



# STATE OF IOWA

TERRY E. BRANSTAD, GOVERNOR  
KIM REYNOLDS, LT. GOVERNOR

DEPARTMENT OF NATURAL RESOURCES  
CHUCK GIPP, DIRECTOR

April 11, 2016

LUKE NELSON, ADMINISTRATOR  
CITY OF BOONE  
923 8<sup>TH</sup> STREET  
BOONE, IA 50036

RE: City of Boone Integrated Wastewater Plan Approval

Dear Mr. Nelson

On May 1, 2014 the Department reissued NPDES permit #0819001 for the City of Boone's wastewater treatment facility discharge with a compliance schedule to comply with limits for bacteria by May 1, 2018. In response to that schedule, on January 28, 2016, Wayne Schwartz, City Engineer for the City of Boone, submitted a document titled City of Boone Integrated Wastewater Plan. The plan describes past, present and future financial and environmental obligations as related to the City's wastewater infrastructure and treatment facilities with the overall goal of justifying additional time to comply with the final bacteria limit. Priorities are based on environmental benefit, health and safety concerns, and financial availability.

The plan outlines the importance of additional time to install disinfection equipment in order to complete current infrastructure projects related to inflow and infiltration (I&I) reductions that will directly influence the sizing, and overall cost, of the necessary disinfection equipment. The I&I reduction project has been ongoing for numerous years, resulting in substantial debt and high user fees.

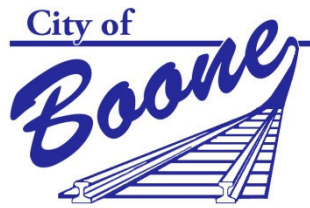
After final review, the Department agrees with the analysis presented in the plan. The City of Boone Integrated Wastewater Plan is approved and will be amended into the City's NPDES permit to reflect the final compliance date for bacteria limits of March 1, 2023.

If you have any questions, please contact me at [ben.hucka@dnr.iowa.gov](mailto:ben.hucka@dnr.iowa.gov) or 515-725-8406.

Sincerely,

Ben Hucka  
NPDES Section

Cc. DNR Field Office #5  
Sewage File 6-08-19-0-01



## City of Boone Integrated Wastewater Plan

The city of Boone integrated plan incorporates all aspects of the City's sanitary sewer collection system and treatment plant. The goal of the City's Integrated Plan is to create a sanitary system project list and schedule that will result in the greatest protection of the environment and human health with the financing available. A key component will be to achieve compliance with the water environment plant's NPDES permit effective May 1, 2014, which requires disinfection of the plant effluent to meet E. coli limits.

### **Element 1: A description of the water quality, human health and regulatory issues to be addressed in the plan.**

The City's Water Environment Plant discharges directly to Honey Creek which drains to the Des Moines River. Honey Creek is a perennial stream and has been designated a Class A2 Secondary Contact Recreational Use waterway. Class A2 waters are considered "Waters in which recreational or other uses may result in contact with the water that is either incidental or accidental. During the recreational use, the probability of ingesting appreciable quantities of water is minimal. Class A2 uses include fishing, commercial and recreational boating, any limited contact incidental to shoreline activities and activities in which users do not swim or float in the water body while on a boating activity." To protect public health, and the waters receiving the treatment plant's effluent, the City may not discharge effluent with E. coli concentration more than 300 org/100mL from March – November. The existing treatment plant equipment and processes are not able to achieve compliance with these new E. coli limits. The primary objective of this integrated plan is to layout a schedule for installation of new equipment and procedures to meet the new limits.

Overall, Boone Utilities have offered customers quality service for many years with sound operations providing little environmental impact. Like many communities with 100+ year infrastructure, we found that portions of our system were in disrepair. Specifically, the condition of our trunk sewers allowed for the sanitary system to become surcharged during heavy rain events. The results of that situation lead to sporadic basement backups.

A concern for any entity operating a sanitary sewer system is backups of the system onto private property. The City has recently achieved compliance with an IDNR Consent Order to complete sanitary sewer improvements to eliminate bypasses and basement backups. The City invested over \$12 million dollars in sanitary sewer rehabilitation, replacement, and upgrades as a means of relieving sewer surcharging during heavy rain events.

While the improvements have

been successful, they have burdened the rate payers with some of the highest rates in the state. Figure 1 shows utility billing in terms of average monthly cost over the past 32 years. Sewer rates in Boone increased by as much as 100% for some customers as a result of the recent sanitary sewer upgrades.

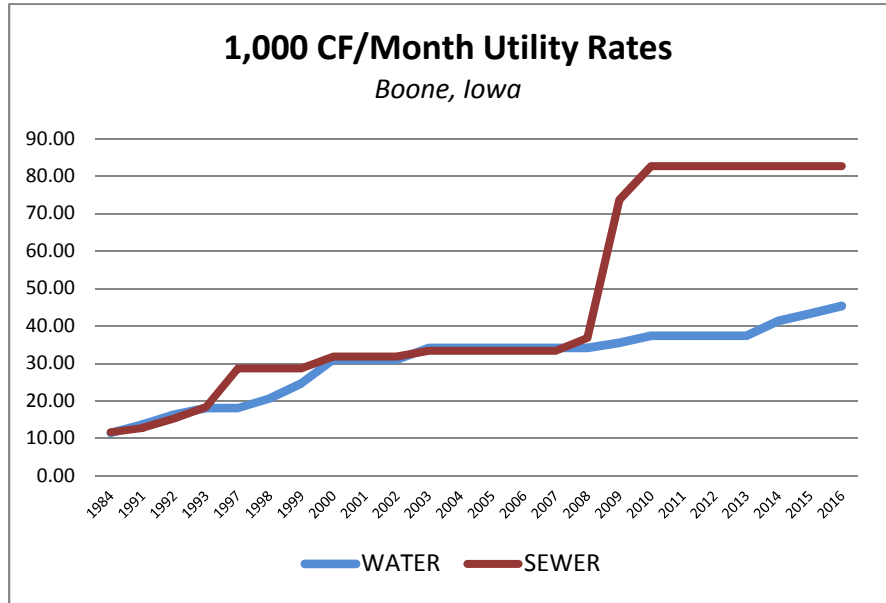


Figure 1 – Utility Rates Over Time

2015 Residential Sewer Rate Survey  
Iowa Cities Over 10,000 Population  
All Wastewater Plants  
Prepared by the City of Ames, Iowa

Minimum or 200 CF		600 CF		1,000 CF		10,000 CF		50,000 CF		100,000 CF	
North Liberty	29.68	Clinton	53.76	Clinton	89.58	Clinton	896.00	Clinton	4,480	Clinton	8,960
Ankeny	29.18	Ankeny	51.04	Ankeny	82.70	Boone	300.00	Boone	3,998	Boone	7,973
Muscatine	26.96	Boone	50.82	Boone	72.28	Indianola	677.70	Indianola	3,393	Indianola	6,786
Keokuk	26.25	North Liberty	44.39	Waukeee	69.71	Waukeee	671.13	Waukeee	3,344	Waukeee	6,688
Fort Madison	25.67	Ottumwa	43.00	Indianola	66.83	Ankeny	574.09	Ankeny	2,786	Ankeny	5,582
Storm Lake	25.27	Waukeee	42.98	Ottumwa	62.00	Altoona	308.25	Altoona	2,521	Altoona	5,038
Ottumwa	24.00	Keokuk	40.73	North Liberty	59.09	Ottumwa	489.50	Ottumwa	2,390	Ottumwa	4,785
Pella	23.38	Fort Madison	40.01	Keokuk	58.10	Des Moines	475.40	Waverly	2,365	Waverly	4,730
Davenport	22.59	Indianola	39.68	Altoona	55.33	Waverly	473.00	Des Moines	2,359	Des Moines	4,714
Spencer	21.28	Davenport	37.67	Fort Madison	54.35	Dubuque	461.00	Dubuque	2,305	Dubuque	4,610
Marshalltown	21.17	Storm Lake	36.58	Davenport	52.75	Keokuk	448.92	Keokuk	2,186	Keokuk	4,367
Boone	18.94	Pella	36.13	Des Moines	51.50	Oskaloosa	425.73	Oskaloosa	2,094	Oskaloosa	4,179
Clinton	17.92	Altoona	35.20	Oskaloosa	50.73	West Des Moines	415.70	West Des Moines	2,065	West Des Moines	4,128
Oskaloosa	17.07	Muscatine	34.60	Pella	48.88	Pella	407.34	Sioux City	2,024	Sioux City	4,023
Waukeee	16.25	Oskaloosa	33.75	Storm Lake	47.89	Iowa City	403.16	Iowa City	1,999	Iowa City	3,994
Ames	16.19	Waverly	33.74	Waverly	47.30	Carroll	396.45	Carroll	1,952	Carroll	3,897
Burlington	16.19	Des Moines	32.66	Spencer	46.19	Johnston	391.83	Johnston	1,937	Johnston	3,868
Fort Dodge	15.80	Carroll	30.21	Dubuque	46.10	Davenport	391.39	Davenport	1,904	Clive	3,802
Carroll	15.23	Marshalltown	29.69	Muscatine	44.84	North Liberty	389.84	Davenport	1,899	Davenport	3,784
Bettendorf	14.96	Clive	29.40	Carroll	44.61	Clive	386.13	North Liberty	1,880	North Liberty	3,697
Marion	14.90	Johnston	28.76	Clive	44.58	Fort Madison	377.00	Fort Madison	1,811	Fort Madison	3,604
Cedar Falls	14.30	Waverly	28.38	West Des Moines	44.45	Newton	354.34	Newton	1,742	Newton	3,477
Waterloo	14.25	Burlington	28.31	Johnston	44.21	Pella	335.76	Pella	1,611	Pella	3,205
Clive	14.22	Iowa City	28.10	Iowa City	44.06	Burlington	313.13	Burlington	1,525	Burlington	3,040
Des Moines	13.82	West Des Moines	27.95	Sioux City	42.52	Storm Lake	302.36	Coralville	1,463	Coralville	2,923
Johnston	13.31	Dubuque	27.66	Burlington	40.43	Spencer	296.81	Storm Lake	1,433	Storm Lake	2,847
Indianola	12.53	Ames	27.15	Marshalltown	38.61	Coralville	296.01	Ames	1,381	Ames	2,721
Cedar Rapids	12.15	Sioux City	26.58	Newton	38.57	Ames	284.71	Muscatine	1,304	Muscatine	2,589
Iowa City	12.14	Bettendorf	24.88	Ames	36.11	Muscatine	276.19	Cedar Falls	1,289	Cedar Falls	2,569
Altoona	11.71	Newton	24.69	Bettendorf	34.80	Cedar Falls	265.18	Bettendorf	1,250	Bettendorf	2,490
Waverly	11.59	Cedar Falls	24.54	Cedar Falls	34.78	Bettendorf	258.00	Bettendorf	1,222	Urbandale	2,440
West Des Moines	11.45	Marion	22.70	Coralville	32.25	Urbandale	246.65	Mason City	1,191	Mason City	2,377
Newton	10.81	Waterloo	21.15	Marion	30.50	Mason City	242.07	Spencer	1,188	Spencer	2,307
Sioux City	10.63	Coralville	20.57	Waterloo	30.35	Waterloo	237.35	Waterloo	1,157	Spencer	2,302
Mason City	9.80	Fort Dodge	20.39	Fort Dodge	29.57	Fort Dodge	236.12	Fort Dodge	1,154	Fort Dodge	2,302
Dubuque	9.22	Mason City	19.11	Mason City	28.59	Marshalltown	234.89	Marshalltown	1,107	Marshalltown	2,197
Coralville	8.85	Cedar Rapids	18.69	Urbandale	27.28	Marion	206.00	Marion	986	Marion	1,961
Urbandale	7.76	Urbandale	17.53	Cedar Rapids	26.24	Council Bluffs	186.80	Council Bluffs	891	Council Bluffs	1,771
Council Bluffs	7.44	Council Bluffs	14.82	Council Bluffs	25.22	Cedar Rapids	172.52	Cedar Rapids	827	Cedar Rapids	1,645
West Des Moines	7.02	West Des Moines	11.28	West Des Moines	12.12	West Des Moines	106.21	West Des Moines	211	West Des Moines	1,011
High	29.68	High	53.76	High	89.58	High	896.00	High	4,480.00	High	8,960.00
Median	14.93	Median	29.08	Median	44.60	Median	381.57	Median	1,835.42	Median	3,650.42
Low	7.02	Low	11.28	Low	12.12	Low	106.21	Low	211.00	Low	1,011.00

Figure 2 – Sewer Rates Comparison shows Boone waste water rates among the highest for Iowa cities over 10,000 population. Further expenditures on the sanitary system will have to be carefully reviewed and chosen to provide the largest benefit at the lowest costs to prevent further rate increases.

**Element 2: A description of the existing wastewater and storm water systems under consideration and summary information describing the systems' current performance.**

The city of Boone solely owns and operates the sanitary, storm and water utilities serving the community. Sanitary sewer service is provided to approximately 12,600 people and an industrial park adjacent to the City. The City utilizes an activated sludge process for treatment and the sewer flow is primarily domestic waste. The treatment plant was constructed in 1993 and is rated to treat:

- 2.1 million gallons per day (MGD) of average dry weather flow
- 7.0 MGD of average wet weather flow
- 15.1 MGD of maximum wet weather flow
- 24.6 MGD peak hourly wet weather flow

The sanitary sewer collection system consists of approximately 1,200 manholes and 75 miles of sanitary sewer collection system piping ranging in size from 6-inch to 42-inch. Much of the collection system is the original sewer installed as the community developed and is likely over 100-years old. This aging system is primarily clay pipe with pipe joints every 3-feet. While the main trunk sewers are new within the past five years, a bulk of the collection system is in poor condition and has significant inflow and infiltration (I/I).

The City has five sewer pump stations throughout the community. The pump stations are of varying age and condition. The two newest lift stations are only five years old with others planned for replacement in the upcoming decade. Equipment failures and/or hydraulic overloading of the stations are a concern as these could lead to a direct discharge of sanitary sewage to the environment. In particular, the Park Avenue lift station, which is located directly adjacent to Polecat Creek, has been known to flood during heavy rain events and to fail and bypass directly to the waterway. This bypassing likely contains sewage with high BOD and high concentrations of E. coli which are a threat to properties downstream. The sanitary sewer upstream of the lift station is aligned adjacent to a waterway and is prone to significant I/I. The replacement of the Park Avenue lift station and rehabilitation of the immediately upstream sewer is a high priority.

**Element 3: A process which opens and maintains channels of communication with relevant community stakeholders in order to give full consideration of the views of others in the planning process and during implementation of the plan.**

Boone City Government has made strong efforts to keep our population informed and involved. We use a variety of means of communication to accomplish this goal. We have two separate monthly radio shows, we have monthly newsletter that goes to every utility customer, we regularly approach civic organizations (Lions Club, Rotary, Kiwanis, etc) to present information, we hold 'open-house' style meetings as a way to encourage public engagement and we also use the local newspaper media. The newspaper and radio are commonly the primary ways of communicating with Boone's older population. To maintain contact with younger generations, the City utilizes the internet for sharing of information. A City website is used to distribute a significant amount of information, including, project information and updates; meeting notices; Council and Committee packets; new laws, ordinances and resolutions; etc. Social media is also used to distribute much of the same information. The social media accounts also allow for more interaction with citizens.

The City has a City Council sub-committee dedicated solely to utilities. This Utility Committee meets once a month and is open to the public. The integrated plan has been included in several agendas and will likely continue to be on future agendas.

There is also a CIP committee that reviews and prioritizes projects during annual Capital Improvement Plan (CIP) review and updating. The results are forwarded to full City Council and discussed in public meetings. City Council meetings occur two times per month. Residents are invited and encouraged to attend all Council and Committee meetings.

**Element 4: A process for identifying, evaluating, and selecting alternatives and proposing implementation schedules.**

The City utilizes a five year CIP as a means of storing, prioritizing and tracking projects. There are currently 24 sanitary department projects in the CIP.

The City is committed to protecting public health and our environment. Multiple City departments (Public Works, Engineering, Treatment Plant and Administration) have reviewed the CIP and prioritized the projects that will help prolong the lifespan of the sanitary infrastructure; protect against backups, bypasses, pass through; and produce safe biosolids for land application. Selecting projects with these criteria will insure that projects protecting public health and the environment receive high prioritization.

The attached exhibit (Exhibit A – Funding Strategy) contains a significant amount of information and is the primary component of this integrated plan. Included in the exhibit are the sanitary projects in the current CIP. The projects are generally listed in order of highest priority using the evaluation explained previously. Below is an excerpt from our Capital Improvement Plan policy document.

***The City of Boone utilizes the following to prioritize projects included in the CIP.***

***CIP Rating Procedure***

- *Highest Priority: Mandates (legislative/legal/contractual requirements)*
- *Secondary Priority: The basics (provide required services, health, safety, general welfare)*
- *Consideration Level: Achieve goals (community growth, new attractions, etc.)*

Exhibit A also incorporates available sanitary funds per fiscal year, taking into account operational costs increases and bond retirements. Dates for projects are then chosen considering the priority and available funds. Factors considered with the funding strategy include: anticipated increase in interest rates, time value of money (inflation), retirement of debt, current rates (in relationship to median household income), and the City's reserve fund policies.

The UV disinfection project has been given a high priority in the integrated plan. That priority level is chosen due to the fact that the disinfection system is a mandate by a State authority. Design is expected to begin in calendar year 2021 with a goal of full operational status in 2023. This completion date is approximately five years beyond the dates included in the treatment plant's current NPDES permit.

#### ***DETAILED SCHEDULE FOR E. COLI COMPLIANCE***

- *Complete a Self-Assessment Matrix and submit a Work Record Request form to DNR's Wastewater Engineering Section by July 1, 2019.*
- *Submit progress report by January 1, 2020*
- *Submit a Facility Plan by May 1, 2020*
- *Submit progress report by November 1, 2020*
- *Submit final plans and specifications by April 1, 2021*
- *Award contract for construction of wastewater treatment improvements by July 1, 2021*
- *Submit progress report by March 1, 2022*
- *Complete construction of wastewater treatment improvements by November 1, 2022*
- *Achieve compliance with final E. coli limit by March 1, 2023*

The City is delaying several other important maintenance and improvements projects to expedite the UV disinfection project. A list of projects is included with the attached exhibit.

The projects scheduled prior to UV disinfection have potential to cause backups and bypasses if not completed. These discharges would likely have little or no treatment and pose a significant health risk. While the UV Disinfection Project is an important part of treatment we believe that other projects, while not mandated, have a more immediate potential for impact on human health.

There are currently no projects listed in the CIP or integrated plan concerning nutrient reduction of the wastewater treatment plant discharge. The City is currently under contract with a consulting engineering firm to evaluate the feasibility and reasonableness of nutrient reduction. If a project is identified, that will have to be added to the integrated plan and existing projects adjusted accordingly.

Sanitary sewer user fees are used for funding of the operation, maintenance and improvements to the sanitary sewer collection and treatment infrastructure. This integrated plan develops a list and schedule of projects that are funded utilizing sanitary enterprise funds. Other potential funding sources include other enterprise funds of water and storm sewer; general fund; and rate increases.

The City maintains a projected five year budget to help anticipate budget surpluses and deficits. The sanitary enterprise fund is the most stable funding source and has the greatest ability to fund projects.

The water enterprise fund is currently in the second year of three consecutive years of rate increases. These rate increases are necessary in order for the water enterprise to maintain existing operations and be self sufficient. These rate increases are not allowing for an increase in water infrastructure maintenance or improvements, but are necessary solely to maintain existing operations. The water enterprise does not have capacity to assist the sanitary enterprise fund.

The general fund is also not in a position to be used to assist in funding sanitary projects. Recent taxing changes have been made by the State of Iowa are reducing the amount of dollars directed to Cities. The general fund revenue is not likely to maintain coverage for general fund expenses in the near future. The general fund is not likely able to cover its own expenses in the next few years, let alone assist other departments.

Raising sanitary user rates could be considered in order to achieve disinfection compliance sooner. The City believes this is not a viable option. The city of Boone already has the second highest sanitary rates in the state according to a 2015 Residential Sewer Rate Survey of Iowa Cities over 10,000 population conducted by the city of Ames, Iowa (Figure 2 – Sewer Rates Comparison Figure 1 – ). These high rates coupled with Boone’s relatively low median household income create a significant burden on our citizens. Raising sewer rates when they are already one of the highest in the state is not considered a practical option. Although the process has not been formally completed, Boone is confident it would meet state and federal requirements to be

considered a disadvantaged community. Boone is a vibrant community with quality housing and a diverse population. Viewing our community as “disadvantaged” could give a negative perception. Our goal is to focus on our financial strategy for future sanitary sewer system improvements through fair rates. It should also be noted that the State DNR

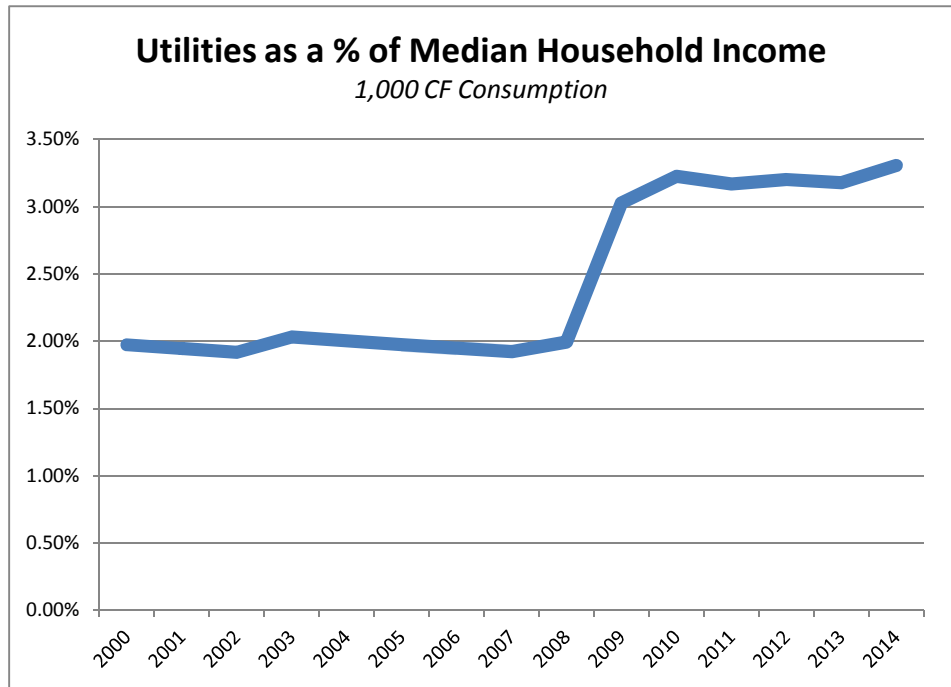


Figure 3 - Water/Sewer Utilities as a % of MHI

disadvantaged community designation is somewhat project specific. The large scale trunk sewer projects completed in 2009-2011 are the primary reason behind our high sewer rates. The current

disinfection project alone would likely not qualify. Instead, we look to our overall utility costs (water/sewer) as a percentage of the Median Household Income (MHI, Source: US Census). This shows us that our citizens are now paying over 3% of the MHI for water/sewer utilities (Figure 3 - Water/Sewer Utilities as a % of MHI). Another key factor to consider is this Integrated Plan achieves compliance with E. Coli limits sooner than a DNR disadvantaged community compliance schedule.

### **Element 5 and 6: Measuring success and Improvements to the plan**

Measuring success of the integrated plan can be done on an annual basis when the City reviews and updates the CIP. This process typically begins around November every year. During updates of our CIP, projects are reviewed to determine appropriate priority and if changes are necessary to budget or schedule. It is during this time that new projects are also considered and possibly added to the CIP. If changes to the integrated plan are necessary, they would be identified at this time and submitted to the DNR for review.

### **Integrated Wastewater Plan Contacts:**

**Wayne Schwartz**

*Boone City Engineer, Utilities Superintendent*

[wschwartz@city.boone.ia.us](mailto:wschwartz@city.boone.ia.us)

515-432-4211 ext 112

**Luke Nelson**

*Boone City Administrator*

[lnelson@city.boone.ia.us](mailto:lnelson@city.boone.ia.us)

515-432-4211 ext 103



# Sanitary Sewer Utility

Boone, Iowa

Project	Project No.	Priority	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33	
Park Ave. Lift Station	09SAN-002	2				700,000															
Lime Feed System Improvements	10WTR-001	2			90,000																
Quinns Area Sanitary Sewer Rehabilitation	11SAN-008	2					670,000														
Polecat Creek Sewer Rehab	11SAN-009	2		150,000																	
Office Building Repairs - Water Env. Plant	14WWF-008	2				25,000															
Potable Water Pipe Replacement	14WWF-004	2				30,000															
Grit Snell and Lime Application	14WWF-005	2				40,000															
Sludge Tank Phase 2	05WWF-003	3								1,250,000											
Automatic Fine Screen	10WWF-006	3									230,000										
VLR Gear Box Replacement	14WWF-002	3							50,000												
Air Diffuser Replacement	14WWF-003	3									80,000										
Sludge Holding Tank Blowers	14WWF-009	3							200,000												
Portable Generator	14WWF-011	3									70,000										
Sanitary Sewer Rehab (14th Street)	15SAN-001	3						350,000													
Snedden Drive Lift Station	10WWF-007	4													460,000						
VLR Blowers Replacement	14WWF-006	4														400,000					
Sludge Tank Phase 3	05WWF-004	6															775,000				
Roof Replacement at WEP	14WWF-001	6																200,000			
VLR Basin Addition	14WWF-010	6																		2,620,000	
Operations Impact	Annual % Inc.			35,000	70,000	105,000	140,000	175,000	210,000	245,000	280,000	315,000	350,000	385,000	420,000	455,000	490,000	525,000	560,000	595,000	
	1,750,000.00	2%	Total Exp	-	185,000	160,000	900,000	810,000	525,000	460,000	1,495,000	660,000	315,000	350,000	2,046,000	880,000	855,000	1,265,000	725,000	560,000	3,215,000
<b>Funding (bond retirements)</b>																					
SS Reciepts Surplus Started FY17	299,000																				
SS Reciepts Surplus Started FY19	442,796																				
SS Receipts Surplus Started FY23	193,093																				
SS Receipts Surplus Started FY30	278,942																				
Running Balance			114,000	253,000	94,796	26,592	243,388	525,184	(34,927)	239,962	859,851	1,444,740	333,629	388,518	468,407	417,238	906,069	1,559,900	(441,269)		