

ASSET MANAGEMENT PROGRAM

for Water Utility Systems



Prepared for:

City of Big Rapids

Project No. 832090

December 2017
Revised May 2019

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EXECUTIVE SUMMARY

OVERVIEW

This report summarizes the Asset Management Program (AMP) for the City of Big Rapids water utility system. It is submitted to comply with Rule 1606 of Act 399 in which a community water supply that serves more than 1,000 people shall implement an asset management program as defined in R 325.10102 beginning January 1, 2018.

The City of Big Rapids, located in the northwest corner of Mecosta County in central Michigan, has a type 1 public water supply and distribution system with four production wells, an iron removal water treatment plant, two booster pump stations, two main pressure districts and one subdivision pressure district, and four elevated storage tanks. The water system is currently serving a population of about 2,261. The City has nine certified water department personnel to maintain the system.

ASSET INVENTORY

The system is comprised of four wells producing an average of 1,134,400 gpd, with a water treatment plant consisting of chlorine oxidization, two upflow clarifiers followed by gravity filtration through three filters. Orthophosphate and fluoride are added to the water after filtration. The system has four elevated storage tanks and two ground storage tanks with a total storage capacity of 2.75 MG, over 312,000 feet of watermain ranging from 4-inches to 20-inches in diameter, two booster pump stations, 484 fire hydrants with valves, and 450 watermain valves.

The water asset inventory is included in Table 2 and provides source asset description, year installed, location, manufacturer (where applicable), replacement cost, useful life and condition rating on a scale of 1-5. A map of the existing water system is included in Attachment 2

CRITICALITY ASSESSMENT

The criticality of the assets of the City's water utility system are based on a numerical (1-5) rating system of performance for Probability of Failure and Consequence of Failure. To determine criticality the following formula is used:

$$\text{Criticality Factor} = \text{Probability of Failure} \times \text{Consequence of Failure}$$

Details of the asset rating system are included in Table 1. The water asset inventory in Table 2 contains the Criticality Factor for each asset in the City of Big Rapids water supply system.

LEVEL OF SERVICE GOALS

Level of Service (LOS) goals were developed with City's administrative staff. The LOS goals are detailed in Table 3.

CAPITAL IMPROVEMENT PLAN

A twenty-year Capital Improvement Plan (CIP) was developed for the City of Big Rapids based on the criticality assessment within this report and the recently completed Water Reliability Study dated June 2017. As a part of the AMP process, the CIP was reviewed with the City of Big Rapids. The water supply system CIP is included in Table 4.

FUNDING STRUCTURE AND RATE METHODOLOGY

The MDEQ requires a summary detailing the funding structure and rate methodology that provides sufficient resources to implement the AMP. For the City of Big Rapids, the current rate structure is included in Attachment 1 and an analysis of the budget over the next ten years is included in Table 5.

ASSET MANAGEMENT TEAM

Utility Information

Utility Name: Big Rapids Water Utility System
Street Address: 730 Osceola Avenue
City: Big Rapids
Zip Code: 49307
Phone Number: 231-796-6231

Number of Connections/ Customers: 2,261

Personnel

Contact Person: Heather Bowman
Title: DPW Director
Phone Number: 231-592-4018

Team Member: Mark Gifford
Title: City Manager
Phone Number: 231-592-4020

Team Member: Aaron Kuhn
Title: City Treasurer
Phone Number: 231-592-4010

Team Member: Steve Cook
Title: Water Treatment Plant Superintendent
Phone Number: 231-796-6231

Team Member: Van Johnson
Title: Street Superintendent
Phone Number: 231-796-8542

Team Member: Fleis & VandenBrink Engineering – Todd Richter
Title: Engineer
Phone Number: 616-977-1000

Column J	
Condition Assessment	
Condition Rating	Description
5	Asset Unserviceable - Over 50% of asset requires replacement
4	Significant deterioration - significant renewal/upgrade required (20 -40%)
3	Moderate deterioration - Significant maintenance required (10 -20%)
2	Minor Deterioration - Minor maintenance required (5%)
1	New or Excellent Condition - Only normal maintenance required

Column K	
Probability of Failure	
Performance Rating	Description
5	Imminent - Likely to occur in the life of the item
4	Probable - Will occur several times in the life of an item
3	Occasional - Likely to occur some- time in the life of an item
2	Remote - Unlikely but possible to occur in the life of an item
1	Improbable - So unlikely, it can be assumed occurrence may not be experienced

Column L	
Consequence of Failure *	
Performance Rating	Description
5	Catastrophic disruption
4	Major disruption
3	Moderate disruption
2	Minor disruption
1	Insignificant disruption

* consider safety/social, economic/financial, environmental

Table 2
Water Asset Inventory

Source Assets											
Source Assets	Year Installed	Location	Latitude	Longitude	Manufacturer	Replacement Cost	Remaining Useful Life in Years	Condition	Probability of Failure	Consequence of Failure	Criticality Factor
Well No. 1 (12 in diameter @ 210 ft depth)	2001	N. of West Ave.	N43.717357	W085.497923		\$ 120,000	74	1	2	3	6
Well No. 2 (16 in diameter @ 155 ft depth)	2001	N. of West Ave.	N43.718532	W085.499409		\$ 130,000	74	1	2	3	6
Well No. 3 (16 in diameter @ 168 ft depth)	2001	N. of West Ave.	N43.719926	W085.500755		\$ 130,000	74	1	2	3	6
Well No. 4 (16 in diameter @ 213 ft depth)	2001	N. of West Ave.	N43.721386	W085.502322		\$ 140,000	74	1	2	3	6
Wellhouse	2001	N. of West Ave.				\$ 150,000	74	1	2	3	6
Pump No. 1 (500 gpm @ 167 ft)	1998	N. of West Ave.	N43.717357	W085.497923	Floway	\$ 10,000	6	2	2	3	6
Pump No. 2 (1,200 gpm @ 96 ft)	2000	N. of West Ave.	N43.718532	W085.499409	Floway	\$ 12,000	8	2	2	3	6
Pump No. 3 (1,200 gpm @ 80 ft)	1999	N. of West Ave.	N43.719926	W085.500755	Floway	\$ 12,000	7	2	2	3	6
Pump No. 4 (800 gpm @ 118 ft)	2001/ 2016 O'haul	N. of West Ave.	N43.721386	W085.502322	Christensen	\$ 10,000	24	1	2	3	6
250 kW natural gas fixed generator	2000	N. of West Ave.			Cummins	\$ 60,000	8	1	2	2	4

Treatment Assets											
Treatment Assets	Year Installed	Location	Latitude	Longitude	Manufacturer	Replacement Cost	Remaining Useful Life in Years	Condition	Probability of Failure	Consequence of Failure	Criticality Factor
WTP Building	1937	WTP				\$ 400,000	10	2	2	2	4
Chemical Feed/ Storage	2003	WTP			Force Flow/ Carus Corporation/ PPG Industries	\$ 50,000	76	1	1	3	3
Detention Tank No. 1 (405,000 gallons)	1968	WTP			Walker Process	\$ 400,000	41	4	4	3	12
Detention Tank No. 2 (283,552 gallons)	1983	WTP			General Filter	\$ 300,000	56	2	2	3	6
Gravity Rapid Sand Filter No. 1 (3 gpm/sft)	1983	WTP			Leopold and Micro Floc Media	\$ 50,000	-19	1	1	2	2
Gravity Rapid Sand Filter No. 2 (3 gpm/sft)	1983	WTP			Leopold and Micro Floc Media	\$ 50,000	-19	1	1	2	2
Gravity Rapid Sand Filter No. 3 (3 gpm/sft)	1983	WTP			Leopold and Micro Floc Media	\$ 50,000	-19	1	1	2	2
Backwash Pump (7,000 gpm @ 27 ft)	1968/ 2005	WTP			Peerless	\$ 15,000	3	3	3	3	9
Sludge Pump (220 gpm @ 150 ft)	1992	WTP			Wilden	\$ 5,000	-10	1	1	3	3
Recycle Pump No. 1 (1,400 gpm @ 60 ft))	1959/ 2000 O'haul	WTP			Peerless	\$ 5,000	-2	1	1	2	2
Recycle Pump No. 2 (1,400 gpm @ 60 ft)	1959/ 2000 O'haul	WTP			Peerless	\$ 5,000	-2	1	1	2	2
Low Service Pump No. 1 (3750 gpm @ 50 ft)	2005	WTP			Peerless	\$ 10,000	13	2	2	2	4
Low Service Pump No. 2 (3750 gpm @ 50 ft)	2005	WTP			Peerless	\$ 10,000	13	2	2	2	4
High Service Pump No. 1 (3,750 gpm @ 194 ft)	1983/2008	WTP			Worthington	\$ 10,000	16	2	2	2	4
High Service Pump No. 2 (2,500 gpm @ 168 ft)	1983/2007	WTP			Worthington	\$ 10,000	15	2	2	2	4
High Service Pump No. 3 (1,600 gpm @ 160 ft)	1983/2010	WTP			Fairbanks Morse	\$ 10,000	18	5	5	2	10
High Service Pump No. 4 (2,500 gpm @ 168 ft)	1983/ 2009	WTP			Worthington	\$ 10,000	17	2	2	2	4
500 kW diesel fixed generator	2010	WTP			Cummins/Genset	\$ 90,000	25	2	2	2	4

Storage Assets											
Storage Assets	Year Installed	Material	Location / Label	Capacity	Manufacturer	Replacement Cost	Remaining Useful Life in Years	Condition	Probability of Failure	Consequence of Failure	Criticality Factor
Water Storage - Useful life: 90 years											
Ground Storage Tank No. 1	1983	Steel	WTP	0.5 MG	Prairie Tank Company	\$ 500,000	56	1	1	3	3
Ground Storage Tank No. 2	1959	Steel	WTP	1.0 MG	Hammond Tanks	\$ 1,000,000	32	2	2	3	6
Single- Pedestal Spheroid Tower	1968	Steel	Bjornson St	0.25 MG	Universal Tank	\$ 1,000,000	41	2	2	3	6
Single- Pedestal Spheroid Tower	1952	Steel	State St	0.3 MG	Pitt-Des Moines	\$ 1,200,000	25	3	3	3	9
Single- Pedestal Spheroid Tower	1968	Steel	Perry St	0.2 MG	Universal Tank	\$ 800,000	41	1	1	3	3
Single- Pedestal Spheroid Tower	1996	Steel	Ferris St	0.5 MG	Chicago Bridge and Iron	\$ 2,000,000	69	1	1	3	3

Table 2
Water Asset Inventory

Distribution Assets											
Distribution Assets	Year Installed	Material	Diameter (in)	Total Length (ft)/Quantity	Manufacturer	Replacement Cost	Remaining Useful Life in Years	Condition	Probability of Failure	Consequence of Failure	Criticality Factor
Booster Station											
State Street Booster Station											
Booster Station Building	1961					\$ 100,000	34	1	1	3	3
Pump No. 1 (970 gpm)	1961				Peerless	\$ 10,000	-31	2	2	3	6
Pump No. 2 (970 gpm)	1961				Peerless	\$ 10,000	-31	2	2	3	6
Pump No. 3 (1,940 gpm)	1994				Peerless	\$ 10,000	2	2	2	3	6
Hills of Mitchell Creek Booster Station											
Booster Station Building	2005				Gorman-Rupp	\$ 75,000	78	3	3	3	9
Pump No. 1 (260 gpm)	2005				Patterson	\$ 6,000	13	2	2	3	6
Pump No. 2 (260 gpm)	2005				Patterson	\$ 6,000	13	2	2	3	6
Watermain - Useful Life Based on Material											
Replacement cost*:	1900	CI	4	16,144		\$ 1,937,280	8	3	3	1	3
8" @ \$120 per foot	1900	CI	6	21,047		\$ 2,525,640	8	3	3	2	6
10"-12" @ \$130 per foot	1900	CI	8	4,769		\$ 572,280	8	3	3	2	6
16"-20" @ \$160 per foot	1900	CI	12	5,596		\$ 727,480	8	3	3	3	9
	1910	CI	4	647		\$ 77,640	18	3	3	1	3
	1910	CI	6	2,737		\$ 328,440	18	3	3	2	6
	1910	CI	8	1,644		\$ 197,280	18	3	3	2	6
	1940	CI	4	903		\$ 108,360	48	2	2	1	2
	1940	CI	6	3,404		\$ 408,480	48	2	2	2	4
	1950	CI	4	2,678		\$ 321,360	58	2	2	1	2
	1950	CI	6	9,022		\$ 1,082,640	58	2	2	2	4
	1950	CI	8	2,176		\$ 261,120	58	2	2	2	4
	1950	CI	10	5,005		\$ 650,650	58	2	2	3	6
	1950	CI	12	2,493		\$ 324,090	58	2	2	3	6
	1960	DI	4	1,496		\$ 179,520	53	2	2	1	2
	1960	DI	6	15,278		\$ 1,833,360	53	2	2	2	4
	1960	DI	8	12,218		\$ 1,466,160	53	2	2	2	4
	1960	DI	10	1,447		\$ 188,110	53	2	2	3	6
	1960	DI	12	16,556		\$ 2,152,280	53	2	2	3	6
	1970	DI	4	1,680		\$ 201,600	63	2	2	1	2
	1970	DI	6	12,186		\$ 1,462,320	63	2	2	2	4
	1970	DI	8	7,650		\$ 918,000	63	2	2	2	4
	1970	DI	12	9,785		\$ 1,272,050	63	2	2	3	6
	1980	DI	4	1,758		\$ 210,960	73	2	2	1	2
	1980	DI	6	16,434		\$ 1,972,080	73	2	2	2	4
	1980	DI	8	25,901		\$ 3,108,120	73	2	2	2	4
	1980	DI	10	720		\$ 93,600	73	2	2	3	6
	1980	DI	12	16,716		\$ 2,173,080	73	2	2	3	6
	1990	DI	6	6,338		\$ 760,560	83	1	1	2	2
	1990	DI	8	8,082		\$ 969,840	83	1	1	2	2
	1990	DI	12	16,548		\$ 2,151,240	83	1	1	3	3
	1990	DI	16	857		\$ 137,120	83	1	1	4	4
	1990	DI	20	8,307		\$ 1,329,120	83	1	1	5	5
	2000	DI	16	367		\$ 58,720	93	1	1	4	4
	2000	DI	20	745		\$ 119,200	93	1	1	5	5
	2001	DI	8	5,369		\$ 644,280	94	1	1	2	2
	2001	DI	12	756		\$ 98,280	94	1	1	3	3
	2001	DI	16	4,080		\$ 652,800	94	1	1	4	4
	2002	DI	8	965		\$ 115,800	95	1	1	2	2
	2002	DI	12	1,139		\$ 148,070	95	1	1	3	3
	2003	DI	8	329		\$ 39,480	96	1	1	2	2
	2003	DI	12	4,162		\$ 541,060	96	1	1	3	3
	2004	DI	4	600		\$ 72,000	97	1	1	1	1
	2004	DI	12	884		\$ 114,920	97	1	1	3	3
	2004	DI	16	3,124		\$ 499,840	97	1	1	4	4
	2005	DI	8	7,704		\$ 924,480	98	1	1	2	2
	2005	DI	12	8,294		\$ 1,078,220	98	1	1	3	3
	2005	DI	16	5,553		\$ 888,480	98	1	1	4	4
	2006	DI	12	1,535		\$ 199,550	99	1	1	3	3
	2007	DI	12	2,284		\$ 296,920	100	1	1	3	3
	2008	DI	8	744		\$ 89,280	101	1	1	2	2
	2009	DI	6	1,146		\$ 137,520	102	1	1	2	2

Table 2
Water Asset Inventory

Distribution Assets	Year Installed	Material	Diameter (in)		Manufacturer	Replacement Cost	Remaining Useful Life in Years	Condition	Probability of Failure	Consequence of Failure	Criticality Factor
	2010	DI	8	1,985		\$ 238,200	103	1	1	2	2
	2010	DI	12	493		\$ 64,090	103	1	1	3	3
	2016	DI	12	2,505		\$ 325,650	109	1	1	3	3
Hydrants - Useful Life: 90 Years											
Replacement cost @ \$3,000 each	1900			74		\$ 222,000	-27	4	4	2	8
	1910			8		\$ 24,000	-17	4	4	2	8
	1940			6		\$ 18,000	13	3	3	2	6
	1950			33		\$ 99,000	23	3	3	2	6
	1960			72		\$ 216,000	33	2	2	2	4
	1970			48		\$ 144,000	43	2	2	2	4
	1980			95		\$ 285,000	53	1	1	2	2
	1990			62		\$ 186,000	63	1	1	2	2
	2000			2		\$ 6,000	73	1	1	2	2
	2001			15		\$ 45,000	74	1	1	2	2
	2002			3		\$ 9,000	75	1	1	2	2
	2003			7		\$ 21,000	76	1	1	2	2
	2004			7		\$ 21,000	77	1	1	2	2
	2005			33		\$ 99,000	78	1	1	2	2
	2006			3		\$ 9,000	79	1	1	2	2
	2007			3		\$ 9,000	80	1	1	2	2
	2008			2		\$ 6,000	81	1	1	2	2
	2009			3		\$ 9,000	82	1	1	2	2
	2010			4		\$ 12,000	83	1	1	2	2
	2016			4		\$ 12,000	89	1	1	2	2
Valves - Useful Life: 70 Years											
4"-6" @ \$1,800 each	1900		4	23		\$ 41,400	-47	4	4	2	8
8" @ \$2,000 each	1900		6	30		\$ 54,000	-47	4	4	2	8
10" @ \$2,500 each	1900		8	7		\$ 14,000	-47	4	4	2	8
12" @ \$3,000 each	1900		12	8		\$ 24,000	-47	4	4	2	8
16" @ \$4,000 each	1910		4	1		\$ 1,800	-37	4	4	2	8
20" @ \$4,500 each	1910		6	4		\$ 7,200	-37	4	4	2	8
	1910		8	2		\$ 4,000	-37	4	4	2	8
	1940		4	1		\$ 1,800	-7	3	3	2	6
	1940		6	5		\$ 9,000	-7	3	3	2	6
	1950		4	4		\$ 7,200	3	2	2	2	4
	1950		6	13		\$ 23,400	3	2	2	2	4
	1950		8	3		\$ 6,000	3	2	2	2	4
	1950		10	7		\$ 17,500	3	2	2	2	4
	1950		12	4		\$ 12,000	3	2	2	2	4
	1960		4	2		\$ 3,600	13	2	2	2	4
	1960		6	22		\$ 39,600	13	2	2	2	4
	1960		8	18		\$ 36,000	13	2	2	2	4
	1960		10	2		\$ 5,000	13	2	2	2	4
	1960		12	24		\$ 72,000	13	2	2	2	4
	1970		4	2		\$ 3,600	23	1	1	2	2
	1970		6	18		\$ 32,400	23	1	1	2	2
	1970		8	11		\$ 22,000	23	1	1	2	2
	1970		12	14		\$ 42,000	23	1	1	2	2
	1980		4	3		\$ 5,400	33	1	1	2	2
	1980		6	24		\$ 43,200	33	1	1	2	2
	1980		8	37		\$ 74,000	33	1	1	2	2
	1980		10	1		\$ 2,500	33	1	1	2	2
	1980		12	24		\$ 72,000	33	1	1	2	2
	1990		6	9		\$ 16,200	43	1	1	2	2
	1990		8	12		\$ 24,000	43	1	1	2	2
	1990		12	24		\$ 72,000	43	1	1	2	2
	1990		16	1		\$ 4,000	43	1	1	2	2
	1990		20	12		\$ 54,000	43	1	1	2	2
	2000		16	1		\$ 4,000	53	1	1	2	2
	2000		20	1		\$ 4,500	53	1	1	2	2
	2001		8	8		\$ 16,000	54	1	1	2	2
	2001		12	1		\$ 3,000	54	1	1	2	2
	2001		16	6		\$ 24,000	54	1	1	2	2
	2002		8	1		\$ 2,000	55	1	1	2	2
	2002		12	2		\$ 6,000	55	1	1	2	2
	2003		12	6		\$ 18,000	56	1	1	2	2



Table 2
Water Asset Inventory

Distribution Assets	Year Installed	Material	Diameter (in)		Manufacturer	Replacement Cost	Remaining Useful Life in Years	Condition	Probability of Failure	Consequence of Failure	Criticality Factor
	2004		4	1		\$ 1,800	57	1	1	2	2
	2004		12	1		\$ 3,000	57	1	1	2	2
	2004		16	4		\$ 16,000	57	1	1	2	2
	2005		8	11		\$ 22,000	58	1	1	2	2
	2005		12	12		\$ 36,000	58	1	1	2	2
	2005		16	8		\$ 32,000	58	1	1	2	2
	2006		12	2		\$ 6,000	59	1	1	2	2
	2007		12	3		\$ 9,000	60	1	1	2	2
	2009		6	2		\$ 3,600	62	1	1	2	2
	2010		8	3		\$ 6,000	63	1	1	2	2
	2010		12	1		\$ 3,000	63	1	1	2	2
	2016		12	4		\$ 12,000	69	1	1	2	2

*Assume all watermain less than 8" in diameter will be replaced with 8" watermain

The City of Big Rapids commits to maintaining and improving the water system to provide clean, safe drinking water and fire protection to the community while minimizing the long-term costs for their operation. The most cost effective means of the maintenance and improvements will be sought without sacrificing quality. The City is committed to providing excellent customer service to the constituents.

LOS Determinants	Define the goal	How often do you measure it
NPDES requirements	Meet federal and state water quality standards.	Monitor water quality: monthly for bacteria, annually for partial chemical, and triannually for metals.
Safety	Safe work environment.	Safety meetings, no MIOSHA violations.
Security	Secure water installations from tampering.	Maintain fenced, locked, and lit well houses and water towers.
Operator certification	Certified operators to operate and maintain system.	Maintain a minimum of two certified operators at all times.
Customer complaints	Provide excellent customer service.	Respond to and investigate customer complaints within one business day of report, then provide results to the customer.
Upcoming regulatory changes	Keep up with regulatory changes and comply in a timely fashion.	Attend conferences and training to keep regulatory compliance current. Meet annually with MDEQ to ensure compliance.
Response time	Provide excellent customer service.	Respond to customer emergencies within 30 minutes of receiving report. Give 24 hour advance notice of planned service interruptions.
Operating Reserves	Funds to address unexpected breakdowns and major expenses.	Maintain an operating reserve of 50% OM&R budget.
Internal versus external funding	Balance internal vs external funding for projects.	Seek external funding for major projects as they present themselves.
Water Supply	Sustain water supplies.	Annual inspections of wells and pumps, then complete recommended improvements to keep functioning as designed.
Water Quality	Provide quality, good tasting water.	Maintain water treatment equipment and flush watermains twice annually.
Water Storage	Maintain for longer lifespan.	Professional inspection every 5 years and complete recommended improvements.
Distribution	Maintain pipes, hydrants, and valves to ensure good working order.	Flush watermains annually and maintain normal condition pressure between 30 and 90 psi.
Administrative	Ensure accurate billing.	Review discrepancies and correct in a timely fashion.

Table 4
Capital Improvement Project Plan

Projects	Years Until Project Begins	Projected Cost
Repaint 1.0 MG reservoir	1	\$ 90,000
Recoat the exterior of the State Street water tower along with other miscellaneous improvements	1	\$ 250,000
Replace 1,200 feet of 10-inch watermain with 12-inch watermain on Ives Avenue from Oak Street to Magnolia.	1	\$ 158,000
Replace 500 feet of 6-inch watermain with 8-inch watermain on Clark Street from Fuller Avenue to Morrison Avenue.	2	\$ 60,000
Replace 1,300 feet of 10-inch watermain with 12-inch watermain on South Street from State Street to Stadium Dr.	2	\$ 250,000
Bulk water fill station	2	\$ 44,300
Replace 1,000 feet of 4-inch watermain with 8-inch watermain on Darwin Avenue from Catherine Street to Bjornson Street.	2	\$ 120,000
Replace 600 feet of 6-inch watermain with 8-inch watermain on Dexter Avenue from Baily Drive to cul-de-sac.	2	\$ 72,000
Replace 700 feet of 10-inch watermain with 12-inch watermain on South Street from Stadium Dr. to Demascus	3	\$ 91,000
Replace 1,600 feet of 10-inch watermain with 12-inch watermain on Ives Avenue from Demascus to Magnolia.	3	\$ 208,000
Replace 1,300 feet of 6-inch watermain with 8-inch watermain on Baily Drive from Woodward Avenue to Fuller Avenue.	3	\$ 156,000
Loop 400 feet of 8-inch watermain on Magnolia Street from Ives Avenue to Winter Street.	3	\$ 48,000
Led lighting at the water plant	4	\$ 66,000
Replace 1,500 feet of 6-inch watermain with 8-inch watermain on Winter Avenue from Chestnut Street to Cypress Street, then east 90 feet.	4	\$ 180,000
Replace 800 feet of 6 inch watermain with 8 inch watermain on Green St. from Spring St. to Woodward Ave.	4	\$ 96,000
Replace 2,100 feet of 4-inch watermain on Colburn Aveune from Bronson Avenue to Third Avenue.	4	\$ 252,000
Replace 900 feet of 6-inch watermain with 8-inch watermain on Ridgeview Drive from Dexter Avenue to Fuller Avenue.	5	\$ 108,000
Clarifier Painting	5	\$ 110,000
New pump and motor at State Street booster station	5	\$ 80,000
Replace 900 feet of 4-inch watermain with 8-inch watermain on Darwin Avenue from Olaf Street to Bjornson Street.	5	\$ 108,000
Replace 700 feet of 4-inch watermain with 8-inch watermain on Bjornson Street from Milton Avenue to Speer Avenue.	5	\$ 96,000
Install 1,400 feet of 12-inch watermain from 205th east to Gilbert Road	6	\$ 182,000
Replace 400 feet of 6-inch watermain with 8-inch watermain on Finley Avenue from Bellevue Street to Madison Street.	6	\$ 48,000
Replace 600 feet of 6 inch watermain with 8 inch watermain on Monroe Ave from Madison St. to dead end	6	\$ 72,000
Install 700 feet of 12-inch watermain on Northland Drive from Gilbert Road to 14 Mile Road.	6	\$ 91,000
Install 4,600 feet of 12-inch watermain on 205 th Avenue from 15 Mile Road south to west of Gilbert Road, then east to existing 12-inch watermain.	7	\$ 598,000
Replace 1,400 feet of 6-inch watermain with 12-inch watermain on Northland Drive from Waterloo Street to Williams Street, then west to Marion Avenue.	8	\$ 182,000
Replace 500 feet of 8-inch watermain with 12-inch watermain on Marion Avenue from Williams Street to Fremont Street.	8	\$ 65,000
Replace 600 feet of 4-inch watermain with 12-inch watermain, then continue with 900 feet of 12-inch watermain on West Avenue from Northland Drive to Sheridan Street.	8	\$ 195,000
Replace 500 feet of 4-inch watermain with 8-inch watermain on Marion Avenue from Pine Street to Spruce Street.	8	\$ 60,000
Replace HS pump No. 3 with adequately sized pump	9	\$ 225,000
Replace 1,200 feet of 4-inch watermain with 8-inch watermain on Stewart Avenue from Elm Street to Spruce Street, then west on Spruce to the alley.	9	\$ 144,000
Replace 1,000 feet of 6-inch watermain with 12-inch watermain on Dekraft Avenue from Milton Avenue N, then install another 1,700 feet to Harding Drive.	9	\$ 351,000
Loop 1,300 feet of 8-inch watermain on Harding Drive from Bjornson Street to 190 th Avenue.	10	\$ 156,000
Replace 500 feet of 6-inch watermain with 8-inch watermain on Escott Street from Rust Avenue to Sanborn Avenue.	10	\$ 60,000
Recoat the exterior, wet interior, and part of the dry interior of the Ferris water tower along with other miscellaneous improvements	10	\$ 199,000
Install 1,300 feet of 12-inch watermain on 14 Mile Road from Northland Drive to the University Park Suites	10	\$ 200,000
Redundant raw watermain from wellfield to treatment plant Phase I	11	\$ 600,000
Redundant raw watermain from wellfield to treatment plant Phase II	12	\$ 600,000
Redundant raw watermain from wellfield to treatment plant Phase III	13	\$ 600,000
Redundant raw watermain from wellfield to treatment plant Phase IV	14	\$ 600,000
Install 2,650 feet of 12 inch watermain on Woodward from Bailey Dr. to Waldren Way Phase I	15	\$ 350,000
Install 2,650 feet of 12 inch watermain on Woodward from Bailey Dr. to Waldren Way Phase II	16	\$ 350,000
Install 2,300 feet of 12 inch watermain on Waldron Way from Woodward south to 16 inch main west of Meijer	17	\$ 300,000
Replace 1,800 feet of 6-inch and 8-inch watermain with 12-inch watermain Northland Drive from Freemont to north	17	\$ 250,000
Install 2,400 feet of 12 inch watermain on Woodward from Waldron Way to 220th	18	\$ 462,000
Install 7,100 feet of 8 inch watermain on 220th from Woodward to south	19	\$ 850,000
Install 4,100 feet of 8 inch watermain from south end of 220th east to 215th and north to complete loop	20	\$ 500,000

Table 5
Ten Year Budget

City of Big Rapids
Water Asset Management Program
Project # 832090

INFLATION FACTOR (%) - 2.0 **

EXPENSES	Current Year	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
OPERATIONS & MAINTENANCE										
Salaries	\$ 334,400	\$ 341,088	\$ 347,910	\$ 354,868	\$ 361,965	\$ 369,205	\$ 376,589	\$ 384,120	\$ 391,803	\$ 399,639
Benefits	\$ 302,700	\$ 308,754	\$ 314,929	\$ 321,228	\$ 327,652	\$ 334,205	\$ 340,889	\$ 347,707	\$ 354,661	\$ 361,755
Uniform	\$ 1,200	\$ 1,224	\$ 1,248	\$ 1,273	\$ 1,299	\$ 1,325	\$ 1,351	\$ 1,378	\$ 1,406	\$ 1,434
DPW Services	\$ 144,700	\$ 147,594	\$ 150,546	\$ 153,557	\$ 156,628	\$ 159,760	\$ 162,956	\$ 166,215	\$ 169,539	\$ 172,930
Chemicals	\$ 40,000	\$ 40,800	\$ 41,616	\$ 42,448	\$ 43,297	\$ 44,163	\$ 45,046	\$ 45,947	\$ 46,866	\$ 47,804
Operational Supplies	\$ 68,000	\$ 69,360	\$ 70,747	\$ 72,162	\$ 73,605	\$ 75,077	\$ 76,579	\$ 78,111	\$ 79,673	\$ 81,266
Maintenance Materials	\$ 30,000	\$ 30,600	\$ 31,212	\$ 31,836	\$ 32,473	\$ 33,122	\$ 33,785	\$ 34,461	\$ 35,150	\$ 35,853
Contract Services	\$ 90,000	\$ 91,800	\$ 93,636	\$ 95,509	\$ 97,419	\$ 99,367	\$ 101,355	\$ 103,382	\$ 105,449	\$ 107,558
Fuel	\$ 2,000	\$ 2,040	\$ 2,081	\$ 2,122	\$ 2,165	\$ 2,208	\$ 2,252	\$ 2,297	\$ 2,343	\$ 2,390
Annual Well Maintenance	\$ 20,000	\$ 20,400	\$ 20,808	\$ 21,224	\$ 21,649	\$ 22,082	\$ 22,523	\$ 22,974	\$ 23,433	\$ 23,902
Wellhead Protection Measures	\$ 2,500	\$ 2,550	\$ 2,601	\$ 2,653	\$ 2,706	\$ 2,760	\$ 2,815	\$ 2,872	\$ 2,929	\$ 2,988
Tank Inspection	\$ 2,500	\$ 2,550	\$ 2,601	\$ 2,653	\$ 2,706	\$ 2,760	\$ 2,815	\$ 2,872	\$ 2,929	\$ 2,988
MDEQ Fee	\$ 14,600	\$ 14,892	\$ 15,190	\$ 15,494	\$ 15,804	\$ 16,120	\$ 16,442	\$ 16,771	\$ 17,106	\$ 17,448
Engineering Services	\$ 22,000	\$ 22,440	\$ 22,889	\$ 23,347	\$ 23,814	\$ 24,290	\$ 24,776	\$ 25,271	\$ 25,777	\$ 26,292
Independent Audit Fees	\$ 2,800	\$ 2,856	\$ 2,913	\$ 2,971	\$ 3,031	\$ 3,091	\$ 3,153	\$ 3,216	\$ 3,281	\$ 3,346
Insurance Coverages	\$ 22,100	\$ 22,542	\$ 22,993	\$ 23,453	\$ 23,922	\$ 24,400	\$ 24,888	\$ 25,386	\$ 25,894	\$ 26,412
Operator License Fees	\$ 500	\$ 510	\$ 520	\$ 531	\$ 541	\$ 552	\$ 563	\$ 574	\$ 586	\$ 598
Travel Expenses	\$ 3,000	\$ 3,060	\$ 3,121	\$ 3,184	\$ 3,247	\$ 3,312	\$ 3,378	\$ 3,446	\$ 3,515	\$ 3,585
Training	\$ 1,500	\$ 1,530	\$ 1,561	\$ 1,592	\$ 1,624	\$ 1,656	\$ 1,689	\$ 1,723	\$ 1,757	\$ 1,793
Public Utilities	\$ 175,000	\$ 178,500	\$ 182,070	\$ 185,711	\$ 189,426	\$ 193,214	\$ 197,078	\$ 201,020	\$ 205,040	\$ 209,141
Cross Connection	\$ 22,000	\$ 22,440	\$ 22,889	\$ 23,347	\$ 23,814	\$ 24,290	\$ 24,776	\$ 25,271	\$ 25,777	\$ 26,292
Operational Repairs & Maintenance	\$ 74,000	\$ 75,480	\$ 76,990	\$ 78,529	\$ 80,100	\$ 81,702	\$ 83,336	\$ 85,003	\$ 86,703	\$ 88,437
Membership Fees	\$ 1,000	\$ 1,020	\$ 1,040	\$ 1,061	\$ 1,082	\$ 1,104	\$ 1,126	\$ 1,149	\$ 1,172	\$ 1,195
Lunch/ Dinner Meetings	\$ 100	\$ 102	\$ 104	\$ 106	\$ 108	\$ 110	\$ 113	\$ 115	\$ 117	\$ 120
Equipment	\$ 8,000	\$ 8,160	\$ 8,323	\$ 8,490	\$ 8,659	\$ 8,833	\$ 9,009	\$ 9,189	\$ 9,373	\$ 9,561
Equipment Rental	\$ 60,000	\$ 61,200	\$ 62,424	\$ 63,672	\$ 64,946	\$ 66,245	\$ 67,570	\$ 68,921	\$ 70,300	\$ 71,706
Wireless Meter Reading	\$ 72,000	\$ 73,440	\$ 74,909	\$ 76,407	\$ 77,935	\$ 79,494	\$ 81,084	\$ 82,705	\$ 84,359	\$ 86,047
Security Cameras	\$ 15,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Software	\$ 2,000	\$ 2,040	\$ 2,081	\$ 2,122	\$ 2,165	\$ 2,208	\$ 2,252	\$ 2,297	\$ 2,343	\$ 2,390
Software Maintenance	\$ 900	\$ 918	\$ 936	\$ 955	\$ 974	\$ 994	\$ 1,014	\$ 1,034	\$ 1,054	\$ 1,076
TOTAL OM&R EXPENSES	\$ 1,534,500	\$ 1,549,890	\$ 1,580,888	\$ 1,612,506	\$ 1,644,756	\$ 1,677,651	\$ 1,711,204	\$ 1,745,428	\$ 1,780,336	\$ 1,815,943
Debt Services	\$ 222,400	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Capital Improvements	\$ 485,000	\$ 546,300	\$ 513,060	\$ 605,880	\$ 512,040	\$ 400,860	\$ 609,960	\$ 512,040	\$ 734,400	\$ 627,300
Water Replacement	\$ -	\$ 200,000	\$ 250,000	\$ 200,000	\$ 300,000	\$ 350,000	\$ 250,000	\$ 300,000	\$ 150,000	\$ 250,000
General Fund Contribution	\$ 271,500	\$ 276,930	\$ 282,469	\$ 288,118	\$ 293,880	\$ 299,758	\$ 305,753	\$ 311,868	\$ 318,106	\$ 324,468
TOTAL EXPENSES	\$ 2,513,400	\$ 2,573,120	\$ 2,626,416	\$ 2,706,504	\$ 2,750,676	\$ 2,728,269	\$ 2,876,917	\$ 2,869,336	\$ 2,982,842	\$ 3,017,711
REVENUES										
User charge Revenue***	\$ 2,568,600	\$ 2,619,972	\$ 2,672,371	\$ 2,725,819	\$ 2,780,335	\$ 2,835,942	\$ 2,892,661	\$ 2,950,514	\$ 3,009,524	\$ 3,069,715
Miscellaneous Revenue	\$ 5,000	\$ 5,100	\$ 5,202	\$ 5,306	\$ 5,412	\$ 5,520	\$ 5,631	\$ 5,743	\$ 5,858	\$ 5,975
Interest Income	\$ 5,000	\$ 5,100	\$ 5,202	\$ 5,306	\$ 5,412	\$ 5,520	\$ 5,631	\$ 5,743	\$ 5,858	\$ 5,975
TOTAL REVENUES	\$ 2,578,600	\$ 2,630,172	\$ 2,682,775	\$ 2,736,431	\$ 2,791,160	\$ 2,846,983	\$ 2,903,922	\$ 2,962,001	\$ 3,021,241	\$ 3,081,666
BUDGET SURPLUS/DEFICIT	\$ 65,200	\$ 57,052	\$ 56,359	\$ 29,927	\$ 40,484	\$ 118,714	\$ 27,006	\$ 92,665	\$ 38,399	\$ 63,955

* The 10 Year Budget is for estimation purposes only. It is not intended for determining debt funding needs. For a more accurate debt evaluation please seek the services of a financial advisor.

** The annual inflation factor can be found at the following website
<http://www.usinflationcalculator.com/inflation/historical-inflation-rates/>

*** See detailed calculations for current year in Attachment 2 and 3

Attachment 1
SCHEDULE OF WATER & SEWER RATES

METER SIZE	WATER RATES EFFECTIVE JULY 1, 2017 ORDINANCE NO. 703-06-17			WATER RATES EFFECTIVE JULY 1, 2017 ORDINANCE No. 704-06-17	
	RESIDENTIAL MINIMUM BILLING - WATER	COMMERCIAL/INDUSTRIAL MINIMUM BILLING - WATER	INSTITUTIONAL MINIMUM BILLING - WATER	RESIDENTIAL MINIMUM BILLING - SEWER	COMMERCIAL/INDUSTRIAL/INSTITUTIONAL MINIMUM BILLING - SEWER
5/8	\$4.00 Base Charge	\$4.00 Base Charge	\$10.00 Base Charge	\$5.40 Base Charge	\$5.40 Base Charge
3/4	\$4.00 Base Charge	\$8.25 Base Charge	\$16.80 Base Charge	\$5.40 Base Charge	\$23.71 Base Charge
1	\$4.00 Base Charge	\$24.68 Base Charge	\$27.67 Base Charge	\$5.40 Base Charge	\$39.64 Base Charge
1 1/2		\$43.48 Base Charge	\$59.87 Base Charge		\$90.45 Base Charge
2		\$118.37 Base Charge	\$115.17 Base Charge		\$218.70 Base Charge
3		\$218.75 Base Charge	\$197.07 Base Charge		\$373.73 Base Charge
4		\$195.06 Base Charge	\$374.87 Base Charge		\$662.90 Base Charge
6		\$421.49 Base Charge	\$606.57 Base Charge		\$1,189.64 Base Charge

WATER

Commodity Charge of \$6.15/1,000 gallons

Commodity Charge Institutional Water Rate \$7.00/1,000 gallons

SEWER

Sewer Rate \$7.00/1,000 gallons.

Sewer Flat Rate \$61.40/unit/month(*8 Units x \$7.00 + \$5.40 Base Charge)

*8 Units established - City Ordinance 54.10

IPP Sewer Rate \$7.82/1,000 gallons (\$7.00 Sewer + \$0.82 IPP Rate from User Charge).

IPP Flat Rate \$6.56/unit/month (*8 Units x \$0.82 IPP Rate from User Charge)

Water User Charge Revenue**Attachment 2****2017 Base Revenue**

Meter Size	Customers	Base Rate	Annual Base Revenue
5/8	1878	\$4.00	\$90,144.00
3/4	64	\$8.25	\$6,336.00
1	151	\$24.68	\$44,720.16
1-1/2	76	\$43.48	\$39,653.76
2	62	\$118.37	\$88,067.28
3	23	\$218.75	\$60,375.00
4	5	\$195.06	\$11,703.60
6	1	\$421.49	\$5,057.88
Flat	<u>1</u>	\$53.20	<u>\$638.40</u>
	2261		\$346,696.08

2017 Revenue Projection

FY 2016 Unit Consumption	332,789
Projected Consumption Increase	<u>0.00%</u>
FY 2017 Estimated Unit Consumption	332,789
New Connections	<u>3800</u>
FY 2018 Adjusted Consumption	336,589
Unit Rate	<u>\$6.15</u>
Estimated Volumetric Revenue	\$2,070,022.35
Estimated Institutional Adjustment	\$116,937.31
Estimated Base Revenue	\$346,696.08
Miscellaneous Administrative Income	\$34,950
Total Estimated User Charge Revenue	\$2,568,605.74

Water Institutional Rate

Fiscal Year 2016/2017

Attachment 3

Meter Size	Customers	Base Rate	Annual Base Revenue	Monthly Base Rate Difference	Annual Base Rate Difference
5/8"	73	\$10.00	\$8,760.00	\$6.00	\$5,256.00
3/4"	7	\$16.80	\$1,411.20	(\$2.40)	(\$201.79)
1"	81	\$27.67	\$26,895.24	\$5.18	\$5,032.61
1 -1/2"	18	\$59.87	\$12,931.92	\$21.50	\$4,644.66
2"	22	\$115.17	\$30,404.88	(\$1.19)	(\$313.79)
3"	20	\$197.07	\$47,296.80	(\$13.75)	(\$3,299.92)
4"	4	\$374.87	\$17,993.76	\$71.42	\$3,428.16
6"	0	\$606.57	\$0.00	\$275.41	\$0.00
Total	225		\$145,693.80		\$14,545.92

Institutional Rate Comparison

Base Rate Difference \$14,545.92

FY 2016 Volume 114,373

Projected Consumption Decrease 2.00%

FY 2017 Estimated Volume 116,660

Creek's Edge Connection 2,300

Hampton Inn 600

The Brooke Assisted Living 900

Adjusted FY 2016 Consumption 120,460

Standard Volumetric Rate \$6.15

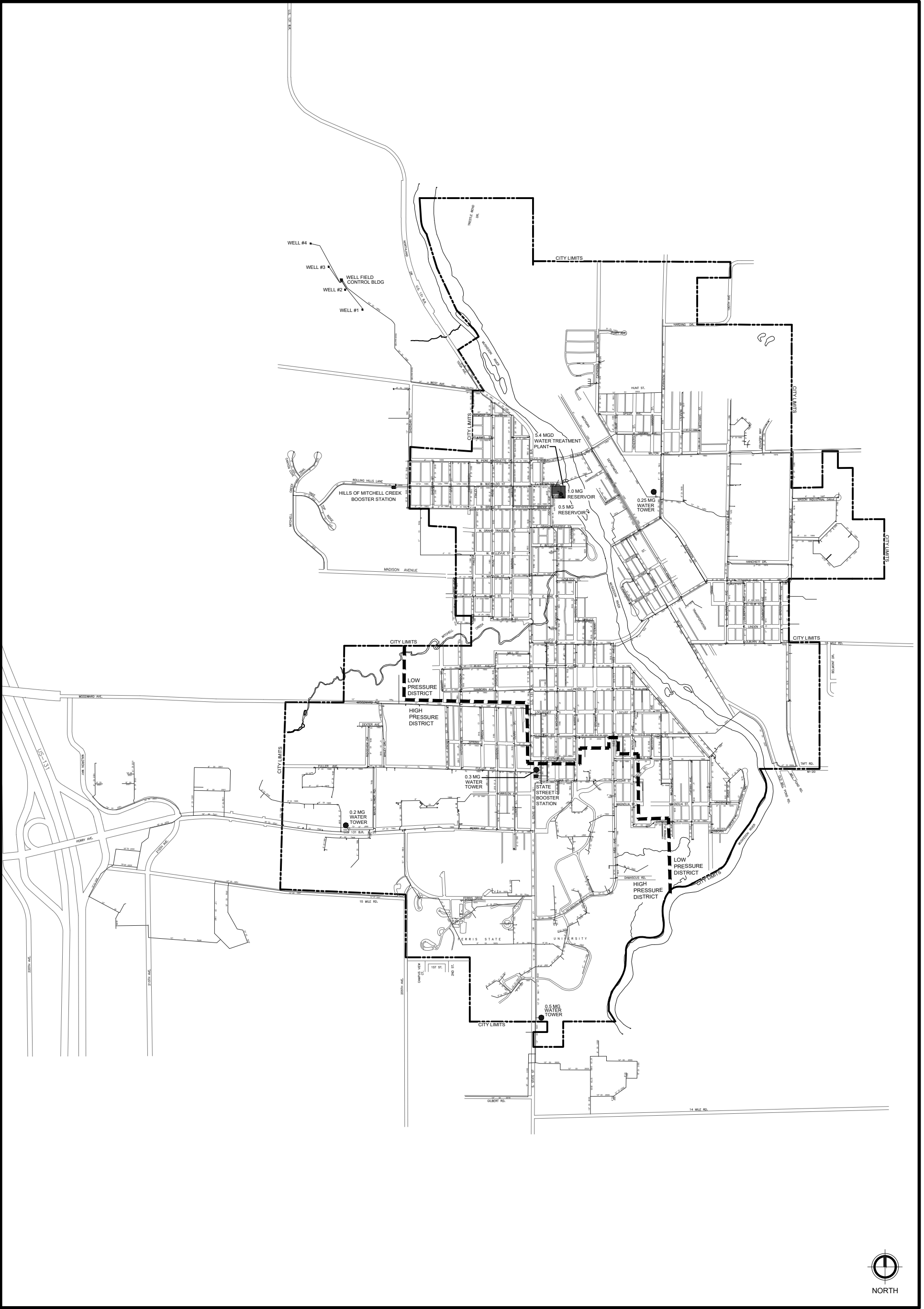
Standard Volume Revenue \$740,831.83

Institutional Volumetric Rate \$7.00

Institutional Volume Revenue \$843,223.22

Difference in Institutional Volume \$102,391.39

Net Difference in Institutional Rates \$116,937.31



LEGEND

- x— WATERMAIN WITH SIZE
- ↑ FIRE HYDRANT
- ⋈ VALVES
- PRESSURE DISTRICT BORDER

CITY OF BIG RAPIDS
MECOSTA COUNTY, MICHIGAN
EXISTING WATER SYSTEM
ATTACHMENT 4

832090
F&V PROJECT NO.

