
Analysis of Compensation and Benefit Data, in gros
For the 12 Months Ended December 31, 2019

Employee Categories	Accidental Death and Disability Benefit		Defined Benefit Retirement Costs		Defined Contribution Plan - Utility Contribution	Other Benefit Available	Total Compensation and Benefits	
	Utility	Employee	Utility	Employee			Utility	Employee
Joseph Koester (Board Member)	-	-	-	-	-	-	6,000.00	-
Patricia Sommerkamp (Board Member)	-	-	-	-	-	-	6,000.00	-
Douglas Wagner (Board Member)	-	-	-	-	-	-	6,000.00	-
Fred Macke (Board Member)	-	-	-	-	-	-	6,000.00	-
Clyde Cunningham (Board Member)	-	-	-	-	-	-	6,000.00	-
David Spaulding (Board Member)	-	-	-	-	-	-	2,400.00	-
Jody Lange (Board Member)	-	-	-	-	-	-	2,000.00	-
Total Corporate Officers	-	-	-	-	-	-	34,400.00	-
Executives	6,390.12	4,494.55	125,306.93	28,691.55	-	-	795,743.36	43,389.08
Directors	-	-	-	-	-	-	-	-
Managers	6,379.31	-	184,497.72	43,095.13	-	-	1,265,835.73	73,759.23
Supervisors	3,778.76	-	114,022.30	25,035.80	-	-	894,031.01	53,474.15
Exempt	4,024.34	-	136,672.88	33,513.54	-	-	949,062.82	60,465.90
Non-Exempt	38,049.34	-	1,414,859.15	336,487.49	-	-	10,355,507.45	660,984.59
Total Other Categories	58,621.87	4,494.55	1,975,358.98	466,823.51	-	-	14,260,180.36	892,072.95
Total Amounts	58,621.87	4,494.55	1,975,358.98	466,823.51	-	-	14,294,580.36	892,072.95

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Kim Clemons

Q.31. For each benefit listed in Item 30 above for which an employee is required to pay part of the cost, provide a detailed explanation as to how the employee contribution rate was determined.

A.31. District employees share in the cost of health insurance coverage. All regular and temporary full-time employees of the District and their dependents are eligible for health care and dental benefits. Such employees are expected to pay twenty percent (20%) of the difference in cost for a single plan and the applicable three-level coverage the employee has chosen. All employees electing single plan coverage are expected to pay 5% of the cost.

Employees pay 100% of their vision insurance.

The District's dental plan is a self-funded plan, therefore there are no premiums. All District employees electing dental coverage pay a fixed 5% based on Fully Insured Equivalent rates.

Life and AD&D insurance of one-time annual salary is paid by the District. Short and Long term disability is paid by the District. Voluntary life insurance is paid by the employee.

The District is a participant in CERS. The KRS sets the contribution rate for employees. Employees hired on or before 8/31/2008 contribute 5% of gross wages. Employees hired on or after 9/1/2008 contribute 5% of gross wages, plus 1% of gross wages for health coverage in retirement.

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Kim Clemons

Q.32. Provide a listing of all health care plan categories, dental plan categories, and vision plan categories available to corporate officers individually and to groups defined as Directors, Managers, Supervisors, Exempt, Non-Exempt, Union, and Non-Union Hourly employees (e.g., single, family, etc.). Include the associated employee contribution rates and employer contribution rates of the total premium cost for each category, and each plan's deductible(s) amounts.

A.32. NKWD submits as follows which is available to all full-time employees for the test year 2021:

HEALTH CARE PLAN CATEGORIES	Employee Contribution Rates	Employer Contribution Rates	In-Network Deductible Amount	Out-of-Network Deductible Amount
Single	5%	95%	$0	$300 Single/$600 Family
Employee + Spouse	10%	90%	$0	$300 Single/$600 Family
Employee + Dependent	9%	91%	$0	$300 Single/$600 Family
Family	14%	86%	$0	$300 Single/$600 Family

DENTAL PLAN CATEGORIES - Basic	Employee Contribution Rates	Employer Contribution Rates	In-Network Deductible Amount	Out-of-Network Deductible Amount
Single	5%	95%	$50 Single/$150 Family	$50 Single/$150 Family
Employee + Spouse	5%	95%	$50 Single/$150 Family	$50 Single/$150 Family
Employee + Dependent	5%	95%	$50 Single/$150 Family	$50 Single/$150 Family
Family	5%	95%	$50 Single/$150 Family	$50 Single/$150 Family

DENTAL PLAN CATEGORIES - Enhanced	Employee Contribution Rates	Employer Contribution Rates	In-Network Deductible Amount	Out-of-Network Deductible Amount
Single	5%	95%	$25 Single/$50 Family	$25 Single/$50 Family
Employee + Spouse	5%	95%	$25 Single/$50 Family	$25 Single/$50 Family
Employee + Dependent	5%	95%	$25 Single/$50 Family	$25 Single/$50 Family
Family	5%	95%	$25 Single/$50 Family	$25 Single/$50 Family

VISION PLAN CATEGORIES	Employee Contribution Rates	Employer Contribution Rates	In-Network Deductible Amount	Out-of-Network Deductible Amount
Single	100%	0%	$N/A	$N/A
Employee + Spouse	100%	0%	$N/A	$N/A
Employee + Dependent	100%	0%	$N/A	$N/A
Family	100%	0%	$N/A	$N/A

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Kim Clemons

Q.33. Provide each medical insurance policy that the utility currently maintains.

A.33. A copy of NKWD's Health Insurance Policy is attached hereto as Exhibit 33-1. A copy of NKWD's Dental Insurance Policy is attached hereto as Exhibit 33-2. A copy of NKWD's Vision Insurance Policy is attached hereto as Exhibit 33-3. The attached policies were in effect for the 2021 test year and are the same for 2022.

EXHIBIT 33-1

-

UnitedHealthcare of Kentucky, Ltd.

Group Policy

For

Northern Kentucky Water District

Enrolling Group Number: 903813

Policy Effective Date: January 1, 2021

UnitedHealthcare of Kentucky, Ltd.

230 Lexington Green Circle, Suite 400

Lexington, KY 40503

(859) 825-6132 (800) 495-5285

READ YOUR POLICY CAREFULLY. This cover sheet provides only a brief outline of some of the important features of your policy. This is not the insurance contract and only the actual policy provisions will control. The policy itself sets forth, in detail, the rights and obligations of both you and your insurance company. IT IS THEREFORE IMPORTANT THAT YOU READ YOUR POLICY.

PCOV.ACA.H.11.KA.NGF.KY

Group Policy

UnitedHealthcare of Kentucky, Ltd.

This Policy is a legal contract entered into by and between UnitedHealthcare of Kentucky, Ltd. and the "Enrolling Group," as described in Exhibit 1.

When used in this document, the words "we," "us," and "our" are referring to UnitedHealthcare of Kentucky, Ltd.

Upon our receipt of the Enrolling Group's signed application and payment of the first Policy Charge, this Policy is deemed executed.

We agree to provide Benefits for Covered Health Services set forth in this Policy, including the attached *Certificate(s) of Coverage* and *Schedule(s) of Benefits*, subject to the terms, conditions, exclusions, and limitations of this Policy. The Enrolling Group's application is made a part of this Policy.

This Policy replaces and overrules any previous agreements relating to Benefits for Covered Health Services between the Enrolling Group and us. The terms and conditions of this Policy will in turn be overruled by those of any subsequent agreements relating to Benefits for Covered Health Services between the Enrolling Group and us.

We will not be deemed or construed as an employer or plan administrator for any purpose with respect to the administration or provision of benefits under the Enrolling Group's benefit plan. We are not responsible for fulfilling any duties or obligations of an employer or plan administrator with respect to the Enrolling Group's benefit plan.

This Policy will become effective on the date specified in Exhibit 1 and will be continued in force by the timely payment of the required Policy Charges when due, subject to termination of this Policy as provided in Article 5.

When this Policy is terminated, as described in Article 5, this Policy and all Benefits under this Policy will end at 12:00 midnight on the date of termination.

This Policy is issued as described in Exhibit 1.

Issued By:

UNITEDHEALTHCARE OF KENTUCKY, LTD.

Kimberly Sonerholm, President and CEO

Group Policy Table of Contents

Article 1: Glossary of Defined Terms

The terms used in this Policy have the same meanings given to those terms in *Section 9: Defined Terms* of the attached *Certificate(s) of Coverage*.

Coverage Classification - one of the categories of coverage described in Exhibit 2 for rating purposes (for example: Subscriber only, Subscriber and spouse, Subscriber and children, Subscriber and family).

Material Misrepresentation - any written communication that is untrue and is intended to create a misleading impression in the mind of another person. A misrepresentation is material if we in good faith would either not have issued this Policy, or would not have issued it at the same premium rate, or would not have issued a policy in as large an amount, or would not have provided coverage with respect to the hazard resulting in the loss, if the true facts had been known to us as required either by the application for this Policy or otherwise.

Article 2: Benefits

Subscribers and their Enrolled Dependents are entitled to Benefits for Covered Health Services subject to the terms, conditions, limitations and exclusions set forth in the *Certificate(s) of Coverage* and *Schedule(s) of Benefits* attached to this Policy. Each *Certificate of Coverage* and *Schedule of Benefits*, including any Riders and Amendments, describes the Covered Health Services, required Copayments, and the terms, conditions, limitations and exclusions related to coverage.

Article 3: Premium Rates and Policy Charge

3.1 Premiums

Monthly Premiums payable by or on behalf of Covered Persons are specified in the *Schedule of Premium Rates* in Exhibit 2 of this Policy or in any attached *Notice of Change*.

We reserve the right to change the *Schedule of Premium Rates* as described in Exhibit 1 of this Policy. We also reserve the right to change the *Schedule of Premium Rates* at any time after the current rate has been in effect for a period of 12 months, if the *Schedule of Premium Rates* was based upon an intentional Material Misrepresentation that resulted in the Premium rates being lower than they would have been if the intentional Material Misrepresentation had not been made. We reserve the right to change the *Schedule of Premium Rates* for this reason retroactive to the effective date of the *Schedule of Premium Rates* that was based on the intentional Material Misrepresentation.

3.2 Computation of Policy Charge

The Policy Charge will be calculated based on the number of Subscribers in each Coverage Classification that we show in our records at the time of calculation. The Policy Charge will be calculated using the Premium rates in effect at that time. Exhibit 1 describes the way in which the Policy Charge is calculated.

3.3 Adjustments to the Policy Charge

We may make retroactive adjustments for any additions or terminations of Subscribers or changes in Coverage Classification that are not reflected in our records at the time we calculate the Policy Charge. We will not grant retroactive credit or refund for any change occurring more than 60 days prior to the date we received notification of the change from the Enrolling Group. We also will not grant retroactive credit or refund for any calendar month in which a Subscriber has received Benefits. Coverage will remain in force for a Covered Person for the period of time in which premiums have been paid or for coverage that has been terminated, a refund will be provided for any premiums collected.

The Enrolling Group must notify us in writing within 60 days of the effective date of enrollments, terminations, or other changes. The Enrolling Group must notify us in writing each month of any change in the Coverage Classification for any Subscriber.

If premium taxes, guarantee or uninsured fund assessments, or other governmental charges relating to or calculated in regard to Premium are either imposed or increased, those charges will be submitted to the *Kentucky Department of Insurance* for approval before being added to the Premium, and only after the current Premium has been in effect for a period of 12 months. In addition, any change in law or regulation that significantly affects our cost of operation will result in an increase or decrease in Premium after the current Premium has been in effect for a period of 12 months, and with approval from the *Kentucky Department of Insurance.*

If this Policy is terminated, we will promptly return the unearned portion of the Policy Charge that has been paid. The termination will be without prejudice to any claim originating prior to the effective date of termination.

3.4 Payment of the Policy Charge

The Policy Charge is payable to us in advance by the Enrolling Group as described under "Payment of the Policy Charge" in Exhibit 1. The first Policy Charge is due and payable on or before the effective date of this Policy. Subsequent Policy Charges are due and payable no later than the first day of each payment period specified in item 6 of Exhibit 1, while this Policy is in force.

All payments shall be made in United States dollars, in immediately available funds, and shall be remitted to us at the address set forth in the Enrolling Group's application, or at such other address as we may from time to time designate in writing. The Enrolling Group agrees not to send us payments marked "paid in full", "without recourse", or similar language. In the event that the Enrolling Group sends such a payment, we may accept it without losing any of our rights under this Policy and the Enrolling Group will remain obligated to pay any and all amounts owed to us.

A late payment charge, not exceeding 18 percent per annum, will be assessed for any Policy Charge not received within 31 calendar days following the due date. A service charge will be assessed for any non-sufficient-fund check received in payment of the Policy Charge. All Policy Charge payments must be accompanied by supporting documentation that states the names of the Covered Persons for whom payment is being made.

The Enrolling Group must reimburse us for attorney's fees and any other costs related to collecting delinquent Policy Charges.

3.5 Grace Period

A grace period of 31 days will be granted for the payment of any Policy Charge not paid when due. During the grace period, this Policy will continue in force. The grace period will not extend beyond the date this Policy terminates.

The Enrolling Group is liable for payment of the Policy Charge during the grace period. If we receive written notice from the Enrolling Group to terminate this Policy during the grace period, we will adjust the Policy Charge so that it applies only to the number of days this Policy was in force during the grace period.

This Policy terminates as described in Article 5.1 if the grace period expires and the past due Policy Charge remains unpaid.

Article 4: Eligibility and Enrollment

4.1 Eligibility Conditions or Rules

Eligibility conditions or rules for each class are stated in the corresponding Exhibit 2. The eligibility conditions stated in Exhibit 2 are in addition to those specified in *Section 3: When Coverage Begins* of the *Certificate of Coverage*.

4.2 Initial Enrollment Period

Eligible Persons and their Dependents may enroll for coverage under this Policy during the Initial Enrollment Period. The Initial Enrollment Period is determined by the Enrolling Group.

4.3 Open Enrollment Period

An Open Enrollment Period will be provided periodically for each class, as specified in the corresponding Exhibit 2. During an Open Enrollment Period, Eligible Persons may enroll for coverage under this Policy.

4.4 Effective Date of Coverage

The effective date of coverage for properly enrolled Eligible Persons and their Dependents is stated in Exhibit 2.

Article 5: Policy Termination

5.1 Conditions for Termination of the Entire Policy

This Policy and all Benefits for Covered Health Services under this Policy will automatically terminate on the earliest of the dates specified below, with at least 30 days prior written notice, by regular United States first class mail, unless otherwise stated:

A. On the last day of the grace period if the Policy Charge remains unpaid. If the Policy Charge is not paid at the conclusion of the 31 grace period, this Policy shall automatically terminate to the last date through which the Premium was paid. The Enrolling Group remains liable for payment of the Policy Charge for the period of time this Policy remained in force during the grace period.

B. On the date specified by the Enrolling Group, after at least 31 days prior written notice to us that this Policy is to be terminated.

C. On the date we specify, after at least 31 days prior written notice to the Enrolling Group, that this Policy is to be terminated due to the Enrolling Group's violation of the participation and contribution rules as shown in Exhibit 1.

D. On the date we specify, after at least 31 days prior written notice to the Enrolling Group, that this Policy is to be terminated because the Enrolling Group performed an act, practice or omission that constituted fraud or made an intentional misrepresentation of a fact that was material to the execution of this Policy or to the provision of coverage under this Policy. In this case, we have the right to rescind this Policy back to either:

   - The effective date of this Policy.
   - The date of the act, practice or omission, if later.

E. On the date we specify, after at least 90 days prior written notice to the Enrolling Group, that this Policy is to be terminated because we will no longer issue this particular type of group health benefit plan within the applicable market. If this occurs, we will offer each Enrolling Group the

option to purchase a similar employer health benefit plan that we may have within the applicable market. When discontinuing coverage, we will act uniformly without regard to any health status-related factor of the Covered Persons or persons who may become eligible for coverage.

F. On the date we specify, after at least 180 days prior written notice to the applicable state authority and to the Enrolling Group, that this Policy is to be terminated because we will no longer issue any employer health benefit plan within the applicable market. When discontinuing coverage, we will act uniformly without regard to any health status-related factor of the Covered Persons or persons who may become eligible for coverage.

G. On the date we specify, in written notice to the Enrolling Group, that this Policy shall be terminated because the Enrolling Group has engaged in intentional and abusive noncompliance with the material provisions of this Policy.

The Enrolling Group shall be responsible for mailing a copy of the termination notice to each Covered Person. The Enrolling Group shall also provide proof of the mailing, including the date, to us. We will provide each Covered Person with written notification of the right to conversion coverage within 15 business days after the end of the grace period.

If this Policy is terminated, we will promptly return the unearned portion of the Policy Charge that has been paid. The termination will be without prejudice to any claim originating prior to the effective date of termination.

If we fail to provide the required 30-day notice, the coverage shall remain in effect at the existing Policy Charge until 30 days after the notice is given or until the effective date of the replacement coverage obtained by the Covered Person, whichever occurs first.

5.2 Payment and Reimbursement Upon Termination

Upon any termination of this Policy, the Enrolling Group is and will remain liable to us for the payment of any and all Premiums which are unpaid at the time of termination, including a pro rata portion of the Policy Charge for any period this Policy was in force during the grace period preceding the termination.

5.3 Notice of Termination

The Enrolling Group must promptly mail a true copy of our notice to terminate this Policy to each Covered Person. The notice must include clear and easily understandable information. The Enrolling Group is also responsible for providing us with prompt proof that copies of the notice of termination have been mailed to all Covered Persons, including the date of the mailing. We will provide each Covered Person with written notification of the right to conversion coverage within 15 business days after the end of the grace period.

5.4 Reinstatement

If the Policy Charge remains unpaid at the conclusion of the 31 day grace period, our subsequent acceptance of that Policy Charge will reinstate this Policy, without requiring an application. However, if we require an application for reinstatement and issue a conditional receipt for the Policy Charge tendered, this Policy shall be reinstated upon our approval of the application, or upon the 45th day following the date of the conditional receipt, unless we have previously provided notification of our disapproval of the application.

The reinstated Policy shall cover any accidental Injury sustained after the date of the reinstatement or any Sickness that begins more than 10 days after reinstatement. Otherwise, each Covered Person shall have the same rights they had under this Policy immediately prior to the date of the defaulted Policy Charge.

Article 6: General Provisions

6.1 Entire Policy

This Policy, including the *Certificate(s) of Coverage*, the *Schedule(s) of Benefits*, the application of the Enrolling Group, and any Amendments, Notices of Change, and Riders, constitute the entire Policy between the parties. All statements made by the Enrolling Group or by a Subscriber will, in the absence of fraud, be deemed representations and not warranties. Any statement made for the purpose of effecting insurance will not void the insurance or reduce Benefits unless contained in a written instrument signed by the Enrolling Group or Subscriber.

6.2 Limitation of Action

Prior to bringing any legal proceeding or action, you are encouraged to complete all steps of the appeal process as described in *Section 6: Questions, Complaints and Appeals* of the *Certificate of Coverage*. Any legal proceeding or action must be initiated within one year from the date the cause of action first arose.

6.3 Time Limit on Certain Defenses

No statement made by the Enrolling Group, except a fraudulent statement, can be used to void this Policy after it has been in force for a period of two years.

6.4 Amendments and Alterations

Amendments to this Policy are effective 31 days after we send written notice to the Enrolling Group. Riders are effective on the date we specify. Other than changes to Exhibit 2 stated in a Notice of Change to Exhibit 2, no change will be made to this Policy unless made by an Amendment or a Rider which is signed by one of our authorized executive officers. No agent has authority to change this Policy or to waive any of its provisions.

6.5 Relationship between Parties

The relationships between us and Network providers, and relationships between us and Enrolling Groups, are solely contractual relationships between independent contractors. Network providers and Enrolling Groups are not our agents or employees, nor are we or any of our employees an agent or employee of Network providers or Enrolling Groups.

The relationship between a Network provider and any Covered Person is that of provider and patient. The Network provider is solely responsible for the services provided by it to any Covered Person. The relationship between any Enrolling Group and any Covered Person is that of employer and employee, Dependent, or any other category of Covered Person described in the Coverage Classifications specified in this Policy.

The Enrolling Group is solely responsible for enrollment and Coverage Classification changes (including termination of a Covered Person's coverage) and for the timely payment of the Policy Charges.

6.6 Records

The Enrolling Group must furnish us with all information and proofs which we may reasonably require with regard to any matters pertaining to this Policy. We may at any reasonable time inspect:

- All documents furnished to the Enrolling Group by an individual in connection with coverage.
- The Enrolling Group's payroll.

- Any other records pertinent to the coverage under this Policy.

By accepting Benefits under this Policy, each Covered Person authorizes and directs any person or institution that has provided services to him or her, to furnish us or our designees any and all information and records or copies of records relating to the health care services provided to the Covered Person. We have the right to request this information at any reasonable time. This applies to all Covered Persons, including Enrolled Dependents whether or not they have signed the Subscriber's enrollment form.

We agree that such information and records will be considered confidential. We have the right to release any and all records concerning health care services which are necessary to implement and administer the terms of this Policy including records necessary for appropriate medical review and quality assessment or as we are required by law or regulation.

During and after the term of this Policy, we and our related entities may use and transfer the information gathered under this Policy for research and analytic purposes.

6.7 Administrative Services

The services necessary to administer this Policy and the Benefits provided under it will be provided in accordance with our standard administrative procedures or those standard administrative procedures of our designee. If the Enrolling Group requests that administrative services be provided in a manner other than in accordance with these standard procedures, including requests for non-standard reports, the Enrolling Group must pay for such services or reports at the then current charges for such services or reports.

We may offer to provide administrative services to the Enrolling Group for certain wellness programs including, but not limited to, fitness programs, biometric screening programs and wellness coaching programs.

6.8 Employee Retirement Income Security Act (ERISA)

When this Policy is purchased by the Enrolling Group to provide benefits under a welfare plan governed by the federal *Employee Retirement Income Security Act* 29 U.S.C., 1001 et seq., we will not be named as, and will not be, the plan administrator or the named fiduciary of the welfare plan, as those terms are used in ERISA.

6.9 Examination of Covered Persons

In the event of a question or dispute concerning Benefits for Covered Health Services, we may reasonably require that a Network Physician, acceptable to us, examine the Covered Person at our expense.

6.10 Clerical Error

Clerical error will not deprive any individual of Benefits under this Policy or create a right to Benefits. Failure to report enrollments will not be considered a clerical error and will not result in retroactive coverage for Eligible Persons. Failure to report the termination of coverage will not continue the coverage for a Covered Person beyond the date it is scheduled to terminate according to the terms of this Policy. Upon discovery of a clerical error, any necessary appropriate adjustment in Premiums will be made. However, we will not grant any such adjustment in Premiums or coverage to the Enrolling Group for more than 60 days of coverage prior to the date we received notification of the clerical error. Coverage will remain in force for a Covered Person for the period of time in which premiums have been paid or for coverage that has been terminated, a refund will be provided for any premiums collected.

If this Policy is terminated, we will promptly return the unearned portion of the Policy Charge that has been paid. The termination will be without prejudice to any claim originating prior to the effective date of termination.

6.11 Workers' Compensation Not Affected

Benefits provided under this Policy do not substitute for and do not affect any requirements for coverage by workers' compensation insurance.

6.12 Conformity with Law

Any provision of this Policy which, on its effective date, is in conflict with the requirements of state or federal statutes or regulations (of the jurisdiction in which this Policy is delivered) is deemed to be amended to conform to the minimum requirements of those statutes and regulations.

6.13 Notice

When we provide written notice regarding administration of this Policy to an authorized representative of the Enrolling Group, that notice is deemed notice to all affected Subscribers and their Enrolled Dependents. The Enrolling Group is responsible for giving notice to Covered Persons on a timely basis.

Any notice sent to us under this Policy and any notice sent to the Enrolling Group must be addressed as described in Exhibit 1.

6.14 Continuation Coverage

We agree to provide Benefits under this Policy for those Covered Persons who are eligible to continue coverage under federal or state law, as described in *Section 4: When Coverage Ends* of the *Certificate of Coverage*.

We will not provide any administrative duties with respect to the Enrolling Group's compliance with federal or state law except those duties described in *Section 4: When Coverage Ends* of the *Certificate of Coverage*. All other duties of the plan sponsor or plan administrator remain the sole responsibility of the Enrolling Group, such as notification of COBRA and/or state law continuation rights and billing and collection of Premium for COBRA and/or state continuation.

6.15 Certification of Coverage Forms

As required by the federal *Health Insurance Portability and Accountability Act of 1996 (HIPAA)*, we will produce certification of coverage forms for Covered Persons who lose coverage under this Policy. The Enrolling Group agrees to provide us with all necessary eligibility and termination data. Certification of coverage forms will be based on eligibility and termination data that the Enrolling Group provides to our eligibility systems in accordance with our data specifications, and which is available in our eligibility systems as of the date the form is generated. The certification of coverage forms will only include periods of coverage that we administer under this Policy.

6.16 Subscriber's Individual Certificate and Summary of Benefits and Coverage

We will issue *Certificate(s) of Coverage*, *Schedule(s) of Benefits*, and any attachments to the Enrolling Group for delivery to each covered Subscriber. The *Certificate(s) of Coverage*, *Schedule(s) of Benefits*, and any attachments will show the Benefits and other provisions of this Policy. In addition, you may have access to your *Certificate(s) of Coverage* and *Schedule(s) of Benefits* online at www.myuhc.com.

We will issue a Summary of Benefits and Coverage form containing the essential features of coverage to the Enrolling Group for delivery to each covered Subscriber.

6.17 Summary of Benefits and Coverage

We will provide a *Summary of Benefits and Coverage ("SBC")*, as required by the *Affordable Care Act* and associated regulations *("ACA")*, to the Enrolling Group for each benefit plan purchased by the

Enrolling Group. The Enrolling Group shall be responsible for delivering the *SBC* to all Covered Persons and to other persons eligible for coverage in the manner and at the times required by the *ACA*, unless we notify the Enrolling Group that we will deliver the *SBC* to Covered Persons and other persons eligible for coverage.

6.18 System Access

The term "systems" as used in this provision means our systems that we make available to the Enrolling Group to facilitate the transfer of information in connection with this Policy.

System Access

We grant the Enrolling Group the nonexclusive, nontransferable right to access and use the functionalities contained within the systems, under the terms set forth in this Policy. The Enrolling Group agrees that all rights, title and interest in the systems and all rights in patents, copyrights, trademarks and trade secrets encompassed in the systems will remain ours. In order to obtain access to the systems, the Enrolling Group will obtain, and be responsible for maintaining, at no expense to us, the hardware, software and Internet browser requirements we provide to the Enrolling Group, including any amendments to those requirements. The Enrolling Group is responsible for obtaining an internet service provider or other access to the Internet.

The Enrolling Group will not:

- Access systems or use, copy, reproduce, modify, or excerpt any of the systems documentation provided by us in order to access or utilize systems, for purposes other than as expressly permitted under this Policy.
- Share, transfer or lease its right to access and use systems, to any other person or entity which is not a party to this Policy.

The Enrolling Group may designate any third party to access systems on its behalf, provided the third party agrees to these terms and conditions of systems access and the Enrolling Group assumes joint responsibility for such access.

Security Procedures

The Enrolling Group will use commercially reasonable physical and software-based measures, and comply with our security procedures, as may be amended from time to time, to protect the system, its functionalities, and data accessed through systems from any unauthorized access or damage (including damage caused by computer viruses). The Enrolling Group will notify us immediately if any breach of the security procedures, such as unauthorized use, is suspected.

System Access Termination

We reserve the right to terminate the Enrolling Group's system access:

- On the date the Enrolling Group fails to accept the hardware, software and browser requirements provided by us, including any amendments to the requirements.
- Immediately on the date we reasonably determine that the Enrolling Group has breached, or allowed a breach of, any applicable provision of this Policy. Upon termination of this Policy, the Enrolling Group agrees to cease all use of systems, and we will deactivate the Enrolling Group's identification numbers and passwords and access to the system.

Exhibit 1

1. **Parties**. The parties to this Policy are UnitedHealthcare of Kentucky, Ltd. and Northern Kentucky Water District, the Enrolling Group.

2. **Effective Date of this Policy**. The effective date of this Policy is 12:01 a.m. on January 1, 2021 in the time zone of the Enrolling Group's location.

3. **Place of Issuance**. We are delivering this Policy in the State of Kentucky. This Policy is governed by ERISA. To the extent that state law applies, the laws of the State of Kentucky are the laws that govern this Policy.

4. **Premiums**. We reserve the right to change the *Schedule of Premium Rates* specified in Exhibit 2, after a 45-day prior written notice on the first anniversary of the effective date of this Policy specified in the application or on any anniversary date thereafter, or on any date the provisions of this Policy are amended, but only after the current Premium rates have been in effect for a period of 12 months and only after the new Premium rates have been submitted to and approved by the *Kentucky Department of Insurance*. We also reserve the right to change the *Schedule of Premium Rates,* retroactive to the effective date, if an intentional Material Misrepresentation has resulted in a lower schedule of rates at any time.

5. **Computation of Policy Charge**. A full calendar month's Premiums will be charged for Covered Persons whose effective date of coverage falls on or before the 15th of that calendar month. No Premiums will be charged for Covered Persons whose effective date of coverage falls after the 15th of that calendar month. A full calendar month's Premiums will be charged for Covered Persons whose coverage is terminated after the 15th of that calendar month. No Premiums will be charged for Covered Persons whose coverage is terminated on or before the 15th of that calendar month.

6. **Payment of the Policy Charge**. The Policy Charge is payable to us in advance by the Enrolling Group on a monthly basis.

7. **Minimum Participation Requirement**. The minimum participation requirement for the Enrolling Group is 100% of Eligible Persons excluding spousal waivers but no less than 50% of all Eligible Persons must be enrolled for coverage under this Policy.

8. **Minimum Contribution Requirement**. The Enrolling Group must maintain a minimum contribution requirement of 100% of the Premium for each Eligible Person.

9. **Notice**. Any notice sent to us under this Policy must be addressed to:

   UnitedHealthcare of Kentucky, Ltd.

   230 Lexington Green Circle

   Suite 400

   Lexington, Kentucky 40503

   Any notice sent to the Enrolling Group under this Policy must be addressed to:

   Northern Kentucky Water District

   2835 Crescent Springs Rd

   Erlanger, Kentucky 41018

10. 903813: Enrolling Group Number

Exhibit 2

1. **Class Description**.

   All Employees enrolled in UnitedHealthcare Choice Plus Plan DSC.

2. **Eligibility**. The eligibility rules are established by the Enrolling Group. The following eligibility rules are in addition to the eligibility rules specified in the Employer Application and/or in *Section 3: When Coverage Begins* of the *Certificate of Coverage*:

   A. The waiting or probationary period for newly Eligible Persons shall not exceed 90 days, and is as follows:

      None

   B. Other:

      None

3. **Open Enrollment Period**. An Open Enrollment Period of at least 30 days will be provided by the Enrolling Group during which Eligible Persons may enroll for coverage. The Open Enrollment Period will be provided on an annual basis.

4. **Effective Date for Eligible Persons**. The effective date of coverage for Eligible Persons who are eligible on the effective date of this Policy is January 1, 2021.

   For an Eligible Person who becomes eligible after the effective date of this Policy, his or her effective date of coverage is the date the Eligible Person joins the Enrolling Group. Any required waiting period will not exceed 90 days.

5. **Schedule of Premium Rates**.

   The *Schedule of Premium Rates* payable by or on behalf of this class of Covered Persons as of January 1, 2021 is shown below:

Coverage Classification	**Monthly Premium**
Employee Only	$887.99
Employee plus Spouse	$1,773.92
Employee plus Child(ren)	$1,611.20
Employee plus Family	$2,876.74

   Changes to this *Schedule of Premium Rates* and/or subsequent *Schedules of Premium Rates* will be attached to this Policy by means of a *Notice of Change to Exhibit 2*.

UnitedHealthcare of Kentucky, Ltd.

230 Lexington Green Circle, Suite 400

Lexington, KY 40503

(859) 825-6132 (800) 495-5285

Exhibit 3 - Premium Credit

The Enrolling Group may be eligible for a Premium reduction credit. All subsequent Policy Charge due dates, grace periods, and other requirements of the Policy will remain unchanged and unaffected by this Premium credit. In the event the Policy ends less than one year from the date the Premium credit is granted, the Enrolling Group agrees to pay the pro rata cost of the Premium credit.

EXHIBIT 33-2

The Dental Care PLUS GROUP

Benefit Summary

Northern Kentucky Water District

BASIC-PPO

Product: DPPO

Network: DentaSelect Plus

Benefit Year: The 12 month period beginning January 1st and ending December 31st (calendar year)

Annual Maximum Benefit: $2000 per Member

Orthodontic Lifetime Maximum Benefit: $1250 per Eligible Member
Limited to eligible dependent children under age 19

Deductible: Deductible for services provided by an In-Network Provider

$50 per Member, per Benefit Year
$150 per Family, per Benefit Year

Deductible for services provided by an Out-of-Network Provider

$50 per Member, per Benefit Year
$150 per Family, per Benefit Year

The deductible applies to Basic and Major Benefits only
Any deductible amount that is satisfied will be applied toward both the In-Network and Out-of-Network deductibles

Covered Dental Services	Deductible Applied	In Network		Out-of Network	
		Percentage of Allowable Expense Paid by the Plan	*Member Copayment*	*Percentage of Allowable Expense Paid by the Plan*	*Member Copayment*
Preventive Benefits	No	100%	None	100%	None
Basic Benefits	Yes	80%	20%	80%	20%
Major Benefits	Yes	50%	50%	50%	50%
Orthodontic Benefits	No	50% Limited to eligible dependent children under age 19	50%	50% Limited to eligible dependent children under age 19	50%

Out of network claims are reimbursed at the Defined 800 level.
Endodontic Services are covered as Major Benefits.
Periodontic Services are covered as Major Benefits.
Sealants are covered as Preventive Benefits.

Dependent children are eligible for coverage until age 26.

A complete description of covered services, limitations and exclusions is available in the Summary Plan Description. Members who receive services from a non-participating provider are subject to balance billing.

Summary
Plan Description
For
Northern Kentucky
Water District

NKWD 001759

NOTICE: IF YOU OR YOUR FAMILY MEMBERS ARE COVERED BY MORE THAN ONE DENTAL CARE PLAN, YOU MAY NOT BE ABLE TO COLLECT BENEFITS FROM BOTH PLANS. EACH PLAN MAY REQUIRE YOU TO FOLLOW ITS RULES OR USE SPECIFIC DENTISTS, AND IT MAY BE IMPOSSIBLE TO COMPLY WITH BOTH PLANS AT THE SAME TIME. READ ALL OF THE RULES VERY CAREFULLY, INCLUDING THE COORDINATION OF BENEFITS.

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INTRODUCTION

Northern Kentucky Water District is pleased to present its self-insured DentaSelect Plus dental Plan. As Members of the Plan, You and Your eligible dependents are entitled to access providers who participate in the DentaSelect Plus (DSP) Preferred Provider Organization which is a network of dentists offered by the Dental Care Plus Group. The Plan, as described in this booklet, became effective January 1, 2019 and provides dental coverage for You and Your eligible dependents. It is very important that You read this booklet so that You become familiar with Your benefits and how to use them.

This document outlines eligibility requirements, services covered and Plan limits as well as how to file a claim and how to find an answer when You have a question.

We recommend that You use this booklet as Your first source of reference when You have questions about the Plan, Your benefits, and Your rights. If You have questions that don't appear to be covered in this booklet, please do not hesitate to contact the Claims Administrator, DCP Holding Company, which is part of The Dental Care Plus Group. DCP Holding Company keeps records of individual Plan Participants and supervises the administration of the Plan. The address of The Dental Care Plus Group and DCP Holding Company is listed on the back cover. When communicating with DCP Holding Company, be sure to indicate that Your Plan is a DentaSelect Plus Plan.

SECTION 1 - PLAN DEFINITIONS

Accidental Injury - an accidental physical injury to the body caused by unexpected means that does not arise out of or in the course of employment.

Actively at Work - an Employee, as hired by the Employer, working full-time and paid regular earnings (temporary or seasonal employment is excluded) for a specific task or set of responsibilities.

This includes:

- working a specified number of hours each week, and
- working at the Employer's usual place of business or at a location to which Your Employer's business requires You to travel.

An Employee who does not complete his/her work assignments due to leave of absence, Disability, strike, or layoff is not Actively at Work.

Allowable Expense - the maximum allowable amount that the Plan establishes for a Covered Dental Service. The Plan will pay based on the lesser of the actual billed charge or the Allowable Expense, subject to the coverage levels referenced in the Schedule of Benefits. If services are obtained from an Out-of-Network Provider, the Member is responsible for payment to the Dentist for the difference between the Dentist's actual charge and the Allowable Expense.

Annual Maximum Benefit - the maximum amount payable under the Plan for Covered Dental Services received by a Member in a Benefit Year.

Benefit Year (Calendar Year) - the calendar year begins January 1 and ends December 31st.

Claims Administrator - DCP Holding Company (which is part of The Dental Care Plus Group), the organization designated by the Employer to administer claims for the Plan.

Company – Northern Kentucky Water District.

Copayment - the amount which the Member is required to pay for certain dental services covered under the Plan. Copayments may be a fixed dollar amount or a percentage of the Allowable Expense. The Member is responsible for payment of the Copayment directly to the Dentist. See Schedule of Benefits for Copayment levels.

Covered Dental Services / Covered Services - services which are covered under the Plan and for which the Plan will pay part or all of the Allowable Expense. Covered Dental Services are described in the Covered Dental Services section of this Summary Plan Description. Covered Dental Services does not include services that exceed any Plan limitations or maximum benefit levels.

Covered Dependent - a spouse or Dependent Child who is eligible for coverage and enrolled under the Plan.

Deductible - the amount which the Member is required to pay for Covered Dental Services before benefits are paid under the Plan. The Deductible amount is shown in the Schedule of Benefits.

DentaSelect Plus (DSP) – the name used by The Dental Care Plus Group to describe the package of administrative services The Dental Care Plus Group provides to the Plan, including claims administration by DCP Holding Company (which is part of The Dental Care Plus Group), and access to the DentaSelect Plus Preferred Provider Organization (PPO).

Dentist - a person who is a legally licensed doctor of dental surgery, dental medicine or dental science in the state where services are rendered and who is acting within the scope of that license.

Disability - the inability of an Employee (because of injury or illness) to perform the material duties pertaining to his/her employment with the Employer. Disability of a Covered Dependent is the inability (because of injury or illness) to perform all regular and customary activities usual to that Covered Dependent's age and family status. An Employee or Covered Dependent is not considered to be suffering from a Disability if he/she is performing any work or engaging in any occupation or employment for wage or profit, unless related to rehabilitation.

Emergency - a dental condition characterized by the sudden onset of acute symptoms of sufficient severity that the absence of immediate dental attention could reasonably result in:

- permanently placing the Member's health in jeopardy:
- causing other serious dental or health consequences; or
- causing serious impairment of dental function.

Employer – Northern Kentucky Water District, its subsidiaries, and the affiliated businesses that are designated by Northern Kentucky Water District as participating Employers in the Plan as well as any other businesses that are designated by Northern Kentucky Water District as participating Employers in the Plan.

Experimental - any care, procedure, treatment protocol, or technology that is not widely accepted as safe, effective, and appropriate for the treatment of injury or sickness throughout the recognized medical profession and established medical societies in the United States; or is in the research or investigational stage or conducted as part of research protocol; or has not been proven by statistically significant randomized clinical trials to establish increased survival or improvement in the quality of life over other conventional therapies. This also includes drugs, tests, and technology that the Food and Drug Administration has not approved for general use; that which is considered Experimental; that which

is for investigational use; or that which is approved for a specific medical condition but applied to another condition.

Family Dependent - means a spouse or Dependent Child of a Subscriber who is enrolled in the Plan and eligible for coverage under the Plan. See Eligibility Information for specific guidelines regarding eligibility.

Immediate Family - means a person who is related to a Member in any of the following ways: spouse, brother-in-law, sister-in-law, son-in-law, daughter-in-law, mother-in-law, father-in-law, parent (includes stepparent), brother or sister (includes stepbrother and stepsister), or child.

In-Network Provider - means a Dentist who is part of the DentaSelect Plus Preferred Provider Organization and who has entered into an agreement with The Dental Care Plus Group, either directly or through an affiliate or a subcontracted vendor, to provide Covered Dental Services to Members.

Injury - an accidental physical injury to the body caused by unexpected external means which does not arise out of or in the course of employment. All injuries sustained in connection with one accident are considered to be one injury. The term "injury" does not include disease or infection, except pyogenic infection occurring through an accidental cut or wound.

Lifetime Maximum Benefit - the maximum amount payable under the Plan for Covered Dental Services received by a Member during the Member's lifetime.

Medically Necessary/Medical Necessity - means that the treatment, services, or supplies received by a Member are determined to be:

1. appropriate and necessary for the symptoms, diagnosis, or direct care and treatment of the Member's condition;
2. within the standards the organized dental community deems good dental practice for the Member's condition;
3. not primarily for the convenience of the Member, the Member's Dentist or another person or provider;
4. not investigational or unproven, as recognized by the organized dental community, or which are used for any type of research program or protocol; and
5. not excessive in scope, duration, or intensity to provide safe, adequate, and appropriate treatment.

The fact that a Dentist may prescribe, order, recommend, or approve a service, supply, or level of care does not, of itself, make the treatment Medically Necessary or the make the charge a Covered Dental Service under the Plan.

Member - means the Subscriber and Family Dependents enrolled in the Plan who are eligible to receive Covered Dental Services under the Plan.

Military Service - includes service in the Army, Navy, Air Force, Marine Corps, Coast Guard, or any other recognized branch of service, pertaining to the military of any country.

Out-Of-Network Provider - means a Dentist who is not part of the DentaSelect Plus Preferred Provider Organization and who has not entered into an agreement with The Dental Care Plus Group, either directly or through an affiliate or a subcontracted vendor.

Placed for Adoption - means the assumption or retention by a person of a legal obligation for total or partial support of a child in anticipation of the adoption of the child. The child's placement with a person terminates upon the termination of that legal obligation.

Plan – Northern Kentucky Water District Dental Benefits Plan and its Schedule of Benefits as amended from time to time.

Plan Administrator – Northern Kentucky Water District. The Plan Administrator has the discretionary authority to interpret the Plan including those provisions relating to eligibility and benefit determination. The Plan Administrator's interpretations and determinations are final and binding.

Plan Document - the legal document governing the administration and interpretation of the Northern Kentucky Water District Dental Benefits Plan.

Plan Participant - see Member and Subscriber definitions.

Plan Sponsor – Northern Kentucky Water District.

Plan Year - the 12-consecutive month period that ends on December 31.

Subscriber, Employee, You, Your - means any Employee, eligible by virtue of employment and proper enrollment, to receive Covered Dental Services under the Plan.

Total Disability - a person's complete inability to perform any and every duty of his/her occupation or any other work or employment for wage or profit, or his/her Covered Dependent's complete inability to perform the normal activities of a person of his/her age and sex in good health.

Work In Progress - services or procedures started prior to the effective date of the coverage, with the exception of orthodontia if covered by the Plan. Prosthetic devices and crowns will not be covered if impressions are taken before the effective date of coverage. If final impressions were taken while coverage is in effect, but the prosthetic device or crown is installed more than thirty (30) days after coverage terminates, then charges for the prosthetic device or crown will not be covered.

SECTION 2 - ELIGIBILITY INFORMATION

Eligible Family Dependents are a Subscriber's legally married spouse and Dependent Children, as defined below.

Under the Plan, Your eligible Family Dependents are defined as:

- Your legally married spouse
- Your or Your legally married spouse's Dependent Children defined as:
  - Biological child(ren)
  - Child(ren) named in a divorce decree or Qualified Medical Child Support Order as being the responsibility of the Subscriber for dental benefits coverage.
  - Legally adopted child(ren), foster child(ren), or child(ren) for which You have legal custody.
  - Child(ren) who have been Placed for Adoption with You, if legal adoption is anticipated but not yet finalized.
  - Child(ren) of any age who are incapable of self-support because of permanent mental or physical Disability, if the mental or physical Disability occurred before attainment of age 26. The Subscriber must principally support the disabled Dependent Child and proof of the permanent Disability must be submitted to the Claims Administrator.

Dependent Children (who are not disabled) can be covered until the end of the month in which they attain age 26, regardless of financial dependency, residency, student status or marital status.

Coverage for Dependent Children does not include coverage for such Dependent Child's spouse or children.

In no event shall the term Family Dependent include (a) a spouse or child on active duty in any Military Service of any country, (b) a child who is eligible for coverage under the Plan as a Subscriber.

SECTION 3 - ENROLLMENT AND EFFECTIVE DATE OF INDIVIDUAL COVERAGE

Enrollment

An eligible Employee may enroll himself or herself and any Family Dependent during the initial eligibility period by following the Employer's enrollment procedures. A newly acquired Family Dependent is eligible to enroll in the Plan for a period of thirty-one (31) days beginning on the date he becomes a Family Dependent.

The Employer shall notify the Claims Administrator in writing of any enrollments, terminations or changes in the coverage classification of any Member. The time period of notification cannot exceed thirty-one (31) days following the effective dates of such changes.

Effective Date of Coverage

The coverage of a Member shall become effective on the date the Plan takes effect, or as otherwise specified in the Employer's application.

Unless otherwise provided by the Plan, a Subscriber not Actively at Work (except while on paid vacation or unpaid leave under FMLA) on the date the Plan takes effect, shall have his coverage become effective on the date of his return to active work.

In no event shall a Family Dependent of any Subscriber be covered under this Plan until the Subscriber's coverage becomes effective.

Changes in Plan Coverage

You can change Your level of coverage before the next annual enrollment period if You experience a change in Your family status. If You experience a change in family status and wish to change Your level of coverage, You must submit written notification to the Employer within 31-days* of Your change in family status. The Plan reserves the right to require the applicant to submit proof of any change of status. The following are examples of qualifying events for a change in family status:

- Marriage
- Divorce
- birth or adoption of a Dependent Child
- death of a Family Dependent
- loss of Your spouse's employment
- employment of Your spouse
- You are called to active military duty and obtain a military leave of absence
- You change from full-time status to part-time status or vice versa
- You change from active status to an unpaid leave of absence

- Your spouse's change from full-time status to part-time status or vice versa
- Your spouse's change from active status to an unpaid leave of absence
- a spouse's change in employment that significantly changes Your spouse's or Your own dental care coverage

* The 31-day notification period is waived if court/administrative ordered coverage is required for a Dependent Child. This waiver applies when written notification/enrollment is made by either the Subscriber or other parent. The Dependent Child's coverage will not be terminated unless the Subscriber's coverage is terminated, the court/administrative order has expired or other comparable coverage is in effect.

SECTION 4 – ACCESSING BENEFITS

Identification Card

You will be issued Identification Card(s) which will list the names of all enrolled Family Dependents and which will indicate You are covered under a DentaSelect Plus Plan. The Identification Card should be presented whenever dental services are being received. This will assist in assuring that bills for Covered Dental Services are sent directly to the Claims Administrator.

Preferred Provider Organizations (PPO)

Your coverage under the Plan includes access to the DentaSelect Plus Preferred Provider Organization (PPO). A Member is free to obtain dental care from the Dentist of his or her choice, but the Member's out-of-pocket expenses may be less in the case of treatment received from a Dentist who participates in the DentaSelect Plus PPO (referred to as an In-Network Provider). The percentage payable for Covered Dental Services is shown in the Schedule of Benefits. Services rendered to a Member by an In-Network or an Out-of-Network Provider are paid under the Plan as shown in the Schedule of Benefits. A complete list of Dentists who participate in the DentaSelect Plus PPO is available on The Dental Care Plus Group website at www.dentalcareplus.com.

Covered Dental Services incurred in the event of an Emergency, regardless as to whether or not the Dentist is an In-Network or Out-of-Network Provider, shall be paid in accordance with the Schedule of Benefits, without further deductions, subject to all Plan maximums, limitations, conditions, and exclusions.

The Dental Care Plus Group does not make any representation or warranty as to the medical competence or ability of an In-Network Provider or an Out-of-Network Provider or to their respective staff or Dentists. The Dental Care Plus Group shall not have any liability or responsibility, either direct, indirect, vicarious or otherwise, for any actions or inactions, whether negligent or otherwise, of the In-Network Provider or Out-of-Network Provider, their staff or Dentists.

SECTION 5 – BENEFIT PROVISIONS

Allowable Expenses

Allowable Expense is the maximum allowable amount for a Covered Dental Service. The Plan will pay based on the lesser of the actual billed charge or the Allowable Expense subject to the payment levels referenced in the Schedule of Benefits.

When Covered Services are obtained from an In-Network Provider, the Member is not responsible for the difference between the Dentist's actual charge and the Allowable Expense.

When Covered Services are obtained from an Out-of-Network Provider, the Member is responsible for payment to the Dentist for the difference between the Dentist's actual charge and the Allowable Expense.

The Member is responsible for payment of the following, regardless of whether services were obtained from an In-Network Provider or an Out-of-Network Provider:

- Copayments;
- Deductible amounts; and
- Any amount in excess of Annual or Lifetime Maximum Benefit levels.

Copayment and Maximum Benefits

Copayments are amounts that are directly payable by a Member to the Dentist for Covered Dental Services. Your Plan may also have an Annual or Lifetime Maximum Benefit level, after which no benefits are paid by the Plan. You are responsible for payment to the Dentist of any amount in excess of Annual or Lifetime Benefit levels. See the Schedule of Benefits for Copayment and Annual and Lifetime Maximum Benefit levels.

Deductible Provision

Your Deductible is per covered Member, per Benefit Year. The Deductible amount is identified in the Schedule of Benefits. Your Deductible is calculated on the Allowable Expense for Covered Services received by a Member. If the Dentist's actual charge for a Covered Service is greater than the Allowable Expense, the difference between the Dentist's actual charge and the Allowable Expense will not be counted toward Your Deductible.

After You pay the Deductible, the Plan pays a portion of the remaining Allowable Expenses up to the specified maximum(s). You pay for the balance of the Allowable Expense, which is Your Copayment.

Deductible Carryover

Any Allowable Expenses incurred in the last three months of the Benefit Year which were applied toward the Deductible, may be carried forward and applied against the Deductible for the next following Benefit Year.

Financial Obligation for Non-Covered Services

The Member is responsible for payment to the Dentist for any service that is not covered by the Plan. Non-covered services include (but are not limited to) the following:

- any service specifically listed as an exclusion of the Plan in this Summary Plan Description.
- any service not covered by the Plan due to a specified limitation of the Plan. For examples of such limitations, please see the Covered Dental Services section of this Summary Plan Description.
- any service that is denied because a Member has exceeded the Annual or Lifetime Maximum Benefits payable under the Plan. See the Schedule of Benefits for the Annual and Lifetime Maximum Benefit levels of Your Plan.

Alternative Benefit Policy

Many dental conditions can be treated in more than one way. The Plan has an "alternative benefit policy" which governs the amount of benefits the Plan will pay for treatments covered under the Plan. If two or more alternative treatments are both covered under the Plan, and You choose a more expensive treatment than is needed to correct a dental problem according to accepted standards of dental practice, the benefit payment will be based on the cost of the covered treatment which provides professionally satisfactory results at the most cost-effective level. The Member will pay the difference in cost.

SECTION 7 - COVERED DENTAL SERVICES

All payments made by the Plan for Preventive, Basic, and Major services will apply to the Annual Maximum Benefit level referenced in the Schedule of Benefits. The Plan will pay for Covered Services provided by a Dentist licensed to provide such services in the state or territory where the Covered Services are being provided.

Preventive Benefits

Preventive & Diagnostic Services

Routine oral examinations	limited to two visits each year
Prophylaxis (cleaning)	limited to two each year
Topical application of fluoride	limited to two treatments each year to children under age 18
Bitewing xrays	limited to one set each year
Vertical Bitewing xrays (7 - 8 films)	limited to once every three years
Periapical xrays	limited to 5 films per year
Full mouth x-rays (complete series or panoramic)	limited to once every three years

Emergency Services

Emergency/limited oral examinations

Emergency palliative treatment

Space Maintainers

Fixed band type	only under a treatment plan filed with the Claims Administrator. Limited to children under age 19.
Space maintainer – fixed, unilateral	limited to children under 19 years of age
Distal shoe space maintainer – fixed, unilateral	limited to children under 8 years of age

Recementation of space maintainers

Sealants

Permanent molar teeth only	limited to children under 15 years of age and once every five years per tooth

Basic Benefits

Emergency Services

Office visit after hours .... for emergencies only

Diagnostic Services

Referral consultations and examinations performed by a specialist.

Extraoral xrays

Oral Surgery (Includes local anesthesia and routine postoperative care)

Extractions

Simple single tooth extractions

Root removal - exposed roots

Surgical Extractions

Removal of an erupted tooth (uncomplicated)

Removal of impacted tooth - soft tissue

Removal of impacted tooth - partially bony

Removal of impacted tooth - completely bony

Removal of impacted tooth - completely bony, with complications

Surgical removal of residual roots

Pre-Prosthetic oral surgery

Alveoloplasty and vestibuloplasty

Other Oral Surgery

Incision and drainage of abscess

Biopsy and examination

General anesthesia or intraveneous sedation.....	only when necessary and provided in connection with oral surgery

Periodontic Services (Includes local anesthesia and routine postoperative care)

Emergency treatment (periodontal abscess, acute periodontitis, etc.)	
Periodontal scaling and root planing.....	limited to four quadrants each year, as a definitive treatment when pocket depths of at least 4mm are demonstrated.
Surgical periodontics (including post-surgical visits).....	limited to two additional recalls in the first year following complex surgery
Gingivectomy	
Osseous and muco-gingival surgery	
Gingival grafting	
Guided tissue regeneration	
Periodontal maintenance procedure.....	limited to two each year following a history of periodontal disease.

Endodontic Services (Includes local anesthesia and routine postoperative care)

Root canal therapy, traditional	
Retreatment of previous root canal.....	must be at least three years following previous root canal treatment on the same tooth
Recalcification and apexification	

Restorative Services (Includes local anesthesia. Multiple restorations on a single surface will be considered as a single restoration.)

Restorations (amalgam, composite and sedative fillings).....	limited to once every two years per tooth (same surfaces only)
Pins-pin retention as part of restoration when used instead of gold or crown restoration	
Stainless steel crowns when tooth cannot be adequately restored with filling material	

Recementation of inlays, onlays, crowns and bridges

Repairs to crowns and bridges

Prosthodontic Services

Full and partial denture repairs

Repair broken, complete or partial dentures. Replacement of broken teeth on complete or partial denture. Additions to partial dentures to replace extracted natural teeth.

Relining and rebasing	limited to once every three years

Major Benefits

Restorative Services (*Gold restorations and crowns are covered only as treatment for decay or traumatic injury and only when teeth cannot be restored with a filling material or when the tooth is an abutment to a covered partial denture or fixed bridge.)*

Inlays, onlays, crowns, and post & cores…….	limited to once in five years on same tooth

Prosthodontic Services

Fixed bridge	limited to one original or replacement prosthesis every five years
Complete upper or lower denture	limited to one original or replacement prosthesis every five years
Partial upper or lower denture.....	limited to one original or replacement prosthesis every five years

Orthodontic Benefits

Orthodontic Benefits may not be covered under Your Plan. Please refer to the Schedule of Benefits to determine whether Orthodontic Benefits are covered under Your Plan.

Orthodontic Treatment may be subject to a Lifetime Maximum Benefit. Refer to the Schedule of Benefits for the Lifetime Maximum Benefit of Your Plan.

Comprehensive Orthodontic Treatment

Other Orthodontic Treatment ..... (limited to one appliance per individual)

Appliance for tooth guidance

Appliance to control harmful habits

Orthodontic retention appliance

Coverage includes orthodontic procedures provided under a treatment plan that has been submitted by Your Dentist to the Claims Administrator. The Dentist providing this service must supply the Claims Administrator with films and study models upon request.

The Plan will make an initial payment of benefits, based on the Schedule of Benefits and the initial charge submitted under the treatment plan, and additional payments will be made in installments beginning when appliances are inserted. The payments will be monthly or quarterly for the length of the estimated treatment plan. The amount of the first Member payment for the initial charge will be at the discretion of the Orthodontist. Under the Plan, up to 25% of the total treatment cost may be recognized as the initial charge, of which the payment will be the benefit level specified in the Schedule of Benefits.

If a Member is receiving orthodontic treatment which was covered under another company's benefit program(s) prior to the effective date of the Plan, payments made by the other company's benefit program(s) will be deducted from the Lifetime Maximum Benefit. All benefits paid toward orthodontic services by all previous benefit programs will be applied to the Lifetime Maximum Benefit.

All limitations can be appealed under the appeals procedure.

SECTION 8 - EXCLUSIONS

The following are expenses, charges and services specifically excluded from coverage under the Plan. The Member is financially obligated for payment to the Dentist of the full charge for any service that is excluded/not covered under the Plan.

1. Services performed for cosmetic reasons, including personalization or characterization of prosthetic devices and the bleaching of teeth.
2. Services or supplies which are considered Experimental according to standard dental practice.
3. Charges which are incurred before the Member's effective date of coverage or after the date a Member's coverage terminates.
4. Services or procedures started prior to the effective date of the Member's coverage, with the exception of orthodontic services if covered by the Plan. Prosthetic devices and crowns will not be covered if impressions are taken before the effective date of coverage. If final impressions were taken while coverage is in effect, but the prosthetic device or crown is installed more than thirty (30) days after coverage terminates, then charges for the prosthetic device or crown will not be covered.
5. Porcelain coverage on posterior crowns.
6. Missed appointment charges.
7. Completion of claim forms.
8. Replacement of lost, stolen or broken prosthetic devices or appliances unless it is after the limitation date.
9. Analgesics, nitrous oxide, non-intravenous conscious sedation and other drugs and prescriptions.
10. Localized delivery of antimicrobial or chemotherapeutic agents.
11. Hospital related charges.
12. Appliances, restorations, and procedures other than full dentures, for the primary purpose of increasing vertical dimension, restoring the occlusion or treatment of Bruxism.
13. Veneers or similar properties of crowns and pontics.
14. Services for educational purposes.
15. Splinting (if tooth does not otherwise need to be restored).
16. Services related to work conditions if the claimant is eligible for benefits under any workers' compensation act or similar law.
17. Surgical implants or transplants of any type (including prosthetic devices, such as crowns, attached to them) and all related services.

18. Services performed by other than a licensed Dentist, except for legally delegated services to a licensed hygienist or licensed expanded functions auxiliary.
19. Treatment for Temporomandibular Joint Disease (TMJ) or Myofacial Pain Dysfunction Syndromes (MPD).
20. X-rays for TMJ.
21. Orthognathic surgery.
22. Services or supplies rendered, or furnished in connection with, any duplicate appliance.
23. Services or supplies which are not Medically Necessary.
24. Expenses incurred for more than two oral examinations and/or prophylaxis treatments during a Benefit Year.
25. Expenses incurred for the replacement of amalgams and/or composites more often than once in any two (2) year period.
26. Expenses incurred for the replacement of fixed bridgework, crowns, gold restorations and jackets more often than once in any five (5) year period.
27. Expenses incurred for the replacement of partial or full dentures more often than once in any five (5) year period.
28. Expenses incurred for replacement of an existing denture which is or can be made satisfactory.
29. Expenses incurred for relining of dentures more often than once in any three (3) year period.
30. Expenses incurred for a temporary full denture.
31. Expenses incurred for the retreatment of root canals if it has not been at least three (3) years since the previous root canal treatment.
32. Services which are determined to be eligible expenses under any medical plan in which the Member is enrolled.
33. House calls.
34. Dental services or supplies for a condition resulting from civil disobedience, active participation in a riot or in the commission of a felony, self-inflicted injury, nonaccidental injury, or an act of war.
35. Any services not specifically listed as a Covered Dental Service.
36. Treatment by a member of the Immediate Family or a resident in the covered Employee's home; self-treatment.
37. Acid etches.
38. Expenses for the completion of periodontal charting.
39. Asepsis.
40. Claims that are not received by the Claims Administrator within one calendar year from the date of service.

41. Charges for services received after a Member has reached the Annual or Lifetime Maximum Benefits payable under the Plan.
42. Expenses for gold restorations and crowns, except when used as treatment for decay or traumatic injury when teeth cannot be restored with a filling material or when the tooth is an abutment to a covered partial denture or fixed bridge.

SECTION 9 - PRETREATMENT REVIEW

Pretreatment Review is a voluntary program designed to assist You and Your Dentist in understanding Your dental coverage before services are provided.

If You or Your Dentist would like to submit a treatment plan for pretreatment review, Your Dentist must file that request for pretreatment review. Requests for pretreatment review should be sent to the following address:

DCP Holding Company
DentaSelect Plus Plans
100 Crowne Point Place
Cincinnati, OH 45241

When a proposed treatment plan for services that are expected to exceed $400 is submitted, the Claims Administrator will review those services for coverage under the Plan. After the review is complete, Your Dentist will be provided with an estimate of the amount payable, in whole or in part (if any), by the Plan on the proposed treatment. Pretreatment review only provides an estimate of Covered Services and does not constitute a guarantee of payment. Exact benefits are determined based upon the eligibility of the Member and benefit plan in effect at the time services are actually rendered.

The Claims Administrator will notify Your Dentist of the pretreatment estimate within a reasonable period of time appropriate to the dental circumstances, but generally not later than 15 days after receipt of the request for pretreatment review. In certain circumstances this time period may be extended for an additional 15 days, and the Claims Administrator will notify You or Your Dentist of any extension. If additional information is necessary to process Your request for pretreatment review, the Claims Administrator will notify You or Your Dentist, and You or Your Dentist will have 45 days from receipt of the notice to provide the additional information. If You or Your Dentist do not provide the additional information within the 45 day period, Your request for pretreatment review may be denied. In cases where the additional information is provided within the 45 day period, the Claims Administrator will notify Your Dentist of the pretreatment estimate within 15 days after receipt of the additional information. The notice will inform You and Your Dentist of the specific basis for the pretreatment estimate, and describe Your right to information concerning the estimate and Your right to appeal.

A pretreatment estimate that has been approved may be modified by the Plan at any time, and the Claims Administrator will notify Your Dentist of the modification in advance and provide You with an opportunity to appeal the modification before it is effective. Your Dentist may request that the time for the treatment plan to be completed or the number of treatments included in the pretreatment estimate be increased at any time. A request for an extension of time or increase in the number of treatments will be approved or denied after receipt of a completed request.

Pretreatment Review of Urgent Conditions:

If Your request for pretreatment review is for treatment of an urgent condition, and failure to obtain treatment quickly would jeopardize Your health or, in the opinion of Your Dentist, would subject You to severe pain which cannot be managed without the treatment, Your request for pretreatment review will be processed as soon as possible taking into account the dental circumstances, but not later than 72 hours after the Claims Administrator receives the request. If additional information is needed to process the request, the Claims Administrator will notify You or Your Dentist as soon as possible, but no later than 24 hours after the Claims Administrator receives the request, and You or Your Dentist will have at least 48 hours to provide the additional information. If You or Your Dentist do not provide the additional information within the time period allowed, the request for a pretreatment estimate may be denied. If You or Your Dentist provide the additional information requested, the Claims Administrator will notify Your Dentist of the pretreatment estimate as soon as possible, but not later than 48 hours after receipt of the additional information. The notice will include the specific basis for the estimate, and describe Your right to information concerning the estimate and Your right to appeal.

SECTION 10 – CLAIMS PROCEDURES

How to Submit a Claim

If you receive dental treatment from an In-Network Provider, Your In-Network Provider will submit the claim directly to the Claims Administrator. If You receive dental treatment from an Out-of-Network Provider, You may submit claims for dental treatment received while You are eligible under the Plan. If You receive dental treatment from an Out-of-Network Provider and You assign Your right to receive payment under the Plan to the Out-of-Network Provider, the Out-of-Network Provider may submit the claim directly to the Claims Administrator. Assignment of claims to an Out-of-Network Provider must be in writing and signed by You, and the Out-of-Network Provider must submit the written assignment form with the claim. Claims should be sent to the following address:

DCP Holding Company
DentaSelect Plus Plans
100 Crowne Point Place
Cincinnati, OH 45241

The Claims Administrator will determine if enough information has been submitted to enable proper consideration of the claim. If not, more information may be requested from You or Your Dentist.

Claims Processing Procedures

When the Claims Administrator receives claims from You or Your Dentist, the Claims Administrator will process those claims and make a determination in accordance with Plan documents. If the claim for dental treatment provided by an In-Network Provider is paid, payment will be sent directly to the In-Network Provider. If a claim for dental treatment provided by an Out-of-Network Provider is paid, payment will be sent to You or, if You assigned Your right to payment under the Plan to the Out-of-Network Provider, payment will be sent directly to the Out-of-Network Provider.

If the claim is denied in whole or in part, the Claims Administrator will notify You, and if the claim was filed by Your Dentist, the Claims Administrator will also notify Your Dentist, within a reasonable period of time, but generally not later than 30 days after the claim is received. In certain circumstances, the 30 day time period may be extended for an additional 15 days, and the Claims Administrator will notify You that the time period has been extended.

If additional information is required to process Your claim, the Claims Administrator will notify You or Your Dentist, and You or Your Dentist will have 45 days from receipt of the notice to provide the additional information. If

You or Your Dentist do not provide the additional information within the 45 day period, Your claim may be denied. In cases where the additional information is provided within the 45 day period, the Claims Administrator will notify You and Your Dentist if the claim is denied in whole or in part within 30 days after the claim was initially received or 15 days after receipt of the additional information, whichever is later. The notice of a denial will inform You and Your Dentist of the specific reason for the denial, and describe Your right to information concerning the claim and Your right to appeal.

SECTION 11 - COORDINATION OF BENEFITS (C.O.B.)

"Coordination of benefits" is the procedure used to pay dental care expenses when a person is covered by more than one plan. The Plan follows certain rules defined below to decide which plan pays first and how much the other plan must pay. The objective is to make sure the combined payments of all plans are no more than Your actual bills.

When You or Your Family Dependents are covered by another group plan in addition to the Plan, You must submit all bills first to the primary plan. The primary plan must pay its full benefits as if You had no other coverage. If the primary plan denies the claim or does not pay the full bill, You may then submit the balance to the secondary plan.

The Plan pays for dental care only when You follow the Plan's rules and procedures. If the Plan's rules conflict with those of another plan, it may be impossible to receive benefits from both plans, and You will be forced to choose which plan to use.

Plans that do not Coordinate

The Plan will pay benefits without regard to benefits paid by the following kinds of coverage.

- Medicaid
- Group hospital indemnity plans which pay less than $110 per day
- School accident coverage
- Some supplemental sickness and accident policies

How the Plan Pays As Primary Plan

- When the Plan is primary, the Plan will pay the full benefit allowed by the Plan as if You had no other coverage.

How the Plan Pays As Secondary Plan

- When the Plan is secondary, payments will be based on the balance left after the primary plan has paid. The Plan will pay no more than that balance. In no event will the Plan pay more than the Plan would have paid had the Plan been primary.
- The Plan will pay only for dental care expenses that are covered by the Plan.
- The Plan will pay only if You have followed all of the Plan's procedural requirements.
- The Plan will pay no more than the "Allowable Expenses" for the dental care involved. If the Allowable Expense is lower than the primary plan's, the primary plan's allowable expense will be used. The Allowable Expense may be less than the actual bill.

Which Plan is Primary?

To decide which plan is primary, both the coordination provisions of the other plan and which member of Your family is involved in a claim must be considered. The primary plan will be determined by the first of the following which applies:

1. *Non-coordinating Plan*

   If You have another group plan which does not coordinate benefits, it will always be primary.

2. *Employee*

   The plan which covers You as an Employee (neither laid off nor retired) is always primary.

3. *Children (Parents Divorced or Separated)*

   If the court decree makes one parent responsible for dental care expenses, that parent's plan is primary.

   If the court decree gives joint custody and does not mention dental care, the Plan follows the birthday rule.

   If neither of those rules applies, the order will be determined in accordance with the Ohio Insurance Department rule on Coordination of Benefits.

4. *Children and the Birthday Rule*

   When Your children's dental care expenses are involved, the Plan follows the "birthday rule." The plan of the parent with the first birthday in a calendar year is always primary for the children. For example, if Your birthday is in January and Your spouse's birthday is in March, Your plan will be primary for all of Your children.

   However, if Your spouse's plan has some other coordination rule (for example, a "gender rule" which says the father's plan is always primary), the Plan will follow the rules of the other plan.

5. *Other situations*

   For all other situations not described above, the order of benefits will be determined in accordance with Department of Insurance rules of Coordination of Benefits.

SECTION 12 - TERMINATION OF MEMBER COVERAGE

Benefits for the Member under the Plan will automatically terminate on the earliest of the following dates:

1. The date the Plan is terminated, or with respect to any specific coverage item of the Plan, the date such coverage item terminates.
2. The last day of the last month for which the required Member contribution has been paid to the Plan, if the Member is required to make a contribution.
3. The date specified by the Employer that a Subscriber or Family Dependent is no longer eligible for coverage under the terms of the Plan.
4. The date the Employer receives written notice from the Member for termination of coverage, or the date requested by the Member in such notice, if later.
5. The date on which the Member is retired or pensioned, unless a specific coverage classification is specified for retired or pensioned individuals in the Plan.
6. The date of entry into military duty, except temporary duty of thirty (30) days or less.
7. For a Dependent Child, the end of the month when the child no longer qualifies as a Family Dependent.

SECTION 13 - COBRA CONTINUATION COVERAGE

If coverage under the Plan ceases for You, Your eligible spouse and Your eligible dependents, under certain circumstances You, Your eligible spouse and Your eligible dependents may be able to continue coverage under this Plan under a federal law called COBRA. COBRA continuation coverage is a continuation of coverage under the Plan when coverage would otherwise end because of a life event known as a "qualifying event." Specific qualifying events are listed below. After a qualifying event, COBRA continuation coverage must be offered to each person who is a "qualified beneficiary." You, Your spouse, and Your Dependent Children could become qualified beneficiaries if coverage under the Plan is lost because of the qualifying event. Under the Plan, qualified beneficiaries who elect COBRA continuation coverage must pay for COBRA continuation coverage.

If You are an Employee, You will become a qualified beneficiary if You will lose Your coverage under the Plan because either one of the following qualifying events happens:

(1) Your hours of employment are reduced, or

(2) Your employment ends for any reason other than Your gross misconduct.

If You are the spouse of an Employee, You will become a qualified beneficiary if You will lose Your coverage under the Plan because any of the following qualifying events happens:

(1) Your spouse dies;

(2) Your spouse's hours of employment are reduced;

(3) Your spouse's employment ends for any reason other than his or her gross misconduct;

(4) Your spouse becomes enrolled in Medicare (Part A, Part B, or both); or

(5) You become divorced or legally separated from Your spouse.

Your Dependent Children will become qualified beneficiaries if they will lose coverage under the Plan because any of the following qualifying events happens:

(1) The parent-Employee dies;

(2) The parent-Employee's hours of employment are reduced;

(3) The parent-Employee's employment ends for any reason other than his or her gross misconduct;

(4) The parent-Employee becomes enrolled in Medicare (Part A, Part B, or both);

(5) The parents become divorced or legally separated; or

(6) The child stops being eligible for coverage under the Plan as a "Dependent Child."

The Plan will offer COBRA continuation coverage to qualified beneficiaries only after the Plan Administrator has been notified that a qualifying event has occurred. When the qualifying event is the end of employment or reduction of hours of employment, death of the Employee, or enrollment of the Employee in Medicare (Part A, Part B, or both), the Employer must notify the Plan Administrator of the qualifying event.

For the other qualifying events (divorce or legal separation of the Employee and spouse or a Dependent Child's losing eligibility for coverage as a Dependent Child), You must notify the Plan Administrator within 60 days after the qualifying event occurs. You must send this notice to: Northern Kentucky Water District. In addition, if applicable, You must provide a certified copy of the court order granting the divorce or legal separation.

Once the Plan Administrator receives notice that a qualifying event has occurred, COBRA continuation coverage will be offered to each of the qualified beneficiaries. Each qualified beneficiary will have an independent right to elect COBRA continuation coverage. Covered Employees may elect COBRA continuation coverage on behalf of their spouses, and parents may elect COBRA continuation on behalf of their children.

COBRA continuation coverage is a temporary continuation of coverage. When the qualifying event is the death of the Employee, the Employee's becoming entitled to Medicare (Part A, Part B, or both), Your divorce or legal separation, or a Dependent Child's losing eligibility as a Dependent Child, COBRA continuation coverage lasts up to a total of 36 months. When the qualifying event is the end of employment or reduction of the Employee's hours of employment, and the Employee became entitled to Medicare benefits less than 18 months before the qualifying event, COBRA continuation coverage for qualified beneficiaries other than the Employee lasts until 36 months after the date of Medicare entitlement. For example, if a covered Employee becomes entitled to Medicare 8 months before the date on which his employment terminates, COBRA continuation coverage for his spouse and children can last up to 36 months after the date of Medicare entitlement, which is equal to 28 months after the date of the qualifying event (36 months minus 8 months). Otherwise, when the qualifying event is the end of employment or reduction of the Employee's hours of employment, COBRA continuation coverage generally lasts for only up to a total of 18 months. There are two ways in which this 18-month period of COBRA continuation coverage can be extended.

Disability Extension of 18-month Period of Continuation Coverage

If You or anyone in Your family covered under the Plan is determined by the Social Security Administration to be disabled and You notify the Plan Administrator in a timely fashion, You and Your entire family may be entitled to receive up to an additional 11 months of COBRA continuation coverage, for a total maximum of 29 months. The Disability would have to start at some time before the 60th day of COBRA continuation coverage and last at least until the end of the 18-month period of continuation coverage. You must make sure that the Plan Administrator is notified of the Social Security Administration determination within 60 days of the date of the determination and before the end of the 18-month period of COBRA continuation coverage. This notice should be sent to:

Northern Kentucky Water District
2835 Crescent Springs Road
Erlanger, KY 41018

Second Qualifying Event Extension of 18-month Period of Continuation Coverage

If Your family experiences another qualifying event while receiving 18 months of COBRA continuation coverage, Your spouse and Dependent Children can get up to 18 additional months of COBRA continuation coverage, for a maximum of 36 months, if notice of the second qualifying event is properly given to the Plan. This extension may be available to the spouse and any Dependent Children receiving continuation coverage if the Employee or former Employee dies, becomes entitled to Medicare benefits (under Part A, Part B, or both), or gets divorced or legally separated, or if the Dependent Child stops being eligible under the Plan as a Dependent Child, but only if the event would have caused the spouse or Dependent Child to lose coverage under the Plan had the first qualifying event not occurred. In all of these cases, You must make sure that the Plan Administrator is notified of the second qualifying event within 60 days of the second qualifying event. This notice must be sent to:

Northern Kentucky Water District
2835 Crescent Springs Road
Erlanger, KY 41018

If You Have Questions About COBRA

Questions concerning the Plan or Your COBRA continuation coverage should be addressed to the contact or contacts identified below. For more information about Your rights under ERISA, including COBRA, the Health Insurance Portability and Accountability Act (HIPAA), and other laws affecting group health benefits, contact the nearest Regional or District Office of the U.S.

Department of Labor's Employee Benefits Security Administration (EBSA) in Your area or visit the EBSA website at www.dol.gov/ebsa. (Addresses and phone numbers of Regional and District EBSA Offices are available through EBSA's website.)

In order to protect Your family's rights, You should keep the Plan Administrator informed of any changes in the addresses of family members. You should also keep a copy, for Your records, of any notices You send to the Plan Administrator.

Plan Contact Information

Plan Administrator:

Northern Kentucky Water District
2835 Crescent Springs Road
Erlanger, KY 41018
859-578-5454

Claims Administrator:

DCP Holding Company
DentaSelect Plus Plans
100 Crowne Point Place
Cincinnati, OH 45241
513-554-1100

SECTION 14 – RIGHT TO RECOVERY

If any payment is made under this Plan in excess of the amount properly payable to or on behalf of You or Your Covered Dependents under the terms and conditions of this Plan, then the Plan has the right to recover such excess payments from You and/or Your Covered Dependents or any entity which received such payment or was relieved from payment due to payment by this Plan.

As Participants in the Plan, You and Your Covered Dependents hereby agree that You will execute and deliver any and all instruments and papers required by the Plan in order to protect the Plan's rights of recovery, and further, You must do whatever is requested or necessary in order to fully execute and to fully protect all the Plan's rights hereunder.

SECTION 15 - SUBROGATION AND REIMBURSEMENT

This Plan reserves the right of subrogation. This means that the Plan can recover the cost of benefits paid to You or on Your behalf when a third party is or may be liable for or pays any money for an injury, illness or loss covered under the Plan.

A common situation involving subrogation is where someone injures a Plan Participant in an auto accident. The Participant suffers an injury and receives dental treatment which is covered under the Plan and the Plan pays for the treatment. The Plan can then recover the cost of the treatment directly from the driver or his insurance company. Recovery can also be made from a second medical policy, e.g., for medical malpractice; from a homeowner's policy, e.g., for accidents in another's home or property; or from general liability coverage, e.g., for a defective product; where the Plan Participant incurred dental expenses for which the other party was liable. The Plan can recover the cost of benefits paid from any person or organization including, but not limited to, insurance companies that issue liability insurance, uninsured/underinsured insurance and medical payments coverage.

You may be asked to assist the Plan in the process of securing payment for the cost of benefits provided on Your behalf. As a Participant in the Plan, You, and Your Covered Dependents, agree to execute and deliver any and all instruments, papers or other documents required by the Plan to fully protect the Plan's right to subrogation and to cooperate fully with the Plan to secure such rights. Moreover, You, and Your Covered Dependents, shall do nothing which may prejudice the Plan's subrogation rights.

The Plan shall be legally subrogated to all claims, demands, actions and rights of recovery You may have against a third party to the extent of any and all payments of benefits by the Plan. The Plan's right to subrogation takes priority over Your right to recover from third parties, even if the third party has insufficient resources to fully compensate You for all losses sustained or alleged.

The Plan also reserves the right of reimbursement. This means that You must reimburse the Plan for the cost of benefits paid to You or on Your behalf for any illness or injury caused by a third party in the event You, or Your Covered Dependents, receive any money for the same illness or injury. As a Participant in the Plan, You are required to hold the gross (unreduced by attorney fees, other expenses or costs) proceeds of any third party payment in trust for the benefit of the Plan and You must immediately upon receipt pay the third party payment to the Plan. If the third party pays You before the Plan pays any benefits, then the Plan will not pay benefits for the same injury to the extent of the payment by the third party. If the third party pays You after the Plan pays benefits, then You must repay the Plan for the cost of any and all benefits provided for the same injury or illness. If You fail to repay the Plan for any payment received from a third party, then the Plan will cease paying benefits on Your behalf until either You repay the Plan or the Plan receives unrelated claims which, in the aggregate, amount to more than the amount of the third party payment.

You must reimburse the Plan regardless of whether:

- the third party payment is the result of a court judgement, arbitration award, compromise, settlement or any other arrangement; or
- the third party admits liability;
- the medical and dental expenses or loss of income are itemized or included in the third party payment; or
- You have been fully compensated or made whole by the third party payment for all losses sustained or alleged.

Consider, once again, the auto accident example where someone injures You and You receive dental treatment that is covered under the Plan. If the Plan has already paid benefits and the other driver's insurance company sends You a check for damages or You settle a lawsuit concerning the accident, You must first repay the Plan for the cost of any and all benefits paid on Your behalf before You pay any other expenses. This is true even if the amount You receive is not sufficient to fully compensate You for all the losses You incurred or if the portion of the settlement payment allocated to pay dental expenses is smaller than the amount which must be repaid to the Plan.

You, and Your Covered Dependents, agree to reimburse the Plan in first priority and without any set-off or reduction for attorney fees, other expenses, or costs. The "common fund" doctrine does not apply to any funds recovered by any attorney You hire regardless of whether funds recovered are used to repay benefits paid by the Plan. You, and Your Covered Dependents, also agree, to notify the Plan, in writing, whenever benefits are paid under this Plan that arise out of any injury or illness that provides or may provide the Plan subrogation or reimbursement rights. You, and Your Covered Dependents, further agree, when requested by the Plan, to execute and deliver any and all instruments, papers or other documents required by the Plan to fully protect the Plan's right to

reimbursement and to cooperate fully with the Plan to secure such rights. You shall do nothing to prejudice the Plan's right to reimbursement.

Failure to comply fully with the provisions of the Plan regarding subrogation and reimbursement can result in suspension or termination of benefits.

SECTION 16 - RIGHTS AND LIMITS

This booklet is a general description of the Plan and Your benefits. It is important to remember that:

- The description of benefits in this booklet replaces and supersedes any other summary or description previously issued by Northern Kentucky Water District.
- All benefits are subject to the terms, conditions, and limitations of the Northern Kentucky Water District Dental Benefits Plan as set forth in the Plan Document.
- Nothing in the Plan or in this booklet is intended to provide Employees, former Employees, or Covered Dependents with a vested right to any benefits under the Plan and/or any rights for continued employment.
- Your rights, if any, to benefits of the Plan depend upon whether You satisfy the eligibility requirements of the Plan and whether Your submitted claims are allowed charges under the Plan.
- Your rights as a participant in this Plan are outlined in the ERISA information sections that follow.

SECTION 17 - ERISA INFORMATION

This Plan, regulated by the Employee Retirement Income Security Act of 1974 (ERISA), is required to make available to all Plan Participants specific information about the Plan. The following sections describe basic Plan information and Your rights under ERISA.

Plan Name

Northern Kentucky Water District Dental Benefits Plan

Plan Sponsor and Plan Administrator

Northern Kentucky Water District
2835 Crescent Springs Road
Erlanger, Kentucky 41018
(859) 578-5454

Employer's Identification number:

61-1311695

The Plan Sponsor is also the Plan's Agent for the serving of legal process

Plan Type and Number

This is a welfare benefit plan that offers dental benefits. The Plan number is 501.

Plan Effective Date

The effective date of the Plan as described in this booklet is January 1, 2019.

Eligible Participants

Please refer to the Eligibility Information section.

Claims Administrator:

The independent third party administrator who processes all Plan claims is:

DCP Holding Company
DentaSelect Plus Plans
100 Crowne Point Place
Cincinnati, Ohio 45241

(513) 554-1100
1-800-367-9466 (Toll Free)

Plan Funding

This Plan is self-funded by the Plan Sponsor. Benefits are paid by contributions from the Employer and the Employees. Benefits are paid from the general assets of Northern Kentucky Water District. Employee contributions, if any, are

calculated annually and are used to pay claims. DCP Holding Company is the Claims Administrator, and does not insure the benefits paid by the Plan.

Benefit Records - Calendar Year

The benefit records are kept 1/1 to 12/31 for processing claims.

Plan Records - Calendar

The fiscal records are kept 1/1 to 12/31 for IRS reporting.

Plan Document

The Plan has a legal document called the Plan Document. A copy of the Plan Document is available upon written request to the Plan Administrator who may make a reasonable charge for the copies. If the wording of this booklet, the Summary Plan Description, is in conflict with the wording of the Plan Document, the wording of the Plan Document governs.

SECTION 18 - APPEAL PROCEDURE

Each Plan Participant has the right to appeal and is entitled to a full and fair review of any denial of a claim, or any pretreatment estimate obtained under the pretreatment review procedure. Appeals must be filed in writing within 180 days following Your receipt of notice of the denial and should be sent to the Claims Administrator. If You are appealing a pretreatment estimate which involves treatment of an urgent condition (as defined in the Pretreatment Review section), You may request an appeal by phone. All other appeals must be filed in writing by forwarding the written appeal to the following address:

DCP Holding Company
DentaSelect Plus Plans
Appeals Department
100 Crowne Point Place
Cincinnati, OH 45241

You or Your Dentist may submit written comments, records and other information when You file an appeal. You may also request, free of charge, copies of all records and other information which were relied on or created in the process of reviewing the claim or pretreatment review request. If the claim or estimate was denied, in whole or in part, based on the professional judgment of a Dentist that the treatment is Experimental or not Medically Necessary, the Claims Administrator will notify You of the identity of the Dentist who was initially consulted or who reviewed the claim or pretreatment review request. Your appeal and all relevant information, including information You submitted, will be re-reviewed by a different Dentist prior to deciding Your appeal.

The Claims Administrator will review Your appeal to make sure the initial determination was consistent with Your Plan benefits. If the Claims Administrator determines that the initial determination was not consistent with Your Plan benefits, the initial determination will be reversed and the claim paid or the pretreatment estimate modified. If the Claims Administrator determines that the initial determination was consistent with Your Plan benefits, the complete record will be forwarded to Your Plan Administrator for a final determination of Your appeal.

Your Plan Administrator will make a final determination on Your appeal and You and Your Dentist will be notified of the final determination as soon as possible taking into account the dental circumstances. If You are appealing a denial of a claim, You will be notified not later than 60 days after the date the appeal was received. If You are appealing a pretreatment estimate, You will be notified not later than 30 days after the date the appeal was received. If You are appealing a pretreatment estimate which involved urgent treatment, You will be notified as soon as possible, but not later than 72 hours after the appeal was received.

The Claims Administrator will notify You and Your Dentist of the Plan Administrators final determination in writing, or orally followed by a written confirmation if the appeal was of a pretreatment estimate involving urgent treatment. If the appeal decision is adverse, the notice will include the specific reason for the determination and the specific plan provisions on which the determination is based, and You will be entitled to request, free of charge, copies of all records and other information which was relied on or obtained in making the adverse determination.

You must file an appeal before bringing a civil action under Section 502(a) of ERISA. If Your appeal is denied, You then have the right to file an action under 29 U.S.C. 1132, section 502(a).

SECTION 19 - STATEMENT OF ERISA RIGHTS

As a Participant in the Plan, You are entitled to certain rights and protection under the Employee Retirement Income Security Act of 1974 (ERISA). ERISA provides that all Plan Participants shall be entitled to:

- examine, without charge, at the Plan Administrator's office, all documents governing the Plan, including the Summary Plan Description and a copy of the latest annual report.
- obtain, upon written request to the Plan Administrator, copies of documents governing the Plan, including the Plan document, Plan, Summary Plan Description, and a copy of the latest annual report. The Plan Administrator may make a reasonable charge for copies.
- receive a summary of the Plan's annual financial report. Northern Kentucky Water District is required by law to furnish each Plan Participant with a copy of this summary financial report.

You may have a right to continue dental coverage for Yourself, spouse or Covered Dependents if there is a loss of coverage under the Plan as a result of a qualifying event. You or Your dependents may have to pay for such coverage. Review this Summary Plan Description and the documents governing the Plan on the rules governing Your COBRA continuation coverage rights.

In addition to creating rights for Plan Participants, ERISA imposes duties upon the people who are responsible for the operation of the Employee benefit plan. The people who operate Your Plan, called Fiduciaries of the Plan, have a duty to do so prudently and in the interest of You and other Plan Participants and beneficiaries.

No one, including Your Employer, may fire You or otherwise discriminate against You in any way to prevent You from obtaining a welfare benefit or exercising Your rights under ERISA.

If Your claim for a welfare benefit is denied, in whole or in part, You must receive a written explanation of the reason for the denial. You have the right to have the Plan review and reconsider Your claims.

Under ERISA, there are steps You can take to enforce the above rights. For instance, if You request materials from the Plan and do not receive them within 30 days, You may file suit in a federal court. In such a case, the court may require the Plan Administrator to provide the material and pay You up to $110 a day until You receive the materials, unless the materials were not sent because of reasons beyond the control of the Plan Administrator. If You have a claim for benefits which is denied or ignored, in whole or in part, You may file suit in a state or federal court. In most cases, the Plan Sponsor is the Plan's agent for service of legal process. If You disagree with the Plan's decision or lack thereof concerning the qualified status of a domestic relations order or medical child support order, You may file suit in federal court.

If it should happen that the Plan Fiduciaries misuse the Plan's money, or if You are discriminated against for asserting Your rights, You may seek assistance from the U.S. Department of Labor, or You may file suit in a federal court. The court decides who should pay the court cost and legal fees. If You are successful, the court may order the person You sued to pay these costs and fees. If You lose, the court may order You to pay these costs and fees, for example, if it finds Your claim to be frivolous.

If You have questions about Your Plan, You should contact Your Human Resources Department or the Claims Administrator. If You have any questions about this statement or about Your rights under ERISA, You should contact the nearest office of the Employee Benefits Security Administration, U.S. Department of Labor, or the Division of Technical Assistance and Inquiries, Employee Benefits Security Administration, U.S. Department of Labor, 200 Constitution Avenue N.W., Washington, D.C. 20210. You may also obtain certain publications about Your rights and responsibilities under ERISA by calling the publications hotline of the Employee Benefits Security Administration.

SECTION 20 - IN THE FUTURE

Northern Kentucky Water District has established this Plan with the intention of it being maintained for an indefinite period of time. However, Northern Kentucky Water District, reserves the right, at its sole discretion:

- to alter, amend, or terminate this Plan, in whole or in part, at any time;
- to alter, amend, or terminate retiree benefits (if any), in whole or in part, at any time;
- to change, increase, or decrease Plan contributions (if any), in whole or in part, at anytime.

All amendments will be made pursuant to written documents.

The Dental Care Plus Group
DentaSelect Plus Plans
100 Crowne Point Place
Cincinnati, Ohio 45241
(513) 554-1100 or 1-800-367-9466
Fax (513) 554-3187
www.dentalcareplus.com

Rev. 11/18

The Dental Care PLUS GROUP

Benefit Summary

Northern Kentucky Water District

Enhanced-PPO

Product: DPPO

Network: DentaSelect Plus

Benefit Year: The 12 month period beginning January 1st and ending December 31st (calendar year)

Annual Maximum Benefit: $5000 per Member

Orthodontic Lifetime Maximum Benefit: $2500 per Eligible Member
Limited to eligible subscriber, spouse, and dependents.

Deductible: Deductible for services provided by an In-Network Provider

$25 per Member, per Benefit Year
$50 per Family, per Benefit Year

Deductible for services provided by an Out-of-Network Provider

$25 per Member, per Benefit Year
$50 per Family, per Benefit Year

The deductible applies to Basic and Major Benefits only
Any deductible amount that is satisfied will be applied toward both the In-Network and Out-of-Network deductibles

Covered Dental Services	Deductible Applied	In Network		Out-of Network	
		Percentage of Allowable Expense Paid by the Plan	*Member Copayment*	*Percentage of Allowable Expense Paid by the Plan*	*Member Copayment*
Preventive Benefits	No	100%	None	90%	None
Basic Benefits	Yes	100%	None	90%	None
Major Benefits	Yes	90%	20%	80%	20%
Orthodontic Benefits	No	50% Limited to eligible subscriber, spouse, and dependents.	50%	50% Limited to eligible subscriber, spouse, and dependents.	50%

Out of network claims are reimbursed at the Defined 800 level.
Endodontic Services are covered as Basic Benefits.
Periodontic Services are covered as Basic Benefits.
Sealants are covered as Preventive Benefits.
Implants are covered as Major Benefits.

Dependent children are eligible for coverage until age 26.

A complete description of covered services, limitations and exclusions is available in the Summary Plan Description. Members who receive services from a non-participating provider are subject to balance billing.

Summary
Plan Description
For
Northern Kentucky
Water District

NKWD 001803

NOTICE: IF YOU OR YOUR FAMILY MEMBERS ARE COVERED BY MORE THAN ONE DENTAL CARE PLAN, YOU MAY NOT BE ABLE TO COLLECT BENEFITS FROM BOTH PLANS. EACH PLAN MAY REQUIRE YOU TO FOLLOW ITS RULES OR USE SPECIFIC DENTISTS, AND IT MAY BE IMPOSSIBLE TO COMPLY WITH BOTH PLANS AT THE SAME TIME. READ ALL OF THE RULES VERY CAREFULLY, INCLUDING THE COORDINATION OF BENEFITS.

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INTRODUCTION

Northern Kentucky Water District is pleased to present its self-insured DentaSelect Plus dental Plan. As Members of the Plan, You and Your eligible dependents are entitled to access providers who participate in the DentaSelect Plus (DSP) Preferred Provider Organization which is a network of dentists offered by the Dental Care Plus Group. The Plan, as described in this booklet, became effective January 1, 2019 and provides dental coverage for You and Your eligible dependents. It is very important that You read this booklet so that You become familiar with Your benefits and how to use them.

This document outlines eligibility requirements, services covered and Plan limits as well as how to file a claim and how to find an answer when You have a question.

We recommend that You use this booklet as Your first source of reference when You have questions about the Plan, Your benefits, and Your rights. If You have questions that don't appear to be covered in this booklet, please do not hesitate to contact the Claims Administrator, DCP Holding Company, which is part of The Dental Care Plus Group. DCP Holding Company keeps records of individual Plan Participants and supervises the administration of the Plan. The address of The Dental Care Plus Group and DCP Holding Company is listed on the back cover. When communicating with DCP Holding Company, be sure to indicate that Your Plan is a DentaSelect Plus Plan.

SECTION 1 - PLAN DEFINITIONS

Accidental Injury - an accidental physical injury to the body caused by unexpected means that does not arise out of or in the course of employment.

Actively at Work - an Employee, as hired by the Employer, working full-time and paid regular earnings (temporary or seasonal employment is excluded) for a specific task or set of responsibilities.

This includes:

- working a specified number of hours each week, and
- working at the Employer's usual place of business or at a location to which Your Employer's business requires You to travel.

An Employee who does not complete his/her work assignments due to leave of absence, Disability, strike, or layoff is not Actively at Work.

Allowable Expense - the maximum allowable amount that the Plan establishes for a Covered Dental Service. The Plan will pay based on the lesser of the actual billed charge or the Allowable Expense, subject to the coverage levels referenced in the Schedule of Benefits. If services are obtained from an Out-of-Network Provider, the Member is responsible for payment to the Dentist for the difference between the Dentist's actual charge and the Allowable Expense.

Annual Maximum Benefit - the maximum amount payable under the Plan for Covered Dental Services received by a Member in a Benefit Year.

Benefit Year (Calendar Year) - the calendar year begins January 1 and ends December 31st.

Claims Administrator - DCP Holding Company (which is part of The Dental Care Plus Group), the organization designated by the Employer to administer claims for the Plan.

Company – Northern Kentucky Water District.

Copayment - the amount which the Member is required to pay for certain dental services covered under the Plan. Copayments may be a fixed dollar amount or a percentage of the Allowable Expense. The Member is responsible for payment of the Copayment directly to the Dentist. See Schedule of Benefits for Copayment levels.

Covered Dental Services / Covered Services - services which are covered under the Plan and for which the Plan will pay part or all of the Allowable Expense. Covered Dental Services are described in the Covered Dental Services section of this Summary Plan Description. Covered Dental Services does not include services that exceed any Plan limitations or maximum benefit levels.

Covered Dependent - a spouse or Dependent Child who is eligible for coverage and enrolled under the Plan.

Deductible - the amount which the Member is required to pay for Covered Dental Services before benefits are paid under the Plan. The Deductible amount is shown in the Schedule of Benefits.

DentaSelect Plus (DSP) – the name used by The Dental Care Plus Group to describe the package of administrative services The Dental Care Plus Group provides to the Plan, including claims administration by DCP Holding Company (which is part of The Dental Care Plus Group), and access to the DentaSelect Plus Preferred Provider Organization (PPO).

Dentist - a person who is a legally licensed doctor of dental surgery, dental medicine or dental science in the state where services are rendered and who is acting within the scope of that license.

Disability - the inability of an Employee (because of injury or illness) to perform the material duties pertaining to his/her employment with the Employer. Disability of a Covered Dependent is the inability (because of injury or illness) to perform all regular and customary activities usual to that Covered Dependent's age and family status. An Employee or Covered Dependent is not considered to be suffering from a Disability if he/she is performing any work or engaging in any occupation or employment for wage or profit, unless related to rehabilitation.

Emergency - a dental condition characterized by the sudden onset of acute symptoms of sufficient severity that the absence of immediate dental attention could reasonably result in:

- permanently placing the Member's health in jeopardy:
- causing other serious dental or health consequences; or
- causing serious impairment of dental function.

Employer – Northern Kentucky Water District, its subsidiaries, and the affiliated businesses that are designated by Northern Kentucky Water District as participating Employers in the Plan as well as any other businesses that are designated by Northern Kentucky Water District as participating Employers in the Plan.

Experimental - any care, procedure, treatment protocol, or technology that is not widely accepted as safe, effective, and appropriate for the treatment of injury or sickness throughout the recognized medical profession and established medical societies in the United States; or is in the research or investigational stage or conducted as part of research protocol; or has not been proven by statistically significant randomized clinical trials to establish increased survival or improvement in the quality of life over other conventional therapies. This also includes drugs, tests, and technology that the Food and Drug Administration has not approved for general use; that which is considered Experimental; that which

is for investigational use; or that which is approved for a specific medical condition but applied to another condition.

Family Dependent - means a spouse or Dependent Child of a Subscriber who is enrolled in the Plan and eligible for coverage under the Plan. See Eligibility Information for specific guidelines regarding eligibility.

Immediate Family - means a person who is related to a Member in any of the following ways: spouse, brother-in-law, sister-in-law, son-in-law, daughter-in-law, mother-in-law, father-in-law, parent (includes stepparent), brother or sister (includes stepbrother and stepsister), or child.

In-Network Provider - means a Dentist who is part of the DentaSelect Plus Preferred Provider Organization and who has entered into an agreement with The Dental Care Plus Group, either directly or through an affiliate or a subcontracted vendor, to provide Covered Dental Services to Members.

Injury - an accidental physical injury to the body caused by unexpected external means which does not arise out of or in the course of employment. All injuries sustained in connection with one accident are considered to be one injury. The term "injury" does not include disease or infection, except pyogenic infection occurring through an accidental cut or wound.

Lifetime Maximum Benefit - the maximum amount payable under the Plan for Covered Dental Services received by a Member during the Member's lifetime.

Medically Necessary/Medical Necessity - means that the treatment, services, or supplies received by a Member are determined to be:

1. appropriate and necessary for the symptoms, diagnosis, or direct care and treatment of the Member's condition;
2. within the standards the organized dental community deems good dental practice for the Member's condition;
3. not primarily for the convenience of the Member, the Member's Dentist or another person or provider;
4. not investigational or unproven, as recognized by the organized dental community, or which are used for any type of research program or protocol; and
5. not excessive in scope, duration, or intensity to provide safe, adequate, and appropriate treatment.

The fact that a Dentist may prescribe, order, recommend, or approve a service, supply, or level of care does not, of itself, make the treatment Medically Necessary or the make the charge a Covered Dental Service under the Plan.

Member - means the Subscriber and Family Dependents enrolled in the Plan who are eligible to receive Covered Dental Services under the Plan.

Military Service - includes service in the Army, Navy, Air Force, Marine Corps, Coast Guard, or any other recognized branch of service, pertaining to the military of any country.

Out-Of-Network Provider - means a Dentist who is not part of the DentaSelect Plus Preferred Provider Organization and who has not entered into an agreement with The Dental Care Plus Group, either directly or through an affiliate or a subcontracted vendor.

Placed for Adoption - means the assumption or retention by a person of a legal obligation for total or partial support of a child in anticipation of the adoption of the child. The child's placement with a person terminates upon the termination of that legal obligation.

Plan – Northern Kentucky Water District Dental Benefits Plan and its Schedule of Benefits as amended from time to time.

Plan Administrator – Northern Kentucky Water District. The Plan Administrator has the discretionary authority to interpret the Plan including those provisions relating to eligibility and benefit determination. The Plan Administrator's interpretations and determinations are final and binding.

Plan Document - the legal document governing the administration and interpretation of the Northern Kentucky Water District Dental Benefits Plan.

Plan Participant - see Member and Subscriber definitions.

Plan Sponsor – Northern Kentucky Water District.

Plan Year - the 12-consecutive month period that ends on December 31.

Subscriber, Employee, You, Your - means any Employee, eligible by virtue of employment and proper enrollment, to receive Covered Dental Services under the Plan.

Total Disability - a person's complete inability to perform any and every duty of his/her occupation or any other work or employment for wage or profit, or his/her Covered Dependent's complete inability to perform the normal activities of a person of his/her age and sex in good health.

Work In Progress - services or procedures started prior to the effective date of the coverage, with the exception of orthodontia if covered by the Plan. Prosthetic devices and crowns will not be covered if impressions are taken before the effective date of coverage. If final impressions were taken while coverage is in effect, but the prosthetic device or crown is installed more than thirty (30) days after coverage terminates, then charges for the prosthetic device or crown will not be covered.

SECTION 2 - ELIGIBILITY INFORMATION

Eligible Family Dependents are a Subscriber's legally married spouse and Dependent Children, as defined below.

Under the Plan, Your eligible Family Dependents are defined as:

- Your legally married spouse
- Your or Your legally married spouse's Dependent Children defined as:
  - Biological child(ren)
  - Child(ren) named in a divorce decree or Qualified Medical Child Support Order as being the responsibility of the Subscriber for dental benefits coverage.
  - Legally adopted child(ren), foster child(ren), or child(ren) for which You have legal custody.
  - Child(ren) who have been Placed for Adoption with You, if legal adoption is anticipated but not yet finalized.
  - Child(ren) of any age who are incapable of self-support because of permanent mental or physical Disability, if the mental or physical Disability occurred before attainment of age 26. The Subscriber must principally support the disabled Dependent Child and proof of the permanent Disability must be submitted to the Claims Administrator.

Dependent Children (who are not disabled) can be covered until the end of the month in which they attain age 26, regardless of financial dependency, residency, student status or marital status.

Coverage for Dependent Children does not include coverage for such Dependent Child's spouse or children.

In no event shall the term Family Dependent include (a) a spouse or child on active duty in any Military Service of any country, (b) a child who is eligible for coverage under the Plan as a Subscriber.

SECTION 3 - ENROLLMENT AND EFFECTIVE DATE OF INDIVIDUAL COVERAGE

Enrollment

An eligible Employee may enroll himself or herself and any Family Dependent during the initial eligibility period by following the Employer's enrollment procedures. A newly acquired Family Dependent is eligible to enroll in the Plan for a period of thirty-one (31) days beginning on the date he becomes a Family Dependent.

The Employer shall notify the Claims Administrator in writing of any enrollments, terminations or changes in the coverage classification of any Member. The time period of notification cannot exceed thirty-one (31) days following the effective dates of such changes.

Effective Date of Coverage

The coverage of a Member shall become effective on the date the Plan takes effect, or as otherwise specified in the Employer's application.

Unless otherwise provided by the Plan, a Subscriber not Actively at Work (except while on paid vacation or unpaid leave under FMLA) on the date the Plan takes effect, shall have his coverage become effective on the date of his return to active work.

In no event shall a Family Dependent of any Subscriber be covered under this Plan until the Subscriber's coverage becomes effective.

Changes in Plan Coverage

You can change Your level of coverage before the next annual enrollment period if You experience a change in Your family status. If You experience a change in family status and wish to change Your level of coverage, You must submit written notification to the Employer within 31-days* of Your change in family status. The Plan reserves the right to require the applicant to submit proof of any change of status. The following are examples of qualifying events for a change in family status:

- Marriage
- Divorce
- birth or adoption of a Dependent Child
- death of a Family Dependent
- loss of Your spouse's employment
- employment of Your spouse
- You are called to active military duty and obtain a military leave of absence
- You change from full-time status to part-time status or vice versa
- You change from active status to an unpaid leave of absence

- Your spouse’s change from full-time status to part-time status or vice versa
- Your spouse’s change from active status to an unpaid leave of absence
- a spouse’s change in employment that significantly changes Your spouse’s or Your own dental care coverage

* The 31-day notification period is waived if court/administrative ordered coverage is required for a Dependent Child. This waiver applies when written notification/enrollment is made by either the Subscriber or other parent. The Dependent Child's coverage will not be terminated unless the Subscriber’s coverage is terminated, the court/administrative order has expired or other comparable coverage is in effect.

SECTION 4 – ACCESSING BENEFITS

Identification Card

You will be issued Identification Card(s) which will list the names of all enrolled Family Dependents and which will indicate You are covered under a DentaSelect Plus Plan. The Identification Card should be presented whenever dental services are being received. This will assist in assuring that bills for Covered Dental Services are sent directly to the Claims Administrator.

Preferred Provider Organizations (PPO)

Your coverage under the Plan includes access to the DentaSelect Plus Preferred Provider Organization (PPO). A Member is free to obtain dental care from the Dentist of his or her choice, but the Member's out-of-pocket expenses may be less in the case of treatment received from a Dentist who participates in the DentaSelect Plus PPO (referred to as an In-Network Provider). The percentage payable for Covered Dental Services is shown in the Schedule of Benefits. Services rendered to a Member by an In-Network or an Out-of-Network Provider are paid under the Plan as shown in the Schedule of Benefits. A complete list of Dentists who participate in the DentaSelect Plus PPO is available on The Dental Care Plus Group website at www.dentalcareplus.com.

Covered Dental Services incurred in the event of an Emergency, regardless as to whether or not the Dentist is an In-Network or Out-of-Network Provider, shall be paid in accordance with the Schedule of Benefits, without further deductions, subject to all Plan maximums, limitations, conditions, and exclusions.

The Dental Care Plus Group does not make any representation or warranty as to the medical competence or ability of an In-Network Provider or an Out-of-Network Provider or to their respective staff or Dentists. The Dental Care Plus Group shall not have any liability or responsibility, either direct, indirect, vicarious or otherwise, for any actions or inactions, whether negligent or otherwise, of the In-Network Provider or Out-of-Network Provider, their staff or Dentists.

SECTION 5 – BENEFIT PROVISIONS

Allowable Expenses

Allowable Expense is the maximum allowable amount for a Covered Dental Service. The Plan will pay based on the lesser of the actual billed charge or the Allowable Expense subject to the payment levels referenced in the Schedule of Benefits.

When Covered Services are obtained from an In-Network Provider, the Member is not responsible for the difference between the Dentist's actual charge and the Allowable Expense.

When Covered Services are obtained from an Out-of-Network Provider, the Member is responsible for payment to the Dentist for the difference between the Dentist's actual charge and the Allowable Expense.

The Member is responsible for payment of the following, regardless of whether services were obtained from an In-Network Provider or an Out-of-Network Provider:

- Copayments;
- Deductible amounts; and
- Any amount in excess of Annual or Lifetime Maximum Benefit levels.

Copayment and Maximum Benefits

Copayments are amounts that are directly payable by a Member to the Dentist for Covered Dental Services. Your Plan may also have an Annual or Lifetime Maximum Benefit level, after which no benefits are paid by the Plan. You are responsible for payment to the Dentist of any amount in excess of Annual or Lifetime Benefit levels. See the Schedule of Benefits for Copayment and Annual and Lifetime Maximum Benefit levels.

Deductible Provision

Your Deductible is per covered Member, per Benefit Year. The Deductible amount is identified in the Schedule of Benefits. Your Deductible is calculated on the Allowable Expense for Covered Services received by a Member. If the Dentist's actual charge for a Covered Service is greater than the Allowable Expense, the difference between the Dentist's actual charge and the Allowable Expense will not be counted toward Your Deductible.

After You pay the Deductible, the Plan pays a portion of the remaining Allowable Expenses up to the specified maximum(s). You pay for the balance of the Allowable Expense, which is Your Copayment.

Deductible Carryover

Any Allowable Expenses incurred in the last three months of the Benefit Year which were applied toward the Deductible, may be carried forward and applied against the Deductible for the next following Benefit Year.

Financial Obligation for Non-Covered Services

The Member is responsible for payment to the Dentist for any service that is not covered by the Plan. Non-covered services include (but are not limited to) the following:

- any service specifically listed as an exclusion of the Plan in this Summary Plan Description.
- any service not covered by the Plan due to a specified limitation of the Plan. For examples of such limitations, please see the Covered Dental Services section of this Summary Plan Description.
- any service that is denied because a Member has exceeded the Annual or Lifetime Maximum Benefits payable under the Plan. See the Schedule of Benefits for the Annual and Lifetime Maximum Benefit levels of Your Plan.

Alternative Benefit Policy

Many dental conditions can be treated in more than one way. The Plan has an "alternative benefit policy" which governs the amount of benefits the Plan will pay for treatments covered under the Plan. If two or more alternative treatments are both covered under the Plan, and You choose a more expensive treatment than is needed to correct a dental problem according to accepted standards of dental practice, the benefit payment will be based on the cost of the covered treatment which provides professionally satisfactory results at the most cost-effective level. The Member will pay the difference in cost.

SECTION 7 - COVERED DENTAL SERVICES

All payments made by the Plan for Preventive, Basic, and Major services will apply to the Annual Maximum Benefit level referenced in the Schedule of Benefits. The Plan will pay for Covered Services provided by a Dentist licensed to provide such services in the state or territory where the Covered Services are being provided.

Preventive Benefits

Preventive & Diagnostic Services

Routine oral examinations	limited to two visits each year
Prophylaxis (cleaning)	limited to two each year
Topical application of fluoride	limited to two treatments each year to children under age 18
Bitewing xrays	limited to one set each year
Vertical Bitewing xrays (7 - 8 films)	limited to once every three years
Periapical xrays	limited to 5 films per year
Full mouth x-rays (complete series or panoramic)	limited to once every three years

Emergency Services

Emergency/limited oral examinations

Emergency palliative treatment

Space Maintainers

Fixed band type	only under a treatment plan filed with the Claims Administrator. Limited to children under age 19.
Space maintainer – fixed, unilateral	limited to children under 19 years of age
Distal shoe space maintainer – fixed, unilateral	limited to children under 8 years of age

Recementation of space maintainers

Sealants

Permanent molar teeth only	limited to children under 15 years of age and once every five years per tooth

Basic Benefits

Emergency Services

Office visit after hours .... for emergencies only

Diagnostic Services

Referral consultations and examinations performed by a specialist.

Extraoral xrays

Oral Surgery (Includes local anesthesia and routine postoperative care)

Extractions

Simple single tooth extractions

Root removal - exposed roots

Surgical Extractions

Removal of an erupted tooth (uncomplicated)

Removal of impacted tooth - soft tissue

Removal of impacted tooth - partially bony

Removal of impacted tooth - completely bony

Removal of impacted tooth - completely bony, with complications

Surgical removal of residual roots

Pre-Prosthetic oral surgery

Alveoloplasty and vestibuloplasty

Other Oral Surgery

Incision and drainage of abscess

Biopsy and examination

General anesthesia or intraveneous sedation.....	only when necessary and provided in connection with oral surgery

Periodontic Services (Includes local anesthesia and routine postoperative care)

Emergency treatment (periodontal abscess, acute periodontitis, etc.)	
Periodontal scaling and root planing.....	limited to four quadrants each year, as a definitive treatment when pocket depths of at least 4mm are demonstrated.
Surgical periodontics (including post-surgical visits).....	limited to two additional recalls in the first year following complex surgery
Gingivectomy	
Osseous and muco-gingival surgery	
Gingival grafting	
Guided tissue regeneration	
Periodontal maintenance procedure.....	limited to two each year following a history of periodontal disease.

Endodontic Services (Includes local anesthesia and routine postoperative care)

Root canal therapy, traditional	
Retreatment of previous root canal.....	must be at least three years following previous root canal treatment on the same tooth
Recalcification and apexification	

Restorative Services (Includes local anesthesia. Multiple restorations on a single surface will be considered as a single restoration.)

Restorations (amalgam, composite and sedative fillings).....	limited to once every two years per tooth (same surfaces only)
Pins-pin retention as part of restoration when used instead of gold or crown restoration	
Stainless steel crowns when tooth cannot be adequately restored with filling material	

Recementation of inlays, onlays, crowns and bridges

Repairs to crowns and bridges

Prosthodontic Services

Full and partial denture repairs

Repair broken, complete or partial dentures. Replacement of broken teeth on complete or partial denture. Additions to partial dentures to replace extracted natural teeth.

Relining and rebasing	limited to once every three years

Major Benefits

Restorative Services (*Gold restorations and crowns are covered only as treatment for decay or traumatic injury and only when teeth cannot be restored with a filling material or when the tooth is an abutment to a covered partial denture or fixed bridge.)*

Inlays, onlays, crowns, and post & cores…….	limited to once in five years on same tooth

Prosthodontic Services

Fixed bridge	limited to one original or replacement prosthesis every five years
Complete upper or lower denture	limited to one original or replacement prosthesis every five years
Partial upper or lower denture.....	limited to one original or replacement prosthesis every five years

Orthodontic Benefits

Orthodontic Benefits may not be covered under Your Plan. Please refer to the Schedule of Benefits to determine whether Orthodontic Benefits are covered under Your Plan.

Orthodontic Treatment may be subject to a Lifetime Maximum Benefit. Refer to the Schedule of Benefits for the Lifetime Maximum Benefit of Your Plan.

Comprehensive Orthodontic Treatment

Other Orthodontic Treatment ..... (limited to one appliance per individual)

Appliance for tooth guidance

Appliance to control harmful habits

Orthodontic retention appliance

Coverage includes orthodontic procedures provided under a treatment plan that has been submitted by Your Dentist to the Claims Administrator. The Dentist providing this service must supply the Claims Administrator with films and study models upon request.

The Plan will make an initial payment of benefits, based on the Schedule of Benefits and the initial charge submitted under the treatment plan, and additional payments will be made in installments beginning when appliances are inserted. The payments will be monthly or quarterly for the length of the estimated treatment plan. The amount of the first Member payment for the initial charge will be at the discretion of the Orthodontist. Under the Plan, up to 25% of the total treatment cost may be recognized as the initial charge, of which the payment will be the benefit level specified in the Schedule of Benefits.

If a Member is receiving orthodontic treatment which was covered under another company's benefit program(s) prior to the effective date of the Plan, payments made by the other company's benefit program(s) will be deducted from the Lifetime Maximum Benefit. All benefits paid toward orthodontic services by all previous benefit programs will be applied to the Lifetime Maximum Benefit.

All limitations can be appealed under the appeals procedure.

SECTION 8 - EXCLUSIONS

The following are expenses, charges and services specifically excluded from coverage under the Plan. The Member is financially obligated for payment to the Dentist of the full charge for any service that is excluded/not covered under the Plan.

1. Services performed for cosmetic reasons, including personalization or characterization of prosthetic devices and the bleaching of teeth.
2. Services or supplies which are considered Experimental according to standard dental practice.
3. Charges which are incurred before the Member's effective date of coverage or after the date a Member's coverage terminates.
4. Services or procedures started prior to the effective date of the Member's coverage, with the exception of orthodontic services if covered by the Plan. Prosthetic devices and crowns will not be covered if impressions are taken before the effective date of coverage. If final impressions were taken while coverage is in effect, but the prosthetic device or crown is installed more than thirty (30) days after coverage terminates, then charges for the prosthetic device or crown will not be covered.
5. Porcelain coverage on posterior crowns.
6. Missed appointment charges.
7. Completion of claim forms.
8. Replacement of lost, stolen or broken prosthetic devices or appliances unless it is after the limitation date.
9. Analgesics, nitrous oxide, non-intravenous conscious sedation and other drugs and prescriptions.
10. Localized delivery of antimicrobial or chemotherapeutic agents.
11. Hospital related charges.
12. Appliances, restorations, and procedures other than full dentures, for the primary purpose of increasing vertical dimension, restoring the occlusion or treatment of Bruxism.
13. Veneers or similar properties of crowns and pontics.
14. Services for educational purposes.
15. Splinting (if tooth does not otherwise need to be restored).
16. Services related to work conditions if the claimant is eligible for benefits under any workers' compensation act or similar law.
17. Surgical implants or transplants of any type (including prosthetic devices, such as crowns, attached to them) and all related services.

18. Services performed by other than a licensed Dentist, except for legally delegated services to a licensed hygienist or licensed expanded functions auxiliary.
19. Treatment for Temporomandibular Joint Disease (TMJ) or Myofacial Pain Dysfunction Syndromes (MPD).
20. X-rays for TMJ.
21. Orthognathic surgery.
22. Services or supplies rendered, or furnished in connection with, any duplicate appliance.
23. Services or supplies which are not Medically Necessary.
24. Expenses incurred for more than two oral examinations and/or prophylaxis treatments during a Benefit Year.
25. Expenses incurred for the replacement of amalgams and/or composites more often than once in any two (2) year period.
26. Expenses incurred for the replacement of fixed bridgework, crowns, gold restorations and jackets more often than once in any five (5) year period.
27. Expenses incurred for the replacement of partial or full dentures more often than once in any five (5) year period.
28. Expenses incurred for replacement of an existing denture which is or can be made satisfactory.
29. Expenses incurred for relining of dentures more often than once in any three (3) year period.
30. Expenses incurred for a temporary full denture.
31. Expenses incurred for the retreatment of root canals if it has not been at least three (3) years since the previous root canal treatment.
32. Services which are determined to be eligible expenses under any medical plan in which the Member is enrolled.
33. House calls.
34. Dental services or supplies for a condition resulting from civil disobedience, active participation in a riot or in the commission of a felony, self-inflicted injury, nonaccidental injury, or an act of war.
35. Any services not specifically listed as a Covered Dental Service.
36. Treatment by a member of the Immediate Family or a resident in the covered Employee's home; self-treatment.
37. Acid etches.
38. Expenses for the completion of periodontal charting.
39. Asepsis.
40. Claims that are not received by the Claims Administrator within one calendar year from the date of service.

41. Charges for services received after a Member has reached the Annual or Lifetime Maximum Benefits payable under the Plan.
42. Expenses for gold restorations and crowns, except when used as treatment for decay or traumatic injury when teeth cannot be restored with a filling material or when the tooth is an abutment to a covered partial denture or fixed bridge.

SECTION 9 - PRETREATMENT REVIEW

Pretreatment Review is a voluntary program designed to assist You and Your Dentist in understanding Your dental coverage before services are provided.

If You or Your Dentist would like to submit a treatment plan for pretreatment review, Your Dentist must file that request for pretreatment review. Requests for pretreatment review should be sent to the following address:

DCP Holding Company
DentaSelect Plus Plans
100 Crowne Point Place
Cincinnati, OH 45241

When a proposed treatment plan for services that are expected to exceed $400 is submitted, the Claims Administrator will review those services for coverage under the Plan. After the review is complete, Your Dentist will be provided with an estimate of the amount payable, in whole or in part (if any), by the Plan on the proposed treatment. Pretreatment review only provides an estimate of Covered Services and does not constitute a guarantee of payment. Exact benefits are determined based upon the eligibility of the Member and benefit plan in effect at the time services are actually rendered.

The Claims Administrator will notify Your Dentist of the pretreatment estimate within a reasonable period of time appropriate to the dental circumstances, but generally not later than 15 days after receipt of the request for pretreatment review. In certain circumstances this time period may be extended for an additional 15 days, and the Claims Administrator will notify You or Your Dentist of any extension. If additional information is necessary to process Your request for pretreatment review, the Claims Administrator will notify You or Your Dentist, and You or Your Dentist will have 45 days from receipt of the notice to provide the additional information. If You or Your Dentist do not provide the additional information within the 45 day period, Your request for pretreatment review may be denied. In cases where the additional information is provided within the 45 day period, the Claims Administrator will notify Your Dentist of the pretreatment estimate within 15 days after receipt of the additional information. The notice will inform You and Your Dentist of the specific basis for the pretreatment estimate, and describe Your right to information concerning the estimate and Your right to appeal.

A pretreatment estimate that has been approved may be modified by the Plan at any time, and the Claims Administrator will notify Your Dentist of the modification in advance and provide You with an opportunity to appeal the modification before it is effective. Your Dentist may request that the time for the treatment plan to be completed or the number of treatments included in the pretreatment estimate be increased at any time. A request for an extension of time or increase in the number of treatments will be approved or denied after receipt of a completed request.

Pretreatment Review of Urgent Conditions:

If Your request for pretreatment review is for treatment of an urgent condition, and failure to obtain treatment quickly would jeopardize Your health or, in the opinion of Your Dentist, would subject You to severe pain which cannot be managed without the treatment, Your request for pretreatment review will be processed as soon as possible taking into account the dental circumstances, but not later than 72 hours after the Claims Administrator receives the request. If additional information is needed to process the request, the Claims Administrator will notify You or Your Dentist as soon as possible, but no later than 24 hours after the Claims Administrator receives the request, and You or Your Dentist will have at least 48 hours to provide the additional information. If You or Your Dentist do not provide the additional information within the time period allowed, the request for a pretreatment estimate may be denied. If You or Your Dentist provide the additional information requested, the Claims Administrator will notify Your Dentist of the pretreatment estimate as soon as possible, but not later than 48 hours after receipt of the additional information. The notice will include the specific basis for the estimate, and describe Your right to information concerning the estimate and Your right to appeal.

SECTION 10 – CLAIMS PROCEDURES

How to Submit a Claim

If you receive dental treatment from an In-Network Provider, Your In-Network Provider will submit the claim directly to the Claims Administrator. If You receive dental treatment from an Out-of-Network Provider, You may submit claims for dental treatment received while You are eligible under the Plan. If You receive dental treatment from an Out-of-Network Provider and You assign Your right to receive payment under the Plan to the Out-of-Network Provider, the Out-of-Network Provider may submit the claim directly to the Claims Administrator. Assignment of claims to an Out-of-Network Provider must be in writing and signed by You, and the Out-of-Network Provider must submit the written assignment form with the claim. Claims should be sent to the following address:

DCP Holding Company
DentaSelect Plus Plans
100 Crowne Point Place
Cincinnati, OH 45241

The Claims Administrator will determine if enough information has been submitted to enable proper consideration of the claim. If not, more information may be requested from You or Your Dentist.

Claims Processing Procedures

When the Claims Administrator receives claims from You or Your Dentist, the Claims Administrator will process those claims and make a determination in accordance with Plan documents. If the claim for dental treatment provided by an In-Network Provider is paid, payment will be sent directly to the In-Network Provider. If a claim for dental treatment provided by an Out-of-Network Provider is paid, payment will be sent to You or, if You assigned Your right to payment under the Plan to the Out-of-Network Provider, payment will be sent directly to the Out-of-Network Provider.

If the claim is denied in whole or in part, the Claims Administrator will notify You, and if the claim was filed by Your Dentist, the Claims Administrator will also notify Your Dentist, within a reasonable period of time, but generally not later than 30 days after the claim is received. In certain circumstances, the 30 day time period may be extended for an additional 15 days, and the Claims Administrator will notify You that the time period has been extended.

If additional information is required to process Your claim, the Claims Administrator will notify You or Your Dentist, and You or Your Dentist will have 45 days from receipt of the notice to provide the additional information. If

You or Your Dentist do not provide the additional information within the 45 day period, Your claim may be denied. In cases where the additional information is provided within the 45 day period, the Claims Administrator will notify You and Your Dentist if the claim is denied in whole or in part within 30 days after the claim was initially received or 15 days after receipt of the additional information, whichever is later. The notice of a denial will inform You and Your Dentist of the specific reason for the denial, and describe Your right to information concerning the claim and Your right to appeal.

SECTION 11 - COORDINATION OF BENEFITS (C.O.B.)

"Coordination of benefits" is the procedure used to pay dental care expenses when a person is covered by more than one plan. The Plan follows certain rules defined below to decide which plan pays first and how much the other plan must pay. The objective is to make sure the combined payments of all plans are no more than Your actual bills.

When You or Your Family Dependents are covered by another group plan in addition to the Plan, You must submit all bills first to the primary plan. The primary plan must pay its full benefits as if You had no other coverage. If the primary plan denies the claim or does not pay the full bill, You may then submit the balance to the secondary plan.

The Plan pays for dental care only when You follow the Plan's rules and procedures. If the Plan's rules conflict with those of another plan, it may be impossible to receive benefits from both plans, and You will be forced to choose which plan to use.

Plans that do not Coordinate

The Plan will pay benefits without regard to benefits paid by the following kinds of coverage.

- Medicaid
- Group hospital indemnity plans which pay less than $110 per day
- School accident coverage
- Some supplemental sickness and accident policies

How the Plan Pays As Primary Plan

- When the Plan is primary, the Plan will pay the full benefit allowed by the Plan as if You had no other coverage.

How the Plan Pays As Secondary Plan

- When the Plan is secondary, payments will be based on the balance left after the primary plan has paid. The Plan will pay no more than that balance. In no event will the Plan pay more than the Plan would have paid had the Plan been primary.
- The Plan will pay only for dental care expenses that are covered by the Plan.
- The Plan will pay only if You have followed all of the Plan's procedural requirements.
- The Plan will pay no more than the "Allowable Expenses" for the dental care involved. If the Allowable Expense is lower than the primary plan's, the primary plan's allowable expense will be used. The Allowable Expense may be less than the actual bill.

Which Plan is Primary?

To decide which plan is primary, both the coordination provisions of the other plan and which member of Your family is involved in a claim must be considered. The primary plan will be determined by the first of the following which applies:

1. *Non-coordinating Plan*

   If You have another group plan which does not coordinate benefits, it will always be primary.

2. *Employee*

   The plan which covers You as an Employee (neither laid off nor retired) is always primary.

3. *Children (Parents Divorced or Separated)*

   If the court decree makes one parent responsible for dental care expenses, that parent's plan is primary.

   If the court decree gives joint custody and does not mention dental care, the Plan follows the birthday rule.

   If neither of those rules applies, the order will be determined in accordance with the Ohio Insurance Department rule on Coordination of Benefits.

4. *Children and the Birthday Rule*

   When Your children's dental care expenses are involved, the Plan follows the "birthday rule." The plan of the parent with the first birthday in a calendar year is always primary for the children. For example, if Your birthday is in January and Your spouse's birthday is in March, Your plan will be primary for all of Your children.

   However, if Your spouse's plan has some other coordination rule (for example, a "gender rule" which says the father's plan is always primary), the Plan will follow the rules of the other plan.

5. *Other situations*

   For all other situations not described above, the order of benefits will be determined in accordance with Department of Insurance rules of Coordination of Benefits.

SECTION 12 - TERMINATION OF MEMBER COVERAGE

Benefits for the Member under the Plan will automatically terminate on the earliest of the following dates:

1. The date the Plan is terminated, or with respect to any specific coverage item of the Plan, the date such coverage item terminates.
2. The last day of the last month for which the required Member contribution has been paid to the Plan, if the Member is required to make a contribution.
3. The date specified by the Employer that a Subscriber or Family Dependent is no longer eligible for coverage under the terms of the Plan.
4. The date the Employer receives written notice from the Member for termination of coverage, or the date requested by the Member in such notice, if later.
5. The date on which the Member is retired or pensioned, unless a specific coverage classification is specified for retired or pensioned individuals in the Plan.
6. The date of entry into military duty, except temporary duty of thirty (30) days or less.
7. For a Dependent Child, the end of the month when the child no longer qualifies as a Family Dependent.

SECTION 13 - COBRA CONTINUATION COVERAGE

If coverage under the Plan ceases for You, Your eligible spouse and Your eligible dependents, under certain circumstances You, Your eligible spouse and Your eligible dependents may be able to continue coverage under this Plan under a federal law called COBRA. COBRA continuation coverage is a continuation of coverage under the Plan when coverage would otherwise end because of a life event known as a "qualifying event." Specific qualifying events are listed below. After a qualifying event, COBRA continuation coverage must be offered to each person who is a "qualified beneficiary." You, Your spouse, and Your Dependent Children could become qualified beneficiaries if coverage under the Plan is lost because of the qualifying event. Under the Plan, qualified beneficiaries who elect COBRA continuation coverage must pay for COBRA continuation coverage.

If You are an Employee, You will become a qualified beneficiary if You will lose Your coverage under the Plan because either one of the following qualifying events happens:

(1) Your hours of employment are reduced, or

(2) Your employment ends for any reason other than Your gross misconduct.

If You are the spouse of an Employee, You will become a qualified beneficiary if You will lose Your coverage under the Plan because any of the following qualifying events happens:

(1) Your spouse dies;

(2) Your spouse's hours of employment are reduced;

(3) Your spouse's employment ends for any reason other than his or her gross misconduct;

(4) Your spouse becomes enrolled in Medicare (Part A, Part B, or both); or

(5) You become divorced or legally separated from Your spouse.

Your Dependent Children will become qualified beneficiaries if they will lose coverage under the Plan because any of the following qualifying events happens:

(1) The parent-Employee dies;

(2) The parent-Employee's hours of employment are reduced;

(3) The parent-Employee's employment ends for any reason other than his or her gross misconduct;

(4) The parent-Employee becomes enrolled in Medicare (Part A, Part B, or both);

(5) The parents become divorced or legally separated; or

(6) The child stops being eligible for coverage under the Plan as a "Dependent Child."

The Plan will offer COBRA continuation coverage to qualified beneficiaries only after the Plan Administrator has been notified that a qualifying event has occurred. When the qualifying event is the end of employment or reduction of hours of employment, death of the Employee, or enrollment of the Employee in Medicare (Part A, Part B, or both), the Employer must notify the Plan Administrator of the qualifying event.

For the other qualifying events (divorce or legal separation of the Employee and spouse or a Dependent Child's losing eligibility for coverage as a Dependent Child), You must notify the Plan Administrator within 60 days after the qualifying event occurs. You must send this notice to: Northern Kentucky Water District. In addition, if applicable, You must provide a certified copy of the court order granting the divorce or legal separation.

Once the Plan Administrator receives notice that a qualifying event has occurred, COBRA continuation coverage will be offered to each of the qualified beneficiaries. Each qualified beneficiary will have an independent right to elect COBRA continuation coverage. Covered Employees may elect COBRA continuation coverage on behalf of their spouses, and parents may elect COBRA continuation on behalf of their children.

COBRA continuation coverage is a temporary continuation of coverage. When the qualifying event is the death of the Employee, the Employee's becoming entitled to Medicare (Part A, Part B, or both), Your divorce or legal separation, or a Dependent Child's losing eligibility as a Dependent Child, COBRA continuation coverage lasts up to a total of 36 months. When the qualifying event is the end of employment or reduction of the Employee's hours of employment, and the Employee became entitled to Medicare benefits less than 18 months before the qualifying event, COBRA continuation coverage for qualified beneficiaries other than the Employee lasts until 36 months after the date of Medicare entitlement. For example, if a covered Employee becomes entitled to Medicare 8 months before the date on which his employment terminates, COBRA continuation coverage for his spouse and children can last up to 36 months after the date of Medicare entitlement, which is equal to 28 months after the date of the qualifying event (36 months minus 8 months). Otherwise, when the qualifying event is the end of employment or reduction of the Employee's hours of employment, COBRA continuation coverage generally lasts for only up to a total of 18 months. There are two ways in which this 18-month period of COBRA continuation coverage can be extended.

Disability Extension of 18-month Period of Continuation Coverage

If You or anyone in Your family covered under the Plan is determined by the Social Security Administration to be disabled and You notify the Plan Administrator in a timely fashion, You and Your entire family may be entitled to receive up to an additional 11 months of COBRA continuation coverage, for a total maximum of 29 months. The Disability would have to start at some time before the 60th day of COBRA continuation coverage and last at least until the end of the 18-month period of continuation coverage. You must make sure that the Plan Administrator is notified of the Social Security Administration determination within 60 days of the date of the determination and before the end of the 18-month period of COBRA continuation coverage. This notice should be sent to:

Northern Kentucky Water District
2835 Crescent Springs Road
Erlanger, KY 41018

Second Qualifying Event Extension of 18-month Period of Continuation Coverage

If Your family experiences another qualifying event while receiving 18 months of COBRA continuation coverage, Your spouse and Dependent Children can get up to 18 additional months of COBRA continuation coverage, for a maximum of 36 months, if notice of the second qualifying event is properly given to the Plan. This extension may be available to the spouse and any Dependent Children receiving continuation coverage if the Employee or former Employee dies, becomes entitled to Medicare benefits (under Part A, Part B, or both), or gets divorced or legally separated, or if the Dependent Child stops being eligible under the Plan as a Dependent Child, but only if the event would have caused the spouse or Dependent Child to lose coverage under the Plan had the first qualifying event not occurred. In all of these cases, You must make sure that the Plan Administrator is notified of the second qualifying event within 60 days of the second qualifying event. This notice must be sent to:

Northern Kentucky Water District
2835 Crescent Springs Road
Erlanger, KY 41018

If You Have Questions About COBRA

Questions concerning the Plan or Your COBRA continuation coverage should be addressed to the contact or contacts identified below. For more information about Your rights under ERISA, including COBRA, the Health Insurance Portability and Accountability Act (HIPAA), and other laws affecting group health benefits, contact the nearest Regional or District Office of the U.S.

Department of Labor's Employee Benefits Security Administration (EBSA) in Your area or visit the EBSA website at www.dol.gov/ebsa. (Addresses and phone numbers of Regional and District EBSA Offices are available through EBSA's website.)

In order to protect Your family's rights, You should keep the Plan Administrator informed of any changes in the addresses of family members. You should also keep a copy, for Your records, of any notices You send to the Plan Administrator.

Plan Contact Information

Plan Administrator:

Northern Kentucky Water District
2835 Crescent Springs Road
Erlanger, KY 41018
859-578-5454

Claims Administrator:

DCP Holding Company
DentaSelect Plus Plans
100 Crowne Point Place
Cincinnati, OH 45241
513-554-1100

SECTION 14 – RIGHT TO RECOVERY

If any payment is made under this Plan in excess of the amount properly payable to or on behalf of You or Your Covered Dependents under the terms and conditions of this Plan, then the Plan has the right to recover such excess payments from You and/or Your Covered Dependents or any entity which received such payment or was relieved from payment due to payment by this Plan.

As Participants in the Plan, You and Your Covered Dependents hereby agree that You will execute and deliver any and all instruments and papers required by the Plan in order to protect the Plan's rights of recovery, and further, You must do whatever is requested or necessary in order to fully execute and to fully protect all the Plan's rights hereunder.

SECTION 15 - SUBROGATION AND REIMBURSEMENT

This Plan reserves the right of subrogation. This means that the Plan can recover the cost of benefits paid to You or on Your behalf when a third party is or may be liable for or pays any money for an injury, illness or loss covered under the Plan.

A common situation involving subrogation is where someone injures a Plan Participant in an auto accident. The Participant suffers an injury and receives dental treatment which is covered under the Plan and the Plan pays for the treatment. The Plan can then recover the cost of the treatment directly from the driver or his insurance company. Recovery can also be made from a second medical policy, e.g., for medical malpractice; from a homeowner's policy, e.g., for accidents in another's home or property; or from general liability coverage, e.g., for a defective product; where the Plan Participant incurred dental expenses for which the other party was liable. The Plan can recover the cost of benefits paid from any person or organization including, but not limited to, insurance companies that issue liability insurance, uninsured/underinsured insurance and medical payments coverage.

You may be asked to assist the Plan in the process of securing payment for the cost of benefits provided on Your behalf. As a Participant in the Plan, You, and Your Covered Dependents, agree to execute and deliver any and all instruments, papers or other documents required by the Plan to fully protect the Plan's right to subrogation and to cooperate fully with the Plan to secure such rights. Moreover, You, and Your Covered Dependents, shall do nothing which may prejudice the Plan's subrogation rights.

The Plan shall be legally subrogated to all claims, demands, actions and rights of recovery You may have against a third party to the extent of any and all payments of benefits by the Plan. The Plan's right to subrogation takes priority over Your right to recover from third parties, even if the third party has insufficient resources to fully compensate You for all losses sustained or alleged.

The Plan also reserves the right of reimbursement. This means that You must reimburse the Plan for the cost of benefits paid to You or on Your behalf for any illness or injury caused by a third party in the event You, or Your Covered Dependents, receive any money for the same illness or injury. As a Participant in the Plan, You are required to hold the gross (unreduced by attorney fees, other expenses or costs) proceeds of any third party payment in trust for the benefit of the Plan and You must immediately upon receipt pay the third party payment to the Plan. If the third party pays You before the Plan pays any benefits, then the Plan will not pay benefits for the same injury to the extent of the payment by the third party. If the third party pays You after the Plan pays benefits, then You must repay the Plan for the cost of any and all benefits provided for the same injury or illness. If You fail to repay the Plan for any payment received from a third party, then the Plan will cease paying benefits on Your behalf until either You repay the Plan or the Plan receives unrelated claims which, in the aggregate, amount to more than the amount of the third party payment.

You must reimburse the Plan regardless of whether:

- the third party payment is the result of a court judgement, arbitration award, compromise, settlement or any other arrangement; or
- the third party admits liability;
- the medical and dental expenses or loss of income are itemized or included in the third party payment; or
- You have been fully compensated or made whole by the third party payment for all losses sustained or alleged.

Consider, once again, the auto accident example where someone injures You and You receive dental treatment that is covered under the Plan. If the Plan has already paid benefits and the other driver's insurance company sends You a check for damages or You settle a lawsuit concerning the accident, You must first repay the Plan for the cost of any and all benefits paid on Your behalf before You pay any other expenses. This is true even if the amount You receive is not sufficient to fully compensate You for all the losses You incurred or if the portion of the settlement payment allocated to pay dental expenses is smaller than the amount which must be repaid to the Plan.

You, and Your Covered Dependents, agree to reimburse the Plan in first priority and without any set-off or reduction for attorney fees, other expenses, or costs. The "common fund" doctrine does not apply to any funds recovered by any attorney You hire regardless of whether funds recovered are used to repay benefits paid by the Plan. You, and Your Covered Dependents, also agree, to notify the Plan, in writing, whenever benefits are paid under this Plan that arise out of any injury or illness that provides or may provide the Plan subrogation or reimbursement rights. You, and Your Covered Dependents, further agree, when requested by the Plan, to execute and deliver any and all instruments, papers or other documents required by the Plan to fully protect the Plan's right to

reimbursement and to cooperate fully with the Plan to secure such rights. You shall do nothing to prejudice the Plan's right to reimbursement.

Failure to comply fully with the provisions of the Plan regarding subrogation and reimbursement can result in suspension or termination of benefits.

SECTION 16 - RIGHTS AND LIMITS

This booklet is a general description of the Plan and Your benefits. It is important to remember that:

- The description of benefits in this booklet replaces and supersedes any other summary or description previously issued by Northern Kentucky Water District.
- All benefits are subject to the terms, conditions, and limitations of the Northern Kentucky Water District Dental Benefits Plan as set forth in the Plan Document.
- Nothing in the Plan or in this booklet is intended to provide Employees, former Employees, or Covered Dependents with a vested right to any benefits under the Plan and/or any rights for continued employment.
- Your rights, if any, to benefits of the Plan depend upon whether You satisfy the eligibility requirements of the Plan and whether Your submitted claims are allowed charges under the Plan.
- Your rights as a participant in this Plan are outlined in the ERISA information sections that follow.

SECTION 17 - ERISA INFORMATION

This Plan, regulated by the Employee Retirement Income Security Act of 1974 (ERISA), is required to make available to all Plan Participants specific information about the Plan. The following sections describe basic Plan information and Your rights under ERISA.

Plan Name

Northern Kentucky Water District Dental Benefits Plan

Plan Sponsor and Plan Administrator

Northern Kentucky Water District
2835 Crescent Springs Road
Erlanger, Kentucky 41018
(859) 578-5454

Employer's Identification number:

61-1311695

The Plan Sponsor is also the Plan's Agent for the serving of legal process

Plan Type and Number

This is a welfare benefit plan that offers dental benefits. The Plan number is 501.

Plan Effective Date

The effective date of the Plan as described in this booklet is January 1, 2019.

Eligible Participants

Please refer to the Eligibility Information section.

Claims Administrator:

The independent third party administrator who processes all Plan claims is:

DCP Holding Company
DentaSelect Plus Plans
100 Crowne Point Place
Cincinnati, Ohio 45241

(513) 554-1100
1-800-367-9466 (Toll Free)

Plan Funding

This Plan is self-funded by the Plan Sponsor. Benefits are paid by contributions from the Employer and the Employees. Benefits are paid from the general assets of Northern Kentucky Water District. Employee contributions, if any, are

calculated annually and are used to pay claims. DCP Holding Company is the Claims Administrator, and does not insure the benefits paid by the Plan.

Benefit Records - Calendar Year

The benefit records are kept 1/1 to 12/31 for processing claims.

Plan Records - Calendar

The fiscal records are kept 1/1 to 12/31 for IRS reporting.

Plan Document

The Plan has a legal document called the Plan Document. A copy of the Plan Document is available upon written request to the Plan Administrator who may make a reasonable charge for the copies. If the wording of this booklet, the Summary Plan Description, is in conflict with the wording of the Plan Document, the wording of the Plan Document governs.

SECTION 18 - APPEAL PROCEDURE

Each Plan Participant has the right to appeal and is entitled to a full and fair review of any denial of a claim, or any pretreatment estimate obtained under the pretreatment review procedure. Appeals must be filed in writing within 180 days following Your receipt of notice of the denial and should be sent to the Claims Administrator. If You are appealing a pretreatment estimate which involves treatment of an urgent condition (as defined in the Pretreatment Review section), You may request an appeal by phone. All other appeals must be filed in writing by forwarding the written appeal to the following address:

DCP Holding Company
DentaSelect Plus Plans
Appeals Department
100 Crowne Point Place
Cincinnati, OH 45241

You or Your Dentist may submit written comments, records and other information when You file an appeal. You may also request, free of charge, copies of all records and other information which were relied on or created in the process of reviewing the claim or pretreatment review request. If the claim or estimate was denied, in whole or in part, based on the professional judgment of a Dentist that the treatment is Experimental or not Medically Necessary, the Claims Administrator will notify You of the identity of the Dentist who was initially consulted or who reviewed the claim or pretreatment review request. Your appeal and all relevant information, including information You submitted, will be re-reviewed by a different Dentist prior to deciding Your appeal.

The Claims Administrator will review Your appeal to make sure the initial determination was consistent with Your Plan benefits. If the Claims Administrator determines that the initial determination was not consistent with Your Plan benefits, the initial determination will be reversed and the claim paid or the pretreatment estimate modified. If the Claims Administrator determines that the initial determination was consistent with Your Plan benefits, the complete record will be forwarded to Your Plan Administrator for a final determination of Your appeal.

Your Plan Administrator will make a final determination on Your appeal and You and Your Dentist will be notified of the final determination as soon as possible taking into account the dental circumstances. If You are appealing a denial of a claim, You will be notified not later than 60 days after the date the appeal was received. If You are appealing a pretreatment estimate, You will be notified not later than 30 days after the date the appeal was received. If You are appealing a pretreatment estimate which involved urgent treatment, You will be notified as soon as possible, but not later than 72 hours after the appeal was received.

The Claims Administrator will notify You and Your Dentist of the Plan Administrators final determination in writing, or orally followed by a written confirmation if the appeal was of a pretreatment estimate involving urgent treatment. If the appeal decision is adverse, the notice will include the specific reason for the determination and the specific plan provisions on which the determination is based, and You will be entitled to request, free of charge, copies of all records and other information which was relied on or obtained in making the adverse determination.

You must file an appeal before bringing a civil action under Section 502(a) of ERISA. If Your appeal is denied, You then have the right to file an action under 29 U.S.C. 1132, section 502(a).

SECTION 19 - STATEMENT OF ERISA RIGHTS

As a Participant in the Plan, You are entitled to certain rights and protection under the Employee Retirement Income Security Act of 1974 (ERISA). ERISA provides that all Plan Participants shall be entitled to:

- examine, without charge, at the Plan Administrator's office, all documents governing the Plan, including the Summary Plan Description and a copy of the latest annual report.
- obtain, upon written request to the Plan Administrator, copies of documents governing the Plan, including the Plan document, Plan, Summary Plan Description, and a copy of the latest annual report. The Plan Administrator may make a reasonable charge for copies.
- receive a summary of the Plan's annual financial report. Northern Kentucky Water District is required by law to furnish each Plan Participant with a copy of this summary financial report.

You may have a right to continue dental coverage for Yourself, spouse or Covered Dependents if there is a loss of coverage under the Plan as a result of a qualifying event. You or Your dependents may have to pay for such coverage. Review this Summary Plan Description and the documents governing the Plan on the rules governing Your COBRA continuation coverage rights.

In addition to creating rights for Plan Participants, ERISA imposes duties upon the people who are responsible for the operation of the Employee benefit plan. The people who operate Your Plan, called Fiduciaries of the Plan, have a duty to do so prudently and in the interest of You and other Plan Participants and beneficiaries.

No one, including Your Employer, may fire You or otherwise discriminate against You in any way to prevent You from obtaining a welfare benefit or exercising Your rights under ERISA.

If Your claim for a welfare benefit is denied, in whole or in part, You must receive a written explanation of the reason for the denial. You have the right to have the Plan review and reconsider Your claims.

Under ERISA, there are steps You can take to enforce the above rights. For instance, if You request materials from the Plan and do not receive them within 30 days, You may file suit in a federal court. In such a case, the court may require the Plan Administrator to provide the material and pay You up to $110 a day until You receive the materials, unless the materials were not sent because of reasons beyond the control of the Plan Administrator. If You have a claim for benefits which is denied or ignored, in whole or in part, You may file suit in a state or federal court. In most cases, the Plan Sponsor is the Plan's agent for service of legal process. If You disagree with the Plan's decision or lack thereof concerning the qualified status of a domestic relations order or medical child support order, You may file suit in federal court.

If it should happen that the Plan Fiduciaries misuse the Plan's money, or if You are discriminated against for asserting Your rights, You may seek assistance from the U.S. Department of Labor, or You may file suit in a federal court. The court decides who should pay the court cost and legal fees. If You are successful, the court may order the person You sued to pay these costs and fees. If You lose, the court may order You to pay these costs and fees, for example, if it finds Your claim to be frivolous.

If You have questions about Your Plan, You should contact Your Human Resources Department or the Claims Administrator. If You have any questions about this statement or about Your rights under ERISA, You should contact the nearest office of the Employee Benefits Security Administration, U.S. Department of Labor, or the Division of Technical Assistance and Inquiries, Employee Benefits Security Administration, U.S. Department of Labor, 200 Constitution Avenue N.W., Washington, D.C. 20210. You may also obtain certain publications about Your rights and responsibilities under ERISA by calling the publications hotline of the Employee Benefits Security Administration.

SECTION 20 - IN THE FUTURE

Northern Kentucky Water District has established this Plan with the intention of it being maintained for an indefinite period of time. However, Northern Kentucky Water District, reserves the right, at its sole discretion:

- to alter, amend, or terminate this Plan, in whole or in part, at any time;
- to alter, amend, or terminate retiree benefits (if any), in whole or in part, at any time;
- to change, increase, or decrease Plan contributions (if any), in whole or in part, at anytime.

All amendments will be made pursuant to written documents.

The Dental Care Plus Group
DentaSelect Plus Plans
100 Crowne Point Place
Cincinnati, Ohio 45241
(513) 554-1100 or 1-800-367-9466
Fax (513) 554-3187
www.dentalcareplus.com

Rev. 11/18

Northern Kentucky Water District

EXHIBIT 33-3

FIDELITY SECURITY LIFE INSURANCE COMPANY

3130 Broadway
Kansas City, Missouri 64111-2406
Phone 800-648-8624
A STOCK COMPANY
(Herein Called "the Company")

POLICY NUMBER: VC-19

POLICYHOLDER: Northern Kentucky Water District

STATE OF ISSUE: Kentucky

POLICY EFFECTIVE DATE: January 1, 2017

POLICY ANNIVERSARY DATE: January 1 of the following year and each January 1 thereafter

Fidelity Security Life Insurance Company agrees to pay the benefits provided by the Policy in accordance with its terms and conditions.

The Policy is issued in consideration of the Policyholder's application (a copy of which is attached) and receipt by the Company of the premiums.

All periods of time under the Policy begin and end at 12:01 A.M. Local Time at the Policyholder's business address.

The Policy may be modified by mutual agreement between the Policyholder and the Company.

The Policy is issued by Fidelity Security Life Insurance Company at Kansas City, Missouri on the Policy Effective Date.

FIDELITY SECURITY LIFE INSURANCE COMPANY

President Secretary

GROUP VISION INSURANCE POLICY
THIS IS A LIMITED BENEFIT POLICY
Please read the Policy carefully.

PREMIUMS

Premiums are payable in advance by the Policyholder. The first premium is due on the effective date of the Policy. Subsequent premiums are due on the first day of each calendar month thereafter.

The required premium due on each premium due date is the sum of the premiums for all Insureds and their Dependents covered under the Policy. The premiums due will be determined by applying the premium rates then in effect for each plan provided by the Policy to the number of Insured Persons. All premiums are payable to the Company at the Company's home office or to any of the Company's authorized agents.

The premium due may be adjusted due to a change in insurance as requested by the Policyholder or as required by the Company as follows:

1. if an amount of insurance is added or increased during a calendar month, premiums will be increased as of the date the change becomes effective, unless otherwise mutually agreed;
2. if an amount of insurance is deleted or decreased during a calendar month, premium will cease or be decreased at the end of the calendar month in which the deletion or decrease occurred, unless otherwise mutually agreed;
3. if the Policyholder's contribution percentage is changed, premium will be adjusted at the end of the calendar month in which the change occurred, unless otherwise mutually agreed; or
4. if the number of eligible employees increases or decreases by more than 10%, premium will be adjusted at the end of the calendar month in which the increase or decrease occurred, unless otherwise mutually agreed.

If premiums are due the Company, or premium refunds are due the Policyholder as a result of clerical error or delay in the reporting of dates and/or data to the Company, all premiums or refunds will be calculated at the current rate of premium payment and are limited to a maximum period of three months.

Premium Rate Change. The Company has the right to change the premium rate on or after the fourth Policy Anniversary Date. The Company will provide written notice at least 31 days before the date of change.

Grace Period. A grace period of 31 days will be allowed to the Policyholder for the payment of each premium due after the first premium. The Policy will remain in force during the grace period. If the required premium is not paid by the end of the 31-day period, the Policy will terminate. The Policyholder will be required to pay premium for the grace period.

Return of Premium. The Company reserves the right to rescind the coverage for one or all Insureds due to misrepresentation or fraud on the Policyholder's application or an Insured's enrollment form, if such misrepresentation materially affected the acceptance of the risk.

If, on the date coverage is rescinded, no claims have been paid under the Policy, the Company will return all premiums paid for such coverage to the Policyholder.

If, on the date coverage is rescinded, claims have been paid under the Policy, the Company reserves the right to deduct an amount equal to the amount of such claims paid from the premiums to be returned to the Policyholder.

TERMINATION OF POLICY

The Policyholder or the Company may terminate or cancel the Policy on the earliest of the following:

1. on any date on or after the fourth Policy Anniversary Date. Written notice must be provided to the other party at least 31 days prior to termination;
2. the date the number or percentage of persons covered under the Policy does not meet the minimum participation requirements of 10;
3. the date the required premium has not been paid, except as provided in the Grace Period provision; or
4. the date 100% of the eligible employees are not covered when a contribution is not required by the employee.

The Policyholder is responsible for notifying the Insured of the termination of the Policy.

CERTIFICATES

The Company will furnish a Certificate to the Policyholder which will set forth the essential features of the insurance coverage.

ADDITIONAL INSUREDS

Insured Persons may be added at any time if they meet the eligibility requirements stated in the Policyholder's application, complete an enrollment form, if required, and pay any required premium.

INCORPORATION PROVISION

The provisions of the attached Certificate and all Rider(s) issued to amend the Policy after the Policy Effective Date are made a part of the Policy.

FIDELITY SECURITY LIFE INSURANCE COMPANY

3130 Broadway
Kansas City, Missouri 64111-2406
Phone 800-648-8624
A STOCK COMPANY
(Herein Called "the Company")

AMENDMENT TO THE APPLICATION FOR VISION CARE BENEFITS

CURRENT GROUP INFORMATION (AS REFLECTED IN THE COMPANY'S RECORDS):

Group Name: Northern Kentucky Water District

DBA, if applicable: _____

Policy Number: VC-19 Group Number: 1009713 / 1027603

EFFECTIVE 1-1-20 **THE APPLICATION FOR VISION CARE BENEFITS IS AMENDED AS NOTED BELOW:**

☐ **NAME CHANGE (SAME TAX ID #):**

New Group Name: _____

DBA, if applicable: _____

☐ **CHANGE IN PRIMARY BUSINESS ADDRESS (SAME STATE):**

New Street Address: _____

P.O. Box: _____

City: _____ State: _____ Zip Code: _____

☐ **CHANGE TO COVERAGE FOR DOMESTIC PARTNERS*:**

Are Domestic Partners to be covered under this Plan? ☐ Yes ☐ No

Same Sex*? ☐ Yes ☐ No Opposite Sex*? ☐ Yes ☐ No

** Except as required by state law.*

☐ **CHANGE TO DEPENDENT AGE COVERAGE**:**

Dependent Children to be covered to Age** ☐ 19 ☐ 21 ☐ 25 ☐ 26*** ☐ Other_____

Dependent Children to be covered if Full-Time Student** ☐ Yes ☐ No

If "Yes", Dependent Full-Time Student Covered to** ☐ 21 ☐ 25 ☐ 27 ☐ Other_____

***Unless state law has different requirements for Dependent Child status.*

**** Regardless of financial dependency, residency, student status, or marital status.*

NKWD 001850

■ **NEW RATES, BENEFITS, NETWORK OR PLANS:**

- ☐ A. New Rates — Please refer to the attached proposal page.
- ■ B. New Benefits — Please refer to the attached proposal page.
- ☐ C. New Network — Please refer to the attached proposal page.
- ☐ D. New Plan — Please refer to the attached proposal page.

☐ **CHANGE IN RENEWAL DATE:**

Original Renewal Date: _____

New Renewal Date: _____

☐ **CHANGE IN GROUP SIZE (FLORIDA POLICYHOLDERS ONLY):**

Original Number of Full-time Employees: _____

New Number of Full-time Employees: _____

FIDELITY SECURITY LIFE INSURANCE COMPANY

Richard E. Jones — President

Bradford R. Jones — Secretary

Application for Vision Care Benefits

Underwritten by Fidelity Security Life Insurance Company
Kansas City, Missouri

I. GROUP INFORMATION

Group Name: Northern Kentucky Water District Tax ID#: 61-1311695

DBA Name (If other than above):

Business Address: 2835 Crescent Springs Road City Erlanger State: KY ZIP: 41018

Mailing Address: City State: ZIP:

Primary Contact: Kim Clemons Title: Human Resource Manager

Phone Number: (859-578-5454 Fax Number: ( )

E-mail Address: kclemons@nkywater.org

Type of Business: ☐ Proprietorship ☐ Corporation ☒ Other (Specify): Public Administration

Service Area: ☐ National (United States – does not include Puerto Rico) ☐ State Specific (List)

PLEASE NOTE THE FOLLOWING TYPE BUSINESSES REQUIRE PRIOR CARRIER APPROVAL:

☐ MEWA ☐ PEO ☐ Trust ☐ Union

If any subsidiary or affiliated companies are to be insured or any Employees/Members are working at a location other than the business address above, please explain.

Billing Contact Name: Tara Martin Phone: (859-578-5459

Billing Address: 2835 Crescent Springs Road City: Erlanger State: KY ZIP: 41018

If you have subsidiaries, affiliated companies, or divisions who use another name and will be covered by this plan, AND require separate billing invoices, please attach the following information on a separate sheet of paper signed by you: • Name • Address • Billing Contact & Phone Number

Will this plan replace any existing coverage? ☒ Yes ☐ No

If "Yes," indicate name of existing insurer:

Name: Humana - Vision

If "Yes," are any Employees/Members on COBRA continuation? ☐ Yes ☒ No How many?

Do you intend to offer Employees/Members COBRA continuation? ☐ Yes ☒ No

II. PLAN SELECTION

Please refer to the attached proposal page. Services are provided by EyeMed Vision Care.

III. PREMIUMS

Group's Premium Contribution for*: Employees/Members: 0 % Dependents: 0 %

Employee's/Member's Premium Contribution for: Employees/Members: 100 % Dependents: 100 %

Are Employee/Member and Dependent premiums paid through a Section 125 Plan? ☐ Yes ☒ No

Are Employee/Member and Dependent premiums collected via payroll deduction? ☒ Yes ☐ No

Premiums shall be payable at the rates included on the attached proposal page.

**If the Group's contribution percentage is changed or the number of eligible Employees/Members increases or decreases, premium may be adjusted as allowed under the Policy. The premium may be adjusted at the end of the calendar month in which the change occurred.*

IV. ELIGIBILITY

Number of Employees/Members: 149 Number Applying: _____

Number of Dependents: _____ Number of Retirees: _____

Are Domestic Partners covered under this Plan*? ☐ Yes ☒ No

Same Sex*? ☐ Yes ☐ No Opposite Sex*? ☐ Yes ☐ No

Dependent Children Covered to Age*: ☐ 19 ☐ 23 ☒ 26** ☐ Other _____

Dependent Children Covered if Full-Time Student*? ☐ Yes ☒ No

If "Yes," Dependent Full-Time Students Covered to Age*: ☐ 23 ☐ 25 ☐ 27 ☐ Other _____

**Unless state law has different requirements.*

***Dependent Children covered to age 26 regardless of financial dependency, residency, student status or marital status.*

Eligibility Reporting Contact (produces the eligibility file): Kim Clemons

Address (if different from Group): 2835 Crescent Springs Road

City: Erlanger State: KY ZIP: 41091

E-mail Address: kclemons@nkywater.org Phone: (859-578-5454 Fax: ( )

Eligibility Authorization Contact (Benefits Administrator or Third Party Administrator responsible for verifying vision election for Employees/Members):

Name: Kim Clemons Phone: (859-578-5454

Days/Hours of Availability: 8:00 a.m. - 5:00 p.m. E-mail Address: kclemons@nkywater.org

PROBATIONARY PERIOD

For New Employees/Members: ☐ 30 days ☐ 60 days ☐ 90 days ☐ 180 days ☒ Other start date of hire

Probationary Period is waived for present Employees/Members: ☒ Yes ☐ No

Number of Employees/Members who have not yet completed the probationary period: _____

V. EFFECTIVE DATE

This plan will become effective at 12:01 a.m. Local Time at the Group's address herein, on the first day of January, 20 17, provided all of the following have been completed prior to this effective date:

A. This application has been received and accepted by the Company (must be submitted 30 days in advance of the effective date).

B. EyeMed has been furnished a working file of all eligible Employees/Members, according to the layout guidelines. It is understood and agreed that EyeMed may rely on this information to provide services to individuals designated as eligible.

The Group hereby makes application to Fidelity Security Life Insurance Company for Vision Care Benefits. The Group agrees to maintain and furnish any records necessary to administer this plan and to forward premiums monthly.

All the information shown on this application and any attachments are correct and complete as of the date this application is signed. All statements by the Group shall be deemed to be representations and not warranties. The Group understands that the Company intends to rely on this information in determining whether or not the enrolling Employees/Members and their Dependents may become insured. It is further understood and agreed that **NO INSURANCE WILL BECOME EFFECTIVE UNTIL APPROVED BY THE COMPANY**; and that no field representative of the Company has the authority to modify any conditions of the application or the Policy by making any promise or representation. It is understood that the insurance as to any Employee/Member will not become effective on the date insurance should otherwise become effective if he or she is not at work on such date performing all duties of his or her occupation and otherwise meets the requirements of the Company.

Any person who knowingly and with intent to defraud any insurance company or other person files an application for insurance containing any materially false information or conceals, for the purpose of misleading, information concerning any fact material thereto commits a fraudulent insurance act, which is a crime.

Dated at: _____ this 28 day of November, 20 16

Signed for the Group: ► Kim Clemons Title: HR Manager

VI. COMPANY DISPLAY NAME (Your Group name as it should appear to your employees)

Company Name Northern Ky Water District
(Maximum of 30 characters, including punctuation and spacing.)

ATTENTION: THE DEPARTMENT OF INSURANCE REQUIRES THAT ONLY THE BROKER AND/OR GENERAL AGENT WHO SOLD THE PRODUCT AND HOLDS A VALID LIFE AND HEALTH LICENSE MAY COMPLETE THE CERTIFYING STATEMENT

WRITING BROKER'S CERTIFYING STATEMENT

I certify that I have accurately recorded on this application the information supplied by the applicant, if such information has been provided directly to me for recording purposes, and I am properly licensed in the state in which the Group is domiciled.

Firm Name (print): HORAN Tax ID No.: _____

Broker's Name (print): Angela Wolfe SS#: _____

Address: 4990 East Galbraith Road City: Cincinnati State: OH ZIP: 45236

Phone: 513-745-0707 Fax: ( )

Primary Contact: Angela Wolfe Secondary Contact: April Wilson

Title: Account Manager Title: Client Specialist

E-mail Address: angelaw@horanassoc.com E-mail Address: aprilw@horanassoc.com

Commission checks payable to: ☐ Firm ☒ Broker

Broker's Signature: ► Angela Wolfe

Northern Kentucky Water District
EyeMed Insight Plan H, Fixed Fee
Voluntary
Option 1
EyeMed Vision Care in conjunction with Fidelity Security Life Insurance Company

Version 7

Vision Care Services	Member Cost In-Network	Out-of-Network Reimbursement*
Exam with Dilation as Necessary	$10 Copay	$40
Retinal Imaging Benefit	Up to $39	N/A
Exam Options:		
Standard Contact Lens Fit and Follow-Up:	Up to $40	N/A
Premium Contact Lens Fit and Follow-Up:	10% off Retail Price	N/A
Frames: Any available frame at provider location	$0 Copay; $130 Allowance, 20% off balance over $130	$91
Standard Plastic Lenses		
Single Vision	$20 Copay	$30
Bifocal	$20 Copay	$50
Trifocal	$20 Copay	$70
Lenticular	$20 Copay	$70
Standard Progressive Lens	$85 Copay	$50
Premium Progressive Lens	See attached Fixed Premium Progressive price list	$50
Lens Options:		
UV Treatment	$15	N/A
Tint (Solid and Gradient)	$15	N/A
Standard Plastic Scratch Coating	$15	N/A
Standard Polycarbonate - Adults	$40	N/A
Standard Polycarbonate - Kids under 19	$40	N/A
Standard Anti-Reflective Coating	$45	N/A
Polarized	20% off Retail Price	N/A
Photocromatic / Transitions Plastic	$75	N/A
Premium Anti-Reflective	See attached Fixed Premium Anti-Reflective Coating list	N/A
Other Add-Ons	20% off Retail Price	N/A
Contact Lenses *(Contact lens allowance includes materials only)*		
Conventional	$0 Copay; $130 allowance, 15% off balance over $130	$130
Disposable	$0 Copay; $130 allowance, plus balance over $130	$130
Medically Necessary	$0 Copay, Paid-in-Full	$210
Laser Vision Correction Lasik or PRK from U.S. Laser Network	15% off Retail Price or 5% off promotional price	N/A
Amplifon Hearing Health Care	Hearing Health Care from Amplifon Hearing Health Care Network Members receive a 40% discount off hearing exams and a low price guarantee on discounted hearing aids.	N/A
Additional Pairs Benefit:	Members also receive a 40% discount off complete pair eyeglass purchases and a 15% discount off conventional contact lenses once the funded benefit has been used.	N/A
Frequency:		
Examination	Once every calendar year	
Lenses or Contact Lenses	Once every calendar year	
Frame	Once every calendar year	
Monthly Rate		
Subscriber	$7.36	
Subscriber + Spouse	$14.00	
Subscriber + Child(ren)	$14.74	
Subscriber + Family	$21.66	

All plans are based on a 12-month contract term and 12-month rate guarantee.
Premium is subject to adjustment even during a rate guarantee period in the event of any of the following events: changes in benefits, employee contributions, the number of eligible employees, or the imposition of any new taxes, fees or assessments by Federal or State regulatory agencies

* Member Reimbursement Out-of-Network will be the lesser of the listed amount or the member's actual cost from the out-of-network provider. In certain states members may be required to pay the full retail rate and not the negotiated discount rate with certain participating providers. Please see EyeMed's online provider locator to determine which participating providers have agreed to the discounted rate

Additional Discounts:
Member receives a 20% discount on items not covered by the plan at network Providers. Discount does not apply to EyeMed Provider's professional services, or contact lenses. Plan discounts cannot be combined with any other discounts or promotional offers. Services or materials provided by any other group benefit plan providing vision care may not be covered.
Members also receive 15% off retail price or 5% off promotional price for Lasik or PRK from the US Laser Network, owned and operated by LCA Vision.
After initial purchase, replacement contact lenses may be obtained via the Internet at substantial savings and mailed directly to the member. Details are available at www.eyemedvisioncare.com.
The contact lens benefit allowance is not applicable to this service.
Benefit Allowances provide no remaining balance for future use within the same Benefit Frequency.
Certain brand name Vision Materials in which the manufacturer imposes a no-discount practice.
Rates are valid only when the quoted plan is the sole stand-alone vision plan offered by the group
Rates are valid for groups domiciled in the State of KY.
Fees quoted will be valid until the 1/1/2020 plan implementation date. Date quoted: 1/2/2020.
Rates assume Employer contribution of 20% or less for employees and dependents
Insured Plans are underwritten by Fidelity Security Life Insurance Company of Kansas City, Missouri, except in New York
Policy number VC-19/VC-20, form number M-9083

Plan Exclusions:
1) Orthoptic or vision training, subnormal vision aids and any associated supplemental testing; Aniseikonic lenses; 2) Medical and/or surgical treatment of the eye, eyes or supporting structures;
3) Any eye or Vision Examination, or any corrective eyewear required by a Policyholder as a condition of employment; Safety eyewear
4) Services provided as a result of any Workers' Compensation law, or similar legislation, or required by any governmental agency or program whether federal, state or subdivisions thereof;
5) Plano (non-prescription) lenses and/or contact lenses; 6) Non-prescription sunglasses; 7) Two pair of glasses in lieu of bifocals;
8) Services rendered after the date an Insured Person ceases to be covered under the Policy, except when Vision Materials ordered before coverage ended are delivered,
and the services rendered to the Insured Person are within 31 days from the date of such order; 9) Services or materials provided by any other group benefit plan providing vision care;
glasses, or contact lenses will not be replaced except in the next Benefit Frequency when Vision Materials would next become available.

DocuSigned by:
Kim Clemons
078270216B1C409...
Signature

t has chosen this benefit design with the attached supplement, sign here:

1/7/2020 | 2:01 PM PST
Date

Northern Kentucky Water District

Supplement

Option 1

Progressive Price List*	Member Cost In-Network (Includes Lens Copay)
Standard Progressive	$85 copay
Premium Progressives as Follows:	
Tier 1	$105 Copay
Tier 2	$115 Copay
Tier 3	$130 Copay
Tier 4	$85 Copay, 80% of charge less $120 Allowance
Anti-Reflective Coating Price List*	**Member Cost In-Network**
Standard Anti-Reflective Coating	$45
Premium Anti-Reflective Coatings as Follows:	
Tier 1	$57
Tier 2	$68
Tier 3	80% of charge
Other Add-ons Price List	**Member Cost In-Network**
Photochromic (Plastic)	$75
Polarized	80% of charge
EyeMed Vision Care reserves the right to make changes to the products on each tier and the member out-of-pocket costs.	
*Fixed pricing is reflective of brands at the listed product level. All providers are not required to carry all brands at all levels.	

For a current listing of brands by tier, go to:
http://www.eyemedvisioncare.com/theme/pdf/microsite-template/eyemedlenslist.pdf

FACTS

WHAT DOES Fidelity Security Life Insurance Company, Fidelity Security Life Insurance Company of New York (NY Only) and Affiliates DO WITH YOUR PERSONAL INFORMATION?

Why?	Financial companies choose how they share your personal information. Federal law gives consumers the right to limit some but not all sharing. Federal law also requires us to tell you how we collect, share, and protect your personal information. Please read this notice carefully to understand what we do.
What?	The types of personal information we collect and share depend on the product or service you have with us. This information can include: ■ Social Security number and transaction history ■ medical information and insurance claim information ■ assets and checking account information When you are no longer our customer, we continue to share your information as described in this notice.
How?	All financial companies need to share customers' personal information to run their everyday business. In the section below, we list the reasons financial companies can share their customers' personal information; the reasons Fidelity Security Life Insurance Company and Affiliates choose to share; and whether you can limit this sharing.

Reasons we can share your personal information	Does Fidelity Security Life share?	Can you limit this sharing?
For our everyday business purposes – such as to process your transactions, maintain your account(s), respond to court orders and legal investigations, or report to credit bureaus	Yes	No
For our marketing purposes – to offer our products and services to you	Yes	No
For joint marketing with other financial companies	Yes	No
For our affiliates' everyday business purposes – information about your transactions and experiences	Yes	No
For our affiliates' everyday business purposes – information about your creditworthiness	No	We don't share
For our affiliates to market to you	No	We don't share
For nonaffiliates to market to you	No	We don't share

Questions?	Call 800-648-8624 or go to www.fslins.com or www.ftj.com

Who we are	
Who is providing this notice?	Fidelity Security Life Insurance Company and Affiliates including our Administrative, Insurance and Financial Service Providers.

What we do	
How does Fidelity Security Life Insurance Company and Affiliates protect my personal information?	To protect your personal information from unauthorized access and use, we use security measures that comply with federal law. These measures include computer safeguards and secured files and buildings. These physical, electronic and procedural safeguards were created to protect your information. We also limit employee access as appropriate.
How does Fidelity Security Life Insurance Company and Affiliates collect my personal information?	We collect your personal information, for example, when you ■ apply for insurance or pay insurance premiums ■ file an insurance claim or give us your contact information ■ show your driver's license We also collect your personal information from others, such as credit bureaus, affiliates, or other companies.
Why can't I limit all sharing?	Federal law gives you the right to limit only ■ sharing for affiliates' everyday business purposes – information about your creditworthiness ■ affiliates from using your information to market to you ■ sharing for nonaffiliates to market to you State laws and individual companies may give you additional rights to limit sharing.

Definitions	
Affiliates	Companies related by common ownership or control. They can be financial and nonfinancial companies. ■ *Our affiliates include Fidelity Security Life Insurance Company of New York, Forrest T. Jones & Company, Inc., Forrest T. Jones Consulting Company and National Pension & Group Consultants, Inc.*
Nonaffiliates	Companies not related by common ownership or control. They can be financial and nonfinancial companies. ■ *Fidelity Security Life Insurance Company does not share with nonaffiliates so they can market to you.*
Joint marketing	A formal agreement between nonaffiliated financial companies that together market financial products or services to you. ■ *Our joint marketing partners include insurance agencies, broker dealers and investment advisor firms.*

Other important information

FIDELITY SECURITY LIFE INSURANCE COMPANY

3130 Broadway
Kansas City, Missouri 64111-2406
Phone 800-648-8624
A STOCK COMPANY
(Herein Called "the Company")

POLICY NUMBER: VC-19

POLICYHOLDER: Northern Kentucky Water District

POLICY EFFECTIVE DATE: January 1, 2017

POLICY ANNIVERSARY DATE: January 1 of the following year and each January 1 thereafter

Fidelity Security Life Insurance Company represents that the Insured Person is insured for the benefits described on the following pages, subject to and in accordance with the terms and conditions of the Policy.

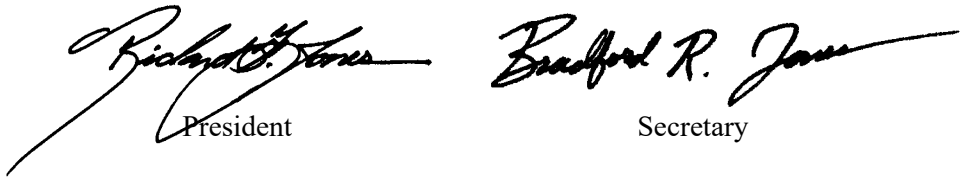
The Policy may be amended, changed, cancelled or discontinued without the consent of any Insured Person.

The Certificate explains the plan of insurance. An individual identification card will be issued to the Insured containing the group number and the Insured's effective date. The Certificate replaces all certificates previously issued to the Insured under the Policy.

All periods of time under the Policy will begin and end at 12:01 A.M. Local Time at the Policyholder's business address.

The Policy is issued by Fidelity Security Life Insurance Company at Kansas City, Missouri on the Policy Effective Date.

FIDELITY SECURITY LIFE INSURANCE COMPANY



President Secretary

GROUP VISION INSURANCE CERTIFICATE
THIS IS A LIMITED BENEFIT CERTIFICATE
Please read the Certificate carefully.

THIS PLAN IS NOT MEDICARE SUPPLEMENT. If you are eligible for Medicare, please review "Choosing a Medigap Policy: A Guide to Health Insurance for People With Medicare," available from the Company.

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DEFINITIONS

Benefit Frequency means the period of time in which a benefit is payable as shown in the Schedule of Benefits.

The Benefit Frequency begins on January 1. Each new Benefit Frequency begins at the expiration of the previous Benefit Frequency.

Co-payment means the designated amount, if any, shown in the Schedule of Benefits each Insured Person must pay to a Provider before benefits are payable for a covered Vision Examination or Vision Materials per Benefit Frequency.

Comprehensive Eye Examination means a comprehensive ophthalmological service as defined in the Current Procedural Technology (CPT) and the Documentation Guidelines listed under "Eyes-examination items". Comprehensive ophthalmological service describes a general evaluation of the complete visual system. The comprehensive services constitute a single service entity but need not be performed at one session. The service includes history, general medical observation, external and ophthalmoscopic examinations, gross visual fields and basic sensorimotor examination. It often includes, as indicated by examination, biomicroscopy, examination with cycloplegia or mydriasis and tonometry. It always includes initiation of diagnostic and treatment programs.

Dependent means any of the following persons whose coverage under the Policy is in force and has not ended:

1. the Insured's lawful spouse;
2. each unmarried child from birth to age 19 who is primarily dependent upon the Insured or the Insured's spouse for support and maintenance;
3. each unmarried child at least 19 years of age to 25 years of age who is primarily dependent upon the Insured or the Insured's spouse for support and maintenance and who is a full-time student; or
4. each unmarried child at least 19 years of age: who is primarily dependent upon the Insured or the Insured's spouse for support and maintenance because the child is incapable of self-sustaining employment by reason of mental incapacity or physical handicap; who was so incapacitated and is an Insured Person under the Policy on his or her 19th birthday; and who has been continuously so incapacitated since his or her 19th birthday.

Child includes stepchild, foster child, legally adopted child, child legally placed in the Insured's home for adoption and child under the Insured's legal guardianship. A full-time student is one who is enrolled at least the minimum number of hours of class a week the school considers as full-time status.

Formulary means a list, provided by the Company, of Vision Materials covered under the Policy.

Insured means an employee of the Policyholder who meets the eligibility requirements as shown in the Policyholder's application, and whose coverage under the Policy is in force and has not ended.

Insured Person means the Insured. Insured Person will also include the Insured's Dependents, if enrolled.

In-Network Provider means a Provider who has signed a Preferred Provider Agreement with the PPO.

Medically Necessary Contact Lenses means:

1. Keratoconus where the Insured Person is not correctable to 20/30 in either or both eyes using standard spectacle lenses, or the Provider attests to the specified level of visual improvement;
2. High Ametropia exceeding -10D or +10D in spherical equivalent in either eye;
3. Anisometropia of 3D in spherical equivalent or more; or
4. vision for an Insured Person can be corrected two lines of improvement on the visual acuity chart when compared to best corrected standard spectacle.

Out-of-Area Provider means a Provider that is utilized by the Insured Person when there is no In-Network Provider within 30 minutes or 30 miles of the Insured Person's residence or work.

Out-of-Network Provider means a Provider, located within the PPO Service Area, who has not signed a Preferred Provider Agreement with the PPO.

Policy means the Policy issued to the Policyholder.

Policyholder means the Employer named as the Policyholder in the face page of the Policy.

PPO Service Area means the geographical area where the PPO is located.

Preferred Provider Agreement means an agreement between the PPO and a Provider that contains the rates and reimbursement methods for services and supplies provided by such Provider.

Preferred Provider Organization ("PPO") means a network of Providers and retail chain stores within the PPO Service Area that has signed a Preferred Provider Agreement.

Provider means a licensed physician or optometrist who is operating within the scope of his or her license or a dispensing optician.

Vision Examination means any eye or visual examination covered under the Policy and shown in the Schedule of Benefits.

Vision Materials means those materials shown in the Schedule of Benefits.

EFFECTIVE DATES

Effective Date of Insured's Insurance. The Insured's insurance will be effective as follows:

1. if the Policyholder does not require the Insured to contribute toward the premium for this coverage, the Insured's insurance will be effective on the date the Insured became eligible;
2. if the Policyholder requires the Insured to contribute toward the premium for this coverage, the Insured's insurance will be effective on the date the Insured became eligible, provided;
   a. the Insured has given the Company the Insured's enrollment form (if required) on, prior to, or within 30 days of the date the Insured became eligible; and
   b. the Insured has agreed to pay the required premium contributions; and
3. if the Insured fails to meet the requirements of 2 a) and 2 b) within 30 days after becoming eligible, the Insured's coverage will not become effective until the Company has verified that the Insured has met these requirements. The Insured will then be advised of the Insured's effective date.

Effective Date of Dependents' Insurance. Coverage for Dependents becomes effective on the later of:

1. the date Dependent coverage is first included in the Insured's coverage; or
2. the premium due date on or after the date the person first qualifies as the Insured's Dependent. If an enrollment form is required, the Insured must provide such form and agree to pay any premium contribution that may be required prior to coverage becoming effective.

If the Insured and the Insured's spouse are both Insureds, one Insured may request to be a Dependent spouse of the other. A Dependent child may not be covered by more than one Insured.

Newborn Children. A Dependent child born while the Insured's coverage is in force will be covered from the moment of birth for 31 days or greater, if elected by the Policyholder. In order to continue coverage beyond this period, the Insured must provide notice to the Company and agree to pay any premium contribution that may be required within this period.

Adopted Children. If a Dependent child is placed with the Insured for adoption while the Insured's coverage is in force, this child will be covered from the date of placement for 31 days or greater, if elected by the Policyholder. In order to

continue coverage beyond this period, the Insured must provide notice to the Company and agree to pay any premium contribution that may be required within this period. If proper notice has been given, coverage will continue unless the placement is disrupted prior to legal adoption and the child is removed from placement.

BENEFITS

Benefits are payable for each Insured Person as shown in the Schedule of Benefits for expenses incurred while this insurance is in force.

Comprehensive Eye Examination. An Insured Person is eligible for one Comprehensive Eye Examination in each Benefit Frequency.

In-Network Provider Benefits. The Insured Person must pay any Co-payment or any cost above the allowance shown in the Schedule of Benefits at the time the covered service is provided. Benefits will be paid to the In-Network Provider who will file a claim with the Company.

Out-of-Area. An Insured Person who does not have access to an In-Network Provider within 30 minutes or 30 miles of the Insured Person's residence or work may receive services from an Out-of-Area Provider. The Insured Person must pay the full cost at the time the covered service is provided and file a claim with the Company. The Insured Person must pay any In-Network Co-payment or any cost above the In-Network allowance shown in the Schedule of Benefits.

Out-of-Network Provider Benefits. The Insured Person must pay the Out-of-Network Provider the full cost at the time the covered service is provided and file a claim with the Company. The Company will reimburse the Insured Person for the Out-of-Network Provider benefits up to the maximum dollar amount shown in the Schedule of Benefits.

Vision Materials. If a Vision Examination results in an Insured Person needing corrective Vision Materials for the Insured Person's visual health and welfare, those Vision Materials prescribed by the Provider will be supplied, subject to certain limitations and exclusions of the Policy, as follows:

- *Lenses* provided one time in each Benefit Frequency.
- *Frames* provided one time in each Benefit Frequency.
- *Contact Lenses* provided one time in each Benefit Frequency in lieu of lenses.

LIMITATIONS

Fees charged by a Provider for services other than a covered benefit must be paid in full by the Insured Person to the Provider. Such fees or materials are not covered under the Policy.

Benefit allowances provide no remaining balance for future use within the same Benefit Frequency.

EXCLUSIONS

No benefits will be paid for services or materials connected with or charges arising from:

1. orthoptic or vision training, subnormal vision aids and any associated supplemental testing; Aniseikonic lenses;
2. medical and/or surgical treatment of the eye, eyes or supporting structures;
3. any Vision Examination, or any corrective eyewear required by a Policyholder as a condition of employment; safety eyewear;
4. services provided to an Insured Person who is eligible for benefits as a result of any Workers' Compensation law, or similar legislation, or required by any governmental agency or program whether federal, state or subdivisions thereof;
5. plano (non-prescription) lenses;

6. non-prescription sunglasses;
7. two pair of glasses in lieu of bifocals;
8. services or materials provided by any other group benefit plan providing vision care;
9. services rendered after the date an Insured Person ceases to be covered under the Policy, except when Vision Materials ordered before coverage ended are delivered, and the services rendered to the Insured Person are within 31 days from the date of such order; or
10. lost or broken lenses, frames, glasses, or contact lenses will not be replaced except in the next Benefit Frequency when Vision Materials would next become available.

TERMINATION OF INSURANCE

The Policyholder or the Company may terminate or cancel the Policy as shown in the Policy.

For All Insureds. The Insureds' insurance will cease on the earliest of the following dates:

1. the date the Policy ends;
2. the end of the last period for which any required premium contribution agreed to in writing has been made, subject to the Grace Period provision;
3. the date the Insured is no longer eligible for insurance; or
4. the date the Insured's employment with the Policyholder ends. The Policyholder may, at the Policyholder's option, continue insurance for individuals whose employment has ended, if the Policyholder:
   a. does so without individual selection between Insureds; and
   b. continues to pay any premium contribution for those individuals.

For Dependents. A Dependent's insurance will cease on the earlier of:

1. the date the Insured's coverage ends;
2. the date in which the Dependent ceases to be an eligible Dependent as defined in the Policyholder's application; or
3. the end of the last period for which any required premium contribution has been made.

A Dependent child will not cease to be a Dependent solely because of age if the child is:

1. not capable of self-sustaining employment due to mental incapacity or physical handicap that began before the age limit was reached; and
2. mainly dependent on the Insured for support.

The Company may ask for proof of the eligible Dependent child's incapacity and dependency two months prior to the date the Dependent child would otherwise cease to be covered.

The Company may require the same proof again, but will not ask for it more than once a year after this coverage has been continued for two years. This continued coverage will end:

1. on the date the Policy ends;
2. on the date the incapacity or dependency ends;
3. on the end of the last period for which any required premium contribution for the Dependent child has been made; or
4. 60 days following the date the Company requests proof and such proof is not provided to the Company.

CLAIMS

Notice of Claim. Written notice of claim must be given to the Company within 30 days after the occurrence or commencement of any loss covered by the Policy, or as soon as is reasonably possible. Notice given by or for the Insured Person to the Company at the Company's home office, to the Company's authorized administrator or to any of the Company's authorized agents with sufficient information to identify the Insured Person will be deemed as notice to the Company.

Claim Forms. The Company will furnish claim forms to the Insured Person within 15 days after notice of claim is received. If the Company does not provide the forms within that time, the Insured Person may send written proof of the occurrence, character and extent of loss for which the claim is made within the time stated in the Policy for filing proof of loss.

Proof of Loss. Written proof of loss must be furnished to the Company at the Company's home office within 90 days after the date of the loss. Failure to furnish proof within the time required will not invalidate or reduce any claim if it was not reasonably possible to give proof within that time, if the proof is furnished as soon as reasonably possible. In no event, except in the absence of legal capacity, will proof of loss be accepted later than one year from the time proof is required.

Time Payment of Claims. Any benefit payable under the Policy will be paid immediately, but not more than 30 days, upon receipt of due written proof of loss.

Payment of Claims. All claims will be paid to the Insured, unless assigned. Any benefits payable on or after the Insured's death will be paid to the Insured's estate.

Right of Recovery. If payment for claims exceeds the amount for which the Insured Person is eligible under any benefit provision or rider of the Policy, the Company has the right to recover the excess of such payment from the Provider or the Insured.

Legal Actions. No Insured Person can bring an action at law or in equity to recover on the Policy until more than 60 days after the date written proof of loss has been furnished according to the Policy. No such action may be brought after the expiration of three years after the time written proof of loss is required to be furnished. If the time limit of the Policy is less than allowed by the laws of the state where the Insured Person resides, the limit is extended to meet the minimum time allowed by such law.

Claim Appeal Procedure. If the Company partially or fully denies a claim for benefits submitted by an Insured Person and the Insured Person disagrees or does not understand the reasons for this denial, the Insured Person, an authorized person or a provider acting on behalf of the Insured Person may appeal this decision and such person has the right to: 1) request a review of the denial; 2) review pertinent plan documents; and 3) submit in writing any data, documents or comments which are relevant to the Company's review of this denial. The appeal must be submitted in writing within 60 days of receiving written notice of denial. The Company will review all information and send written notification within 30 days of the request.

GENERAL PROVISIONS

Clerical Error. Clerical errors or delays in keeping records for the Policy will not deny insurance that would otherwise have been granted, nor extend insurance that otherwise would have ceased, and call for a fair adjustment of premium and benefits to correct the error.

Conformity to Law. Any provision of the Policy that is in conflict with the laws of the state in which it is issued is amended to conform with the laws of that state.

Entire Contract. The Policy, including any endorsements and riders, the Certificate, the Policyholder's application, which is attached to the Policy when issued, the Insured's individual enrollment form, if any, and the eligibility file, if any, are the entire contract between the parties. A copy of the Policy may be examined at the Office of the Policyholder during normal business hours. All statements made by the Policyholder or an Insured will, in the absence of fraud, be deemed representations and not warranties, and no such statement shall be used in defense to a claim hereunder unless it is contained in a written instrument signed by the Policyholder, the Insured, the Insured's beneficiary or personal representative, a copy of which has been furnished to the Policyholder, the Insured, the Insured's beneficiary or personal representative.

Amendments and Changes. No agent is authorized to alter or amend the Policy, or to waive any conditions or restrictions herein, or to extend the time for paying any premium. The Policy and the Certificate may be amended at any time by mutual agreement between the Policyholder and the Company without the consent of the Insured, but without prejudice to any loss incurred prior to the effective date of the amendment. No person except an Officer of the Company has authority on behalf of the Company to modify the Policy or to waive or lapse any of the Company's rights or requirements.

Incontestability. After the Policy has been in force for two years, it can only be contested for nonpayment of premiums. No statement made by an Insured Person can be used in a contest after the Insured Person's insurance has been in force for two years during the Insured Person's lifetime. No statement an Insured Person makes can be used in a contest unless it is in writing and signed by the Insured Person.

Insurance Data. The Policyholder must give the Company the names and ages of all individuals initially insured. The names of persons who later become eligible (whether or not the person becomes insured), and the names of those who cease to be eligible must also be given. The eligibility dates and any other necessary data must be given to the Company so that the premium can be determined.

The Company has the right to audit the Policyholder's books and records as the books and records relate to this insurance. The Company may authorize someone else to perform this audit. Any such inspection may be done at any reasonable time.

Workers' Compensation. The Policy is not a Workers' Compensation policy. The Policy does not satisfy any requirement for coverage by Workers' Compensation Insurance.

SCHEDULE OF BENEFITS

Insured Persons have the right to obtain vision care from the Provider of his or her choice. However, payment of benefits varies depending on the type of Provider chosen. Benefits are payable as shown in the following Schedule of Benefits:

Benefit	In-Network	Out-of-Network	Benefit Frequency
VISION EXAMINATION			
Comprehensive Eye Examination	$10 Co-payment	up to $40	12 months
VISION MATERIALS			
Standard Plastic Lenses			12 months
Single Vision	$20 Co-payment	up to $30	
Bifocal	$20 Co-payment	up to $50	
Trifocal	$20 Co-payment	up to $70	
Lenticular	$20 Co-payment	up to $70	
Frames	$0 Co-payment, up to $130 retail allowance	up to $91	12 months
Contact Lenses ***(only one option available per Benefit Frequency)***			12 months
Conventional	$0 Co-payment, up to $130 allowance	up to $130	
Disposable	$0 Co-payment, up to $130 allowance	up to $130	
Medically Necessary	Paid in full	up to $210	
Lens Options			12 months
Standard Progressive Lenses (add on to Bifocal)	$85 Co-payment	up to $50	
Premium Progressive Lenses (add on to Bifocal)			
Tier 1	$105 Co-payment	up to $50	
Tier 2	$115 Co-payment	up to $50	
Tier 3	$130 Co-payment	up to $50	
Tier 4	$85 Co-payment, up to $120 allowance	up to $50	

FIDELITY SECURITY LIFE INSURANCE COMPANY

3130 Broadway
Kansas City, Missouri 64111-2406
Phone 800-648-8624
A STOCK COMPANY
(Herein Called "the Company")

AMENDATORY RIDER REGARDING REPLACEMENT COVERAGE

The Policy/Certificate to which this Amendment Rider is attached is amended as follows:

The following applies when the Policy serves to replace similar coverage the Policyholder previously obtained through another plan or policy. In this provision, that other plan or policy is referred to as the prior plan. The Policyholder's coverage under the Policy will not be considered as replacement coverage unless the Policyholder's coverage under the Policy takes effect within 60 days after coverage under the prior plan ends.

In the absence of this provision, an Insured Person who was covered by the prior plan at the date of discontinuance might not qualify for coverage under the Policy because the person is not actively at work or is confined in a Hospital.

Each such person will be insured under the Policy if:

1. the person was insured under the prior plan, including coverage under the prior plan's extension of benefits provision, on the date the Policyholder's coverage with the prior plan ended;
2. the prior plan covered more than 15 people; and
3. the person is in a class of persons eligible for coverage under the Policy.

The benefits payable for the persons described above will be the benefits of the Policy less any amount payable under the prior plan pursuant to any extension of benefits provision.

The Policy, in applying any waiting periods, will give credit for the satisfaction or partial satisfaction of the same or similar provisions under the prior policy.

This Rider takes effect on the effective date of the Policy/Certificate to which it is attached. This Rider terminates concurrently with the Policy/Certificate to which it is attached. It is subject to all the terms and conditions of the Policy/Certificate except as stated herein.

FIDELITY SECURITY LIFE INSURANCE COMPANY

President Secretary

FIDELITY SECURITY LIFE INSURANCE COMPANY

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AMENDMENT RIDER

By attachment of this Rider, the third paragraph of the **PREMIUMS** section in the Policy is amended to add the following:

5. if a government action, including fees, taxes and assessments, or change in law or regulation materially affects the Company's risk, premium may be adjusted and will be effective upon written notification from the Company at least 31 days before the date of change.

This Rider takes effect on the effective date of the Policy to which it is attached. This Rider terminates concurrently with the Policy to which it is attached. It is subject to all the definitions, limitations, exclusions and conditions of the Policy except as stated.

FIDELITY SECURITY LIFE INSURANCE COMPANY

President Secretary

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AMENDMENT RIDER

By attachment of this Rider, the Policy/Certificate is amended by the following:

Any provision of the Policy/Certificate that provides coverage for a Dependent child up to a certain age is amended to cover such child to age 26, regardless of financial dependency, residency, student status, or marital status.

This Rider takes effect on the effective date of the Policy/Certificate to which it is attached. This Rider terminates concurrently with the Policy/Certificate to which it is attached. It is subject to all the definitions, limitations, exclusions and conditions of the Policy/Certificate except as stated.

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NOTICE OF ADMINISTRATOR'S CAPACITY

PLEASE READ: This notice advises insured persons of the identity and relationship among the administrator, the policyholder and the insurer:

1. Fidelity Security Life Insurance Company (FSL) has, by agreement, arranged for First American Administrators, Inc. to provide administrative services for your insurance plan. As administrator, First American Administrators, Inc., is authorized to process claim payments, and perform other services, according to the terms of its agreement with the insurance company. First American Administrators, Inc. is not the insurance company or the policyholder.

2. The policyholder is the entity to whom the insurance policy has been issued. The policyholder is identified on either the face page or schedule page of the policy or certificate.

3. Fidelity Security Life Insurance Company is liable for the funds to pay your insurance claims.

As First American Administrators, Inc. is authorized to process claims for the insurance company, they will do so promptly. In the event there are delays in claims processing, you will have no greater rights to interest or other remedies against First American Administrators, Inc. than would otherwise be afforded to you by law.

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Kim Clemons

Q.34. Provide a listing of all life insurance plan categories available to corporate officers individually and to groups defined as Directors, Managers, Supervisors, Exempt, Non-Exempt, Union, and Non-Union Hourly employees. Include the associated employee contribution rates and employer contribution rates of the total premium cost for each plan category.

A.34. The District provides one group life insurance plan that includes accidental death and dismemberment (AD&D). This plan offers three class types.

- Class 1 is Group Life for Executives and provides one times Basic Annual Earnings, rounded to the next higher $1,000; subject to a maximum of $250,000. The AD&D provides one times Basic Annual Earnings, rounded to the next higher $1,000; subject to a maximum of $250,000.

- Class 2 is Group Life for all other Full-Time Employees excluding Board of Commissioners and provides one times Basic Annual Earnings, rounded to the next higher $1,000; subject to a maximum of $100,000. The AD&D provides one times Basic Annual Earnings, rounded to the next higher $1,000; subject to a maximum of $100,000.

- Class 3 is Group Life for Board of Commissioners and provides a $50,000 benefit. The AD&D provides a $50,000 benefit. The cost of this policy is reimbursed by the Board of Commissioners.

The employer contribution rate is 100% for the group term life insurance and accidental death and dismemberment plan.

The District offers a Voluntary Life and Accidental Death & Dismemberment Insurance plan that is paid 100% by the employee. An employee may elect Employee, Spouse, and Dependent Child Benefit.

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Kim Clemons

Q.35. Provide a listing of all retirement plans available to corporate officers individually and to groups defined as Directors, Managers, Supervisors, Exempt, Non-Exempt, Union, and Non-Union Hourly employees. Include the associated employee contribution rates, if any, and employer contribution rates of the total cost for each plan category.

A.35. NKWD participates in the Kentucky Retirement System (CERS Nonhazardous). The employer contribution rate is 24.06% for January 1 – June 30, 2021 and 26.95% for July 1 – December 31, 2021. The employee contribution rate is 5% plus 1% health insurance contribution for employees who began participating on or after 9/1/2008.

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Kim Clemons and Stacey Kampsen

Q.36. Concerning employee fringe benefits:

a. Provide a detailed list of all fringe benefits available to the utility's employees. Indicate any fringe benefits that are limited to management employees.

b. Provide comparative cost information for the 12 months preceding the test year and the test year. Explain any changes in fringe benefits occurring over this 24-month period.

A.36. All management and full-time employees receive the following fringe benefits

Benefit	Test Period (2021)	2020
Health Insurance	$3,036,948	$2,933,083
Dental Insurance	$166,846	$123,017
Vision[(1)]	$0	$0
Life Insurance	$17,581	$16,576
Disability	$67,972	$59,994
Defined Benefit Retirement	$2,367,772	$2,133,604

[(1)] Vision insurance is voluntary and 100% of the premiums are paid by the employee.

In addition, the President/CEO receives a car allowance of $1,100 per month, which is included in the taxable compensation.

Changes in fringe benefits are due to change in premium rates charged to NKWD and change in employee contribution rates.

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Kim Clemons

Q.37. State whether the utility, through an outside consultant or otherwise, performed a study or survey to compare its wages, salaries, benefits, and other compensation to those of other utilities in the region, or to other local or regional enterprises.

a. If comparisons were performed, provide the results of the study or survey, including all workpapers and discuss the results of such comparisons. State whether any adjustments to wages, salaries, benefits, and other compensation in the rate application are consistent with the results of such comparisons.

b. If comparisons were not performed, explain why such comparisons were not performed.

A.37. NKWD does participate and review salary and benefit surveys. NKWD purchases and uses this information for a general comparison to what market is paying for like positions. NKWD has reviewed salary studies from Employer Resource Association, American Water Works Association, and Northern Kentucky Area Development District. Because of the fast-moving market, NKWD also reviewed recent salary increases by other local governmental entities in the area. NKWD will also use a compensation consultant on an as needed basis.

Benefit information from Northern Kentucky Area Development District and Kentucky Public Human Resources Association (conducted by Sherril Morgan, an insurance broker) has also been reviewed. Benefit information is also reviewed with the NKWD's insurance broker, Horan.

The District will submit these survey documents (collectively Exhibit 37-1) with a Motion for Confidentiality.

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Kim Clemons

Q.38. Regarding the utility's employee compensation policy:

a. Provide the utility's written compensation policy as approved by the board of directors.

b. Provide a narrative description of the compensation policy, including the reasons for establishing the policy and the utility's objectives for the policy.

c. Explain whether the compensation policy was developed with the assistance of an outside consultant. If the compensation policy was developed or reviewed by a consultant, provide any study or report provided by the consultant.

d. Explain when the utility's compensation policy was last reviewed or given consideration by the board of directors.

e. Explain whether the utility's expenses for wages, salaries, benefits, and other compensation included in the test year and any adjustments to the test year, are compliant with the board of director's compensation policy.

A.38.

a. NKWD's written compensation policy is attached as Exhibit 38-1.

b. The policy was established in January 2006.

c. The policy was not developed with the assistance of an outside consultant.

d. This policy has been reviewed at various times by the Management Team and President/CEO to determine if changes are required.

e. The compensation in the test year and any adjustments are compliant with the compensation policy.

Northern Kentucky Water District

EXHIBIT 38-1

NORTHERN KENTUCKY WATER DISTRICT

Pay Administration Program

DISCLAIMER

The District possesses the right to update, modify or repeal any and all policies, including all policies related to pay, at any time. No policy set forth in this manual may be construed to imply an employment contract for any period of time.

THE DISTRICT PAY ADMINISTRATION PROGRAM

The quality of water service that the Northern Kentucky Water District provides to the community is directly related to the skills, knowledge, abilities and performance of its employees. Proper pay administration and communication will facilitate the District's ability to attract and retain the best employees. This in turn will enable the District to provide the highest quality service to our customers. As a result, the District maintains a pay program that:

- Provides fair and equitable pay levels which will help attract and retain the caliber of employees needed;
- Is competitive with the marketplace in which the District competes for qualified employees, when all District employee benefits are considered;
- Ensures fiscal responsibility by being cost effective;
- Rewards employee performance; and,
- Is consistently administered.

Within our pay program, job information is used to provide information to:

- Compare District jobs to similar jobs in the marketplace;
- Assess the internal relationship of District jobs to each other;
- Recruit qualified employees; and,
- Develop performance standards.

This portion of the manual is a detailed resource on the Northern Kentucky Water District Pay Administration Program. It is designed to assist the administration of employee pay consistently and equitably.

JOB EVALUATION

The purpose of job evaluation is to determine the relationship of each District position to the others. This is done to ensure:

- Internal equity; and,
- The appropriate pay grade for each job

To achieve these objectives, Human Resources reviews the job description of each position to assess how the duties, responsibilities, skills, knowledge and abilities of the position relate to the marketplace and/or other District jobs.

Guidelines for evaluating new or current positions are as follows:

- Read job descriptions and consult organizational charts
- Individually compare the non-benchmark jobs to appropriate benchmark jobs
    - If the non-benchmark is the same, it belongs in the same range
    - If there is a "noticeable difference", the non-benchmark job is one range higher or lower.
    - If the non-benchmark job is evidently larger or smaller, it may be two (2) or more ranges higher or lower.
- Compare all jobs to peer jobs in the unit
- Compare all jobs to peer jobs in other units of the organization
- Review for logic and internal equity

PAY RANGES

The District's pay program consists of pay ranges. The four most significant aspects of each pay range are the minimum, midpoint, maximum and range width, as illustrated and explained below:

I----------I----------I
Minimum Midpoint Maximum

<<---------Range Width--------->>

Pay Range Minimum	The lowest base pay rate payable to employees; often used as the starting rate.

Pay Range Midpoint	The rate of pay most closely aligned to the "going rate" in the marketplace for trained, experienced people performing a similar job. District provided benefits are considered when aligning the rate of pay to the "going rate". The midpoint is used for comparison when a competitive analysis of the District's pay levels is performed.
Pay Range Maximum	The highest level of base pay an employee can receive in a given job. Its distance from the pay range minimum is designed to give employees sufficient time to learn to perform the job, and ensure that the District does not pay too far beyond the "going rate" for the job.
Range Width	Accomodates the progression in pay as the employee learns to perform the jobs proficiently and provides reward opportunity for high performers.

In constructing the overall pay system:

- Each job is assigned to a pay grade which best represents its combined external value in the marketplace and internal value at the District;
- The difference between pay grades is made significant enough to reflect the meaningful differences in job content.

Pay Rates Below the Pay Range Minimum

No employee's pay will be below the minimum of the pay range for their position. Should the pay range be adjusted upwards as a result of pay range adjustment, any employee's pay that falls below his or her adjusted pay range minimum will automatically receive an increase to their new minimum on the effective date of the pay range adjustment and before his or her merit increase is implemented. An exception to this would be the employee who is on warning due to performance.

Pay Rates Above the Pay Range Maximum

Should the pay range maximum increase due to a pay range adjustment, employees whose pay is at the top of their pay range will receive their merit increase up to, but not to exceed, the new maximum of their range. Employees at the maximum of the range before or after the adjustment will be given a stipend which will equal the difference between what their rate would have been and what the maximum is.

Pay Range Adjustments

To ensure that the pay range reflects the current market value of the District's jobs, Human Resources will evaluate the need to adjust the pay ranges annually as a part of the budget planning process. Such annual evaluation will consider all district employee benefits in comparison to benefits provided by other employers. The pay range structure will be adjusted by applying an annual adjustment factor (e.g.; 3%) to the minimum, midpoint, and maximum of each pay grade should the evaluation indicate that such an increase is warranted.

Pay Structure Adjustment

It will be the responsibility of Human Resources to constantly review the pay structure with the receipt of appropriate pay surveys from the Employers Resource Association and AWWA and any other appropriate survey. As adjustments are warranted, Human Resources will present all proposed modifications to the President/CEO for concurrence. Recommendations made to the President/CEO will balance the need for the District to maintain a competitive pay program with the need for cost effectiveness. The recommended pay ranges and any pay grade reassignments will become effective upon final Commissioner approval of the annual budget.

PAY RATE DETERMINATION

Starting Pay Rate

The starting pay rate for any new hire will be the pay range minimum for the respective position. However, should a candidate to be hired require special consideration because of skills and/or expertise possessed or because of the market demand pressures for a particular job, the President/CEO may make an exception, subject to the following guidelines:

- Assess the current pay rates as well as skill and expertise of all incumbents in the same position;

- Determine a pay level that is equitable given the candidate's skills and experience in relation to all current incumbents in the job. New hires should not be paid more than current incumbents unless their skills and experience warrant the pay difference. *Remember, the skills and experience gained at the District are of value to the organization and our pay practices are intended to reflect that fact.* In most cases, candidates should not be hired at a rate that exceeds the midpoint of the range.

Promotions

Employees who are permanently assigned to a position in a higher pay range due to a promotion will generally receive an increase of 5%. However, should the new position already have incumbents in it, consideration will be given to the pay levels of these employees to ensure internal equity. No employee's pay will be less than the minimum of the new position's pay grade.

Demotion

The pay of employees who are permanently assigned to a new position in a lower pay range due to a demotion will have their pay reduced by 5% per pay range, subject to internal equity. The new rate in the lower range may not exceed the new pay range maximum. Consideration will also be given to the pay rate of incumbents currently in the reassigned position in deciding a reassigned employee's base rate.

Voluntary Demotion

Should an employee desire to be reassigned to a job with a lower pay range than the current position, the employee's pay will be reduced by at least 10%. However, if the employee's pay exceeds the new position's pay range maximum, the employee's pay will be equal to the new pay range maximum. Consideration will be given to the pay rates of incumbents currently in the reassigned position in deciding a reassigned employee's base rate.

Transfer

Employees who are permanently assigned to a new position in the same pay grade as their current position will maintain their current pay rate. Consideration will be given to the pay rates of incumbents currently in the reassigned position in deciding a reassigned employee's base rate.

Reassignment

Employees who accept voluntary reassignment to a position in a lower pay range will follow the guidelines listed above under "Voluntary Demotion".

Employees who accept voluntary reassignment to a position in a higher pay range will generally receive an increase of 5%. Consideration will be given to the pay levels of incumbents to ensure internal equity.

Job Reevaluation

An employee whose job is reevaluated downward will receive no change in pay unless their pay rate exceeds the maximum of their new pay range, in which case their pay will be reduced to the new range maximum.

Reorganization

Should the District's management deem it necessary to reorganize such that an employee is assigned to a job in a lower pay range than their current position, the employee's pay

will remain unchanged. Should their pay rate exceed the maximum of the new pay range, their pay will be reduced to the new range maximum.

Part-time Employees

The pay for employees classified as part-time, including regular part-time, co-ops and seasonal employees, will be based on the position and skills of the employees.

OTHER PAY ADMINISTRATION ISSUES

Market Adjustments

Adjustments to base pay due to competitive labor market pressures or to ensure internal equity require approval of the President/CEO.

Shift Differential

A shift is defined as the eight (8) hour period from 3:00pm to 11:00pm, and the eight (8) hour period from 11:00 pm to 7:00 am. An employee who is scheduled to start work any time during these hours will receive a shift differential per hour for each hour worked.

Under normal, everyday operating conditions, the shift differential is applied to Operations personnel only. Under emergency conditions, the shift differential is applied to all Water Quality and Production personnel who are scheduled to work a shift, as defined above, at the direction of their supervisor with the approval of the Vice President and President/CEO.

Overtime

Overtime will be provided to non-exempt employees according to established departmental policies. Overtime will be paid for all hours over forty (40) per week (which includes all hours worked plus all hours an employee is normally reimbursed for, such as, PTO, Jury Duty, etc.). Overtime is computed by multiplying base pay and shift differential by 1.5.

COMPENSATION PLANNING

Objective

One objective of the District's Pay Administration Program is to provide a fair, understandable method of linking annual pay increases directly to employee performance. While the District's budget may fluctuate from year to year, the intention of this plan is to ensure a consistently positive relationship between an employee's overall performance rating and the size of an employee's annual pay increase.

In other words, in any given year the employees who receive the highest overall ratings should expect to receive the largest annual pay increases, subject to their in-range position.

Guidelines

To accomplish the objective of the District's Pay Administration Program, it is important that any approved non-merit payments (ex. market adjustments) be separate from and precede annual pay increases.

Exceptions to Guidelines

It is the goal of the District to provide meaningful employment opportunities. This includes the opportunity for competitive pay commensurate with job responsibility and demonstrated performance. The policy outlined in this program has been designed to provide fair and equitable pay levels and increases for the work performed by our employees. Therefore, any exceptions to this program will require the approval of the President/CEO.

Employee Communication

How the District's pay program is perceived is based in part on the communication between managers and their employees. The primary guidance to follow is to supply employees with information specific to their position, not information related to other employees. Standard pay information to be communicated includes:

- Current pay rate,
- The pay grade and range of pay for an employee's position, and,
- The range of pay for any job posting.

ANNUAL PAY INCREASE

Each year, subject to Commissioner approval, the opportunity to receive an annual pay increase will be provided all employees. The overall percentage increase will be based on the fiscal constraints of the District and individual employee performance. Pay increases will be reviewed annually for all employees in conjunction with the District's performance management cycle.

Procedure

The following steps are to be followed to determine the annual pay increase each employee will receive:

- Step 1 Develop Recommended Merit Payment Guidelines

  Each year, after determining the average market increase percentage, the District's fiscal objectives, and the distribution of the standard scores from the performance appraisal forms, Human Resources will develop the merit payment guidelines and submit a recommendation to the President/CEO for approval.

- Step 2 Submit Recommended Merit Payment Guidelines to the Commissioners for Approval

  The District will submit the recommended merit guidelines to the Commissioners in the annual budget process. Once approved, the guidelines will be maintained on file by Human Resources.

- Step 3 Determine Employee's Annual Pay Increase

  Human Resources will calculate each employee's annual pay increase, based on the performance appraisal scores and in accordance with the approved merit payment and annual pay increase guidelines.

  Each employee will be notified of his or her pay increase in a letter from the Human Resources Department. Notification will indicate the employee's:

  - Pay increase percentage,
  - Pay increase amount, and,
  - The hourly rate for the coming fiscal year.

Guidelines

Employees with a hire date six months or more prior to the performance review date will be eligible for a pay review. The amount of the potential pay increase will be prorated based on the date of hire.

Employees with a hire date of less than six months prior to the performance review date will be eligible for an increase equivalent to one-half of the increase to the Water District pay grade schedule effective the Monday after their six month anniversary. Special circumstances may warrant consideration for an exception to the guidelines and can only be approved by the President/CEO.

THE DISTRICT PERFORMANCE MANAGEMENT PROGRAM

Introduction

The quality of service which Northern Kentucky Water District provides its customers is a direct result of the skills, knowledge, ability, and performance of its employees. As a result, the District believes in rewarding employees for their contribution to the success of the organization by establishing and maintaining pay levels that:

- Are competitive with the organizations with which the District competes for employees,
- Reflect current job responsibilities and requirements,
- Reward employees with merit pay increases which are a result of their achieved performance level, and,
- Provide opportunities for increases in pay and advancement.

Managing employee performance is a vital management responsibility. To be successful, the District's Performance Management Program must be consistently and equitably administered. This requires a commitment from management. Proper program administration and communication will help facilitate the District's ability to attract, develop and retain the best employees, and to improve the efficiency and effectiveness of operations. This in turn will enable the District to provide the highest quality service

The objectives of performance management are to ensure that employees know:

- What is expected of them,
- How their performance will be measured,
- How well they are performing in their jobs, and,
- What they can do to improve their performance.

This portion of the manual describes the District's Performance Management Program and serves as:

- A detailed source of information on the program,
- An aid in assisting managers/supervisors to administer the program in a manner which is both consistent and fair to individual employees and to the District, and,

- A vehicle to provide a clear understanding of the guidelines and procedures.

To accomplish the objectives of the Performance Management Program, guidelines, documents and procedures have been developed. The following sections will highlight each.

Performance Management Guidelines

The District's performance appraisal guidelines call for:

- The review of each employee's work performance semi-annually against the employee's performance standards,

- Each employee to receive a formal performance evaluation by the end of the twelve-month performance appraisal cycle,

- A formal appraisal to evaluate each employee's performance against specific performance standards, including a development plan for improving future performance, and,

- A formal performance appraisal to be separate from and to precede any discussion of compensation issues.

Performance Appraisal Defined

A performance review is the manager/supervisor's judgment of how well an employee performs his/her job based on established criteria. A performance review is an ONGOING PROCESS of establishing and communicating performance expectations, observing and measuring performance against these expectations, and giving employees constructive feedback. It is not just a form or an annual meeting. While it may require a commitment of time on the manager's part, good coaching and performance feedback are fundamental to encouraging individual growth and helping the District to reach identified goals. Frequent performance discussions help to ensure that the year-end performance appraisal is not a surprise to the employee.

If done properly, the review will objectively measure each employee's actual performance according to standards that are directly related to the job. These three (3) points are measures of the manager/supervisor's fairness and good faith.

The objectives of the performance review are to:

- Help identify the employee's strong points as well as his/her weak points as related to job performance, so that a basis for training and development can be found;

- Assist and motivate employees to improve in the performance of their job responsibilities;

- Provide an objective basis for evaluating the performance of individual employees upon which promotions, transfers, and requests for salary increases may be based;

- Help in assigning work in accordance with the employee's abilities.

The Performance Appraisal Process

In preparation for the annual performance appraisal, it is necessary for the manager/supervisor to prepare the evaluation form.

The first page of each form simply indicates the type of staff to be reviewed: Exempt or Non-Exempt. In addition to covering the basic identification of Employee Name, Title, etc., this page also defines the ratings to be used on these forms.

- The employee who regularly and reliably performs at the level expected and even may occasionally do something above-and-beyond, should be rated as meets standards. This is the starting point, and depending on what the documentation substantiates, the rating moves up or down from there.

- To be rated as commendable, performance should be consistently above the meets standards level and indicate very high skill levels.

- For an employee to be rated as exemplary, performance should be consistently and significantly above established standards. The performance objective for the exemplary employee is performed at a fully superior level and skills are demonstrated at an outstanding level.

Part I of the form is for the performance dimensions that indicate the appropriate District Expectations for the position being reviewed. The dimensions for Exempt employees are quite different from those for non-exempt employees.

Part II of the form investigates performance based on:

A) General Dimensions
B) Actual Performance vs. Goals/Measurements

When an overall rating of needs improvement or exemplary is determined, that particular appraisal must be reviewed by the Manager/Supervisor, Human Resources, and the Department Vice President before it is shared with the employee.

Should a manager/supervisor feel that something may be out-of-line with their assessment of an employee; the manager/supervisor must review the appraisal with the Department Vice President.

The scores should not be finalized until after the appraisal interview with the employee. This allows the manager/supervisor to take into consideration the employee's input during the performance appraisal interview.

Part II C establishes the job specific Goals/Targets and Measurements that are to be used for the coming year. It is intended that at least three (3) Goals/Targets be listed but no more than six (6). These goals/targets are to be related to the job responsibilities of the employee and will very likely be the same or similar to some of the same standards used previously.

The best source of information to use is the job description. Other sources, especially for Exempt jobs, include organization and department goals and objectives, special assignments and major projects.

It must be understood that performance plans are not exhaustive and employees are responsible for satisfactorily performing all assignments they receive.

As an aid to develop some standards, the following list may help to generate ideas:

- Volume — How much of a service is delivered. Could be expressed in:
  - Dollars
  - # of units sold
  - # of calls made
  - # of projects completed
  - #of customers serviced
- Productivity — Assesses how much of a service is delivered compared with amounts of input received.
- Quality — Measures how well the service is delivered compared to performance specifications and customer expectations.
- Cycle Time — The length of time required to process the work to be done.
- Customer Satisfaction — Reflects the extent to which the organization is delivering value to its customers. These measures can include the customers' perception of value and more quantitative measures of performance such as the percentage of units meeting specifications and on-time delivery.

Manager/supervisor's are encouraged to share with each other information on the formulation of goals.

Part III is intended to give a snapshot of the overall performance and includes listing the strong and weak points of the employee's performance and listing specific actions to be accomplished in order for the employee to improve future performance. The development section may seem like a small percentage of the entire appraisal, but it is actually a very important feature because it shows the manager/supervisor's sincere interest in the employee's future. The success or failure of the entire performance review pro-gram is in large part measured by the plans made by the manager/supervisor's to improve the employee's performance and the degree to which those plans are carried out.

Part IV is for the signatures of the Reviewing Manager, the Department Vice President (who, in some cases, will be the same as the Reviewing Manager/Supv.). The final signature is for the employee. It is important for an employee to express their true feelings of the evaluation, particularly if there is a disagreement of any rating.

Documentation

A rating should not be made on intuition, but rather on the SPECIFIC INCIDENTS OF PERFORMANCE; do not generalize. This emphasizes the need to keep a record of significant performance (positive or negative) between performance reviews. Being specific (relating to happenings such as projects, occurrences, dates, etc.) when reviewing the employee's performance, lends emphasis and importance to a performance review interview and will help the manager be more objective in their evaluation.

There should be a written record that documents goals, decisions, observations and actions. It is important that every step of the appraisal system be documented.

Good performance appraisal methods help in other ways too. When goals and standards are committed to writing, there is less room for future misunderstanding. This also provides a historical record of the employees' successes and failures, which can be most valuable when considering an employee for a new assignment, or for disciplinary action.

Most manager/supervisor's get into trouble with performance appraisal documentation when they rely on the use of subjective statements (opinions, impressions, or assumptions) that are unsupported by hard facts, concrete explanations, specific examples, or first-hand observations.

The adjective *unprofessional* falls into the subjective category, since it fails to describe any kind of behavior, accomplishment, or lack or accomplishment on the employee's

part. It does not matter whether the term used is positive or negative; the key is whether it is proven with facts. After all, the employee's definition of the word *unprofessional* may differ from that of the supervisor, leading to misunderstanding.

Consider this alternative:

> Tom needs to work on his *professionalism.* Specifically, he should focus on taking criticism as it is intended and not as a personal affront. For example, when Tom was told to revise parts of his project proposal, he put up a great deal of resistance, arguing for over an hour that the proposal was fine as structured. He focused more on nursing his hurt feelings than on fixing the proposal.

The records that are written must not only communicate supervisory opinions, they must also provide details that explain and support those conclusions.

Take a look at the following two statements:

1. *Lisa is a team player.*

2. *Lisa is always willing to pitch in when asked, and never says "this is not my job" when a request for her assistance is made. For example, she volunteered to train a new employee on how to use the computer system. She also helped a co-worker complete a project in time to meet a tight deadline.*

The first statement is an unsupported opinion. The second one supports the evaluator's conclusion with details that describe the employee's behavior.

The following are samples of other subjective terms people use when writing performance documentation:

ambitious	cooperative	hard-working	lazy
argumentative	creative	helpful	punctual
assertive	dedicated	impatient	team player
careless	detail-oriented	irresponsible	time waster
conscientious	disorganized	lackadaisical	unpleasant

Left alone, each of these terms communicates an opinion, assumption, or impression. They must be supported by concrete explanations and specific examples if they are incorporated into the performance appraisal documents.

One way to determine if the statement provides specific and complete details is to ask: Do they answer the following kinds of questions?

- Who?
- What?

- When?
- Where?
- How?

In addition to these questions, useful performance descriptions often need to answer some other questions, such as:

- How was the information observed and measured:
- What is the standard with which the performance is being compared?
- Does the employee understand his or her performance expectations?
- Does the employee have the skills and resources needed to achieve performance standards and goals?
- If the performance is less than satisfactory, has the employee been given suggestions or training to improve performance deficiencies?

What is written must mirror what is said in the interview. Almost all performance documentation (including goals, standards, notes, logs, memos, etc.) is fair game if an employee challenges personnel decisions in court. That's why smart managers fill out performance documents with this thought in mind: Someday these record may be read by a judge and jury. The court can hear the words, so if negative phrases show evidence of bias or harassment, they can not be offset by verbal explanations.

Potential Pitfalls

THERE IS ONE FUNDAMENTAL RULE OF PERFORMANCE APPRAISAL:
JUDGE THE WORK, NOT THE PERSON

In other words, rate the employees' actual job performance, NOT PERSONALITY. When a reviewer dislikes aspects of an employees' personality, it is all too easy to shift the focus of a reviewers' observations from the individual's work to personal characteristics.

There are several other sources of error one can encounter in doing performance appraisals:

- The "halo" effect. This is the tendency to rate an employee high or low in all areas just because he/she is high or low in one particular area of performance. One suggestion to avoid this effect is to rate all employees being evaluated on the same factor before moving on to the next factor.

- Over-leniency. This is the tendency to rate all employees on the high side and therefore avoid having to give low ratings, even though they may be deserved. Doing this not only shows that the manager condones the employee's inefficiency or poor performance, but also undercuts the performance of a superior employee. One possible way to offset this tendency is to place a pre-determined number of employees in each rating category (the 'forced distribution appraisal' method).

- Over-strictness This tendency is the opposite of over-leniency and occurs when employees are rated too low. If no one's work is satisfactory or if an employee has no acceptable performance ratings, the reviewer may have to re-evaluate his/her own attitude. Perhaps expectations are too high. Unreasonable performance standards can create tensions and discontent.

- Middle-of-the-road This is the tendency to rate employees near the average point of the performance scale. This is really the easy way out and makes the performance evaluation relatively useless.

- Opportunity bias This is the tendency to evaluate one employee higher than another because the employee's job (or at least some factor of it) increases his/her opportunity to influence the total evaluation.

- Personal bias
    a) This is the tendency of the reviewer to rate an employee high or low because of personal characteristics, as has been mentioned above.

    b) Bias can also occur when we base our evaluation only on "recent" events. When we do this, we bypass all the rest that the employee has either done or not done.

The Performance Review Interview

A. Preparation The discussion of the results of the performance review with the employee is a very important step in the overall rating activity and should not be taken lightly.

It is the manager/supervisor's opportunity to:

1. Let the employee know how he/she has carried out his/her duties and met responsibilities;

2. Advise the employee how his/her activities and behavior conform or don't conform to the District objectives;

3. Give credit for those aspects of the job that have been done well and to point out areas of performance which require improvement; and,

4. Lay plans for future improvements and development.

To ensure that these opportunities are realized, it is necessary for the manager/supervisor's to do the following, *before* the interview:

1. Study the completed Performance Appraisal form in detail;

2. Be sure of the total impression to be left with the employee;

3. Select the proper time for the interview so that the decision is not hurried and that it is not interrupted. To accomplish this, the employee should be given advance notice of the interview (*a week's notice is usually sufficient).*

4. Have necessary materials available; that is, records, notes, completed forms, etc.

B. The Interview To emphasize what has already been covered, a Performance Review is a method of communication designed to transmit certain information, influence behavior, and reinforce, develop or improve certain skills. Obviously, the best way to accomplish this is through an interview with the employee.

While the general procedure followed in the interview may vary from one interview to another, the following general guidelines should be followed:

1. Put the employee (and yourself) at ease; maintain a friendly, sincere and courteous manner. Make it clear that it is a two-way conversation. Also emphasize that the time set aside is for the review of the employee's performance and that nothing will interrupt the interview. Conduct the review in private, and on neutral ground, but NOT in the manager/supervisor's own office.

2. It should be explained that the purpose of the performance review is to do just that: review performance. The purpose is not to consider a salary increase. An increase in salary is a separate topic.

3. Give your assessment of the employee's performance and **substantiate** the strong and the weak points with specific supporting incidents of performance. BE AS POSITIVE AS POSSIBLE; instead of talking about the mistakes, faults or weaknesses, talk about constructive steps the employee can take to do a better job, *i.e., talk about an unmet quota rather than the employee's poor job performance.*

There are several ways to approach the question of **improvement.**

First, give the employee an opportunity to make suggestions. If none are offered, ask if s/he has any ideas to suggest concerning his/her improvement.

If no suggestions are still offered, make suggestions in the form of a question, *i.e,, "Do you think it would help you to_____?"*

4. Give the employee a chance to ask questions and even to disagree.

5. Develop an action plan regarding development. Do not dictate this plan, rather work *with* the employee to develop a viable plan. Focus on a few of the most important goals and not on every item. Establish a mutually-agreeable measure of how both of you will know that the goal has been met.

6. Summarize the main points once more, and emphasize the future actions to be taken and the progress schedule agreed upon.

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Kim Clemons and Stacey Kampsen

Q.39. To the extent not provided in the responses above, provide all wage, compensation, or employee benefits studies, analyses, or surveys conducted since the utility's last rate case or that are currently utilized by the utility.

A.39. Please refer to NKWD Response to Question 37.

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Stacey Kampsen

Q.40. Provide the average number of customers on the utility's system (actual and projected), by rate schedule, for the test year and the three most recent calendar years.

A.40. NKWD submits as follows:

Meter Size	Average Number of Customers		
	2021 (Test Year)	2020	2019
Residential	78,364	77,624	77,767
Commercial	4,155	4,129	4,051
Industrial	109	107	107
Public Authorities	473	472	462
Multiple Family Dwellings	2,731	2,660	1,746
Resale	6	6	6

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Stacey Kampsen

Q.41. To the extent not already provided, provide a copy of each cost of service study, billing analysis, and all exhibits and schedules that were prepared in the utility's rate application in Excel spreadsheet format with all formulas, columns, and rows unprotected and fully accessible.

A.41. NKWD submits the attached Exhibit 41-1 and Exhibit 41-2. See also, Application Exhibit N.

Northern Kentucky Water District

EXHIBIT 41-1

NORTHERN KENTUCKY WATER DISTRICT

COMPARATIVE SCHEDULE OF PRESENT AND STEP 2 RATES

	Present Rates		Step 2 Rates		Percentage Increase
Monthly					
Fixed Service Charge					
5/8"	$ 18.50		$ 20.90		12.97%
3/4"	19.00		21.50		13.16%
1"	20.80		23.50		12.98%
1 1/2"	23.40		26.40		12.82%
2"	29.60		33.40		12.84%
3"	71.30		80.50		12.90%
4"	89.50		101.10		12.96%
6"	132.40		149.60		12.99%
8"	178.80		202.00		12.98%
10" and Larger	237.80		268.60		12.95%
Consumption Charge					
First 1,500 CF	$ 4.77	Per 100 CF	$ 5.58	Per 100 CF	16.98%
Next 163,500 CF	4.44	Per 100 CF	5.14	Per 100 CF	15.77%
Over 165,000 CF	3.25	Per 100 CF	3.80	Per 100 CF	16.92%
Quarterly					
Fixed Service Charge					
5/8"	$ 40.50		$ 45.50		12.35%
3/4"	42.50		47.70		12.24%
1"	48.80		54.80		12.30%
1 1/2"	57.70		64.80		12.31%
2"	80.90		90.90		12.36%
3"	251.80		282.90		12.35%
4"	315.50		354.50		12.36%
6"	466.20		523.80		12.36%
8"	637.10		715.80		12.35%
10" and Larger	831.90		934.60		12.35%
Consumption Charge					
First 4,500 CF	$ 4.77	Per 100 CF	$ 5.58	Per 100 CF	16.98%
Next 490,500 CF	4.44	Per 100 CF	5.14	Per 100 CF	15.77%
Over 495,000 CF	3.25	Per 100 CF	3.80	Per 100 CF	16.92%
Wholesale Customers					
Consumption Charge	$ 2.98	Per 100 CF	$ 3.43	Per 100 CF	15.10%
Bulk Loading Customers	$ 6.38	per 1000 gallons	$ 7.46	per 1000 gallons	16.93%

NORTHERN KENTUCKY WATER DISTRICT

APPLICATION OF PRESENT RATES AND STEP 2 RATES TO CONSUMPTION ANALYSIS
YEAR ENDED DECMEBER 31, 2021

Rate Block CCF	Number Of Bills	Total CCF Consumption	Present Rate	Revenue	Step 2 Rate	Proposed Revenue
(1)	(2)	(3)	(4)	(5)	(6)	(7)
			Residential - Quarterly			
Customer Charge						
5/8	301,225	0	$ 40.50	$12,199,613	$ 45.50	$ 13,705,738
1	2,107	0	48.80	102,822	54.80	115,464
1 1/2	385	0	57.70	22,186	64.80	24,916
2	116	0	80.90	9,384	90.90	10,544
Subtotal	303,833	0		12,334,005		13,856,661
First 45	0	4,439,972	4.77	21,178,666	5.58	24,775,044
Next 4,905	0	329,853	4.44	1,464,547	5.14	1,695,444
Over 4,950	0	0	3.25	0	3.80	0
Subtotal	0	4,769,825		22,643,214		26,470,488
Total	303,833	4,769,825		34,977,219		40,327,149
			Residential - Monthly			
Customer Charge						
5/8	40,615	0	18.50	$ 751,378	$ 20.90	$ 848,854
1	1,412	0	20.80	29,370	23.50	33,182
1 1/2	77	0	23.40	1,802	26.40	2,033
2	26	0	29.60	770	33.40	868
Subtotal	42,130	0		783,320		884,937
First 15	0	212,573	4.77	1,013,973	5.58	1,186,157
Next 1,635	0	23,333	4.44	103,599	5.14	119,932
Over 1,650	0	8,347	3.25	27,128	3.80	31,719
Subtotal	0	244,253		1,144,699		1,337,808
Total	42,130	244,253		1,928,019		2,222,744
Total Residential	345,963	5,014,078		36,905,238		42,549,894

NORTHERN KENTUCKY WATER DISTRICT

APPLICATION OF PRESENT RATES AND STEP 2 RATES TO CONSUMPTION ANALYSIS
YEAR ENDED DECMEBER 31, 2021

Rate Block CCF	Number Of Bills	Total CCF Consumption	Present Rate	Revenue	Step 2 Rate	Proposed Revenue
(1)	(2)	(3)	(4)	(5)	(6)	(7)
			Commercial - Quarterly			
Customer Charge						
5/8	10,230	0	40.50	$ 414,315	$ 45.50	$ 465,465
1	2,582	0	48.80	126,002	54.80	141,494
1 1/2	1,394	0	57.70	80,434	64.80	90,331
2	2,078	0	80.90	168,110	90.90	188,890
3	250	0	251.80	62,950	282.90	70,725
4	156	0	315.50	49,218	354.50	55,302
6	79	0	466.20	36,830	523.80	41,380
8	67	0	637.10	42,686	715.80	47,959
Subtotal	16,836	0		980,545		1,101,546
First 45	0	325,454	4.770	1,552,416	5.580	1,816,033
Next 4,905	0	958,439	4.440	4,255,469	5.140	4,926,376
Over 4,950	0	225,461	3.250	732,748	3.800	856,752
Subtotal	0	1,509,354		6,540,633		7,599,162
Total	16,836	1,509,354		7,521,178		8,700,707
			Commercial - Monthly			
Customer Charge						
5/8	637	0	18.50	$ 11,775	$ 20.90	$ 13,303
1	82	0	20.80	1,706	23.50	1,927
1 1/2	37	0	23.40	866	26.40	977
2	146	0	29.60	4,322	33.40	4,876
3	12	1	71.30	856	80.50	966
4	62	0	89.50	5,504	101.10	6,218
6	12	0	132.40	1,589	149.60	1,795
Subtotal	987	1		26,618		30,062
First 15	0	9,922	4.770	47,328	5.5800	55,365
Next 1,635	0	44,391	4.440	197,096	5.1400	228,170
Over 1,650	0	5,175	3.250	16,819	3.8000	19,665
Subtotal	0	59,488		261,243		303,200
Total	987	59,489		287,861		333,261
Total Commercial	17,823	1,568,843		7,809,039		9,033,969

NORTHERN KENTUCKY WATER DISTRICT

APPLICATION OF PRESENT RATES AND STEP 2 RATES TO CONSUMPTION ANALYSIS
YEAR ENDED DECMEBER 31, 2021

Rate Block CCF	Number Of Bills	Total CCF Consumption	Present Rate	Revenue	Step 2 Rate	Proposed Revenue
(1)	(2)	(3)	(4)	(5)	(6)	(7)
			Multi-Family - Quarterly			
Customer Charge						
5/8	6,846	0	40.50	$ 277,263	$ 45.50	$ 311,493
1	6	0	48.80	293	54.80	329
1 1/2	1,605	0	57.70	92,609	64.80	104,004
2	732	0	80.90	59,178	90.90	66,493
3	76	0	251.80	19,137	282.90	21,500
4	50	0	315.50	15,775	354.50	17,725
6	135	0	466.20	62,704	523.80	70,451
8	51	0	637.10	32,174	715.80	36,148
Subtotal	9,500	0		559,133		628,143
First 45	0	319,108	4.7700	1,522,145	5.5800	1,780,623
Next 4,905	0	820,822	4.4400	3,644,450	5.1400	4,219,025
Over 4,950	0	213	3.2500	692	3.8000	809
Subtotal	0	1,140,143		5,167,287		6,000,457
Total	9,500	1,140,143		5,726,420		6,628,600
			Multi-Family - Monthly			
Customer Charge						
5/8	9	0	$ 18.50	$ 167	$ 20.90	$ 188
1 1/2	214	0	23.40	4,996	26.40	5,636
2	216	0	29.60	6,394	33.40	7,214
3	10	0	71.30	713	80.50	805
6	12	0	132.40	1,589	149.60	1,795
Subtotal	461	0		13,859		15,638
First 15	0	6,986	4.7700	33,323	5.5800	38,982
Next 1,635	0	40,650	4.4400	180,486	5.1400	208,941
Over 1,650	0	0	3.2500	0	3.8000	0
Subtotal	0	47,636		213,809		247,923
Total	461	47,636		227,668		263,561
Total Multi-Family	9,960	1,187,779		5,954,088		6,892,161
Total Commercial/Multi-Family	27,783	2,756,622		13,763,127		15,926,130

NORTHERN KENTUCKY WATER DISTRICT

APPLICATION OF PRESENT RATES AND STEP 2 RATES TO CONSUMPTION ANALYSIS
YEAR ENDED DECMEBER 31, 2021

Rate Block CCF	Number Of Bills	Total CCF Consumption	Present Rate	Revenue	Step 2 Rate	Proposed Revenue
(1)	(2)	(3)	(4)	(5)	(6)	(7)
			Industrial - Quarterly			
Customer Charge						
5/8	51	0	40.50	$ 2,066	$ 45.50	$ 2,321
1	36	0	48.80	1,757	54.80	1,973
1 1/2	48	0	57.70	2,770	64.80	3,110
2	152	0	80.90	12,297	90.90	13,817
3	56	0	251.80	14,101	282.90	15,842
4	52	0	315.50	16,406	354.50	18,434
6	29	0	466.20	13,520	523.80	15,190
10	13	0	637.10	8,282	715.80	9,305
Subtotal	437	0		71,199		79,992
First 45	0	17,124	4.7700	81,681	5.5800	95,552
Next 4,905	0	426,037	4.4400	1,891,604	5.1400	2,189,830
Over 4,950	0	414,133	3.2500	1,345,932	3.8000	1,573,705
Subtotal	0	857,294		3,319,217		3,859,088
Total	437	857,294		3,390,416		3,939,080
			Industrial - Monthly			
Customer Charge						
6	0	0	132.40	$ -	$ 149.60	$ -
10	19	0	237.80	4,399	268.60	4,969
Subtotal	19	0		4,399		4,969
First 15	0	285	4.7700	1,359	5.5800	1,590
Next 1,635	0	31,065	4.4400	137,929	5.1400	159,674
Over 1,650	0	174,834	3.2500	568,211	3.8000	664,369
Subtotal	0	206,184		707,499		825,634
Total	19	206,184		711,898		830,603
Total Industrial	456	1,063,478		4,102,314		4,769,682

NORTHERN KENTUCKY WATER DISTRICT

APPLICATION OF PRESENT RATES AND STEP 2 RATES TO CONSUMPTION ANALYSIS
YEAR ENDED DECMEBER 31, 2021

Rate Block CCF	Number Of Bills	Total CCF Consumption	Present Rate	Revenue	Step 2 Rate	Proposed Revenue
(1)	(2)	(3)	(4)	(5)	(6)	(7)
		Public - Quarterly				
Customer Charge						
5/8	653	0	40.50	$ 26,426	$ 45.50	$ 29,689
1	296	0	48.80	14,445	54.80	16,221
1 1/2	186	0	57.70	10,732	64.80	12,053
2	538	0	80.90	43,524	90.90	48,904
3	166	0	251.80	41,673	282.90	46,820
4	68	0	315.50	21,454	354.50	24,106
6	26	0	466.20	12,121	523.80	13,619
8	13	0	637.10	8,282	715.80	9,305
10	4	0	831.90	3,328	934.60	3,738
Subtotal	1,949	0		181,985		204,455
First 45	0	42,614	4.7700	203,269	5.5800	237,786
Next 4,905	0	240,863	4.4400	1,069,432	5.1400	1,238,036
Over 4,950	0	48,442	3.2500	157,437	3.8000	184,080
Subtotal	0	331,919		1,430,138		1,659,902
Total	1,949	331,919		1,612,123		1,864,357
		Public - Monthly				
Customer Charge						
5/8	77	0	$ 18.50	$ 1,425	$ 20.90	$ 1,609
1	12	0	20.80	250	23.50	282
1 1/2	14	0	23.40	328	26.40	370
2	26	0	29.60	770	33.40	868
4	25	0	89.50	2,238	101.10	2,528
10	12	0	237.80	2,854	268.60	3,223
Subtotal	166	0		7,865		8,880
First 15	0	1,326	4.7700	6,325	5.5800	7,399
Next 1,635	0	43,000	4.4400	190,920	5.1400	221,020
Over 1,650	0	138,490	3.2500	450,093	3.8000	526,262
Subtotal	0	182,816		647,338		754,681
Total	166	182,816		655,203		763,561
Total Public	2,115	514,735		2,267,326		2,627,918

NORTHERN KENTUCKY WATER DISTRICT

APPLICATION OF PRESENT RATES AND STEP 2 RATES TO CONSUMPTION ANALYSIS
YEAR ENDED DECMEBER 31, 2021

Rate Block CCF	Number Of Bills	Total CCF Consumption	Present Rate	Revenue	Step 2 Rate	Proposed Revenue
(1)	(2)	(3)	(4)	(5)	(6)	(7)
		Wholesale - Monthly				
Customer Charge						
4	37	0	89.50	$ 3,312	$ 101.10	$ 3,741
6	36	0	132.40	4,766	$ 149.60	5,386
Subtotal	73	0		8,078		9,127
First Block	0	676,093	2.9800	2,014,757	3.4300	2,318,999
Subtotal	0	676,093		2,014,757		2,318,999
Total Sales for Resale	73	676,093		2,022,835		2,328,126
Total	376,389	10,025,006		59,060,840		68,201,749

NORTHERN KENTUCKY WATER DISTRICT

Bill Comparisons

Residential/Commercial Monthly Bills - Step 2
5/8" Meter

Consumption CF	Bills under Present Rates	Bills under Proposed Rates	Increase	Percentage Increase
-	$ 18.50	$ 20.90	$ 2.40	13.0%
100	23.27	26.48	3.21	13.8%
200	28.04	32.06	4.02	14.3%
300	32.81	37.64	4.83	14.7%
400	37.58	43.22	5.64	15.0%
500	42.35	48.80	6.45	15.2%
600	47.12	54.38	7.26	15.4%
700	51.89	59.96	8.07	15.6%
800	56.66	65.54	8.88	15.7%
900	61.43	71.12	9.69	15.8%
1,000	66.20	76.70	10.50	15.9%
1,100	70.97	82.28	11.31	15.9%
1,200	75.74	87.86	12.12	16.0%
1,300	80.51	93.44	12.93	16.1%
1,400	85.28	99.02	13.74	16.1%
1,500	90.05	104.60	14.55	16.2%
1,600	94.49	109.74	15.25	16.1%
1,700	98.93	114.88	15.95	16.1%
1,800	103.37	120.02	16.65	16.1%
1,900	107.81	125.16	17.35	16.1%
2,000	112.25	130.30	18.05	16.1%
2,500	134.45	156.00	21.55	16.0%

NORTHERN KENTUCKY WATER DISTRICT

Bill Comparisons

Residential/Commercial Quarterly Bills - Step 2
5/8" Meter

Consumption CF	Bills under Present Rates	Bills under Proposed Rates	Increase	Percentage Increase
-	$ 40.50	$ 45.50	$ 5.00	12.3%
300	54.81	62.24	7.43	13.6%
600	69.12	78.98	9.86	14.3%
800	78.66	90.14	11.48	14.6%
900	83.43	95.72	12.29	14.7%
1,200	97.74	112.46	14.72	15.1%
1,500	112.05	129.20	17.15	15.3%
1,800	126.36	145.94	19.58	15.5%
2,100	140.67	162.68	22.01	15.6%
2,400	154.98	179.42	24.44	15.8%
2,700	169.29	196.16	26.87	15.9%
3,000	183.60	212.90	29.30	16.0%
3,300	197.91	229.64	31.73	16.0%
3,600	212.22	246.38	34.16	16.1%
3,900	226.53	263.12	36.59	16.2%
4,200	240.84	279.86	39.02	16.2%
4,500	255.15	296.60	41.45	16.2%
4,800	268.47	312.02	43.55	16.2%
5,100	281.79	327.44	45.65	16.2%
5,400	295.11	342.86	47.75	16.2%
5,700	308.43	358.28	49.85	16.2%
6,000	321.75	373.70	51.95	16.1%
7,500	388.35	450.80	62.45	16.1%

NORTHERN KENTUCKY WATER DISTRICT

Bill Comparisons

Public Authority Monthly - Step 2
10" Meter

Consumption CF	Bills under Present Rates	Bills under Proposed Rates	Increase	Percentage Increase
-	$ 237.80	$ 268.60	$ 30.80	13.0%
1,000	285.50	324.40	38.90	13.6%
2,000	331.55	378.00	46.45	14.0%
3,000	375.95	429.40	53.45	14.2%
4,000	420.35	480.80	60.45	14.4%
5,000	464.75	532.20	67.45	14.5%
6,000	509.15	583.60	74.45	14.6%
7,000	553.55	635.00	81.45	14.7%
8,000	597.95	686.40	88.45	14.8%
9,000	642.35	737.80	95.45	14.9%
10,000	686.75	789.20	102.45	14.9%
50,000	2,462.75	2,845.20	382.45	15.5%
100,000	4,682.75	5,415.20	732.45	15.6%
200,000	8,706.25	10,086.20	1,379.95	15.9%
500,000	18,456.25	21,486.20	3,029.95	16.4%
750,000	26,581.25	30,986.20	4,404.95	16.6%
1,000,000	34,706.25	40,486.20	5,779.95	16.7%
1,100,000	37,956.25	44,286.20	6,329.95	16.7%
1,200,000	41,206.25	48,086.20	6,879.95	16.7%
1,300,000	44,456.27	51,886.22	7,429.95	16.7%
1,400,000	47,706.28	55,686.24	7,979.96	16.7%
1,500,000	50,956.30	59,486.25	8,529.96	16.7%
1,600,000	54,206.31	63,286.27	9,079.96	16.8%
1,700,000	57,456.33	67,086.29	9,629.96	16.8%
1,800,000	60,706.34	70,886.31	10,179.97	16.8%
1,900,000	63,956.36	74,686.32	10,729.97	16.8%
2,000,000	67,206.37	78,486.34	11,279.97	16.8%

NORTHERN KENTUCKY WATER DISTRICT

SUMMARY OF PRESENT AND PROPOSED RATES - STEP 1

	Present Rates	Step 1 Rates	Percentage Increase
Monthly			
Fixed Service Charge			
5/8"	$ 18.50	$ 19.70	6.49%
3/4"	19.00	20.30	6.84%
1"	20.80	22.20	6.73%
1 1/2"	23.40	24.90	6.41%
2"	29.60	31.50	6.42%
3"	71.30	75.90	6.45%
4"	89.50	95.30	6.48%
6"	132.40	141.00	6.50%
8"	178.80	190.40	6.49%
10" and Larger	237.80	253.20	6.48%
Consumption Charge			
First 1,500 CF	$ 4.77 Per 100 CF	$ 5.18 Per 100 CF	8.60%
Next 163,500 CF	4.44 Per 100 CF	4.79 Per 100 CF	7.88%
Over 165,000 CF	3.25 Per 100 CF	3.53 Per 100 CF	8.62%
Quarterly			
Fixed Service Charge			
5/8"	$ 40.50	$ 43.00	6.17%
3/4"	42.50	45.10	6.12%
1"	48.80	51.80	6.15%
1 1/2"	57.70	61.25	6.15%
2"	80.90	85.90	6.18%
3"	251.80	267.35	6.18%
4"	315.50	335.00	6.18%
6"	466.20	495.00	6.18%
8"	637.10	676.45	6.18%
10" and Larger	831.90	883.25	6.17%
Consumption Charge			
First 4,500 CF	$ 4.77 Per 100 CF	$ 5.18 Per 100 CF	8.60%
Next 490,500 CF	4.44 Per 100 CF	4.79 Per 100 CF	7.88%
Over 495,000 CF	3.25 Per 100 CF	3.53 Per 100 CF	8.62%
Wholesale Customers			
Consumption Charge	$ 2.98 Per 100 CF	$ 3.21 Per 100 CF	7.72%
Bulk Loading Customers	$ 6.38 per 1000 gallons	$ 6.93 per 1000 gallons	8.62%

NORTHERN KENTUCKY WATER DISTRICT

APPLICATION OF PRESENT RATES AND STEP 1 RATES TO CONSUMPTION ANALYSIS
YEAR ENDED DECMEBER 31, 2021

Rate Block CCF	Number Of Bills	Total CCF Consumption	Present Rate	Revenue	Step 1 Rate	Proposed Revenue
(1)	(2)	(3)	(4)	(5)	(6)	(7)
			Residential - Quarterly			
Customer Charge						
5/8	301,225	0	$ 40.50	$ 12,199,613	$ 43.00	$ 12,952,675
1	2,107	0	48.80	102,822	51.80	109,143
1 1/2	385	0	57.70	22,186	61.25	23,551
2	116	0	80.90	9,384	85.90	9,964
Subtotal	303,833	0		12,334,005		13,095,333
First 45	0	4,439,972	4.77	21,178,666	5.18	22,999,055
Next 4,905	0	329,853	4.44	1,464,547	4.79	1,579,996
Over 4,950	0	0	3.25	0	3.53	0
Subtotal	0	4,769,825		22,643,214		24,579,051
Total	303,833	4,769,825		34,977,219		37,674,383
			Residential - Monthly			
Customer Charge						
5/8	40,615	0	18.50	$ 751,378	$ 19.70	$ 800,116
1	1,412	0	20.80	29,370	22.20	31,346
1 1/2	77	0	23.40	1,802	24.90	1,917
2	26	0	29.60	770	31.50	819
Subtotal	42,130	0		783,320		834,198
First 15	0	212,573	4.77	1,013,973	5.18	1,101,128
Next 1,635	0	23,333	4.44	103,599	4.79	111,765
Over 1,650	0	8,347	3.25	27,128	3.53	29,465
Subtotal	0	244,253		1,144,699		1,242,358
Total	42,130	244,253		1,928,019		2,076,556
Total Residential	345,963	5,014,078		36,905,238		39,750,940

NORTHERN KENTUCKY WATER DISTRICT

APPLICATION OF PRESENT RATES AND STEP 1 RATES TO CONSUMPTION ANALYSIS
YEAR ENDED DECMEBER 31, 2021

Rate Block CCF	Number Of Bills	Total CCF Consumption	Present Rate	Revenue	Step 1 Rate	Proposed Revenue
(1)	(2)	(3)	(4)	(5)	(6)	(7)
			Commercial - Quarterly			
Customer Charge						
5/8	10,230	0	40.50	$ 414,315	$ 43.00	$ 439,890
1	2,582	0	48.80	126,002	51.80	133,748
1 1/2	1,394	0	57.70	80,434	61.25	85,383
2	2,078	0	80.90	168,110	85.90	178,500
3	250	0	251.80	62,950	267.35	66,838
4	156	0	315.50	49,218	335.00	52,260
6	79	0	466.20	36,830	495.00	39,105
8	67	0	637.10	42,686	676.45	45,322
Subtotal	16,836	0		980,545		1,041,045
First 45	0	325,454	4.770	1,552,416	5.180	1,685,852
Next 4,905	0	958,439	4.440	4,255,469	4.790	4,590,923
Over 4,950	0	225,461	3.250	732,748	3.530	795,877
Subtotal	0	1,509,354		6,540,633		7,072,652
Total	16,836	1,509,354		7,521,178		8,113,697
			Commercial - Monthly			
Customer Charge						
5/8	637	0	18.50	$ 11,775	$ 19.70	$ 12,539
1	82	0	20.80	1,706	22.20	1,820
1 1/2	37	0	23.40	866	24.90	921
2	146	0	29.60	4,322	31.50	4,599
3	12	0	71.30	856	75.90	911
4	62	0	89.50	5,504	95.30	5,861
6	12	0	132.40	1,589	141.00	1,692
Subtotal	987	0		26,618		28,344
First 15	0	9,922	4.770	47,328	5.1800	51,396
Next 1,635	0	44,391	4.440	197,096	4.7900	212,633
Over 1,650	0	5,175	3.250	16,819	3.5300	18,268
Subtotal	0	59,488		261,243		282,297
Total	987	59,488		287,861		310,640
Total Commercial	17,823	1,568,842		7,809,039		8,424,337

NORTHERN KENTUCKY WATER DISTRICT

APPLICATION OF PRESENT RATES AND STEP 1 RATES TO CONSUMPTION ANALYSIS
YEAR ENDED DECMEBER 31, 2021

Rate Block CCF	Number Of Bills	Total CCF Consumption	Present Rate	Revenue	Step 1 Rate	Proposed Revenue
(1)	(2)	(3)	(4)	(5)	(6)	(7)
			Multi-Family - Quarterly			
Customer Charge						
5/8	6,846	0	40.50	$ 277,263	$ 43.00	$ 294,378
1	6	0	48.80	293	51.80	311
1 1/2	1,605	0	57.70	92,609	61.25	98,306
2	732	0	80.90	59,178	85.90	62,836
3	76	0	251.80	19,137	267.35	20,319
4	50	0	315.50	15,775	335.00	16,750
6	135	0	466.20	62,704	495.00	66,578
8	51	0	637.10	32,174	676.45	34,161
Subtotal	9,500	0		559,133		593,639
First 45	0	319,108	4.7700	1,522,145	5.1800	1,652,979
Next 4,905	0	820,822	4.4400	3,644,450	4.7900	3,931,737
Over 4,950	0	213	3.2500	692	3.5300	752
Subtotal	0	1,140,143		5,167,287		5,585,469
Total	9,500	1,140,143		5,726,420		6,179,108
			Multi-Family - Monthly			
Customer Charge						
5/8	9	0	18.50	$ 167	$ 19.70	$ 177
1 1/2	214	0	23.40	4,996	24.90	5,316
2	216	0	29.60	6,394	31.50	6,804
3	10	0	71.30	713	75.90	759
6	12	0	132.40	1,589	141.00	1,692
Subtotal	461	0		13,859		14,748
First 15	0	6,986	4.7700	33,323	5.1800	36,187
Next 1,635	0	40,650	4.4400	180,486	4.7900	194,714
Over 1,650	0	0	3.2500	0	3.5300	0
Subtotal	0	47,636		213,809		230,901
Total	461	47,636		227,668		245,649
Total Multi-Family	9,960	1,187,779		5,954,088		6,424,757
Total Commercial/Multi-Family	27,783	2,756,621		13,763,127		14,849,094

NORTHERN KENTUCKY WATER DISTRICT

APPLICATION OF PRESENT RATES AND STEP 1 RATES TO CONSUMPTION ANALYSIS
YEAR ENDED DECMEBER 31, 2021

Rate Block CCF	Number Of Bills	Total CCF Consumption	Present Rate	Revenue	Step 1 Rate	Proposed Revenue
(1)	(2)	(3)	(4)	(5)	(6)	(7)
			Industrial - Quarterly			
Customer Charge						
5/8	51	0	40.50	$ 2,066	$ 43.00	$ 2,193
1	36	0	48.80	1,757	51.80	1,865
1 1/2	48	0	57.70	2,770	61.25	2,940
2	152	0	80.90	12,297	85.90	13,057
3	56	0	251.80	14,101	267.35	14,972
4	52	0	315.50	16,406	335.00	17,420
6	29	0	466.20	13,520	495.00	14,355
8	13	0	637.10	8,282	676.45	8,794
Subtotal	437	0		71,199		75,596
First 45	0	17,124	4.7700	81,681	5.1800	88,702
Next 4,905	0	426,037	4.4400	1,891,604	4.7900	2,040,717
Over 4,950	0	414,133	3.2500	1,345,932	3.5300	1,461,889
Subtotal	0	857,294		3,319,217		3,591,309
Total	437	857,294		3,390,416		3,666,905
			Industrial - Monthly			
Customer Charge						
6	0	0	132.40	$ -	$ 141.00	$ -
10	19	0	237.80	4,399	253.20	4,684
Subtotal	19	0		4,399		4,684
First 15	0	285	4.7700	1,359	5.1800	1,476
Next 1,635	0	31,065	4.4400	137,929	4.7900	148,801
Over 1,650	0	174,834	3.2500	568,211	3.5300	617,164
Subtotal	0	206,184		707,499		767,442
Total	19	206,184		711,898		772,126
Total Industrial	456	1,063,478		4,102,314		4,439,031

NORTHERN KENTUCKY WATER DISTRICT

APPLICATION OF PRESENT RATES AND STEP 1 RATES TO CONSUMPTION ANALYSIS
YEAR ENDED DECMEBER 31, 2021

Rate Block CCF	Number Of Bills	Total CCF Consumption	Present Rate	Revenue	Step 1 Rate	Proposed Revenue
(1)	(2)	(3)	(4)	(5)	(6)	(7)
			Public - Quarterly			
Customer Charge						
5/8	653	0	40.50	$ 26,426	$ 43.00	$ 28,058
1	296	0	48.80	14,445	51.80	15,333
1 1/2	186	0	57.70	10,732	61.25	11,393
2	538	0	80.90	43,524	85.90	46,214
3	166	0	251.80	41,673	267.35	44,246
4	68	0	315.50	21,454	335.00	22,780
6	26	0	466.20	12,121	495.00	12,870
8	13	0	637.10	8,282	676.45	8,794
10	4	0	831.90	3,328	883.25	3,533
Subtotal	1,949	0		181,985		193,221
First 45	0	42,614	4.7700	203,269	5.1800	220,741
Next 4,905	0	240,863	4.4400	1,069,432	4.7900	1,153,734
Over 4,950	0	48,442	3.2500	157,437	3.5300	171,000
Subtotal	0	331,919		1,430,138		1,545,475
Total	1,949	331,919		1,612,123		1,738,696
			Public - Monthly			
Customer Charge						
5/8	77	0	$ 18.50	$ 1,425	$ 19.70	$ 1,517
1	12	0	20.80	250	22.20	266
1 1/2	14	0	23.40	328	24.90	349
2	26	0	29.60	770	31.50	819
4	25	0	89.50	2,238	95.30	2,383
10	12	0	237.80	2,854	253.20	3,038
Subtotal	166	0		7,865		8,372
First 15	0	1,326	4.7700	6,325	5.1800	6,869
Next 1,635	0	43,000	4.4400	190,920	4.7900	205,970
Over 1,650	0	138,490	3.2500	450,093	3.5300	488,870
Subtotal	0	182,816		647,338		701,708
Total	166	182,816		655,203		710,080
Total Public	2,115	514,735		2,267,326		2,448,776

NORTHERN KENTUCKY WATER DISTRICT

APPLICATION OF PRESENT RATES AND STEP 1 RATES TO CONSUMPTION ANALYSIS
YEAR ENDED DECMEBER 31, 2021

Rate Block CCF	Number Of Bills	Total CCF Consumption	Present Rate	Revenue	Step 1 Rate	Proposed Revenue
(1)	(2)	(3)	(4)	(5)	(6)	(7)
			Wholesale - Monthly			
Customer Charge						
4	37	0	89.50	$ 3,312	$ 95.30	$ 3,526
6	36	0	132.40	4,766	141.00	5,076
Subtotal	73	0		8,078		8,602
First Block	0	676,093	2.9800	2,014,757	3.2100	2,170,259
Subtotal	0	676,093		2,014,757		2,170,259
Total Sales for Resale	73	676,093		2,022,835		2,178,861
Total	376,389	10,025,005		$ 59,060,840		$ 63,666,701

NORTHERN KENTUCKY WATER DISTRICT

Bill Comparisons

Residential/Commercial Monthly Bills - Step 1
5/8" Meter

Consumption CF	Bills under Present Rates	Bills under Proposed Rates	Increase	Percentage Increase
-	$ 18.50	$ 19.70	$ 1.20	6.5%
100	23.27	24.88	1.61	6.9%
200	28.04	30.06	2.02	7.2%
300	32.81	35.24	2.43	7.4%
400	37.58	40.42	2.84	7.6%
500	42.35	45.60	3.25	7.7%
600	47.12	50.78	3.66	7.8%
700	51.89	55.96	4.07	7.8%
800	56.66	61.14	4.48	7.9%
900	61.43	66.32	4.89	8.0%
1,000	66.20	71.50	5.30	8.0%
1,100	70.97	76.68	5.71	8.0%
1,200	75.74	81.86	6.12	8.1%
1,300	80.51	87.04	6.53	8.1%
1,400	85.28	92.22	6.94	8.1%
1,500	90.05	97.40	7.35	8.2%
1,600	94.49	102.19	7.70	8.1%
1,700	98.93	106.98	8.05	8.1%
1,800	103.37	111.77	8.40	8.1%
1,900	107.81	116.56	8.75	8.1%
2,000	112.25	121.35	9.10	8.1%
2,500	134.45	145.30	10.85	8.1%

NORTHERN KENTUCKY WATER DISTRICT

Bill Comparisons

Residential/Commercial Quarterly Bills - Step 1
5/8" Meter

Consumption CF	Bills under Present Rates	Bills under Proposed Rates	Increase	Percentage Increase
-	$ 40.50	$ 43.00	$ 2.50	6.2%
300	54.81	58.54	3.73	6.8%
600	69.12	74.08	4.96	7.2%
800	78.66	84.44	5.78	7.3%
900	83.43	89.62	6.19	7.4%
1,200	97.74	105.16	7.42	7.6%
1,500	112.05	120.70	8.65	7.7%
1,800	126.36	136.24	9.88	7.8%
2,100	140.67	151.78	11.11	7.9%
2,400	154.98	167.32	12.34	8.0%
2,700	169.29	182.86	13.57	8.0%
3,000	183.60	198.40	14.80	8.1%
3,300	197.91	213.94	16.03	8.1%
3,600	212.22	229.48	17.26	8.1%
3,900	226.53	245.02	18.49	8.2%
4,200	240.84	260.56	19.72	8.2%
4,500	255.15	276.10	20.95	8.2%
4,800	268.47	290.47	22.00	8.2%
5,100	281.79	304.84	23.05	8.2%
5,400	295.11	319.21	24.10	8.2%
5,700	308.43	333.58	25.15	8.2%
6,000	321.75	347.95	26.20	8.1%
7,500	388.35	419.80	31.45	8.1%

NORTHERN KENTUCKY WATER DISTRICT

Bill Comparisons

Public Authority Monthly - Step 1
10" Meter

Consumption CF	Bills under Present Rates	Bills under Proposed Rates	Increase	Percentage Increase
-	$ 237.80	$ 253.20	$ 15.40	6.5%
1,000	285.50	305.00	19.50	6.8%
2,000	331.55	354.85	23.30	7.0%
3,000	375.95	402.75	26.80	7.1%
4,000	420.35	450.65	30.30	7.2%
5,000	464.75	498.55	33.80	7.3%
6,000	509.15	546.45	37.30	7.3%
7,000	553.55	594.35	40.80	7.4%
8,000	597.95	642.25	44.30	7.4%
9,000	642.35	690.15	47.80	7.4%
10,000	686.75	738.05	51.30	7.5%
50,000	2,462.75	2,654.05	191.30	7.8%
100,000	4,682.75	5,049.05	366.30	7.8%
200,000	8,706.25	9,398.05	691.80	7.9%
500,000	18,456.25	19,988.05	1,531.80	8.3%
750,000	26,581.25	28,813.05	2,231.80	8.4%
1,000,000	34,706.25	37,638.05	2,931.80	8.4%
1,100,000	37,956.25	41,168.05	3,211.80	8.5%
1,200,000	41,206.25	44,698.05	3,491.80	8.5%
1,300,000	44,456.27	48,228.07	3,771.80	8.5%
1,400,000	47,706.28	51,758.08	4,051.80	8.5%
1,500,000	50,956.30	55,288.10	4,331.80	8.5%
1,600,000	54,206.31	58,818.12	4,611.81	8.5%
1,700,000	57,456.33	62,348.13	4,891.81	8.5%
1,800,000	60,706.34	65,878.15	5,171.81	8.5%
1,900,000	63,956.36	69,408.17	5,451.81	8.5%
2,000,000	67,206.37	72,938.18	5,731.81	8.5%

Northern Kentucky Water District

EXHIBIT 41-2

NORTHERN KENTUCKY WATER DISTRICT

COMPARISON OF COST OF SERVICE WITH REVENUES UNDER PRESENT AND PROPOSED RATES - STEP 2
FOR THE TEST YEAR ENDED DECEMBER 31, 2021

Customer Classification	Cost of Service Amount (Schedule B)	Cost of Service Percent	Revenues, Present Rates Amount	Revenues, Present Rates Percent	Revenues, Step 2 Rates Amount	Revenues, Step 2 Rates Percent	Step 2 Increase Amount	Step 2 Increase Percent Increase
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Residential	$ 42,038,185	61.7%	$ 36,905,238	62.6%	$ 42,549,894	62.3%	$ 5,644,655	15.3%
Commercial/Multi-Family	16,088,337	23.6%	13,763,127	23.3%	15,926,130	23.4%	2,163,003	15.7%
Industrial	5,002,853	7.3%	4,102,314	6.9%	4,769,682	7.0%	667,368	16.3%
Public Authority	2,673,922	3.9%	2,267,326	3.8%	2,627,918	3.9%	360,592	15.9%
Wholesale	2,399,304	3.5%	2,022,835	3.4%	2,328,126	3.4%	305,291	15.1%
Total Sales	68,202,600	100.0%	59,060,840	100.0%	68,201,749	100.0%	9,140,909	15.5%
Bulk Water Sales	76,801		66,507		76,801		10,293	15.5%
Total Sales with Bulk Water	68,279,401		59,127,347		68,278,550		$ 9,151,202	15.5%
Other Revenues	2,081,883		2,081,883		2,081,883		-	0.0%
Total	$ 70,361,284		$ 61,209,231		$ 70,360,433		$ 9,151,202	15.0%

NORTHERN KENTUCKY WATER DISTRICT

COST OF SERVICE FOR THE TWELVE MONTHS ENDED DECEMBER 31, 2021, ALLOCATED TO CUSTOMER CLASSIFICATIONS

Account No.	Account	Factor Ref.	Cost of Service	Residential	Commercial	Industrial	Public Authorities	Wholesale Customers	Fire Protection
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	OPERATION AND MAINTENANCE EXPENSES								
	Source of Supply								
	Operations								
615.1	Puchased Power	1	$ 808,023	$ 401,587	$ 220,752	$ 85,166	$ 41,209	$ 54,138	$ 5,171
620.1	General Expense	2	-	-	-	-	-	-	-
635.1	Contractual Service	2	2,958	1,540	783	294	142	187	12
	Total Operations		810,981	403,128	221,535	85,460	41,351	54,325	5,183
	Maintenance								
620.2	Materials and Supplies	2	-	-	-	-	-	-	-
635.2	Contractual Service	2	-	-	-	-	-	-	-
	Total Maintenance		-	-	-	-	-	-	-
	Total Source of Supply		810,981	403,128	221,535	85,460	41,351	54,325	5,183
	Water Treatment								
	Operations								
601.3	Labor	2	1,463,165	761,724	387,300	145,439	70,378	92,472	5,853
601.3	Labor - Lab	2	760,220	395,770	201,230	75,566	36,567	48,046	3,041
615.3	Puchased Power	1	505,551	251,259	138,117	53,285	25,783	33,872	3,236
616.3	Gas	1	76,327	37,934	20,852	8,045	3,893	5,114	488
618.3	Chemicals	1	3,751,917	1,864,703	1,025,024	395,452	191,348	251,378	24,012
620.3	Materials and Supplies	2	186,507	97,096	49,368	18,539	8,971	11,787	746
631.3	Contractual Services - Engineering	2	-	-	-	-	-	-	-
633.3	Contractual Services	2	-	-	-	-	-	-	-
635.3	Contractual Services - Sludge Removal	1	111,400	55,366	30,434	11,742	5,681	7,464	713
635.3	Contractual Services - Laboratory	2	98,407	51,231	26,048	9,782	4,733	6,219	394
635.3	Contractual Services - Other	2	332,188	172,937	87,930	33,020	15,978	20,994	1,329
650.3	Transportation Expense	2	54,800	28,529	14,506	5,447	2,636	3,463	219
	Total Operations		7,340,482	3,716,548	1,980,810	756,315	365,968	480,810	40,030
	Maintenance								
601.4	Labor	2	724,144	376,989	191,681	71,980	34,831	45,766	2,897
620.4	Materials and Supplies	2	311,663	162,252	82,497	30,979	14,991	19,697	1,247
635.4	Contractual Services - Other	2	104,717	54,516	27,719	10,409	5,037	6,618	419
650.4	Transportation Expense	2		-	-	-	-	-	-
	Total Maintenance		1,140,524	593,757	301,897	113,368	54,859	72,081	4,562
	Total Water Treatment		8,481,006	4,310,305	2,282,707	869,683	420,827	552,891	44,592
	Transmission and Distribution								
	Operations								
601.5	Labor	6	1,201,750	554,728	263,304	87,127	42,061	16,704	237,826
615.5	Purchased Power	1	1,249,724	621,113	341,425	131,721	63,736	83,732	7,998
616.5	Gas	6	4,035	1,863	884	293	141	56	799

NORTHERN KENTUCKY WATER DISTRICT

COST OF SERVICE FOR THE TWELVE MONTHS ENDED DECEMBER 31, 2021, ALLOCATED TO CUSTOMER CLASSIFICATIONS

Account No.	Account	Factor Ref.	Cost of Service	Residential	Commercial	Industrial	Public Authorities	Wholesale Customers	Fire Protection
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
620.5	Materials and Supplies	6	151,201	69,795	33,128	10,962	5,292	2,102	29,923

NORTHERN KENTUCKY WATER DISTRICT

COST OF SERVICE FOR THE TWELVE MONTHS ENDED DECEMBER 31, 2021, ALLOCATED TO CUSTOMER CLASSIFICATIONS

Account No.	Account	Factor Ref.	Cost of Service	Residential	Commercial	Industrial	Public Authorities	Wholesale Customers	Fire Protection
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
631.5	Contractual Services - Engineering	6	73,454	33,906	16,094	5,325	2,571	1,021	14,536
633.5	Contractual Services	6	-	-	-	-	-	-	-
635.5	Contractual Services - Other	6	74,558	34,416	16,336	5,405	2,610	1,036	14,755
650.5	Transportation Expense	6	55,340	25,545	12,125	4,012	1,937	769	10,952
	Total Operations		2,810,063	1,341,365	683,295	244,846	118,348	105,420	316,789
	Maintenance								
601.6	Labor	11	750,132	362,164	149,351	46,358	23,329	11,177	157,753
601.6	Labor - Mains	6	2,283,397	1,054,016	500,292	165,546	79,919	31,739	451,884
601.6	Labor - Services	9	27,689	23,735	3,397	138	404	14	-
601.6	Labor - Hydrants	7	28,723	-	-	-	-	-	28,723
620.6	Materials and Supplies - Mains	6	446,716	206,204	97,876	32,387	15,635	6,209	88,405
620.6	Materials and Supplies - Services	9	354,532	303,905	43,501	1,773	5,176	177	-
620.6	Materials and Supplies - Meters	8	-	-	-	-	-	-	-
620.6	Materials and Supplies - Hydrants	7	107,241	-	-	-	-	-	107,241
620.6	Materials and Supplies - Storage Facilities	5	-	-	-	-	-	-	-
620.6	Materials and Supplies	11	96,396	46,540	19,192	5,957	2,998	1,436	20,272
631.6	Contractual Services - Engineering	11	-	-	-	-	-	-	-
635.6	Contractual Services - Other	11	238,336	115,069	47,453	14,729	7,412	3,551	50,122
635.6	Water Tower Painting Write-off	5	533,017	217,791	100,740	31,555	15,298	20,041	147,592
635.6	Contractual Services - Water Towers	5	5,275	2,155	997	312	151	198	1,461
635.6	Contractual Services - Mains	6	726,227	335,226	159,116	52,651	25,418	10,095	143,720
635.6	Contractual Services - Services	9	95,986	82,279	11,777	480	1,401	48	-
642.6	Rental	11	27,216	13,140	5,419	1,682	846	406	5,723
650.6	Transportation Expense	11	379,706	183,322	75,599	23,466	11,809	5,658	79,852
	Total Maintenance		6,100,587	2,945,545	1,214,712	377,035	189,797	90,750	1,282,749
	Total Transmission and Distribution		8,910,651	4,286,910	1,898,006	621,880	308,145	196,170	1,599,539
	Customer Accounting								
601.7	Labor - Meter Reading	12	66,389	61,023	4,900	80	373	13	-
601.7	Labor - Meter Shop	8	401,596	321,678	66,745	3,815	8,956	402	-
601.7	Labor Field Service	8	625,476	501,006	103,954	5,942	13,948	625	-
601.7	Labor - Account Service	12	656,972	603,869	48,491	795	3,692	125	-
620.7	Materials and Supplies	12	96,953	89,116	7,156	117	545	18	-
620.7	Postage	12	156,081	143,465	11,520	189	877	30	-
633.7	Contractual Services - Customer Service	12	-	-	-	-	-	-	-
633.7	Legal Fees	12	-	-	-	-	-	-	-
635.7	Contractual Services - Meter Reading	12	1,366	1,256	101	2	8	0	-
635.7	Contractual Services - Bill Printing/Mailing	12	33,241	30,554	2,453	40	187	6	-
635.7	Contractual Services - Collections	12	30,221	27,778	2,231	37	170	6	-
635.7	Contractual Services - Credit Card Processing	12	250,708	230,443	18,505	303	1,409	48	-
635.7	Contractual Services - Lock Box Processing	12	43,990	40,434	3,247	53	247	8	-
635.7	Contractual Services - Other	12	39,995	36,762	2,952	48	225	8	-
650.7	Transportation Expense	12	132,755	122,024	9,799	161	746	25	-

NORTHERN KENTUCKY WATER DISTRICT

COST OF SERVICE FOR THE TWELVE MONTHS ENDED DECEMBER 31, 2021, ALLOCATED TO CUSTOMER CLASSIFICATIONS

Account No.	Account	Factor Ref.	Cost of Service	Residential	Commercial	Industrial	Public Authorities	Wholesale Customers	Fire Protection
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Total Customer Accounting		2,535,741	2,209,408	282,054	11,583	31,382	1,314	-

NORTHERN KENTUCKY WATER DISTRICT

COST OF SERVICE FOR THE TWELVE MONTHS ENDED DECEMBER 31, 2021, ALLOCATED TO CUSTOMER CLASSIFICATIONS

Account No.	Account	Factor Ref.	Cost of Service	Residential	Commercial	Industrial	Public Authorities	Wholesale Customers	Fire Protection
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Administrative and General								
601.8	Labor	14	2,808,150	1,573,968	573,705	178,037	92,669	72,731	317,040
604.0	Employee Benefits	16	6,518,473	3,641,871	1,378,005	431,523	224,887	176,651	665,536
615.8	Utilities	14	84,450	47,334	17,253	5,354	2,787	2,187	9,534
616.8	Gas Costs	14	46,316	25,960	9,462	2,936	1,528	1,200	5,229
620.8	Materials and Supplies	14	138,823	77,810	28,361	8,801	4,581	3,596	15,673
632.8	Contract Service Accounting/Audit	14	22,160	12,421	4,527	1,405	731	574	2,502
633.8	Legal Fees	14	25,361	14,215	5,181	1,608	837	657	2,863
634.8	Contractual Fees	14	35,473	19,883	7,247	2,249	1,171	919	4,005
635.8	Contractual Services - HR/Infor Systems	16	23,730	13,258	5,016	1,571	819	643	2,423
635.8	Contractual Services	14	1,222,240	685,066	249,704	77,490	40,334	31,656	137,991
642.8	Rental Expense	14	750	420	153	48	25	19	85
650.8	Transportation Expense	14	5,879	3,295	1,201	373	194	152	664
656.0	Vehicle Insurance	14	61,478	34,458	12,560	3,898	2,029	1,592	6,941
657.0	General Liability Insurance	14	489,108	274,145	99,925	31,009	16,141	12,668	55,220
658.0	Workers Comp Insurance	16	72,639	40,583	15,356	4,809	2,506	1,969	7,416
659.0	Other Insurance	14	52,123	29,215	10,649	3,305	1,720	1,350	5,885
660.0	Advertising Expense	14	10,757	6,029	2,198	682	355	279	1,214
667.0	PSC Expense- Rate Case Expense	19	32,331	17,200	7,051	2,334	1,190	1,135	3,421
670.0	Bad Debt Expense	12	382,985	352,028	28,268	463	2,152	73	-
675.0	Miscellaneous Expense	14	38,275	21,453	7,820	2,427	1,263	991	4,321
	Total Adminstrative and General		12,071,499	6,890,612	2,463,643	760,321	397,918	311,041	1,247,963
	Total Operation & Maintenance Expenses		$ 32,809,879	$ 18,100,364	$ 7,147,945	$ 2,348,927	$ 1,199,625	$ 1,115,740	$ 2,897,278

NORTHERN KENTUCKY WATER DISTRICT

COST OF SERVICE FOR THE TWELVE MONTHS ENDED DECEMBER 31, 2021, ALLOCATED TO CUSTOMER CLASSIFICATIONS

Account No.	Account	Factor Ref.	Cost of Service	Residential	Commercial	Industrial	Public Authorities	Wholesale Customers	Fire Protection
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	DEPRECIATION EXPENSE								
304.1	Power and Pumping Structures - Intake	2	$ 458,063	$ 238,468	$ 121,249	$ 45,531	$ 22,033	$ 28,950	$ 1,832
304.2	Water Treatment Plant	2	2,241,381	1,166,863	593,293	222,793	107,810	141,655	8,966
304.3	Pumping Structures	3	323,583	144,156	73,259	27,472	13,332	17,473	47,890
304.4	Office Buildings	14	206,498	115,742	42,188	13,092	6,814	5,348	23,314
304.5	Other Structures	14	1,461	819	298	93	48	38	165
304.6	Structures - Water Treatment	2	149,368	77,761	39,538	14,847	7,185	9,440	597
306.0	Lake, River and Other Intakes	2	25,212	13,125	6,674	2,506	1,213	1,593	101
309.0	Supply Mains	2	58,466	30,437	15,476	5,811	2,812	3,695	234
310.1	Power Generator SOS	2	73,914	38,480	19,565	7,347	3,555	4,671	296
310.2	Power General Plant - Lab	2	4,975	2,590	1,317	495	239	314	20
310.3	Power Generation Equipment	3	82,552	36,777	18,690	7,009	3,401	4,458	12,218
311.1	Pumping Equipment	3	126,637	56,417	28,671	10,751	5,217	6,838	18,742
311.2	Pumping Equipment	3	27,713	12,346	6,274	2,353	1,142	1,497	4,102
311.3	Pumping Equipment	3	105,563	47,028	23,899	8,962	4,349	5,700	15,623
320.1	Purification System	2	972,890	506,486	257,524	96,705	46,796	61,487	3,892
320.2	Purification System - Equipment	2	7,830	4,076	2,073	778	377	495	31
330.1	Distribution Reservoirs and Standpipes	5	343,540	140,370	64,929	20,338	9,860	12,917	95,126
331.1	Mains and Accessories - 10" and larger	3	1,790,779	797,792	405,432	152,037	73,780	96,702	265,035
331.1	Mains and Accessories - Less than 10"	4	2,128,632	994,497	461,062	144,960	70,032	-	458,082
331.2	Mains and Accessories - 10" and larger	3	48,853	21,764	11,060	4,148	2,013	2,638	7,230
331.2	Mains and Accessories - Less than 10"	4	58,070	27,130	12,578	3,955	1,910	-	12,497
331.3	Mains and Accessories - 10" and larger	3	18,561	8,269	4,202	1,576	765	1,002	2,747
331.3	Mains and Accessories - Less than 10"	4	22,062	10,308	4,779	1,502	726	-	4,748
333.1	Services	9	885,677	759,203	108,673	4,428	12,931	443	-
333.2	Services - Taylor Mill	9	9,750	8,358	1,196	49	142	5	-
334.1	Meters	8	824,969	660,800	137,110	7,837	18,397	825	-
335.1	Fire Hydrants	7	257,387	-	-	-	-	-	257,387
335.3	Fire Hydrants - Taylor Mill	7	4,167	-	-	-	-	-	4,167
339.1	Miscellaneous Equipment	14	13,140	7,365	2,684	833	434	340	1,483
340.1	Office Furniture and Equipment	14	135,762	76,095	27,736	8,607	4,480	3,516	15,328
341.1	Transportation Equipment	14	410,709	230,203	83,908	26,039	13,553	10,637	46,369
343.1	Tools,Shop and Garage Equipment	14	32,348	18,131	6,609	2,051	1,067	838	3,652
344.1	Laboratory Equipment	2	39,228	20,422	10,384	3,899	1,887	2,479	157
345.1	Power Operated Equipment	14	32,841	18,407	6,709	2,082	1,084	851	3,708
346.1	Communication Equipment	14	312,354	175,074	63,814	19,803	10,308	8,090	35,265
347.1	Miscellaneous Equipment	14	866	485	177	55	29	22	98
	Total Depreciation Expense		$ 12,235,799	$ 6,466,244	$ 2,663,030	$ 870,746	$ 449,721	$ 434,959	$ 1,351,100

NORTHERN KENTUCKY WATER DISTRICT

COST OF SERVICE FOR THE TWELVE MONTHS ENDED DECEMBER 31, 2021, ALLOCATED TO CUSTOMER CLASSIFICATIONS

Account No.	Account	Factor Ref.	Cost of Service	Residential	Commercial	Industrial	Public Authorities	Wholesale Customers	Fire Protection
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Amort of Acq. Adj.	18	201,120	101,767	43,844	14,722	7,441	7,260	26,085
	Amortization of Reservoir Cleaning	1	458,944	228,095	125,384	48,373	23,406	30,749	2,937
	Debt Service	18	19,692,645	9,964,478	4,292,997	1,441,502	728,628	710,904	2,554,136
	Debt Service Coverage	18	3,938,529	1,992,896	858,599	288,300	145,726	142,181	510,827
	Total Debt Service Requirements		$ 23,631,174	$ 11,957,374	$ 5,151,596	$ 1,729,802	$ 874,353	$ 853,085	$ 3,064,963
	Taxes Other Than Income								
	Utility Reg Assessment Fee	19	117,920	62,733	25,718	8,514	4,339	4,139	12,476
	Employment Taxes	16	906,448	506,433	191,623	60,007	31,272	24,565	92,548
	Total Taxes, Other Than Income		$ 1,024,368	$ 569,166	$ 217,341	$ 68,521	$ 35,612	$ 28,704	$ 105,024
	Total Cost of Service		$ 70,361,284	$ 37,423,010	$ 15,349,140	$ 5,081,090	$ 2,590,159	$ 2,470,498	$ 7,447,388
	Less: Other Water Revenues								
	Penalties	19	442,082	235,187	96,418	31,918	16,269	15,517	46,772
	Surcharge Revenues	18	508,932	257,519	110,947	37,254	18,830	18,372	66,008
	Turn On Fees	8	153,935	123,302	25,584	1,462	3,433	154	-
	Rent	19	383,269	203,899	83,591	27,672	14,104	13,453	40,550
	Lab Test Fees	2	29,720	15,472	7,867	2,954	1,430	1,878	119
	Material Sold	14	72,901	40,861	14,894	4,622	2,406	1,888	8,230
	Bulk Loading Sales	19	76,801	40,858	16,750	5,545	2,826	2,696	8,126
	Interest Earnings	19	481,325	256,065	104,977	34,752	17,713	16,895	50,924
	Miscellaneous Revenue	19	9,720	5,171	2,120	702	358	341	1,028
	Total Other Water Revenues		$ 2,158,684	$ 1,178,335	$ 463,148	$ 146,881	$ 77,368	$ 71,194	$ 221,758
	Total Cost of Service Related to Sales of Water		$ 68,202,600	$ 36,244,675	$ 14,885,992	$ 4,934,209	$ 2,512,790	$ 2,399,304	$ 7,225,630
	Reallocation of Fire Protection	20		$ 5,793,510	$ 1,202,345	$ 68,643	$ 161,132	$ -	$ (7,225,630)
	Total		$ 68,202,600	$ 42,038,185	$ 16,088,337	$ 5,002,853	$ 2,673,922	$ 2,399,304	$ -

NORTHERN KENTUCKY WATER DISTRICT

COST OF SERVICE FOR THE TWELVE MONTHS ENDED DECEMBER 31, 2021, ALLOCATED TO CUSTOMER CLASSIFICATIONS

Account No.	Account	Factor Ref.	Cost of Service	Residential	Commercial	Industrial	Public Authorities	Wholesale Customers	Fire Protection
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	RATE BASE								
303.1	Land - Intake	2	$ 29,200	$ 15,202	$ 7,729	$ 2,902	$ 1,405	$ 1,845	$ 117
303.2	Land - Treatment Plant	2	368,719	191,955	97,600	36,651	17,735	23,303	1,475
303.3	Land - Pump Station and Transmission	3	374,602	166,885	84,810	31,804	15,434	20,228	55,441
303.4	Land - CC	2	2,575,648	1,340,882	681,774	256,019	123,889	162,781	10,303
304.1	Power and Pumping Structures - Intake	2	9,358,525	4,872,048	2,477,202	930,237	450,145	591,459	37,434
304.2	Water Treatment Plant	2	48,658,466	25,331,598	12,879,896	4,836,652	2,340,472	3,075,215	194,634
304.3	Pumping Structures	3	4,678,235	2,084,154	1,059,153	397,182	192,743	252,625	692,379
304.4	Office Buildings	14	5,789,027	3,244,750	1,182,698	367,024	191,038	149,936	653,581
304.5	Other Structures	14	8,383	4,698	1,713	531	277	217	946
304.6	Structures - Water Treatment	2	2,266,763	1,180,077	600,012	225,316	109,031	143,259	9,067
306.0	Lake, River and Other Intakes	2	285,539	148,652	75,582	28,383	13,734	18,046	1,142
309.0	Supply Mains	2	1,634,029	850,675	432,527	162,422	78,597	103,271	6,536
310.1	Power Generator SOS	2	985,522	513,063	260,868	97,961	47,404	62,285	3,942
310.2	Power General Plant - Lab	2	119,398	62,159	31,605	11,868	5,743	7,546	478
310.3	Power Generation Equipment	3	1,245,792	555,001	282,047	105,768	51,327	67,273	184,377
311.1	Pumping Equipment	3	918,826	409,337	208,022	78,008	37,856	49,617	135,986
311.2	Pumping Equipment	3	350,316	156,066	79,311	29,742	14,433	18,917	51,847
311.3	Pumping Equipment	3	693,694	309,040	157,052	58,895	28,580	37,459	102,667
320.1	Purification System	2	16,166,330	8,416,192	4,279,228	1,606,933	777,600	1,021,712	64,665
320.2	Purification System - Equipment	2	160,831	83,729	42,572	15,987	7,736	10,165	643
330.1	Distribution Reservoirs and Standpipes	5	4,055,920	1,657,249	766,569	240,110	116,405	152,503	1,123,084
331.1	Mains and Accessories - 10" and larger	3	80,524,263	35,873,559	18,230,693	6,836,510	3,317,600	4,348,310	11,917,591
331.1	Mains and Accessories - Less than 10"	4	95,716,190	44,718,604	20,732,127	6,518,273	3,149,063	-	20,598,124
331.2	Mains and Accessories - 10" and larger	3	1,963,922	874,927	444,632	166,737	80,914	106,052	290,660
331.2	Mains and Accessories - Less than 10"	4	2,334,441	1,090,651	505,640	158,975	76,803	-	502,372
331.3	Mains and Accessories - 10" and larger	3	775,894	345,661	175,662	65,873	31,967	41,898	114,832
331.3	Mains and Accessories - Less than 10"	4	922,276	430,887	199,765	62,807	30,343	-	198,474
333.1	Services	9	21,103,840	18,090,212	2,589,441	105,519	308,116	10,552	-
333.2	Services - Taylor Mill	9	216,938	185,959	26,618	1,085	3,167	108	-
334.1	Meters	8	10,757,181	8,616,502	1,787,844	102,193	239,885	10,757	-
335.1	Fire Hydrants	7	7,424,519	-	-	-	-	-	7,424,519
335.3	Fire Hydrants - Taylor Mill	7	80,417	-	-	-	-	-	80,417
339.1	Miscellaneous Equipment	14	22,659	12,700	4,629	1,437	748	587	2,558
340.1	Office Furniture and Equipment	14	226,690	127,060	46,313	14,372	7,481	5,871	25,593
341.1	Transportation Equipment	14	1,990,066	1,115,432	406,570	126,170	65,672	51,543	224,678
341.2	Transportation Equipment	14	3,880	2,175	793	246	128	100	438
343.1	Tools,Shop and Garage Equipment	14	394,720	221,241	80,641	25,025	13,026	10,223	44,564
344.1	Laboratory Equipment	2	396,009	206,162	104,824	39,363	19,048	25,028	1,584
345.1	Power Operated Equipment	14	158,865	89,044	32,456	10,072	5,243	4,115	17,936
346.1	Communication Equipment	14	2,811,988	1,576,119	574,489	178,280	92,796	72,830	317,473
347.1	Miscellaneous Equipment	14	13,174	7,384	2,691	835	435	341	1,487
	Total Utility Plant in Service		$ 328,561,697	$ 165,177,689	$ 71,633,799	$ 23,934,170	$ 12,064,016	$ 10,657,978	$ 45,094,045

NORTHERN KENTUCKY WATER DISTRICT

COST OF SERVICE FOR THE TWELVE MONTHS ENDED DECEMBER 31, 2021, ALLOCATED TO CUSTOMER CLASSIFICATIONS

Account No.	Account	Factor Ref.	Cost of Service	Residential	Commercial	Industrial	Public Authorities	Wholesale Customers	Fire Protection
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Construction Work In Progress								
	Mains and Accessories - 10" and larger	3	2,748,522	1,224,466	622,265	233,349	113,239	148,420	406,781
	Mains and Accessories - Less than 10"	4	1,791,023	836,766	387,936	121,969	58,925	-	385,428
	Pumping Equipment	3	198,211	88,303	44,875	16,828	8,166	10,703	29,335
	Water Treatment Plant	2	3,014,840	1,569,526	798,028	299,675	145,014	190,538	12,059
	Distribution Reservoirs and Standpipes	5	2,452,588	1,002,127	463,539	145,193	70,389	92,217	679,122
	Meters	8	438,433	351,185	72,867	4,165	9,777	438	-
	General	14	1,851,785	1,037,925	378,320	117,403	61,109	47,961	209,067
	Total Construction Work in Progress		$ 12,495,402	$ 6,110,299	$ 2,767,830	$ 938,583	$ 466,619	$ 490,278	$ 1,721,792
	Contributions in Aid of Construction	4	$ (32,162,326)	$ (15,026,239)	$ (6,966,360)	$ (2,190,254)	$ (1,058,141)	$ -	$ (6,921,333)
	Other Rate Base Items								
	Add:								
	Other Utility Plant Acquistions/Adjustments	17		-	-	-	-	-	-
	Materials and Supplies	14	1,341,665	752,003	274,102	85,062	44,275	34,749	151,474
	Inventory - Meters	8	513,169	411,049	85,289	4,875	11,444	513	-
	Prepayments	14	1,084,531	607,880	221,570	68,759	35,790	28,089	122,444
	Prepayments - Tank Cleaning/Painting	5	2,927,970	1,196,369	553,386	173,336	84,033	110,092	810,755
	Prepayments - Reservoir Cleaning	5	22,939	9,373	4,335	1,358	658	863	6,352
	Prepayments - Chemicals GAC	2	1,152,078	599,772	304,955	114,517	55,415	72,811	4,608
	Total Other Rate Base Elements		7,042,353	3,576,445	1,443,638	447,906	231,614	247,117	1,095,633
	Total Original Cost Measure of Value		$ 315,937,126	$ 159,838,194	$ 68,878,907	$ 23,130,404	$ 11,704,109	$ 11,395,374	$ 40,990,138

NORTHERN KENTUCKY WATER DISTRICT

FACTORS FOR ALLOCATING COST OF SERVICE TO CUSTOMER CLASSIFICATIONS

FACTOR 1. ALLOCATION OF COSTS WHICH VARY WITH THE AMOUNT OF WATER CONSUMED.

Factors are based on the pro forma test year average daily consumption for each customer classification.

Customer Classification	Average Daily Consumption, CCF	Allocation Factor
(1)	(2)	(3)
Residential	13,737	0.4970
Commercial/Multi-Family	7,552	0.2732
Industrial	2,914	0.1054
Other Public Authority	1,410	0.0510
Wholesale Customers	1,852	0.0670
Fire Protection	178	0.0064
Total	27,643	1.0000

FACTOR 2. ALLOCATION OF COSTS ASSOCIATED WITH FACILITIES SERVING BASE AND MAXIMUM DAY EXTRA CAPACITY FUNCTIONS.

Factors are based on the weighting of the factors for average daily consumption (Factor 1) and the factors derived from maximum day extra capacity demand for each customer classification, as follows:

	Average Daily Consumption		Maximum Day Extra Capacity		
Customer Classification	Allocation Factor 1	Weighted Factor	Allocation Factor	Weighted Factor	Allocation Factor
(1)	(2)	(3)=(2)x 0.6250	(4)	(5)=(4)x 0.3750	(6)=(3)+(5)
Residential	0.4970	0.3105	0.5605	0.2101	0.5206
Commercial/Multi-Family	0.2732	0.1708	0.2504	0.0939	0.2647
Industrial	0.1054	0.0659	0.0892	0.0335	0.0994
Other Public Authority	0.0510	0.0319	0.0432	0.0162	0.0481
Wholesale Customers	0.0670	0.0419	0.0567	0.0213	0.0632
Fire Protection	0.0064	0.0040			0.0040
Total	1.0000	0.6250	1.0000	0.3750	1.0000

The derivation of the maximum day extra capacity factors in column 4 and the basis for the column 3 and 5 weightings are presented on the following page.

NORTHERN KENTUCKY WATER DISTRICT

FACTORS FOR ALLOCATING COST OF SERVICE TO CUSTOMER CLASSIFICATIONS, cont.

FACTOR 2. ALLOCATION OF COSTS ASSOCIATED WITH FACILITIES SERVING BASE AND MAXIMUM DAY EXTRA CAPACITY FUNCTIONS, cont.

		Maximum Day Extra Capacity		
Customer Classification	Average Daily Consumption, CCF	Factor*	Rate of Flow, CCF Per Day	Allocation Factor
(1)	(2)	(3)	(4)=(2)x(3)	(5)
Residential	13,737	0.80	10,990	0.5605
Commercial/Multi-Family	7,552	0.65	4,909	0.2504
Industrial	2,914	0.60	1,748	0.0892
Other Public Authority	1,410	0.60	846	0.0432
Wholesale Customers	1,852	0.60	1,111	0.0567
Total	27,465		19,604	1.0000

The weighting of the factors is based on the maximum day ratio of 1.60, based on a review of maximum day ratios experienced during the period 1998 through 2021 (see Schedule D).

	Maximum Day Ratio	Weight
Average Day	1.00	0.6250
Maximum Day Extra Capacity	0.60	0.3750
Total	1.60	1.0000

* Ratio of maximum day to average day minus 1.0.

NORTHERN KENTUCKY WATER DISTRICT

FACTORS FOR ALLOCATING COST OF SERVICE TO CUSTOMER CLASSIFICATIONS, cont.

FACTOR 3. ALLOCATION OF COSTS ASSOCIATED WITH FACILITIES SERVING BASE, MAXIMUM DAY EXTRA CAPACITY AND FIRE PROTECTION FUNCTIONS.

Factors are based on the weighting of the average daily consumption, the maximum day extra capacity demand, and the fire protection demand for each customer classification.

	Average Daily Consumption		Maximum Day Extra Capacity		Fire Protection		
Customer Classification	Allocation Factor	Weighted Factor	Allocation Factor	Weighted Factor	Allocation Factor	Weighted Factor	Allocation Factor
(1)	(2)	(3)=(2) X 0.5346	(4)	(5)=(4) X 0.3208	(6)	(7)=(6) X 0.1446	(8)=(3)+(5)+(7)
Residential	0.4970	0.2657	0.5605	0.1798			0.4455
Commercial	0.2732	0.1461	0.2504	0.0803			0.2264
Industrial	0.1054	0.0563	0.0892	0.0286			0.0849
Other Public Authority	0.0510	0.0273	0.0432	0.0139			0.0412
Sales for Resale	0.0670	0.0358	0.0567	0.0182			0.0540
Fire Protection	0.0064	0.0034			1.0000	0.1446	0.1480
Total	1.0000	0.5346	1.0000	0.3208	1.0000	0.1446	1.0000

NORTHERN KENTUCKY WATER DISTRICT

FACTORS FOR ALLOCATING COST OF SERVICE TO CUSTOMER CLASSIFICATIONS, cont.

FACTOR 4. ALLOCATION OF COSTS ASSOCIATED WITH FACILITIES SERVING BASE AND MAXIMUM HOUR EXTRA CAPACITY FUNCTIONS.

Factors are based on the weighting of the average daily consumption, the maximum day extra capacity demand, and the fire protection demand for each customer classification.

		Average Hourly Consumption		Maximum Hour Extra Capacity		Fire Protection		
Customer Classification	CCF	Allocation Factor	Weighted Factor	Allocation Factor	Weighted Factor	Allocation Factor	Weighted Factor	Allocation Factor
(1)	(2)	(3)	(4)=(3) X 0.3280	(5)	(6)=(5) X 0.4591	(7)	(8)=(7) X 0.2129	(9)=(4)+(6)+(8)
Residential	572.4	0.5326	0.1747	0.6370	0.2925			0.4672
Commercial/Multi-Family	314.7	0.2928	0.0960	0.2627	0.1206			0.2166
Industrial	121.4	0.1130	0.0371	0.0676	0.0310			0.0681
Other Public Authority	58.8	0.0547	0.0179	0.0327	0.0150			0.0329
Wholesale Customers	0.0	0.0000	0.0000	0.0000	0.0000			0.0000
Fire Protection	7.4	0.0069	0.0023			1.0000	0.2129	0.2152
Total	1,074.7	1.0000	0.3280	1.0000	0.4591	1.0000	0.2129	1.0000

The maximum hour extra capacity factors in column 5 are determined on the next page.

NORTHERN KENTUCKY WATER DISTRICT

FACTORS FOR ALLOCATING COST OF SERVICE TO CUSTOMER CLASSIFICATIONS, cont.

FACTOR 3. ALLOCATION OF COSTS ASSOCIATED WITH FACILITIES SERVING BASE, MAXIMUM DAY EXTRA CAPACITY AND FIRE PROTECTION FUNCTIONS, cont.

The weighting of the factors is based on the potential demand of general and fire protection service. The bases for the potential demand of general service are the maximum day ratio of 1.60 and the average daily system sendout for 2021 of 26.6 MGD. The system demand for fire protection is 12,000 Gallons per minute for 10 hours.

	Ratio	Rate of Flow, (GPD)	Weight
Average Day	1.00	26,613,523	0.5346
Maximum Day Extra Capacity	0.60	15,968,114	0.3208
Subtotal	1.60	42,581,637	0.8554
Fire Protection		7,200,000	0.1446
Total		49,781,637	1.0000

NORTHERN KENTUCKY WATER DISTRICT

FACTORS FOR ALLOCATING COST OF SERVICE TO CUSTOMER CLASSIFICATIONS, cont.

FACTOR 4. ALLOCATION OF COSTS ASSOCIATED WITH FACILITIES SERVING BASE AND MAXIMUM HOUR EXTRA CAPACITY FUNCTIONS, cont.

The weighting of the factors is based on the potential demand of general and fire protection service. The bases for the potential demand of general service are the maximum hour ratio of 2.4 and the average daily system sendout for 2021 of 26.6 MGD. The system demand for fire protection is 12,000 gallons per minute.

	Ratio	Rate of Flow, (GPM)	Weight
Average Hour	1.00	18,482	0.3280
Maximum Hour Extra Capacity	1.40	25,875	0.4591
Subtotal	2.40	44,357	0.7871
Fire Protection		12,000	0.2129
Total		56,357	1.0000

The maximum hour extra capacity factors in column 5 of the previous page are determined as follows:

Customer Classification	Average Hourly Consumption CCF	Maximum Hour Extra Capacity		
		Factor*	CCF Per Hour	Allocation Factor
(1)	(2)	(3)	(4)=(2)x(3)	(5)
Residential	572.4	2.0	1,144.8	0.6370
Commercial/Multi-Family	314.7	1.5	472.1	0.2627
Industrial	121.4	1.0	121.4	0.0676
Other Public Authority	58.8	1.0	58.8	0.0327
Wholesale Customers	0.0	1.0	0.0	0.0000
Total	1,067.3		1,797.1	1.0000

* Ratio of Maximum Hour To Average Hour Minus 1.0.

NORTHERN KENTUCKY WATER DISTRICT

FACTORS FOR ALLOCATING COST OF SERVICE TO CUSTOMER CLASSIFICATIONS, cont.

FACTOR 5. ALLOCATION OF COSTS ASSOCIATED WITH STORAGE FACILITIES.

Factors are based on the weighting of the average hourly consumption, the maximum hour extra capacity demand, and the fire protection demand for each customer classification.

	Average Hourly Consumption			Maximum Hour Extra Capacity		Fire Protection		
Customer Classification	CCF	Allocation Factor	Weighted Factor	Allocation Factor	Weighted Factor	Allocation Factor	Weighted Factor	Allocation Factor
(1)	(2)	(3)	(4)=(3) X 0.3021	(5)	(6)=(5) X 0.4229	(7)	(8)=(7) X 0.2750	(9)=(4)+(6)+(8)
Residential	572.4	0.4970	0.1503	0.6107	0.2583			0.4086
Commercial/Multi-Family	314.7	0.2732	0.0825	0.2519	0.1065			0.1890
Industrial	121.4	0.1054	0.0318	0.0648	0.0274			0.0592
Other Public Authority	58.8	0.0510	0.0154	0.0314	0.0133			0.0287
Wholesale Customers	77.2	0.0670	0.0202	0.0412	0.0174			0.0376
Fire Protection	7.4	0.0064	0.0019			1.0000	0.2750	0.2769
Total	1,151.9	1.0000	0.3021	1.0000	0.4229	1.0000	0.2750	1.0000

The weighting of the factors is based on the ratio of the capacity required for a 3 hour demand of fire flow, as related to total storage capacity. The calculation is shown on the following page.

NORTHERN KENTUCKY WATER DISTRICT

FACTORS FOR ALLOCATING COST OF SERVICE TO CUSTOMER CLASSIFICATIONS, cont.

FACTOR 5. ALLOCATION OF COSTS ASSOCIATED WITH STORAGE FACILITIES, cont.

The weighting of the factors is based on the ratio of the capacity required for a 10 hour demand of fire flow, as related to total storage capacity.

Fire Protection Weight = $\frac{12{,}000 \text{ GPM X } 60 \text{ Min. X } 10 \text{ Hrs.}}{26{,}179{,}000 \text{ Gallons}}$ = 0.2750

General Service Weight = 1.0000 - 0.2750 = 0.7250

The weighting of the average hourly consumption and maximum hour extra demand for general service is based on the maximum hour ratio, as follows:

	Maximum Hour Ratio	Percent	Weight
Average Hour	1.00	41.67	0.3021
Extra Capacity Maximum Hour	1.40	58.33	0.4229
Total	2.40	100.00	0.7250

Customer Classification	Average Hourly Consumption CCF	Maximum Hour Extra Capacity Factor*	Maximum Hour Extra Capacity CCF Per Hour	Allocation Factor
(1)	(2)	(3)	(4)=(2)x(3)	(5)
Residential	572.4	2.0	1,144.8	0.6107
Commercial/Multi-Family	314.7	1.5	472.1	0.2519
Industrial	121.4	1.0	121.4	0.0648
Other Public Authority	58.8	1.0	58.8	0.0314
Wholesale Customers	77.2	1.0	77.2	0.0412
Total	1,144.5		1,874.3	1.0000

* Ratio of Maximum Hour To Average Hour Minus 1.0.

NORTHERN KENTUCKY WATER DISTRICT

FACTORS FOR ALLOCATING COST OF SERVICE TO CUSTOMER CLASSIFICATIONS, cont.

FACTOR 6. ALLOCATION OF COSTS ASSOCIATED WITH TRANSMISSION AND DISTRIBUTION MAINS.

Factors are based on the weighting of the maximum daily consumption with fire, Factor 3, and the maximum hour consumption, Factor 4, for each customer classification, as follows:

	Maximum Daily Consumption w/ Fire		Maximum Hourly Consumption		
Customer Classification	Allocation Factor 3	Weighted Factor	Allocation Factor 4	Weighted Factor	Allocation Factor
(1)	(2)	(3)=(2)X 0.2576	(4)	(5)=(4)X 0.7424	(6)=(3)+(5)
Residential	0.4455	0.1148	0.4672	0.3468	0.4616
Commercial/Multi-Family	0.2264	0.0583	0.2166	0.1608	0.2191
Industrial	0.0849	0.0219	0.0681	0.0506	0.0725
Other Public Authority	0.0412	0.0106	0.0329	0.0244	0.0350
Wholesale Customers	0.0540	0.0139	0.0000	0.0000	0.0139
Fire Protection	0.1480	0.0381	0.2152	0.1598	0.1979
Total	1.0000	0.2576	1.0000	0.7424	1.0000

The weighting of the factors is based on the total footage of mains, designated as either transmission mains or distribution mains, as follows:

	Total Footage of Mains	Weight
Mains 10" and Larger	1,813,896	0.2576
Mains Smaller than 10"	5,227,424	0.7424
Total	7,041,320	1.0000

NORTHERN KENTUCKY WATER DISTRICT

FACTORS FOR ALLOCATING COST OF SERVICE TO CUSTOMER CLASSIFICATIONS, cont.

FACTOR 7. ALLOCATION OF COSTS ASSOCIATED WITH FIRE HYDRANTS.

Costs are assigned directly to Public Fire Protection.

Customer Classification	Allocation Factor
(1)	(3)
Fire Protection	1.0000
Total	1.0000

FACTOR 8. ALLOCATION OF COSTS ASSOCIATED WITH METERS.

Factors are based on the relative cost of meters by size and customer classification, as developed on the following page and summarized below.

Customer Classification	5/8" Dollar Equivalents	Allocation Factor
(1)	(2)	(3)
Residential	80,382	0.8010
Commercial/Multi-Family	16,683	0.1662
Industrial	956	0.0095
Other Public Authority	2,233	0.0223
Wholesale Customers	104	0.0010
Total	100,358	1.0000

NORTHERN KENTUCKY WATER DISTRICT

FACTORS FOR ALLOCATING COST OF SERVICE TO CUSTOMER CLASSIFICATIONS, cont.

FACTOR 9. ALLOCATION OF COSTS ASSOCIATED WITH SERVICES.

Factors are based on the relative cost of services by size and customer classification, as developed on the following page and summarized below.

Customer Classification	3/4" Dollar Equivalents	Allocation Factor
(1)	(2)	(3)
Residential	80,098	0.8572
Commercial/Multi-Family	11,464	0.1227
Industrial	469	0.0050
Other Public Authority	1,361	0.0146
Wholesale Customers	43	0.0005
Total	93,435	1.0000

NORTHERN KENTUCKY WATER DISTRICT

BASIS FOR ALLOCATING METER COSTS TO CUSTOMER CLASSIFICATIONS

Meter Size	5/8" Dollar Equivalent	Residential		Commercial/Multi-Family		Industrial		Other Public Authority		Wholesale Customers		Total	
		Number of Meters	Weighting	Number of Meters	Weighting	Number of Meters	Weighting	Number of Meters	Weighting	Number of Meters	Weighting	Number of Meters	Weighting
(1)	(2)	(3)	(4)=(2)X(3)	(5)	(6)=(2)X(5)	(7)	(8)=(2)X(7)	(9)	(10)=(2)X(9)	(11)	(12)=(2)X(11)	(13)	(14)
5/8	1.0	78,691	78,691	4,323	4,323	13	13	170	170		0	83,197	83,197
3/4	1.4	0	0	0	0	0	0	0	0		0	0	0
1	1.7	644	1,095	654	1,112	9	15	75	128		0	1,382	2,350
1-1/2	4.1	103	422	771	3,161	12	49	48	197		0	934	3,829
2	5.6	31	174	733	4,105	38	213	137	767		0	939	5,259
3	8.6		0	83	714	14	120	41	353		0	138	1,187
4	12.0		0	57	684	13	156	19	228	3	36	92	1,104
6	22.5		0	55	1,238	7	158	7	158	3	68	72	1,622
8	46.4		0	29	1,346	3	139	3	139		0	35	1,624
10	46.4		0	0	0	2	93	2	93			4	186
Total		79,469	80,382	6,705	16,683	111	956	502	2,233	6	104	86,793	100,358

NORTHERN KENTUCKY WATER DISTRICT

BASIS FOR ALLOCATING SERVICE COSTS TO CUSTOMER CLASSIFICATIONS

	3/4"	Residential		Commercial/Multi-Family		Industrial		Other Public Authority		Wholesale Customers		Total	
Service Size	Dollar Equivalent	Number of Services	Weighting	Number of Services	Weighting	Number of Services	Weighting	Number of Services	Weighting	Number of Services	Weighting	Number of Services	Weighting
(1)	(2)	(3)	(4)=(2)X(3)	(5)	(6)=(2)X(5)	(7)	(8)=(2)X(7)	(9)	(10)=(2)X(9)	(11)	(12)=(2)X(11)	(15)	(16)
3/4	1.00	78,691	78,691	4,323	4,323	13	13	170	170	0	0	83,197	83,197
1	1.60	644	1,030	654	1,046	9	14	75	120	0	0	1,382	2,210
1-1/2	2.60	103	268	771	2,005	12	31	48	125	0	0	934	2,429
2	3.50	31	109	733	2,566	38	133	137	480	0	0	939	3,288
3	5.50	0	0	83	457	14	77	41	226	0	0	138	760
4	6.60	0	0	57	376	13	86	19	125	3	20	92	607
6	7.50	0	0	55	413	7	53	7	53	3	23	72	542
8	9.60	0	0	29	278	3	29	3	29	0	0	35	336
10	16.70	0	0	0	0	2	33	2	33	0	0	4	66
Total		79,469	80,098	6,705	11,464	111	469	502	1,361	6	43	86,793	93,435

NORTHERN KENTUCKY WATER DISTRICT

FACTORS FOR ALLOCATING COST OF SERVICE TO CUSTOMER CLASSIFICATIONS, cont.

FACTOR 10. NOT USED IN THE ALLOCATION.

FACTOR 11. ALLOCATION OF TRANSMISSION AND DISTRIBUTION MAINTENANCE SUPERVISION AND ENGINEERING, STRUCTURES AND IMPROVEMENTS, AND OTHER EXPENSES.

Factors are based on transmission and distribution maintenance expenses other than those being allocated, as follows:

Customer Classification	Transmission & Distribution Maintenance Expenses	Allocation Factor
(1)	(2)	(3)
Residential	$ 2,225,311	0.4828
Commercial/Multi-Family	917,697	0.1991
Industrial	284,843	0.0618
Other Public Authority	143,403	0.0311
Wholesale Customers	68,522	0.0149
Fire Protection	969,027	0.2103
Total	$4,608,802	1.0000

NORTHERN KENTUCKY WATER DISTRICT

FACTORS FOR ALLOCATING COST OF SERVICE TO CUSTOMER CLASSIFICATIONS, cont.

FACTOR 12. ALLOCATION OF BILLING AND COLLECTING COSTS AND METER READING

Factors are based on the total number of bills.

Customer Classification	Total Bills	Allocation Factor
(1)	(2)	(3)
Residential	345,963	0.91917
Commercial/Multi-Family	27,783	0.07381
Industrial	456	0.00121
Other Public Authority	2,115	0.00562
Wholesale Customers	73	0.00019
Total	376,389	1.00000

FACTOR 13. NOT USED IN THE ALLOCATION

NORTHERN KENTUCKY WATER DISTRICT

FACTORS FOR ALLOCATING COST OF SERVICE TO CUSTOMER CLASSIFICATIONS, cont.

FACTOR 14. ALLOCATION OF ADMINISTRATIVE AND GENERAL EXPENSES

Factors are based on the allocation of all other operation and maintenance expenses excluding purchased water, power, chemicals and waste disposal.

Customer Classification	Operation & Maintenance Expenses	Allocation Factor
(1)	(2)	(3)
Residential	$7,977,790	0.5605
Commercial/Multi-Family	2,907,699	0.2043
Industrial	903,196	0.0634
Other Public Authority	470,056	0.0330
Wholesale Customers	369,002	0.0259
Fire Protection	1,607,696	0.1129
Total	$14,235,438	1.0000

FACTOR 15. NOT USED IN THE ALLOCATION

NORTHERN KENTUCKY WATER DISTRICT

FACTORS FOR ALLOCATING COST OF SERVICE TO CUSTOMER CLASSIFICATIONS, cont.

FACTOR 16. ALLOCATION OF LABOR RELATED TAXES AND BENEFITS.

Factors are based on the allocation of direct labor expense.

Customer Classification	Direct Labor Expense	Allocation Factor
(1)	(2)	(3)
Residential	$6,590,670	0.5587
Commercial/Multi-Family	2,494,351	0.2114
Industrial	780,823	0.0662
Other Public Authority	407,128	0.0345
Wholesale Customers	319,814	0.0271
Fire Protection	1,205,017	0.1021
Total	$11,797,802	1.0000

FACTOR 17. ALLOCATION OF ORGANIZATION, FRANCHISES AND CONSENTS, MISCELLANEOUS INTANGIBLE PLANT AND OTHER RATE BASE ELEMENTS.

Factors are based on the allocation of the original cost less depreciation other than those items being allocated, as follows:

Customer Classification	Original Cost Less Depreciation	Allocation Factor
(1)	(2)	(3)
Residential	$165,177,689	0.5029
Commercial/Multi-Family	71,633,799	0.2180
Industrial	23,934,170	0.0728
Other Public Authority	12,064,016	0.0367
Wholesale Customers	10,657,978	0.0324
Fire Protection	45,094,045	0.1372
Total	$328,561,697	1.0000

NORTHERN KENTUCKY WATER DISTRICT

FACTORS FOR ALLOCATING COST OF SERVICE TO CUSTOMER CLASSIFICATIONS, cont.

FACTOR 18. ALLOCATION OF DEBT SERVICE AND ACQUISTION ADJUSTMENT

Factors are based on the allocation of the original cost measure of value rate base as shown on the following pages and summarized below.

Customer Classification	Original Cost Measure of Value	Allocation Factor
(1)	(2)	(3)
Residential	$159,838,194	0.5060
Commercial/Multi-Family	68,878,907	0.2180
Industrial	23,130,404	0.0732
Other Public Authority	11,704,109	0.0370
Wholesale Customers	11,395,374	0.0361
Fire Protection	40,990,138	0.1297
Total	$315,937,126	1.0000

FACTOR 19. ALLOCATION OF REGULATORY COMMISSION EXPENSES, ASSESSMENTS AND OTHER WATER REVENUES.

The factors are based on the allocation of the total cost of service, excluding those items being allocated.

Customer Classification	Total Cost of Service	Allocation Factor
(1)	(2)	(3)
Residential	$37,343,076	0.5320
Commercial/Multi-Family	15,316,370	0.2181
Industrial	5,070,242	0.0722
Other Public Authority	2,584,629	0.0368
Wholesale Customers	2,465,224	0.0351
Fire Protection	7,431,491	0.1058
Total	$70,211,033	1.0000

NORTHERN KENTUCKY WATER DISTRICT

FACTORS FOR ALLOCATING COST OF SERVICE TO CUSTOMER CLASSIFICATIONS, cont.

FACTOR 20. REALLOCATION OF FIRE PROTECTION

Factors are based on the relative cost of meters by size and customer classification.

Customer Classification	5/8" Dollar Equivalents	Allocation Factor
(1)	(2)	(3)
Residential	80,382	0.8018
Commercial/Multi-Family	16,683	0.1664
Industrial	956	0.0095
Other Public Authority	2,233	0.0223
Total	100,254	1.0000

NORTHERN KENTUCKY WATER DISTRICT

SUMMARY OF AVERAGE DAILY SEND OUT AND MAXIMUM DAILY USAGE
FOR THE YEARS 1998-2021

Year	Average Daily Send out (MGD)	Maximum Daily Use		
		MGD	Ratio to Average	Highest Use Day
(1)	(2)	(3)	(4)	(5)
1998	32.1	46.6	1.45	9/13/1998
1999	34.7	51.2	1.48	7/26/1999
2000	33.0	48.5	1.47	6/13/2000
2001	33.3	47.1	1.41	6/28/2001
2002	36.4	57.3	1.57	9/13/2002
2003	26.8	38.4	1.43	8/2/2002
2004	27.9	36.9	1.32	7/6/2004
2005	29.2	44.5	1.52	8/4/2005
2006	27.7	40.3	1.45	8/23/2006
2007	31.1	48.8	1.57	9/3/2007
2008	29.0	42.0	1.45	8/4/2008
2009	27.2	36.2	1.33	9/2/2009
2010	28.7	42.2	1.47	8/30/2010
2011	27.4	41.1	1.50	7/28/2011
2012	29.9	46.2	1.55	6/28/2012
2013	25.7	34.3	1.33	8/30/2013
2014	26.4	34.8	1.32	6/13/2014
2015	24.4	33.9	1.39	6/12/2015
2016	26.7	38.0	1.42	7/25/2016
2017	25.3	34.2	1.36	6/12/2017
2018	26.9	39.4	1.46	7/18/2018
2019	27.1	36.4	1.34	7/13/2019
2020	26.4	35.8	1.35	7/17/2020
2021	26.6	35.1	1.32	8/5/2021

NORTHERN KENTUCKY WATER DISTRICT

CALCULATION OF CUSTOMER CHARGE

		Monthly	Quarterly
(1) Cost Related to Meters	$ 11,023,514		
(2) Meter Equivalents X 12	1,204,296		
(3) Cost per Bill - Meter related		$ 9.15	27.45
(4) Cost Related to Services	$ 3,508,989		
(5) Service Equivalents X 12	1,121,220		
(6) Cost per Bill - Services related		$ 3.13	9.39
(7) Cost Related to Billing and Collecting	$ 3,255,197		
(8) Number of Bills	376,389		
(9) Cost per Bill - Billing and Collecting		$ 8.65	8.65
(10) Total Customer Charge (3)+(6)+(9)		$ 20.93	$ 45.49

NORTHERN KENTUCKY WATER DISTRICT

BASIS FOR ALLOCATING DEMAND RELATED COSTS OF FIRE SERVICE
TO PRIVATE AND PUBLIC FIRE PROTECTION CUSTOMER CLASSIFICATIONS

Description		Restrictive Diameters Squared	Quantity	Relative Demand	Allocation Factor
(1)		(2)	(3)	(4)=(2)x(3)	(5)
PUBLIC FIRE PROTECTION					
Hydrant	Nozzle Sizes				
5 1/4 Valve	2- 2-1/4" & 1- 4 1/2"	25.31	11,513	291,423	
Total Public Fire Protection			11,513	291,423	1.0000
Total Fire Protection			11,513	291,423	1.0000

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Stacey Kampsen

Q.42. To the extent not already provided, provide all workpapers, calculations, and assumptions the utility used to develop its test period financial information in Excel spreadsheet format with all formulas, columns, and rows unprotected and fully accessible.

A.42. NKWD submits the attached as:

- Exhibit 42-1, Proforma Journal Entries and Explanation
- Exhibit 42-2, Salary and Benefits
- Exhibit 42-3, Chemicals
- Exhibit 42-4, Sediment Removal
- Exhibit 42-5, Debt Service

Northern Kentucky Water District

EXHIBIT 42-1

Northern Kentucky Water District
Proforma Journal Entries
Test Year December 31, 2021

JE #	Account Description	Account Number	Dr.	Cr.	Agrees to VL
1	Dr. Wage Expense	601-3100-001	2,419,627		
	Cr. Cash	131-0020-000		2,419,627	
	to record proforma wages				
2	Dr. Capitalized Labor	184-4005-000	310,243		
	Cr. Wage Expense	601-3100-001		310,243	
	to record proforma capitalized wages				
3	Dr. Health Insurance Expense	604-3400-001	11,948		
	Dr. Dental Insurance Expense	604-3401-001	1,232		
	Dr. Life Insurance Expense	604-3402-001	38,589		
	Cr. Cash	131-0020-000		51,769	
	to record proforma health, dental, life and AD&D expense				
4	Dr. Pension Expense	604-3300-001	704,574		
	Cr. Cash	131-0020-000		704,574	
	to record proforma pension expense				
5	Dr. FICA Expense	699-3000-001	95,025		
	Cr. Cash	131-0020-000		95,025	
	to record proforma FICA expense				
6	Dr. Chemical Expense	618-3000-001	932,324		
	Cr. Cash	131-0020-000		932,324	
	to record proforma chemical expense				
7	Dr. Prepaid Reservoir Cleaning	162-0006-000	4,589,442		
	Cr. FTTP N. Reservoir Residual Removal	184-4007-000		2,452,588	
	Cr. Cash	131-0020-000		2,136,854	
	to record proforma FTTP solids (sludge) removal				
8	Dr. Contractual Svcs - Reservoir Cleaning	635-4000-027	434,470		
	Cr. Prepaid Reservoir Cleaning	162-0006-000		434,470	
	to record one year exp. of proforma FTTP solids (sludge) removal				
11	Dr. Underwriter's discount	528-0002-000	546,700		
	Dr. Cost of Issuance	528-0002-000	273,350		
	Dr. 2021A BAN Payable	232-0012-000	24,685,000		
	Dr. Debt Service Reserve Fund	133-0181-000	1,786,950		
	Dr. Bond Proceeds Fund BAN 2021A	132-0053-000	837		
	Dr. Interest Expense	527-0001-000	96,169		
	Dr. Accrued Interest Payable	237-0000-000	38,570		
	Cr. Capitalized Interest BAN 2021A	132-0054-000		92,576	
	Cr. Long Term Debt - Bond 2023	221-0042-000		27,335,000	
	to record proforma payoff of BAN 2021A and issuance of Bond 2023				
15	Dr. Cash	131-0020-000	186,958		
	Cr. Revenue - Residential	461-0100-000	11,534		
	Cr. Revenue - Commercial	461-0101-000		59,812	
	Cr. Revenue - Industrial	461-0102-000		68,241	
	Cr. Revenue - Public Authority	461-0103-000		23,978	
	Cr. Revenue - Multi-family	461-0104-000		46,372	
	Cr. Revenue - Bulk loading	461-0011-000		-	
	Cr. Revenue - Income - Resale Water Sales	466-0001-000		89	
	to record proforma revenue - adjust to revenues, present rates				
16	Dr. Cash	131-0020-000	9,151,203		
	Cr. Revenue - Residential	461-0100-000		5,644,656	
	Cr. Revenue - Commercial	461-0101-000		1,224,929	
	Cr. Revenue - Industrial	461-0102-000		667,368	
	Cr. Revenue - Public Authority	461-0103-000		360,592	
	Cr. Revenue - Multi-family	461-0104-000		938,073	
	Cr. Revenue - Bulk loading	461-0011-000		10,294	
	Cr. Revenue - Income - Resale Water Sales	466-0001-000		305,291	
	to record proforma revenue - adjust to revenues, step 2 rates				
17	Dr. Cash - Bond P&I	132-0001-000	975,690		
	Cr. Cash - O&M	131-0020-000		975,690	
	to adjust restricted debt service to 3 year average payment				

Operating & Maintenance Expense Adjustments	Increase (Decrease)	Agrees to VL
Salaries	2,419,627	x
Less: Capitalized	(310,243)	x
Employee Insurance	51,769	x
Pension	704,574	x
Chemical	932,324	x
Contractual Svcs - Resevoir Cleaning	434,470	x
Total O&M Adj	4,232,521	x
Taxes Other Than Income Adjustments		
FICA	95,025	x
Total Taxes Other Than Income Adj	95,025	
Balance Sheet Adjustments		
Cash - O&M	2,022,298	x
Cash - Bond Proceeds Fund	(91,739)	x
Cash - Debt Service Account NC	975,690	x
Cash - Debt Service Account Current		
Regulatory Asset	4,589,442	x
Less: Amortization	(434,470)	x
Net Regulatory Adjustments	4,154,972	x
Construction in Progress	(2,142,345)	x
Bond Anticipation Notes Payable	(24,685,000)	x
Other Accrued Liabilities		
Current Portion of LTD		
Long-term debt - bonds	27,335,000	x
Long-term debt - notes		
Debt Service Reserve	1,786,950	x
Accrued Interest Payable	(38,570)	x
Revenue Adjustments		
Total Water Sales	9,338,161	x
Nonoperating Adjustments		
Amortization	820,050	x
Interest Expense	96,169	x

Explanations/Assumptions:

All payroll related items (wages, cap labor, health, pension, FICA) should go into effect January 1, 2023.

The proforma chemical expense is an adjustment applying chemical bid prices effective 7/1/2022 to the three year average of chemical usage for 7/1/2018-6/30/20 and GAC contactors at bid prices effective 4/1/22

The FTTP north resevoir cleaning expense is expected to be fully paid for an in service no later than 12/31/2022. One year of the expense will be amortized.

The 2021A BAN will come due February 1, 2023 for $24.7M. A bond is expected to be issued 2/1/23 for $27.3M to pay off the $24.7 2021A BAN.

The proforma revenues have been adjusted for normalization.

Operating Revenues	Current as of 12/31/21	Adjustments	Proforma PV of Rates	Adjustments	Proforma Step 2 Rates
Metered Sales					
Sales to Residential Customers	36,916,772	(11,534)	36,905,238	5,644,656	42,549,894
Sales to Commercial Customers	7,749,227	59,812	7,809,039	1,224,929	9,033,968
Sales to Industrial Customers	4,034,073	68,241	4,102,314	667,368	4,769,682
Sales to Public Authorities	2,243,348	23,978	2,267,326	360,592	2,627,918
Sales to Multiple Family Dwellings	5,907,716	46,372	5,954,088	938,073	6,892,161
Sales Through Bulk Loading Stations	66,507	-	66,507	10,294	76,801
Total Metered Sales	56,917,643	186,869	57,104,512	8,845,912	65,950,424
Fire Protection Revenue	43,306	-	43,306	-	43,306
Sales for Resale	2,022,746	89	2,022,835	305,291	2,328,126
Total Water Sales	58,983,695	186,958	59,170,653	9,151,203	68,321,856
Forfeited Discounts	442,082	-	442,082	-	442,082
Rents from Water Property	383,269	-	383,269	-	383,269
Other Water Revenues	266,276	-	266,276	-	266,276
Total Operating Revenues	60,075,322	186,958	60,262,280	9,151,203	69,413,483
			59,170,653		68,321,856
			(43,306)		(43,306)
			59,127,347		68,278,550 agrees to Gannett Fleming Sch A, Revenues, Step 2

Reconciliation of Proforma to COS

Reconciliation of Revenues:

Revenues Water Sales - COS		68,278,550	x
Fire Protection Revenue		43,306	x
Revenues Water Sales - Proforma		(68,321,856)	x
Difference		-	

Other Operating/Non-Operating Revenue - COS		2,081,883	x
Forfeited Discounts - Proforma		(442,082)	x
Rents from Property - Proforma		(383,269)	x
Other Water Revenues - Proforma		(266,276)	x
Surcharge Revenue		(508,932)	x
Dividend & Interest Income	(482,865)	(481,324)	x
Unrealized Gain/Loss	1,541		
Sub-Total: Interest Earnings - Proforma	(481,324)		
Miscellaneous			
Difference		-	

Reconciliation of Operating Expenses:

Operation and Maintenance - COS		32,809,879	x
Taxes Other Than Income - COS		1,024,368	x
Amort. Of Sludge Removal - COS		458,944	x
O&M Expenses - Proforma		(34,293,201)	x
rounding		10	
Difference		-	

Depreciation - COS		12,235,799	x
Utility Plant Acquistion Adj. - COS		201,120	x
Depreciation - Proforma		(12,436,919)	x
Difference		-	

EXHIBIT 42-2

Northern Kentucky Water District
Case No: 2022-00161
Salary & Benefit Data by Employee

Employee Categories	Regular	Overtime Amt	Vacation Payout	Standby	Bonus	Other	Sub-Total	Health Benefits Cost		Dental Benefits		Vision		Basic Life & AD&D		STD & LTD		401k		Defined Benefit Retirement		Totals		FICA Tax
								NKWD	Employee	NKWD	Employee	NKWD	Employee	NKWD	Employee	NKWD	Employee	NKWD	Employee	NKWD	Employee	NKWD	Employee	
Executives	$ 687,433.40	$ -	$ 21,472.90	$ -	$ -	$ 16,951.80	$ 725,858.10	$ 66,024.65	$ 9,693.67	$ 1,341.48	$ 317.84	-	$ 176.64	$ 4,952.56	$ -	$ 8,180.04	$ 3,751.80	-	-	$ 180,682.80	$ 35,529.16	261,181.53	49,469.11	$ 39,210.28
Directors	$ 305,822.61	$ -	$ 7,530.40	$ -	$ -	$ -	$ 313,353.01	$ 28,447.69	$ 3,879.23	$ 728.14	$ 140.10	-	$ 336.00	$ 587.52	$ -	$ 3,531.00	$ -	-	-	$ 82,174.53	$ 15,291.13	115,468.89	19,646.46	$ 22,771.62
Managers	$ 789,028.54	$ -	$ 13,003.60	$ -	$ -	$ -	$ 802,032.14	$ 168,600.85	$ 26,442.59	$ 6,439.32	$ 821.28	$ -	$ 1,280.16	$ 1,514.88	$ -	$ 7,255.68	$ -	$ -	$ -	$ 188,149.58	$ 40,588.47	371,960.32	69,132.49	$ 61,328.85
Supervisors	$ 835,514.66	$ -	$ 18,272.60	$ -	$ -	$ -	$ 853,787.26	$ 187,000.19	$ 27,570.97	$ 16,139.57	$ 994.61	$ -	$ 869.52	$ 1,603.20	$ -	$ 6,513.00	$ -	$ -	$ -	$ 224,502.79	$ 43,456.42	435,758.76	72,891.52	$ 65,314.73
Exempt	$ 1,044,740.01	$ -	$ 15,040.80	$ -	$ -	$ -	$ 1,059,780.81	$ 211,628.86	$ 30,929.42	$ 18,476.35	$ 1,008.13	$ -	$ 1,896.96	$ 2,006.40	$ -	$ 8,151.00	$ -	$ -	$ -	$ 280,721.64	$ 58,852.11	520,984.25	92,686.62	$ 81,073.23
Non-Exempt	$ 7,608,047.62	$ 581,022.95	$ 50,839.28	$ 49,432.75	$ -	$ 34,177.01	$ 8,323,519.60	$ 2,397,288.80	$ 355,896.16	$ 124,033.76	$ 11,408.49	$ -	$ 16,159.68	$ 14,311.68	$ -	$ 57,462.60	$ -	$ -	$ -	$ 2,144,208.92	$ 443,827.38	4,737,305.76	827,291.71	$ 636,749.25

Northern Kentucky Water District

EXHIBIT 42-3

Northern Kentucky Water District
Chemical Cost
2022 Rate Case

		Time Period 12/31/2021	Pro Forma	Adjustment	% Increase
618-3000-001	Chemicals - FTTP	1,215,846.91	1,613,411.67	397,564.76	32.7%
618-3000-002	Chemicals - TMTP	53,746.32	71,320.61	17,574.29	32.7%
618-3000-029	Chemicals MPTP	237,706.50	315,433.17	77,726.67	32.7%
618-3001-001	Chemicals GAC FTTP	1,113,063.74	1,438,883.31	325,819.57	29.3%
618-3001-029	Chemicals GAC MPTP	199,229.60	312,868.00	113,638.40	57.0%
		2,819,593.07	3,751,916.75	932,323.68	33.1%

2021/2022	BID PRICES
Caustic Soda	1.3010
Copper Sulfate	2.3060
Corrosion Inhibitor	0.3810
Hydrofluorosilicic Acid	1.8990
Potassium Permanganate	1.4790
Powdered Carbon (Bulk)	0.6090
Powdered Carbon (Sacks - MPTP)	0.6450
Powdered Carbon (Bags - TMTP)	1.0000
Sodium Hypochlorite (4000 gal)	0.9020
Sodium Hypochlorite (2000 gal - TMTP)	0.8500
Sodium Hypochlorite (Dudley Booster)	1.4000
Sodium Hypochlorite (Bristow Booster)	1.6800
Ferric Sulfate	472.0000
Polyaluminum Chloride (TMTP)	0.2800
Polyaluminum Chloride (MPTP/FTTP)	0.2400
Cationic Polymer (Actiflo/Lamella)	3.3000
Cationic Polymer (Sludge Presses)	3.3000

2022 July-Dec	BID PRICES
Caustic Soda	3.4830
Copper Sulfate	3.4500
Corrosion Inhibitor	0.9800
Hydrofluorosilicic Acid	3.4440
Potassium Permanganate	2.2000
Powdered Carbon (Bulk)	1.0390
Powdered Carbon (Sacks - MPTP)	1.9300
Powdered Carbon (Bags - TMTP)	1.0000
Sodium Hypochlorite (4000 gal)	0.9020
Sodium Hypochlorite (2000 gal - TMTP)	0.8500
Sodium Hypochlorite (Dudley Booster)	1.4000
Sodium Hypochlorite (Bristow Booster)	1.6800
Ferric Sulfate	626.0000
Polyaluminum Chloride (TMTP)	0.4500
Polyaluminum Chloride (MPTP/FTTP)	0.3000
Cationic Polymer (Actiflo/Lamella)	4.2500
Cationic Polymer (Sludge Presses)	4.2500

no contract

CHEMICALS USED 3 year average		
3 year average	current price	new price begins 7/1/22
37,245.7	48,456.66	129,726.77
4,124.34	9,510.73	14,228.97
159,901.91	60,922.63	156,703.87
29,234.29	55,515.92	100,682.89
129,556.78	191,614.48	285,024.92
6,694.00	4,076.65	6,955.07
615.00	396.68	1,186.95
10,945.93	10,945.93	10,945.93
234,100.63	211,158.77	211,158.77
8,355.54	7,102.21	7,102.21
3,176.29	4,446.81	4,446.81
867.04	1,456.63	1,456.63
350.00	165,200.00	219,100.00
64,324.67	18,010.91	28,946.10
2,525,423.21	606,101.57	757,626.96
3,264.14	10,771.66	13,872.60
12,000.00	39,600.00	51,000.00
TOTAL	1,445,288.21	2,000,165.44
% increase		38%
		-

Northern Kentucky Water District
GAC Amortization

Amort. Exp. From PY Bid Cost
Amort. Exp. From 2022 Bid Cost

FTTP

	Contactor One	Contactor Two	Contactor Three	Contactor Four	Contactor Five	Contactor Six	Contactor Seven	Contactor Eight	TOTAL
Total Cost	$280,608	$280,608	$240,796	$240,796	$240,796	$240,796	$280,608	$280,608	
Amortization Months	19	17	19	19	15	15	18	18	
Amortization Per Month	$14,769	$16,506	$12,673	$12,673	$16,053	$16,053	$15,589	$15,589	
Annual Amortization	$177,226	$198,076	$152,082	$152,082	$192,637	$192,637	$187,072	$187,072	**$1,438,883**

MPTP

	Contactor One	Contactor Two	Contactor Three	Contactor Four	TOTAL
Total Cost	$174,650	$150,362	$150,362	$150,362	
Amortization Months	24	24	24	24	
Amortization Per Month	$7,277	$6,265	$6,265	$6,265	
Annual Amortization	$87,325	$75,181	$75,181	$75,181	**$312,868**

TOTAL Annual Amortization **$1,751,751**

Northern Kentucky Water District

EXHIBIT 42-4

Northern Kentucky Water District
Ft. Thomas Treatment Plant Solids Removal
2022 Rate Case

Contractual Svcs - Reservoir Cleaning 635-4000-027

Accumulated Cost as of 4/25/22	3,221,967.00
Known & Measurable Costs Prior to Filing Including Bid	1,367,475.00
Total Estimated Amortizable Base	4,589,442.00
Divided by 10 years/120 Months	120
Monthly Amortization of Regulatory Asset	38,245.35
Multiplied by 12 months	12
Total Est. Annual Amort. of Regulatory Asset	458,944.20

Northern Kentucky Water District

EXHIBIT 42-5

Northern Kentucky Water District
3-Year Average Debt
12/31/22, 12/31/23, 12/31/24

.

Year	Total Debt Service - Senior Debt Only
12/31/2022	16,311,877
12/31/2023	16,882,491
12/31/2024	17,953,861
Total Senior Debt - 2018 - 2021	**51,148,229**
Divided by 3 Years (36 months)	3
Average Debt Service - Senior Debt Only	**17,049,410**

Year	Total Debt Service - Senior & Subordinate Debt	
12/31/2022	18,667,130	
12/31/2023	19,419,101	
12/31/2024	20,991,703	
Total Senior Debt - 2018 - 2021	**59,077,934**	
Divided by 3 Years (36 months)	3	
Average Debt Service - Senior & Subord. Debt	**19,692,645**	<- recover rates for this amount

Assumptions:
BAN 2021 converted to Bond 2023 with first interest payment due August 1, 2023. See DRAFT plan of financing.

F13-012 Interest only payments are still calculated for 2022 & 2023 because interest payments are due whether the loan is closed out or not. Anticipate project complete Spring 2024 with first payment due 12/1/2024

Note Payable	Amount	Interest Rate	Term	Payable at 12/31/2021	12/31/2022	12/31/2023
KIA F13-012	8,000,000	2.00%	20 years	4,523,000	4,523,000	6,000,000

F16-027 interest only payments are still calculated for 2022 and 6/1/23. Anticipate project completion Fall of 2023 with first payment due 12/1/2023.

Note Payable	Amount	Interest Rate	Term	Payable at 12/31/2021	12/31/2022
KIA F16-027	4,000,000	2.00%	20 years	1,304,928	2,000,000

F20-044 interest only payments are still calculated for 2022, 2023 and 6/1/24. Anticipate project completion Fall of 2024 with first payment due 12/1/2024.

Note Payable	Amount	Interest Rate	Term	Payable at 12/31/2021	12/31/2022	12/31/2023
KIA F20-0044	7,000,000	1.75%	20 years	-	4,000,000	6,000,000

Detailed Listing of Debt Service Dec 31, 2022 - Dec 31, 2024

Year	Series	Principal	Interest	Total	Total Debt Service
2022 Total					
	2013A	835,000	891,651	1,726,651	
	2013B	1,430,000	489,450	1,919,450	
	2014A	28,000	45,801	73,801	
	2014B	465,000	135,263	600,263	
	2016A	2,450,000	1,235,900	3,685,900	
	2019	470,000	560,750	1,030,750	
	2020	1,110,000	746,950	1,856,950	
	2021B	4,815,000	603,112	5,418,112	
	2023	-	-	-	
Total 2022 Senior Debt		**11,603,000**	**4,708,877**	**16,311,877**	**16,311,877**
	KIA F-08-07	198,676	28,110	226,786	
	KIA F-09-02	1,168,646	329,876	1,498,522	
	KIA F-13-012	-	90,460	90,460	
	KIA F-14-015	158,893	59,431	218,324	
	KIA F-15-011	158,409	59,249	217,658	
	KIA F-16-027	-	26,099	26,099	
	KIA B-15-003	66,814	10,590	77,404	
	KIA F20-044	-	-	-	
Total 2022 Subordinate Debt		**1,751,438**	**603,815**	**2,355,253**	**2,355,253**
Total 2022 Debt Service Senior & Subordinate					**18,667,130**
2023 Total					
	2013A	880,000	848,776	1,728,776	
	2013B	1,500,000	416,200	1,916,200	
	2014A	28,500	45,024	73,524	
	2014B	485,000	116,363	601,363	
	2016A	2,685,000	1,107,525	3,792,525	
	2019	485,000	544,000	1,029,000	
	2020	1,165,000	690,075	1,855,075	
	2021B	4,485,000	826,900	5,311,900	
	2023	-	574,128	574,128	
Total 2023 Senior Debt		**11,713,500**	**5,168,991**	**16,882,491**	**16,882,491**
	KIA F-08-07	200,668	25,620	226,288	
	KIA F-09-02	1,192,135	303,450	1,495,585	
	KIA F-13-012	-	90,460	90,460	
	KIA F-14-015	161,686	56,239	217,925	
	KIA F-15-011	161,193	56,067	217,260	
	KIA F-16-027	81,822	60,000	141,822	
	KIA B-15-003	67,316	9,954	77,270	
	KIA F20-044	-	70,000	70,000	
Total 2023 Subordinate Debt		**1,864,820**	**671,791**	**2,536,610**	**2,536,610**
Total 2023 Debt Service Senior & Subordinate					**19,419,101**
2024 Total					
	2013A	925,000	803,651	1,728,651	
	2013B	1,570,000	347,300	1,917,300	
	2014A	29,500	44,227	73,727	
	2014B	495,000	101,663	596,663	
	2016A	2,715,000	972,525	3,687,525	
	2019	505,000	524,200	1,029,200	
	2020	1,225,000	630,325	1,855,325	
	2021B	4,675,000	643,700	5,318,700	
	2023	700,000	1,046,770	1,746,770	
Total 2024 Senior Debt		**12,839,500**	**5,114,361**	**17,953,861**	**17,953,861**
	KIA F-08-07	202,680	23,106	225,786	
	KIA F-09-02	1,216,098	276,493	1,492,591	
	KIA F-13-012	163,645	140,000	303,645	
	KIA F-14-015	164,528	52,991	217,519	
	KIA F-15-011	164,026	52,829	216,856	
	KIA F-16-027	166,108	77,537	243,645	
	KIA B-15-003	67,822	9,314	77,135	
	KIA F20-044	146,915	113,750	260,665	
Total 2024 Subordinate Debt		**2,291,822**	**746,020**	**3,037,842**	**3,037,842**
Total 2024 Debt Service Senior & Subordinate					**20,991,703**

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Stacey Kampsen

Q.43. Provide the total amount collected for each nonrecurring charge and the number of occurrences for each nonrecurring charge that was assessed during the test year that is listed in the current tariff. If the revenue consists of occurrences for any nonrecurring charge that was zero, include that charge and indicate that zero revenue was received.

A.43. NKWD submits as follows:

Nonrecurring Charge Type	Calendar Year 2021 (Test Year)	
	Number of Occurrences	Amount Collected
Return Check Charge - $20.00	450	$9,000
Service Charge (disconnect work order for non-payment, bad check, theft, failure to comply with NKWD Rules and Regulations) - $25.00	693	$17,325
Overtime Charge (turn on or off request outside of normal business hours) - $60.00	137	$8,220
Meter Test (1 inch and smaller) - $30.00	4	$120
Service Connection Installation 5/8 Inch - $1,000.00	655	$655,000
Service Connection Installation 1 Inch - $1,500.00	78	$117,000
Fire Hydrant Permit (1" meter assembly with 5/8" outlet) - $15.00 per day	0	$0
Fire Hydrant Permit (3" meter assembly with 2 1/2" outlet) - $30.00 per day	2,249 days	$67,470
Invoice Billing Policy*	44	$156,826.87

**NKWD's Tariff includes an Invoice Billing Policy based on actual services and work performed which is applicable pursuant to the Tariff for various irregular services and situations such as larger service connections, reconnection of abandoned service lines, installation of fire hydrants, and fire hydrant repairs due to damage. The data above reflects the number of occurrences and amount collected for larger service connections only.*

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Stacey Kampsen

Q.44. Provide updated cost justification sheets for all nonrecurring charges listed in Northern Kentucky District's tariff.

A.44. NKWD submits the attached Exhibit 44-1.

Northern Kentucky Water District

EXHIBIT 44-1

AVERAGE METER CONNECTION EXPENSE
COST JUSTIFICATION

Name of Utility Northern Kentucky Water District

The following is an itemization of expenses for providing a metered service connection.

A. Meter Size

5/8-Inch **X** 3/4-Inch ☐ 1-Inch ☐ 1 1/2 -Inch ☐ 2-Inch ☐

Other (specify) _____

B. Materials Expense

		Unit Quantity	Cost	Total Cost
1.	Water Meter	1	$63.46	$63.46
2.	Meter Yoke	1	$18.72	$18.72
3.	Corporation Stop	1	$31.24	$31.24
4.	Meter Box and Top	1	$84.73	$84.73
5.	Miscellaneous Fittings	1	$107.35	$107.35
6.	Other (Itemize)			
	Concrete / Low Density Fill	1	$6.19	$6.19

TOTAL MATERIALS EXPENSE (add total cost) $311.68

C. Service Pipe Expense

Type of Service Pipe Copper Size of Service Pipe ¾"

		Unit Quantity	Cost	Total Cost
1.	Short Side Service	16.38	$2.48	$40.64
2.	Long Side Service	4.03	$27.24	$109.66

AVERAGE SERVICE PIPE EXPENSE (add total cost and divide by 2) $ 75.15

D. Installation Labor Expense

		Total Hours	Hourly Rate	Total Cost
1.	Short Side Service	Average Contractor Cost		$539.38
2.	Long Side Service	Average Contractor Cost		$1,518.00

AVERAGE INSTALLATION LABOR EXPENSE (add total cost and divide by 2) $ 1,028.69

E. Installation Equipment Expense

		Total Hours	Hourly Rate	Total Cost
1.	Short Side Service			
2.	Long Side Service			

AVERAGE INSTALLATION EQUIPMENT EXPENSE (add total cost and divide by 2) $

F. Installation Miscellaneous Expense

		Total Hours	Hourly Rate	Total Cost
1.	Inspection			
2.	Site Clean-Up			
3.	Other			

AVERAGE INSTALLATION MISCELLANEOUS EXPENSE (add total cost) $_____

G. Overhead Expense

1. Installation expense ($_____) times overhead rate (____%) $_____

H. Administrative Expense

1. Office expense for establishing a new account and billing record. $_____

I. Total Expenses

Materials Expense	$ 311.68
Service Pipe Expense	63.46
Installation Labor Expense	1,028.69
Installation Equipment Expense	
Installation Miscellaneous Expense	
Overhead Expense	
Administrative Expense	

TOTAL CONNECTION EXPENSE **$ 1,403.83**

AVERAGE METER CONNECTION EXPENSE

COST JUSTIFICATION

Name of Utility Northern Kentucky Water District

The following is an itemization of expenses for providing a metered service connection.

A. Meter Size

5/8-Inch ☐ 3/4-Inch ☐ 1-Inch **X** 1 1/2 -Inch ☐ 2-Inch ☐

Other (specify) _____

B. Materials Expense

		Unit Quantity	Cost	Total Cost
1.	Water Meter	1	$108.57	$108.57
2.	Meter Yoke	1	$42.25	$42.25
3.	Corporation Stop	1	$53.18	$53.18
4.	Meter Box and Top	1	$142.63	$142.63
5.	Miscellaneous Fittings	1	$254.01	$254.01
6.	Other (Itemize)			
	Low Density Fill Concrete	1	$9.03	$9.03

TOTAL MATERIALS EXPENSE (add total cost) $609.67

C. Service Pipe Expense

Type of Service Pipe Copper Size of Service Pipe 1”

		Unit Quantity	Cost	Total Cost
1.	Short Side Service	16.84	$3.45	$58.07
2.	Long Side Service	37.94	$3.36	$127.59

AVERAGE SERVICE PIPE EXPENSE $92.83
(add total cost and divide by 2)

D. Installation Labor Expense

		Total Hours	Hourly Rate	Total Cost
1.	Short Side Service	Average Contractor Cost		$954.59
2.	Long Side Service	Average Contractor Cost		$2,184.15

AVERAGE INSTALLATION LABOR EXPENSE $1,569.37
(add total cost and divide by 2)

E. Installation Equipment Expense

		Total Hours	Hourly Rate	Total Cost
1.	Short Side Service			
2.	Long Side Service			

AVERAGE INSTALLATION EQUIPMENT EXPENSE $
(add total cost and divide by 2)

F. Installation Miscellaneous Expense

		Total Hours	Hourly Rate	Total Cost
1.	Inspection			
2.	Site Clean-Up			
3.	Other			

AVERAGE INSTALLATION MISCELLANEOUS EXPENSE (add total cost) $_____

G. Overhead Expense

1. Installation expense ($_____) times overhead rate (____%) $_____

H. Administrative Expense

1. Office expense for establishing a new account and billing record. $_____

I. Total Expenses

Materials Expense	$ 609.67
Service Pipe Expense	$92.83
Installation Labor Expense	$1,569.37
Installation Equipment Expense	
Installation Miscellaneous Expense	
Overhead Expense	
Administrative Expense	

TOTAL CONNECTION EXPENSE **$ 2,271.87**

NONRECURRING CHARGE COST JUSTIFICATION

Type of Charge: Fire Hydrant Permit

1. Field Expense:

   A. Materials (Itemize)

Apportioned cost of meter	$ 12

   B. Labor (Time and Wage)

.5 hours at $17.99 per hour	9

Total Field Expense **$** 21

2. Clerical and Office Expense

   A. Supplies $ 1

   B. Labor 19.03

Total Clerical and Office Expense **$** 20.03

3. Miscellaneous Expense

   A. Transportation $

   B. Other (Itemize)

Labor Overhead	12

Total Miscellaneous Expense **$** 12

Total Nonrecurring Charge Expense **$** 53.03

NONRECURRING CHARGE COST JUSTIFICATION

Type of Charge: Meter Test

1. Field Expense:

A.	Materials (Itemize)	
		$
B.	Labor (Time and Wage)	
	2 hours at $17.99 per hour	35.98
	Total Field Expense	**$** 35.98

2. Clerical and Office Expense

A.	Supplies	$ 1
B.	Labor	5.47
	Total Clerical and Office Expense	**$** 6.47

3. Miscellaneous Expense

A.	Transportation	$ 4
B.	Other (Itemize)	
	Labor Overhead	17
	Total Miscellaneous Expense	**$** 21

Total Nonrecurring Charge Expense **$** 63.45

NONRECURRING CHARGE COST JUSTIFICATION

Type of Charge: Overtime Charge

1. Field Expense:

A.	Materials (Itemize)	
	_____	$_____
	_____	_____
	_____	_____
B.	Labor (Time and Wage)	
	1 hour at $26.98 per hour	26.98
	Total Field Expense	**$** 26.98

2. Clerical and Office Expense

A.	Supplies	$ 1
B.	Labor	16.41
	Total Clerical and Office Expense	**$** 17.41

3. Miscellaneous Expense

A.	Transportation	$ 4
B.	Other (Itemize)	
	Labor Overhead	18
	_____	_____
	_____	_____
	Total Miscellaneous Expense	**$** 22

Total Nonrecurring Charge Expense **$** 66.39

NONRECURRING CHARGE COST JUSTIFICATION

Type of Charge: Service Charge

1. Field Expense:

   A. Materials (Itemize)

	$

   B. Labor (Time and Wage)

1 hour at $17.99 per hour	17.99

Total Field Expense	**$** 17.99

2. Clerical and Office Expense

A. Supplies	$ 1
B. Labor	16.41
Total Clerical and Office Expense	**$** 17.41

3. Miscellaneous Expense

A. Transportation	$ 4
B. Other (Itemize)	
Labor Overhead	14
Total Miscellaneous Expense	**$** 18

Total Nonrecurring Charge Expense	**$** 53.40

NONRECURRING CHARGE COST JUSTIFICATION

Type of Charge: Return Check Charge

1. Field Expense:

   A. Materials (Itemize)

_____	$_____
_____	_____
_____	_____

   B. Labor (Time and Wage)

_____	_____

Total Field Expense **$_____**

2. Clerical and Office Expense

A.	Supplies	$ 1
B.	Labor	11
	Total Clerical and Office Expense	**$** 12

3. Miscellaneous Expense

A.	Transportation	$_____
B.	Other (Itemize)	
	Bank Charges	5
	Labor Overhead	5
	_____	_____
	Total Miscellaneous Expense	**$** 10

Total Nonrecurring Charge Expense **$** 22

NORTHERN KENTUCKY WATER DISTRICT

Response to Commission Staff's First Request for Information

CASE NO. 2022-00161

WITNESS – Amy Stoffer & Barry Miller

Q.45. Provide an overview of any actions planned or taken by Northern Kentucky District to reduce its water loss, including any water loss reduction plan.

A.45. In February 2022, NKWD engaged ASTERRA for leak detection services through satellite imagery in three phases that will cover approximately 65% of the service area (848.6 miles of distribution mains) and specifically areas that have historically had the highest probability of leaks based on prior acoustical leak detection surveys and prior work orders. ASTERRA states they have completed over 430 projects and found more than 36,000 verified leaks since its inception in 2016.

Leak detection through satellite imagery is newer technology that takes aerial scans about 300 miles above the Earth's surface which are then analyzed using proprietary algorithms that can detect the unique signature of treated water in saturated soils around the area of the leak. The results are compiled to a report that identifies the potential leak to an area within a 300-foot radius. Upon completion of the report, an acoustical survey is conducted to further pinpoint the leak and create a work order for repair by staff.

ASTERRA completed the first phase of satellite imagery on 297 miles of water main in March 2022 and submitted their results in April reporting 101 areas having potential leaks. An acoustical field survey of 22.8 miles covering these 101 areas has been completed with a total of 70 leaks being verified and pinpointed. Only two of these leaks were surfacing and visible. The other 68 leaks were not visible and could only be detected by listening with the acoustical equipment. A total estimated volume of 180 gallons per minute were found on leaks using the acoustical equipment. All suspected leaks will be further investigated. Work orders to excavate and repair the leaks are being prepared as leaks are found. The leaks will be prioritized by estimated size of leak and repairs made by NKWD crews. The largest single leak estimated at 10 to 15 gallons per minute was immediately fixed by NKWD crews. The estimated annual water loss detected using ASTERRA is $61,685 using a variable production cost of $0.65 per 1,000 gallons. At a cost of $61,650 for the first phase, the anticipated payback for the water loss found using these services is one year.

NKWD believes the satellite imagery can identify more leaks than a traditional acoustical survey alone would discover. NKWD utilized contractors to perform traditional acoustical surveys, meaning the entire system was surveyed by crews in the field (with about 25 percent of the system surveyed twice), between 2010 and 2018. These surveys identified a total of 150 leaks over 1,621 miles of water main surveyed with an estimated total water loss of 644 gallons per minute. This means the acoustical surveys used in the past found an average of 9 leaks per 100 miles surveyed at a cost of more than $1,545 per leak found. With the most recent method using satellite imagery first followed with acoustical surveys of only the

suspicious areas resulted in finding 23 leaks per 100 miles at a cost of $880 per leak. Using ASTERRA results in an estimated savings of $665 per leak found as compared to traditional leak detection surveys. Therefore, NKWD plans to proceed with the next two phases of satellite imagery followed by acoustical surveys of the targeted areas suspected of having greatest potential for leaks. As leaks are repaired, the non-revenue water attributed to loss of water from water mains, service line connections, valves, and fire hydrants will be eliminated.

NKWD initiated a program in 2019 to replace large turbine, compound, and fire-rated meters with ultrasonic meters. There are 340 meters in the system that are 3 inch and larger that are part of this program. While these older meter types are annually tested for accuracy and are able to pass the testing requirements, they do not always properly record the range of flows actually used by the customer. In reviewing the 31 meters replaced with ultrasonic meters over the last three years, NKWD has observed an average increase in meter readings of nearly 30 percent. NKWD will continue to replace the older style of large meters with ultrasonic meters. The large meter replacement program is anticipated to increase the consumption over what is currently recorded by the older meters. This effort will reduce the non-revenue water attributed to the present metering conditions.

NKWD staff periodically investigates approximately 400 fire line connections in the system to determine if there are possible leaks on the customer's system that are not being billed. These efforts have identified several leaks on the customer's side. The customer is notified and advised to repair the leak. These efforts will help to reduce non-revenue water attributed to loss through an unbilled fire line.