



MONROE CITY COUNCIL

Agenda Bill No. 20-107

SUBJECT:	<i>Wastewater Treatment Plant Engineering Report Alternatives Review</i>
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DATE:	DEPT:	CONTACT:	PRESENTER:	ITEM:
7/14/2020	Public Works	Brad Feilberg	John Lande	New Business #2

Discussion: 2/25/2020 (P3 Committee Meeting)
Attachments: 1. Kennedy Jenks Presentation regarding WWTP options
 2. Six Year Utility rate model Spreadsheet

REQUESTED ACTION: Accept the Kennedy Jenks and staff recommendation for CIP 3 and CIP 5 as the preferred options adopted in the Wastewater Treatment Plant Engineering Report.

POLICY CONSIDERATIONS

Provide policy direction for both the liquid stream process and the solids handling process/management that Kennedy Jenks has developed with the Wastewater Treatment Plant Engineering Report. Decisions on these alternatives have impacts that should be taken into consideration that include:

- Initial/Lifecycle Cost
- Environmental Stewardship
- Neighborhood/Community Impacts
- Sustainability
- Future Compliance Restrictions

DESCRIPTION/BACKGROUND

Upon presentation to the P3 committee on February 12, 2020, the committee discussed and recommended that staff should move forward with alternative CIP 3 and CIP 5.

Kennedy Jenks has been working on the Wastewater Treatment Plant Engineering Report over the last year. Initially recommended in the current Utility Systems Plan (2015, BHC Consultants) and later required by NPDES, the Wastewater Treatment Plant Engineering Report identifies current plant needs, future capacity restraints, proposed compliance limitations, as well as 6 and 20 year capital improvement plans. The following describes the area of concerns and recommended or proposed modifications:

pH

The Department of Ecology has implemented more stringent effluent pH requirements becoming enforceable in January 2023. The current WWTP system cannot reliably meet the new effluent pH requirements and therefore modifications are required to ensure reliable compliance. This will be completed in CIP 1 scheduled for design in 2020.

Liquid Stream Limitations

The Wastewater Treatment Plant Engineering Report has identified current and future hydraulic capacity limitations. Specifically, current secondary clarification does not meet peak hydraulic capacity or redundancy requirements. Additionally, the current process does not meet proposed nutrient removal abilities and will require modifications to meet these proposed levels. Kennedy Jenks has identified two alternatives to address the capacity and nutrient shortfalls:



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Alternative CIP 2

This liquid stream alternative keeps the same general operational process (conventional activated sludge) and adds several modifications to address the pending nutrient removal and capacity limitations. This alternative has a reduced initial and lifecycle cost than CIP 3. This will create periods of limited operational control during seasonal variations. It will be able to meet anticipated nutrient levels, but will fall short of meeting any additional or more stringent restrictions. It will require expansion outside of the current facility footprint creating significant permitting challenges for the expansion footprint (see page 7 of handouts). This project will have a greater local impact during construction as well. This project can be phased as growth and capacity is required. This is because secondary clarifier construction can be spaced and built as needed helping with sewer CIP cash flow.

Alternative CIP 3 Recommended

This alternative would fit within the current footprint with no additional disruption to the community. This process produces the highest quality effluent under all operational ranges. The effluent from this process could be utilized for reuse if desired. This alternative would put the City in a better situation if increased effluent requirements were to be enforced.

This liquid stream alternative has a higher construction and lifecycle cost. It would be a new treatment process (Membrane Bioreactor, MBR) compared to the existing, and would run as a parallel process with the existing plant.

Solids Stream Limitations

In the Wastewater Treatment Plant Engineering Report the current solids handling process does not meet the treatment requirements of the Washington State General Biosolids Rule. Treatment at the WWTP is insufficient to meet Class B requirements.

The City's contractor hauler/applicator must utilize additional steps to satisfy compliance requirements.

In addition, the City utilizes the former Department of Corrections Composting Facility for storage and loading. The availability of this site for City use is subject to the discretion of the Department of Correction.

Furthermore, class B land application sites in central Washington are not a sustainable long term solution. Weather and travel conditions over Stevens Pass poses additional operational challenges. Considering the current management plan, the Wastewater Treatment Plant Engineering Report has identified two alternatives to the solids stream process:

Alternative CIP 4

This project addresses the solids handling process. This alternative will use the City's current Biosolids management practice of contract hauling and application to a Beneficial Use Facility, but will add additional digester capacity to meet basic Biosolids treatment limits for class B Beneficial Use. This alternative has a lower initial cost than Alternative CIP 5. It does not address the issues with the current process.

Alternative CIP 5 Recommended

This alternative would utilize a dryer technology to produce a Class A, Excellent Quality Biosolids at the plant. In addition, this new process would significantly reduce volume because of the dryer product significantly reducing handling and hauling costs. This product could be used locally by citizens, the City's Public Works and Parks & Recreation



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Departments, local businesses, or farms without any restrictions. It could also be marketed and sold commercially. This alternative addresses and eliminates the issues that CIP does not resolve.

Alternatives Comparison Table + = Best -- = Reduced/No benefit O = No Change

Considerations	Liquid Alternatives		Solids Alternatives	
	CIP 2 Conventional Activated Sludge	CIP 3 Membrane Bioreactor	CIP 4 Class B	CIP 5 Class A Dryer
Initial Cost	+	--	+	--
Lifecycle Cost (20 yr)	+	--	O	O
Space/Footprint	--	+	--	+
Treatment Quality	--	+	--	+
Future Compliance	--	+	--	+
Environmental Stewardship	--	+	--	+
Reuse Potential/Local Use	--	+	--	+
Best Available Technology	--	+	--	+
Flexibility	--	+	--	+
Efficiency	--	+	--	+
Complexity	+	--	+	--

Recommendation

After presentation to the P3 committee, the committee approved the Kennedy Jenks and staff recommendation for the City to accept CIP 3 and CIP 5 as the preferred options adopted in the Wastewater Treatment Plant Engineering Report.

Future Hydraulic Capacity

This project addresses various hydraulic capacity deficiencies throughout the plant. Various pumps and UV systems will need hydraulic increases. This project is not estimated to be needed until approximately 2040. These improvements are identified in CIP 6.

Background

The Monroe Wastewater Treatment Plant is required to submit a pH Engineering Report to the Department of Ecology by December 31, 2019, per the recently issued NPDES to address upcoming effluent pH requirements. The current facility cannot consistently meet the new requirements and will need modifications to stay compliant with the new pH limits. The new modifications must be implemented by December 31, 2022, when the new pH limits will be enforced.



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In addition to the NPDES requirement described above, the current Utility Systems Plan (2015, BHC Consultants) identified several studies be completed including a Wastewater Treatment Plant Engineering Report. The recommended reports include a Biosolids Management Study and Rerate Study in addition to the Wastewater Treatment Plant Engineering Report. Based on the NPDES requirements and Utility System Plan recommendations, the City issued a request for proposals to prepare a Wastewater Treatment Plant Engineering Report, Biosolids Management Study, and Mixing Zone Analysis (these reports were combined into one Wastewater Treatment Plant Engineering Report) on November 6, 2018. Two firms submitted and presented proposals. After review of submitted proposals and conducting interviews staff selected Kennedy Jenks as the firm most qualified to provide the necessary documents for the Wastewater Treatment Plant Engineering Report.

The Monroe Wastewater Treatment Plant is required to comply with the conditions contained in the National Pollutant Discharge Elimination System (NPDES) permit issued by the Washington State Department of Ecology which expires November 30, 2023.

The current permit, issued October 31, 2019, contains new requirements related to the acidity (pH) of the effluent. We have also been advised, in writing, that the next permit will require the WWTP to plan for upcoming nutrient limits in the next permit cycle beginning in 2024. Currently, it is uncertain which nutrients or limits will be regulated, however the City will have total Nitrogen and potentially Phosphorus effluent limits in its next NPDES permit. It is unlikely that the current facility will not be able to consistently meet the anticipated Nitrogen or Phosphorus limit. The City will need to prepare for this.

FISCAL IMPACTS

CIP 3 has a total cost of \$20,030,000 but is not anticipated until the years 2026-2028. CIP 5 has a total project cost of \$15,420,000. This project timeline is in the years 2022-2024. Based on the rate model provided by the Finance Department, these projects will not have an impact on the current sewer rate structure.

TIME CONSTRAINTS

A determination on the alternatives provided is essential in completing the Engineering Report. Further delay on this action postpones the report completion further delaying capital planning and budgeting.

ALTERNATIVES

1. Take no action. This alternative does not give the Engineering Report value. The Engineering Report is critical for capital planning, budgeting, and meeting compliance schedules.
2. Delay action and direct staff to areas of concern. Further delay impacts the completion of the Engineering Report and complicates capital planning and budgeting.

Summary of Project Purpose

The purpose of this project is to address:

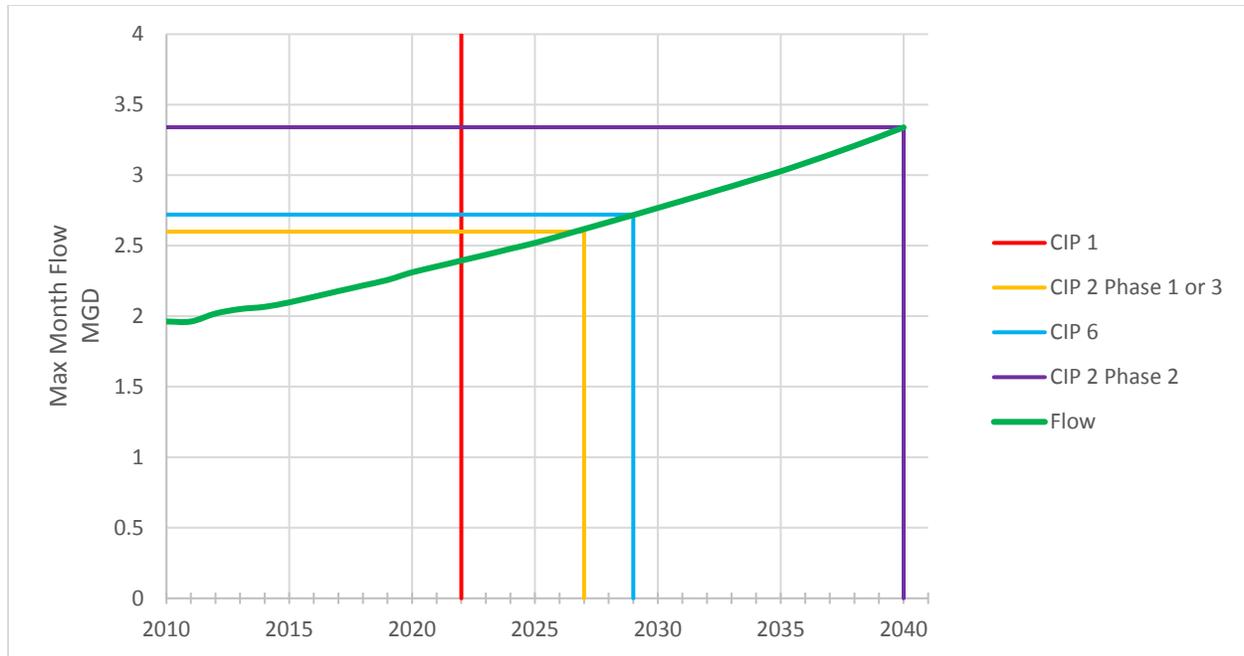
- Recommendation for an Engineering Report for the City's Wastewater Treatment Plant (WWTP) per the City's 2015 Utility Plan
- Regulatory changes, including the more stringent pH limits (new NPDES permit) and potential nutrient removal requirements (future) for discharges to the Skykomish River
- Current risks of existing biosolids program
- Future increased flows due to population growth

"A successful project is defined as one that provides a roadmap to efficient, achievable, reliable, and sustainable compliance."

- Project Goal Statement, City Meeting, March 2019



WWTP Capital Improvement Trigger Chart & Summary Table



CIP No.	WWTP CIP Description	Anticipated Mid-point of Construction	Trigger(s)
1	pH and Filament Control	2021	NPDES permit requires pH control implemented by December 31, 2022
Secondary Treatment Alternatives (2 versus 3)			
2	Phase 1: Conventional Activated Sludge	2027	Class II reliability criteria exceeded for secondary clarifier capacity (2.6 MGD at MMF)
	Phase 2: Conventional Activated Sludge	2040	Class II reliability criteria exceeded for secondary clarifier capacity again (3.6 MGD at MMF)
3	Sidestream Membrane Bioreactor	2027	Class II reliability criteria exceeded for secondary clarifier capacity (2.6 MGD at MMF)
Solids Upgrades Alternatives (4 versus 5)			
4	Class B Solids Upgrades	2023	Risk related triggers, which include currently not meeting regulatory minimum digestion time and hence using disk-in-solids application method
5	Class A Solids Upgrades	2023	Risk related triggers, which include currently not meeting regulatory minimum digestion time; and several class B disposal risks (disk-in-solids, solids transport, contractual agreements)
6	Plantwide Pumps and Ultraviolet Disinfection Upgrades	2029	3W pump replacement (capacity) needed; Effluent pumps and UV capacity exceeded in 2034 at 10 MGD at PHF

Notes:

CIP 4 & CIP 5 are driven by current risk-related issues and therefore are not depicted at a specific flow rate.

Biological oxygen demand (BOD); Capital improvement project (CIP); Max month flow (MMF); Million gallons per day (MGD); National Pollutant Discharge Elimination System (NPDES); Peak hour flow (PHF); Ultraviolet (UV); Wastewater Treatment Plant (WWTP)

CIP No.	Project Elements	Secondary Treatment Alternatives			Solids Upgrades Alternatives		CIP 6 Plantwide Pumps and Ultraviolet Disinfection Upgrades	
		CIP 1	CIP 2		CIP 3	CIP 4		CIP 5
		pH and Filament Control	Phase 1 Conventional Activated Sludge	Phase 2 Conventional Activated Sludge	Sidestream MBR	Class B Solids Handling Upgrades		Class A Solids Handling Upgrades
1	1. Permanent RAS Chlorination	\$140,000						
	2. Upgraded Magnesium Hydroxide Feed System	\$270,000						
	3. Secondary Effluent Sodium Hydroxide Feed System	\$270,000						
	4. Baffling of Aeration Basins	\$350,000						
	5. Surface Wasting System	\$410,000						
	6. Mixed Liquor Return Optimization	\$320,000						
	CIP 1 Total (2020 Dollars)	\$1,760,000						
2 Phase 1	1. Add 3rd Secondary Clarifier		\$4,240,000					
	2. Aeration Basin Upgrades		\$3,780,000					
	3. Site Prep, Retaining Wall and Force Main Relocation		\$1,010,000					
CIP 2 Phase 1 Total (2020 Dollars)		\$9,030,000						
2 Phase 2	1. Add 4th Secondary Clarifier			\$4,140,000				
	CIP 2 Phase 2 Total (2020 Dollars)			\$4,140,000				
3	1. Sidestream MBR			\$20,030,000				
	CIP 3 Total (2020 Dollars)			\$20,030,000				
4	1. Construct New Digester Next to Primary Clarifiers				\$6,310,000			
	2. Install New Screw Press				\$3,310,000			
	3. Install New Flow Meters and TSS Meters				\$70,000			
	CIP 4 Total (2020 Dollars)				\$9,690,000			
5	1. Class A Sludge Dryer					\$12,040,000		
	2. Install New Screw Press					\$3,310,000		
	3. Install New Flow Meters and TSS Meters					\$70,000		
	CIP 5 Total (2020 Dollars)					\$15,420,000		
6	1. Upgrade Effluent Pumps						\$830,000	
	2. 3W System Upgrades						\$460,000	
	3. Upgrade Influent Pumps						\$640,000	
	4. Upgrade UV System						\$3,200,000	
	CIP 6 Total (2020 Dollars)						\$5,130,000	
Total Project Cost (2020 Dollars)		\$1,760,000	\$9,030,000	\$4,140,000	\$20,030,000	\$9,690,000	\$15,420,000	\$5,130,000
Total Lifecycle Costs¹ (2020 Dollars)		\$2,050,000	\$9,950,000	\$4,500,000	\$25,270,000	\$10,536,000	\$12,630,000	\$7,210,000
Lifecycle of Risk Costs (2020 Dollars)						\$1,941,294	\$0	
Total Lifecycle Costs plus Lifecycle of Risk Costs (2020 Dollars)						\$12,477,294	\$12,630,000	
Estimated Midpoint of Construction (Year)		2021	2027	2040	2027	2023	2023	2029
Total Project Cost Escalated to Midpoint of Construction (Escalated \$)		\$1,830,000	\$11,170,000	\$6,940,000	\$24,780,000	\$10,670,000	\$16,980,000	\$6,700,000
Escalation to Midpt of Construction² (Escalated \$)								
	Year^{3,4}	CIP 1	CIP 2 Phase 1	CIP 2 Phase 2	CIP 3	CIP 4	CIP 5	CIP 6
	2020	\$200,000						
	2021	\$1,630,000						
	2022					\$750,000	\$1,200,000	
	2023					\$6,000,000	\$9,500,000	
	2024					\$3,920,000	\$6,280,000	
	2025							
	2026		\$750,000		\$1,700,000			
	2027		\$6,500,000		\$14,000,000			\$450,000
	2028		\$3,920,000		\$9,080,000			\$6,250,000
	2029							
	2030							
	2031							
	2032							
	2033							
	2034							
	2035							
	2036							
	2037							
	2038							
	2039			\$475,000				
	2040			\$6,465,000				

- NOTES:
- Total Lifecycle Cost includes costs that the City will incur over the lifetime of an improvement (typically 20 years). It includes the initial capital cost to build and/or install the improvement plus operations and maintenance cost over the expected lifetime of the improvement. The operations and maintenance costs are adjusted to represent its present value in order to determine the total lifecycle cost.
 - Distribution of project costs assumes 12 month design phase followed by: A) 12 month construction phase for project less than \$10M, and B) 24 month construction phase for project exceeding \$10M.
 - The 6-year period (2020 through 2025) is emphasized for the City's capital planning.
 - The NPDES renewal is anticipated to occur in 2024 assuming no delays.
- Years within the 20-year planning period but not within the 6-year planning period
 Useful for financial comparison of alternatives.

	Costs Across CIP Packages			
	1, 2, 4, 6	1,3,4,6	1,2,5,6	1,3,5,6
Total Project Cost (2020 Dollars)	\$29,750,000	\$36,610,000	\$35,480,000	\$42,340,000
Total Lifecycle Costs¹ (2020 Dollars)	\$34,246,000	\$45,066,000	\$36,340,000	\$47,160,000
Total Lifecycle Costs plus Lifecycle of Risk Costs (2020 Dollars)	\$36,187,294	\$47,007,294	\$36,340,000	\$47,160,000

Escalation to Midpt of Construction ²	Annual Total Project Costs (Escalated \$) Across CIP Packages				
	Year ^{3,4}	1, 2, 4, 6	1,3,4,6	1,2,5,6	1,3,5,6
2020	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000
2021	\$1,630,000	\$1,630,000	\$1,630,000	\$1,630,000	\$1,630,000
2022	\$750,000	\$750,000	\$1,200,000	\$1,200,000	\$1,200,000
2023	\$6,000,000	\$6,000,000	\$9,500,000	\$9,500,000	\$9,500,000
2024	\$3,920,000	\$3,920,000	\$6,280,000	\$6,280,000	\$6,280,000
2025	\$0	\$0	\$0	\$0	\$0
2026	\$750,000	\$1,700,000	\$750,000	\$1,700,000	\$1,700,000
2027	\$6,500,000	\$14,000,000	\$6,500,000	\$14,000,000	\$14,000,000
2028	\$4,370,000	\$9,530,000	\$4,370,000	\$9,530,000	\$9,530,000
2029	\$6,250,000	\$6,250,000	\$6,250,000	\$6,250,000	\$6,250,000
2030	\$0	\$0	\$0	\$0	\$0
2031	\$0	\$0	\$0	\$0	\$0
2032	\$0	\$0	\$0	\$0	\$0
2033	\$0	\$0	\$0	\$0	\$0
2034	\$0	\$0	\$0	\$0	\$0
2035	\$0	\$0	\$0	\$0	\$0
2036	\$0	\$0	\$0	\$0	\$0
2037	\$0	\$0	\$0	\$0	\$0
2038	\$0	\$0	\$0	\$0	\$0
2039	\$475,000	\$0	\$475,000	\$0	\$0
2040	\$6,465,000	\$0	\$6,465,000	\$0	\$0

NOTES:

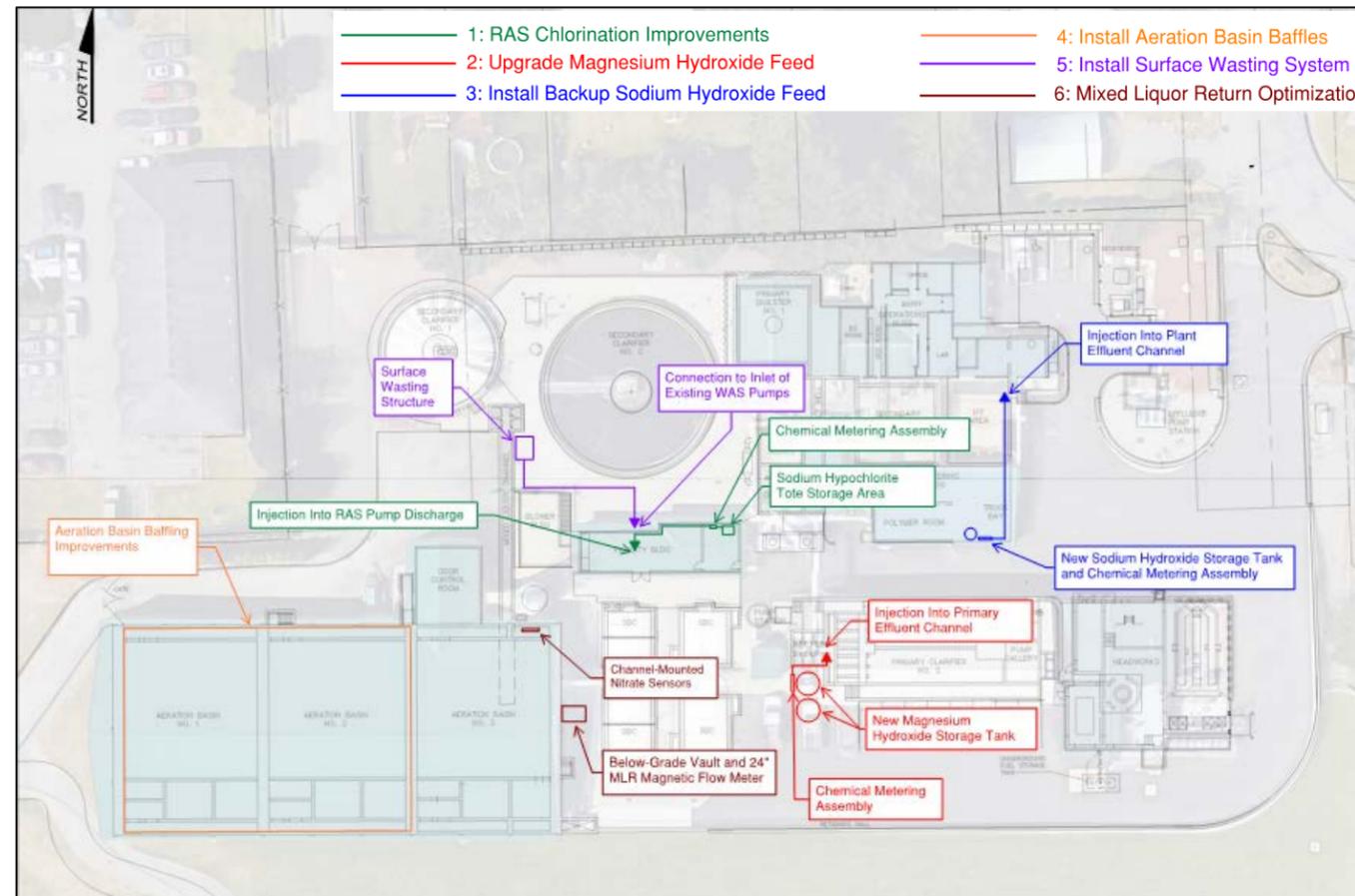
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2. Distribution of project costs assumes 12 month design phase followed by: A) 12 month construction phase for project less than \$10M, and B) 24 month construction phase for project exceeding \$10M.
3. The 6-year period (2020 through 2025) is emphasized for the City's capital planning.
4. The NPDES renewal is anticipated to occur in 2024 assuming no delays.

Years within the 20-year planning period but not within the 6-year planning period.

Engineer's recommendation in January 2020. Engineers recommend reassessment of WWTP performance after completion of CIP1 and re-review of regulatory requirements as of 2022.

Capital Improvement Project 1: pH and Filament Control

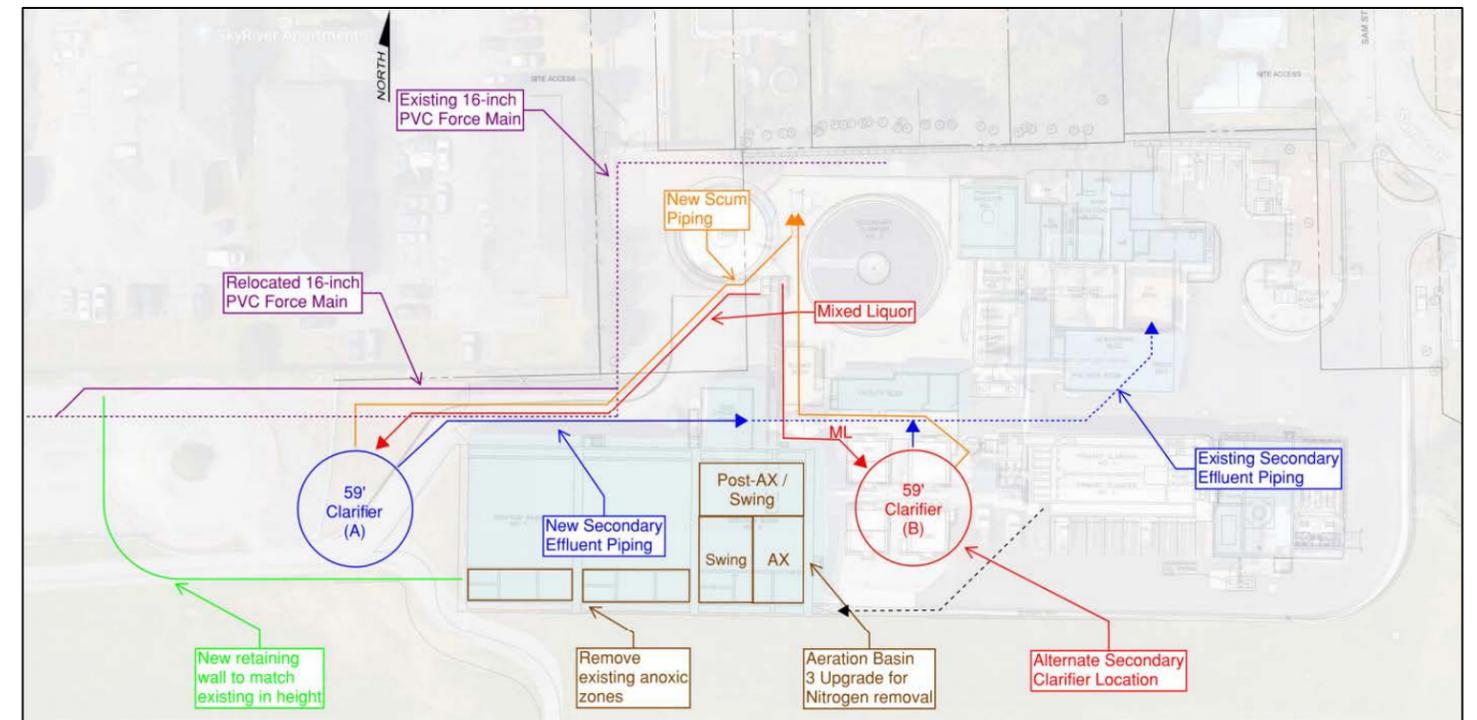
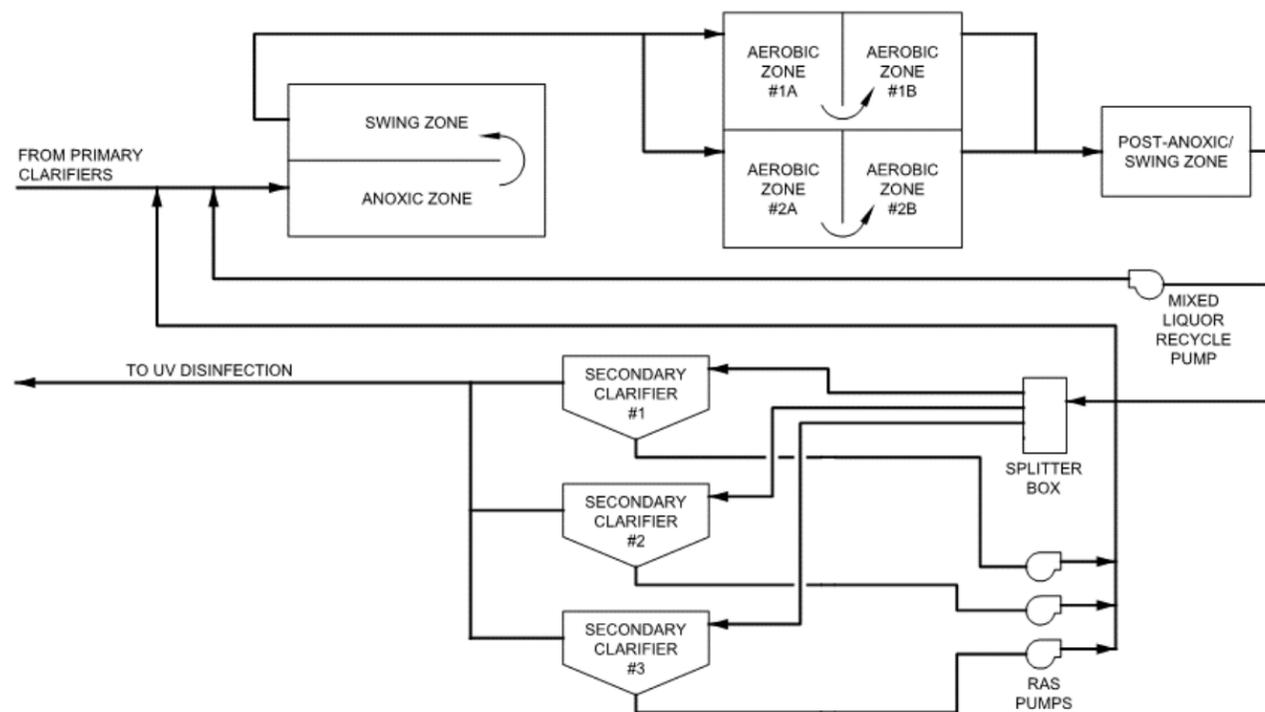
Project Element	Description of Improvements	Project Cost (2020 Dollars)	Additional Operations and Maintenance Cost (\$/yr, 2020 Dollars)
1. Permanent RAS Chlorination	Install a permanent sodium hypochlorite storage and metering system In the Facility Building Shop/Storage room. A chemical metering assembly will be installed adjacent to a tote storage area and will meter Sodium Hydroxide into the WAS pump discharge line to limit the growth of Filamentous organisms.	\$140,000	\$8,450
2. Upgraded Magnesium Hydroxide Feed System	Replace the existing Magnesium Hydroxide bulk storage and metering system located at the West end of the primary clarifiers. Include a second storage tank for redundancy and appropriate cold-weather protections. This improvement would provide more reliable pH buffering capacity in the secondary treatment process to help keep effluent pH within permit limits.	\$270,000	\$0
3. Secondary Effluent Sodium Hydroxide Feed System	Install a new Sodium Hydroxide storage tank and metering system in the solids handling building. Install a pipe from the solids handling building to the Plant's effluent channel located in the UV area. Include meters for pH monitoring. This improvement will give the Plant a backup pH control system to assure reliable permit compliance.	\$270,000	\$3,730
4. Baffling of Aeration Basins	Installation of fiberglass baffles, relocation of effluent weir openings, and relocation of dissolved oxygen probes to improve process control.	\$350,000	\$660
5. Surface Wasting System	Install a vault and automated weir to selectively waste filamentous organisms to the WAS pump station. This improvement would reduce the quantity of filamentous organisms in the secondary treatment process.	\$410,000	\$660
6. Mixed Liquor Return Optimization	Install a below-grade vault east of the aeration basins to house a flow meter on the mixed liquor return (MLR) pipe. Additionally, install channel-mounted nitrate sensors in the mixed liquor return channel. These improvements would give operators better control over MLR flow rate.	\$320,000	\$990



Capital Improvement Project 2 Phase 1 – Conventional Activated Sludge

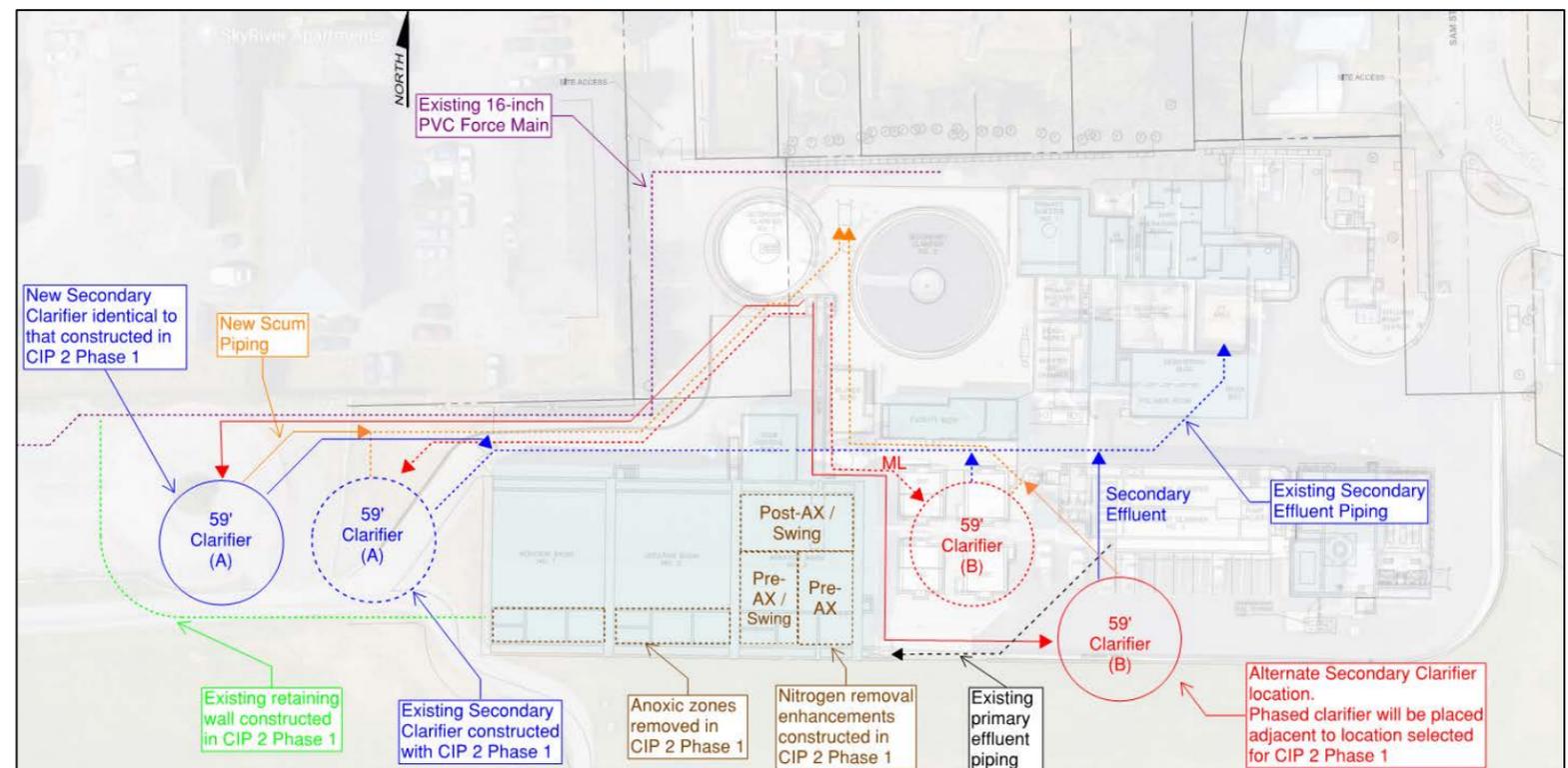
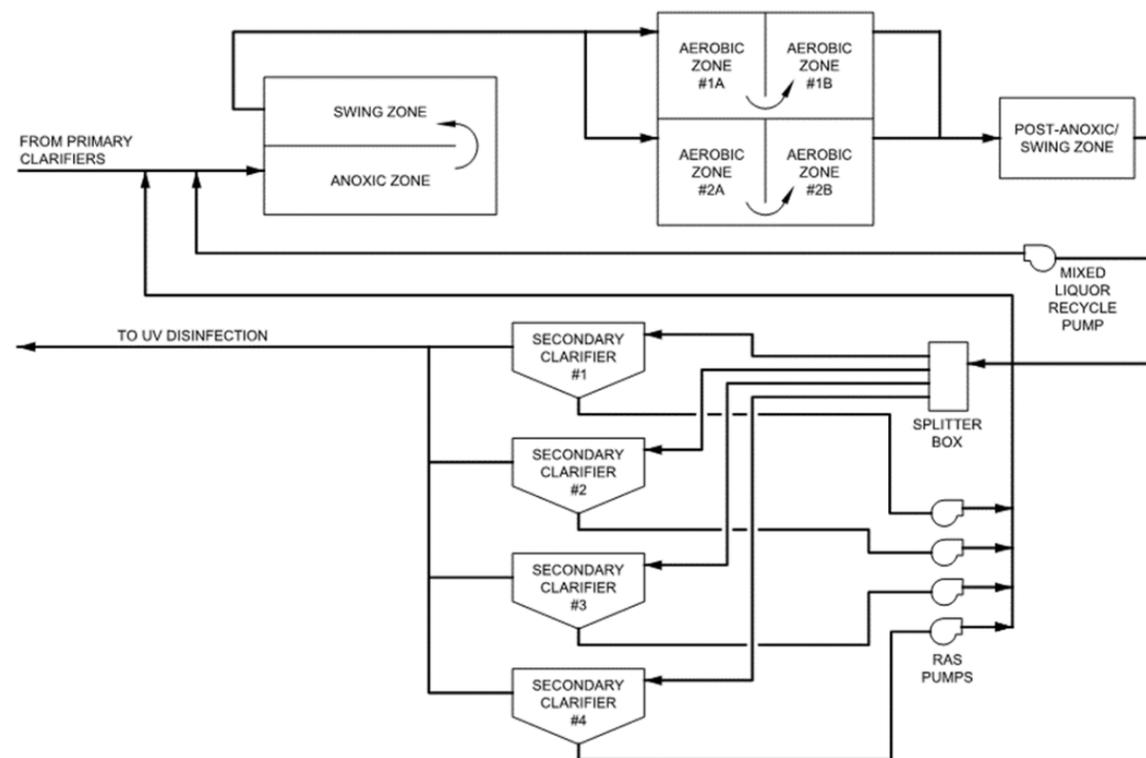
Project Element	Description of Improvements	Project Cost (2020 Dollars)	Additional Operations and Maintenance Cost (\$/yr, 2020 Dollars)	Pros	Cons
1. Add 3rd Secondary Clarifier	Add a single 59' secondary clarifier. An additional clarifier will be constructed as part of a separate phase (see CIP 2 Phase 2). Includes Secondary Clarifier #1 weir replacement. Two possible locations for the new clarifiers are shown below (see locations A & B in figure below).	\$4,240,000	\$18,000	<ul style="list-style-type: none"> Familiarity with this process Improves performance and solids capture Adds redundancy Allows for phasing of new clarifiers 	<ul style="list-style-type: none"> Large footprint May require construction outside current WWTP boundaries during phase 1 if location A is preferred More challenges regarding floodplain permitting if location A is preferred
2. Aeration Basin Upgrades	Convert Aeration Basin 3 into two pre-anoxic/swing zones, and one post-anoxic swing zone. Aeration Basins 1 and 2 will have existing anoxic zones demolished. The existing baffles, installed as a part of CIP 1, may require adjustment to ensure the two zones are equally sized after the demolition of the anoxic zones. These two aerobic zones will allow for tapered aeration (e.g., 3.0 mg/L target in the first zone and 1.5 mg/L target in the second zone) to lower the recycle of DO.	\$3,780,000	\$28,000	<ul style="list-style-type: none"> Optimizes denitrification and increases nitrogen removal Gain secondary treatment capacity Relatively high levels of denitrification would likely meet potential nitrogen limits 	<ul style="list-style-type: none"> Further expansion would require additional property and tankage
3. Site Prep, Retaining Wall, and Force Main Relocation*	Removal of asphalt, addition of retaining wall and fill to bring up to the same grade as existing WWTP facility. An allowance for park improvements is included.	\$1,010,000	\$0	<ul style="list-style-type: none"> SBC tanks location prevents encroachment of WWTP into park parking lot. Parking lot location reserves SBC tanks for other use. 	<ul style="list-style-type: none"> Loss of parking at park or loss of SBC tanks for future use. Cost for park improvements for parking lot location

*NOTE: Project Element 3 and the associated costs are reflective of the option to locate the 3rd secondary clarifier at the site labeled as "(A)", which is west of the existing aeration basins and outside of the existing WWTP.



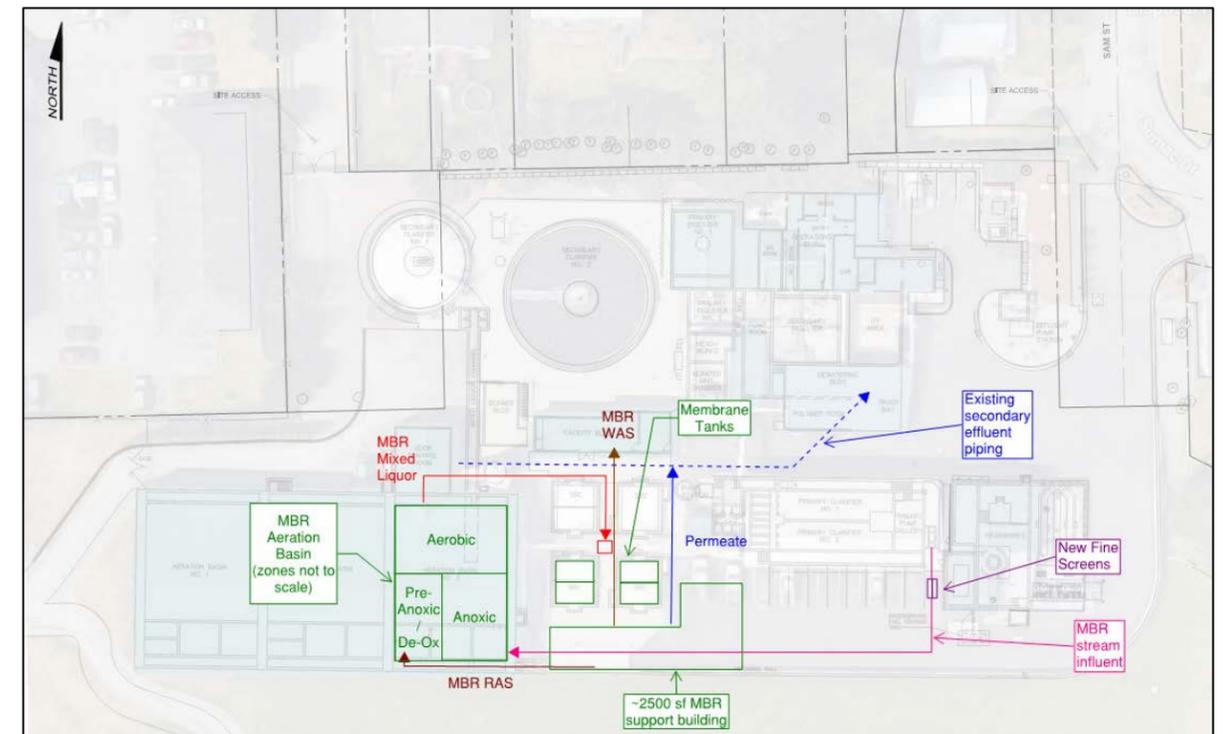
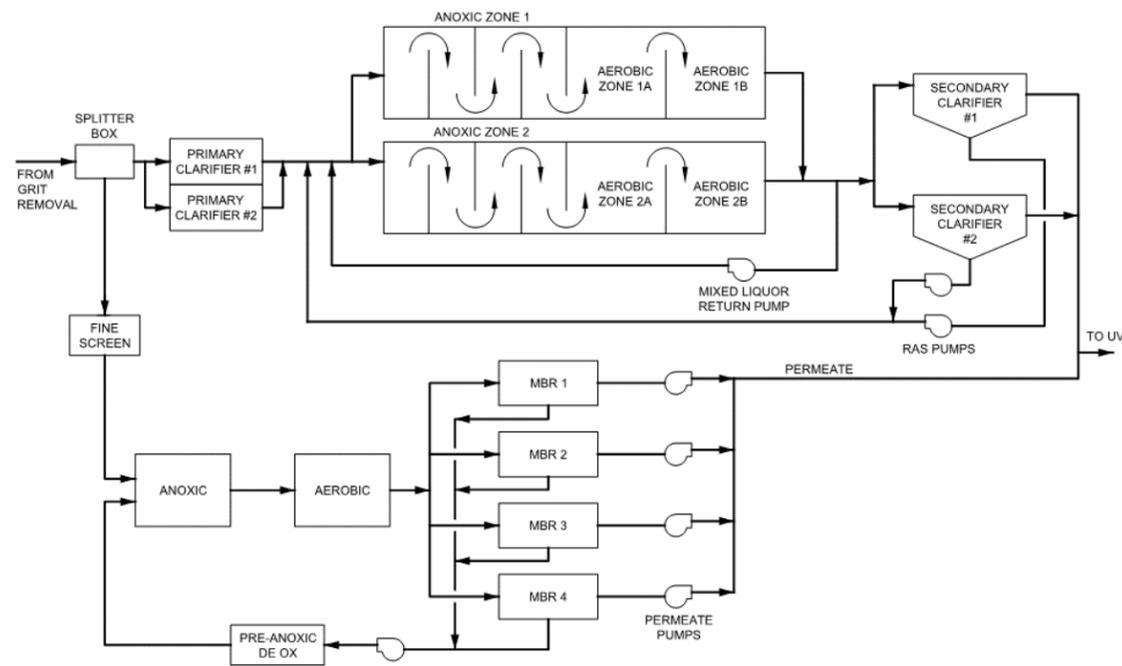
Capital Improvement Project 2 Phase 2 – Conventional Activated Sludge

Project Element	Description of Improvements	Project Cost (2020 Dollars)	Additional Operations and Maintenance Cost (\$/yr, 2020 Dollars)	Pros	Cons
1. Add 4th Secondary Clarifier	Add another identical 59' secondary clarifier as a second phase to CIP 2 Phase 1. The location of the fourth clarifier is dependent upon the location selected for the third clarifier in CIP 2 Phase 1. This cost estimate assumes most of the piping for this additional clarifier is installed and the splitter box improvements are constructed as part of CIP 2 Phase 1.	\$4,140,000	\$18,000	<ul style="list-style-type: none"> Familiarity with this process Further improves performance and solids capture Adds further redundancy Phasing of new clarifiers allows smaller capital outlay for CIP 2 Phase 1 	<ul style="list-style-type: none"> Large footprint Requires construction outside current site boundaries and encroachment into park area or parking lot Challenges regarding floodplain permitting when working outside of current site and within flood zone



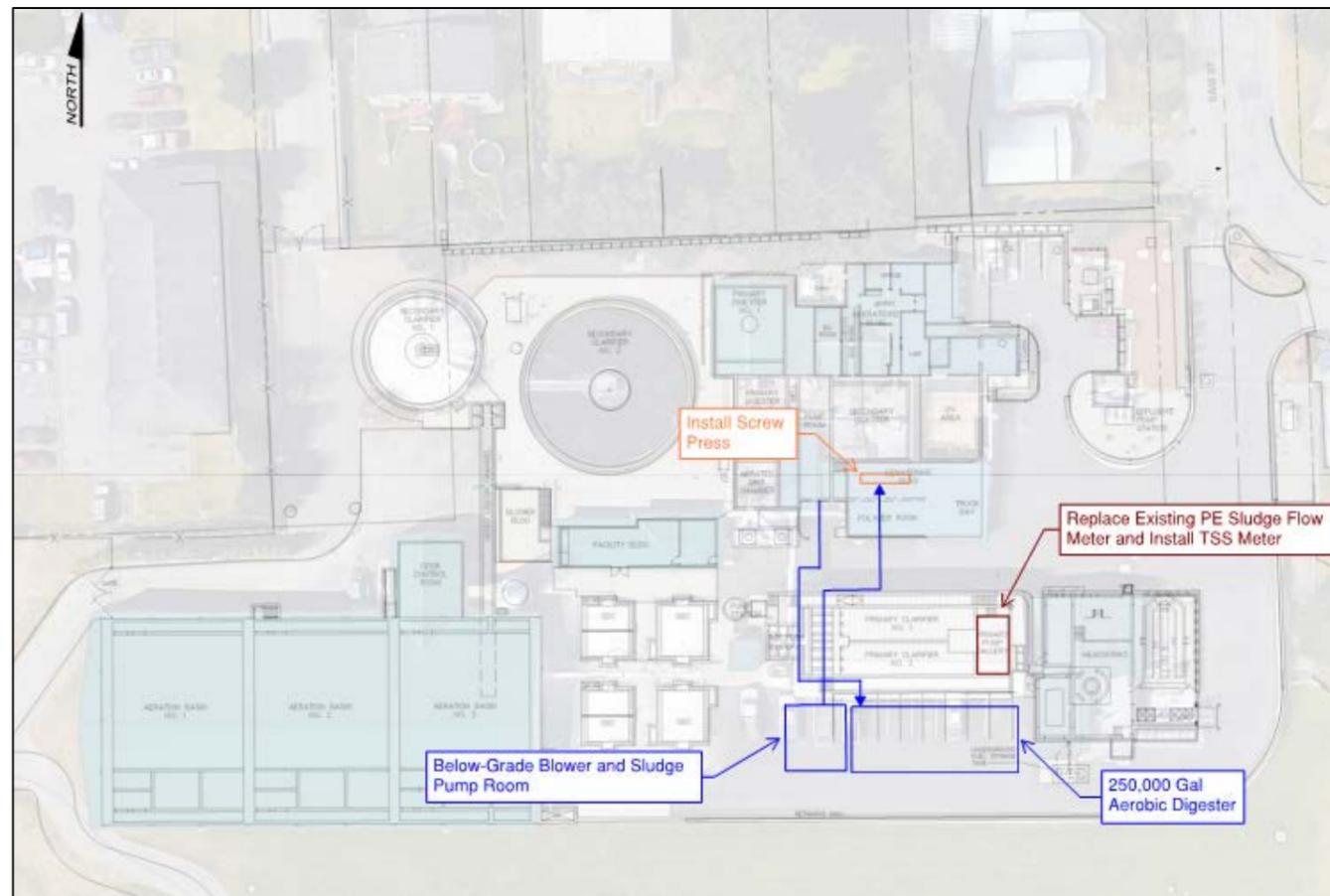
Capital Improvement Project 3 – Sidestream Membrane Bioreactor

Project Element	Description of Improvements	Project Cost (2020 Dollars)	Additional Operations and Maintenance Cost (\$/yr, 2020 Dollars)	Pros	Cons
1. Add a Sidestream MBR	Convert the existing SBC tanks into membrane bioreactors (MBRs). Aeration Basin 3 will be converted to pre-anoxic and aerobic zones for treatment prior to the MBRs. The MBRs will be operated in parallel with the existing conventional activated sludge (CAS) process utilizing Aeration Basins 1 and 2 and the existing clarifiers. This will prevent the CAS process from becoming overloaded but will yield two different microbial populations at the facility. This project also includes some minor improvements to Aeration Basins 1 and 2 for the conventional activated sludge system and replacement of the weir in Secondary Clarifier #1.	\$20,030,000	\$262,000	<ul style="list-style-type: none"> • Small footprint • Improvements fit within the existing WWTP site • No need for property acquisition or park encroachment • High quality effluent • Adequate denitrification • Potential for effluent reuse • Ability to repurpose secondary clarifier tanks if conversion of full plant to MBR is needed in the future to meet regulations • Improves efficiency of UV disinfection • Thicker WAS • More efficient phosphorus removal if required in the future • Best available technology may reduce additional investment to comply with future NPDES permit limits 	<ul style="list-style-type: none"> • High capital and operating expenses • Operational complexities with two treatment streams • Amount of equipment and instruments to maintain • City has no experience with MBRs



Capital Improvement Project 4: Class B Solids Upgrades

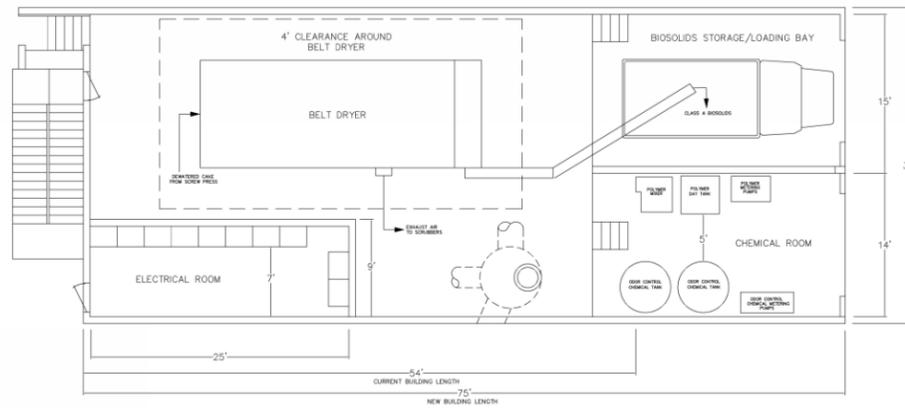
Project Element	Description of Improvements	Project Cost (2020 Dollars)	Additional Operations and Maintenance Cost (\$/yr, 2020 Dollars)	Pros	Cons
1. Construct New Digester Next to Primary Clarifiers	Increase total aerobic digester volume at the Plant by constructing a new digester tank (~250,000 gal) below the parking area south of the Primary Clarifiers. New digester tanks could be operated either in series or in parallel with existing digesters tanks. A new blower and digested sludge pump room would be constructed beneath the parking lot south of the primary clarifiers.	\$6,310,000	\$42,300	<ul style="list-style-type: none"> Existing SBC tanks remain available to be retrofitted to MBR tanks for secondary treatment upgrades as depicted in CIP3 Can meet full solids retention time (SRT) requirements for stabilization 	<ul style="list-style-type: none"> Loss of available space for primary clarifier expansion, if needed in the future Loss of available onsite parking Additional pumping and blower electricity cost Limited end use applications for class B Biosolids product
2. Install New Screw Press	Installation of a dewatering screw press in the space currently occupied by the Belt Filter Press. This project would include demolition of the existing Belt Filter Press.	\$3,310,000		<ul style="list-style-type: none"> Smaller footprint than existing Belt Filter Press New equipment with new equipment warranty 	<ul style="list-style-type: none"> Higher financial cost over refurbishment of existing Belt Filter Press
3. Install New Flow Meters and TSS Meters	Replace the existing primary effluent (PE) sludge flow meter and install a total suspended solids (TSS) meter downstream of PE sludge pumps.	\$70,000		<ul style="list-style-type: none"> Increased PE sludge monitoring capabilities 	<ul style="list-style-type: none"> None



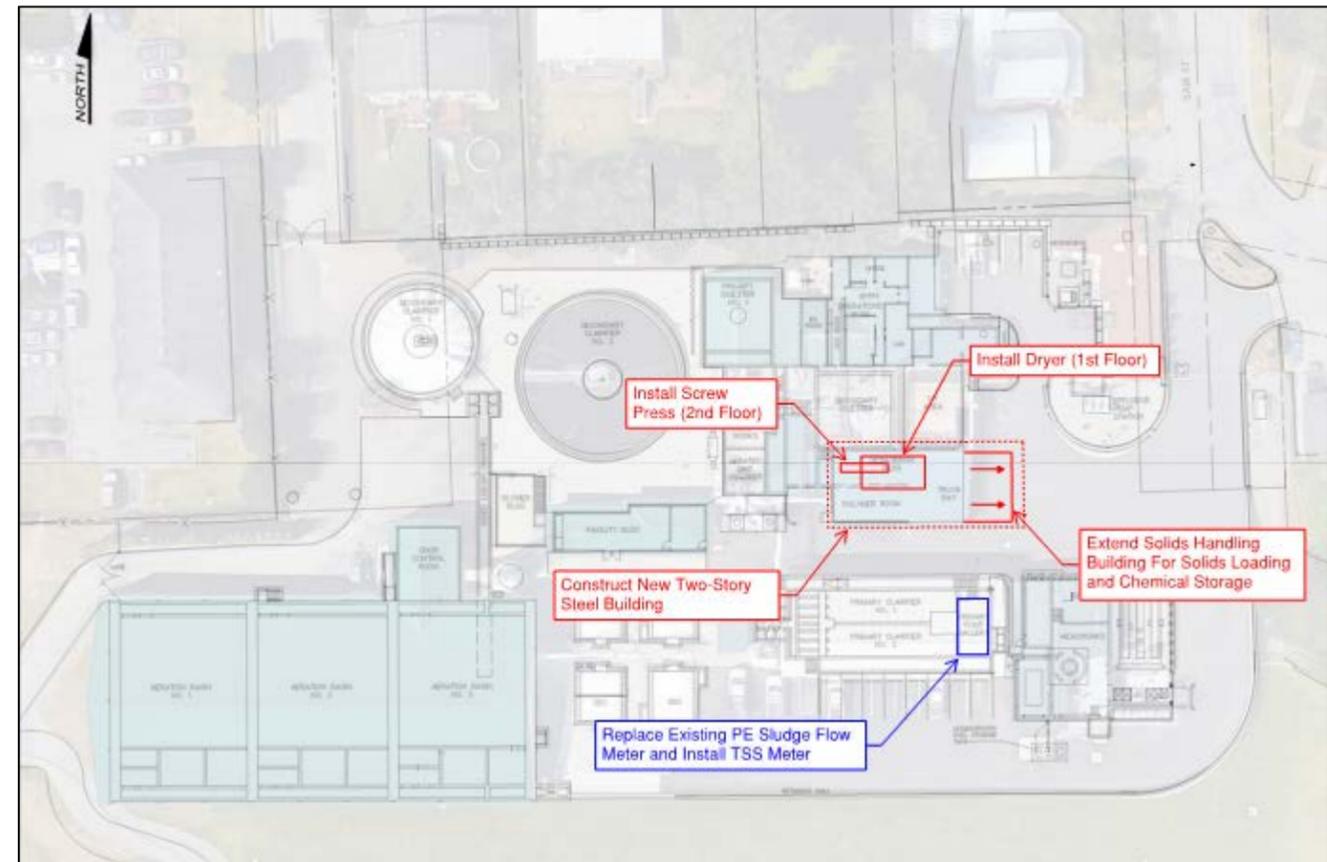
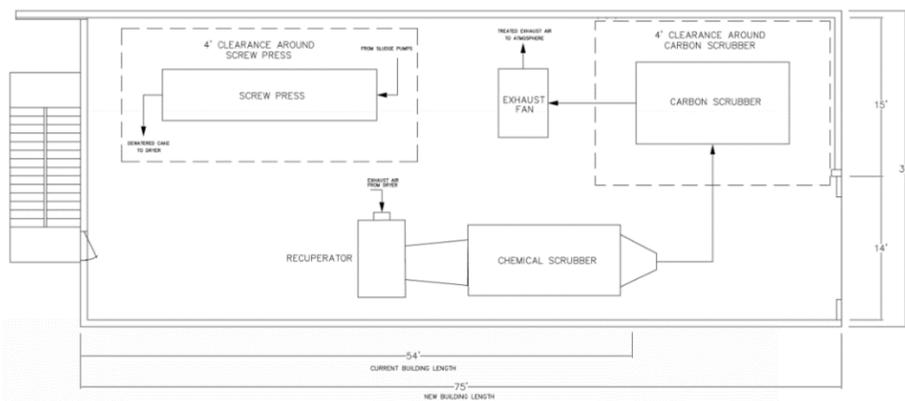
Capital Improvement Project 5: Class A Solids Handling Upgrades

Project Element	Description of Improvements	Project Cost (2020 Dollars)	Additional Operations and Maintenance Cost (\$/yr, 2020 Dollars)	Pros	Cons
1. Class A Sludge Dryer	Install Class A dryer and dryer odor control system. The existing solids handling building, and the belt filter press could be left in place and operational as a two-story steel frame building is constructed around the exterior of the existing building. A dryer could be installed on the first floor in the space occupied by the existing belt filter press.	\$12,040,000	-\$139,500	<ul style="list-style-type: none"> Upgrades do not spatially conflict with any future liquid stream upgrades Produces Class A biosolids product which could be used directly by the local community No hauling costs Reduction in volume of biosolids at the Plant Complete Aerobic Digestion would not be needed, and no future expansion of aerobic digesters would be needed Existing Digesters can be used as upstream equalization tanks which improves operational flexibility for the solids handling system 	<ul style="list-style-type: none"> Higher capital cost Uses natural gas Extensive structural modifications/construction needed
2. Install New Screw Press	Install a dewatering screw press on the second floor of the modified 2-story solids handling building	\$3,310,000		<ul style="list-style-type: none"> Smaller footprint than belt press New equipment with new equipment warranty 	<ul style="list-style-type: none"> Higher financial cost over refurbishment of existing Belt Filter Press
3. Install New Flow Meters and TSS Meters	Replace the existing PE sludge flow meter and install a TSS meter downstream of PE sludge pumps.	\$70,000		<ul style="list-style-type: none"> Increased PE sludge monitoring capabilities 	<ul style="list-style-type: none"> None

First Floor Conceptual Layout



Second Floor Conceptual Layout



Capital Improvement Project 6 – Plantwide Pump and Ultraviolet Disinfection Upgrades

Project Element	Description of Improvements	Project Cost (2020 Dollars)	Additional Operations and Maintenance Cost (\$/yr, 2020 Dollars)	Pros	Cons
1. Upgrade Effluent Pumps	Retrofit effluent pumps by adding a second stage and increasing the motor size to increase capacity.	\$830,000	\$9,000	<ul style="list-style-type: none"> Maintain firm capacity for projected peak flows 	<ul style="list-style-type: none"> Requires retrofit of all effluent pumps
2. 3W System Upgrades	Purchase new pumps sized for the same head, but about half the capacity of the existing pumps to provide adequate turndown, operate the 3W system more efficiently, and prevent unnecessary wear.	\$460,000	\$9,000	<ul style="list-style-type: none"> Optimize pumping of 3W Reduce pump maintenance by avoiding operation near shutoff head 	<ul style="list-style-type: none"> Requires replacement of existing 3W pumps, which are still functional but worn
3. Upgrade Influent Pumps	Replace the two smaller influent pumps with pumps that have twice the flow capacity to provide firm capacity for projected peak flows.	\$640,000	\$12,000	<ul style="list-style-type: none"> Maintain firm capacity for projected peak flows Replaces the pumps that experience the most use and wear 	<ul style="list-style-type: none"> Requires replacement of discharge piping to avoid excessive headloss
4. Upgrade UV System	Replaces the existing UV reactors to increase capacity of the UV disinfection system.	\$3,200,000	\$74,000	<ul style="list-style-type: none"> Provide firm capacity for disinfection of projected peak flows Reduce headloss through UV by increasing reactor and pipe size 	<ul style="list-style-type: none"> Requires new UV reactors, since existing reactors cannot be expanded and insufficient space to add reactors



Scenario 4
2.5% rate decrease, 10% utility tax, \$5M new debt

	2019 Projected	2020	2021	2022	2023	2024
OPERATIONS						
Beginning Fund Balance	\$1,242,171	\$667,746	\$653,152	\$675,481	\$691,608	\$751,484
Service Charges	\$5,606,905	4.26% \$5,845,759	4.26% \$6,094,788	4.26% \$6,354,426	4.26% \$6,625,125	4.26% \$6,907,355
DOC Revenue	\$660,000	0.00% \$660,000	0.00% \$660,000	0.00% \$660,000	0.00% \$660,000	0.00% \$660,000
Charges for Services	\$221,472	1.26% \$220,294	1.26% \$223,070	1.26% \$225,880	1.26% \$228,726	1.26% \$231,608
Misc. Revenues	\$41,910	2.00% \$15,054	2.00% \$14,763	2.00% \$15,209	2.00% \$15,532	2.00% \$16,729
Other/Transfer In	\$34,937	\$3,664				
subtotal revenues	\$7,807,395	\$7,412,517	\$7,645,774	\$7,930,997	\$8,220,992	\$8,567,176
Expenditures						
Salaries (10)	\$584,810	\$798,044	\$837,946	\$879,844	\$923,836	\$970,027
Salaries (10) new staff	\$0	1.89 \$0	-0.34 (\$23,779)	0.29 (\$3,704)	0.00 (\$3,890)	0.70 \$53,093
Benefits (20)	\$299,034	\$403,557	\$443,913	\$488,304	\$537,134	\$590,848
Benefits (20) new staff	\$0	1.89 \$0	-0.34 (\$14,680)	0.29 (\$2,396)	0.00 (\$2,635)	0.70 \$37,686
Supplies (30)	\$185,000	\$208,659	\$214,919	\$221,366	\$228,007	\$234,848
Water for resale (30)	\$1,500,000	\$1,600,000	\$1,664,000	\$1,730,560	\$1,799,782	\$1,871,774
Professional Svcs (40)	\$1,024,064	\$1,014,421	\$1,044,854	\$1,076,199	\$1,108,485	\$1,141,740
Intergovernmental (50)	\$291,396	\$10,000	\$10,126	\$10,254	\$10,383	\$10,514
Utility Tax	\$653,027	\$654,109	\$699,261	\$725,550	\$752,938	\$781,568
Other Transfers (90)	\$1,911,191	\$0	\$9,625	\$9,625	\$9,625	\$9,625
Capital (60)	\$0	\$3,691	\$0	\$0	\$0	\$0
subtotal expenses	\$6,448,522	\$4,692,481	\$4,886,185	\$5,135,601	\$5,363,666	\$5,701,722
rev over/under exp	\$1,358,873	\$2,720,036	\$2,759,589	\$2,795,396	\$2,857,326	\$2,865,454
Debt Service (70-80)	\$694,940	\$754,145	\$752,449	\$637,424	\$908,322	\$1,121,705
Subtotal Fund Balance	\$663,933	\$1,965,891	\$2,007,140	\$2,157,972	\$1,949,004	\$1,743,749
reserve target	\$627,873	\$653,152	\$675,481	\$691,608	\$751,484	\$817,656
Amount to transfer to CIP	\$36,060	\$1,312,738	\$1,331,659	\$1,466,364	\$1,197,521	\$926,093
CAPITAL						
Beginning Fund Balance	\$7,179,696	\$5,238,060	\$2,345,461	\$442,701	\$2,725,358	\$959,771
Bond Proceeds			\$0	\$5,000,000	\$3,000,000	
Transfer In from Operations	\$1,901,566	\$1,312,738	\$1,331,659	\$1,466,364	\$1,197,521	\$926,093
Interest Earnings & Other	\$82,800	\$105,761	\$47,909	\$9,854	\$55,507	\$20,195
Capital Fees	\$750,000	\$820,160	\$745,600	\$596,480	\$596,480	\$596,480
subtotal revenues	\$9,914,062	\$7,476,720	\$4,470,628	\$7,515,399	\$7,574,866	\$2,502,539
Salaries (10)	\$202,123	\$267,655	\$281,038	\$295,090	\$309,844	\$325,336
Salaries (10) new staff	\$0	0.40 \$0	0.04 \$2,681	0.11 \$11,113	0.00 \$11,669	0.00 \$12,252
Benefits (20)	\$89,932	\$124,636	\$137,100	\$150,810	\$165,891	\$182,480
Benefits (20) new staff	\$0	0.40 \$0	0.04 \$1,655	0.11 \$7,187	0.00 \$7,906	0.00 \$8,697
Professional Svcs (40)	\$75,352	3.00% \$122,398	3.00% \$126,070	3.00% \$129,852	3.00% \$133,748	3.00% \$137,760
Capital (60)	\$4,225,314	\$4,523,977	\$3,400,032	\$4,135,355	\$5,920,838	\$1,241,261
Utility Tax	\$83,280	\$92,593	\$79,351	\$60,634	\$65,199	\$61,668
subtotal expenses	\$4,676,002	\$5,131,259	\$4,027,927	\$4,790,041	\$6,615,095	\$1,969,454
rev over/under exp (EFB)	\$5,238,060	\$2,345,461	\$442,701	\$2,725,358	\$959,771	\$533,085
total available for debt coverage	\$2,191,673	\$3,645,957	\$3,553,098	\$3,401,730	\$3,509,313	\$3,482,129
debt service	\$694,940	\$754,145	\$752,449	\$637,424	\$908,322	\$1,121,705
debt service ratio (>1.25)	3.15	4.83	4.72	5.34	3.86	3.10
Total Utility Tax to General Fund	\$736,307	\$746,702	\$778,612	\$786,184	\$818,137	\$843,236

	2019 Projected	2020	2021	2022	2023	2024	2025	Notes
OPERATIONS								
Beginning Fund Balance	\$1,101,589	\$2,200,584	\$794,198	\$807,499	\$797,558	\$806,329	\$874,773	
Service Charges	\$6,500,000	1.26% \$6,581,900	1.26% \$6,664,832	1.26% \$6,748,809	1.26% \$6,833,844	1.26% \$6,919,950	1.26% \$7,007,142	1.26% est 1.26% pop growth per year
DOC Revenue	\$1,135,000	0.00% \$1,150,000	0.00% \$1,150,000	0.00% \$1,150,000	0.00% \$1,150,000	0.00% \$1,150,000	0.00% \$1,150,000	0.00%
Charges for Services	\$16,200	0.00% \$16,200	0.00% \$16,200	0.00% \$16,200	0.00% \$16,200	0.00% \$16,200	0.00% \$16,200	0.00%
Misc. Revenues	\$37,086	2.00% \$49,511	2.00% \$18,583	2.00% \$18,849	2.00% \$18,651	2.00% \$18,826	2.00% \$20,195	2.00% bulk is interest earnings
Other/Transfer In	\$99,930	\$7,453						latecomers/bond reserve in
subtotal revenues	\$8,889,805	\$10,005,648	\$8,643,813	\$8,741,357	\$8,816,252	\$8,911,305	\$9,068,310	
Expenditures								
Salaries (10)	\$988,843	\$853,368	\$896,036	\$940,838	\$987,880	\$1,037,274	\$1,089,138	5.00% CPI and merit
Salaries (10) new staff	\$0	(0.20) \$0	(0.58) (\$40,925)	0.29 (\$21,708)	0.00 (\$22,793)	0.00 (\$23,933)	0.00 (\$25,129)	
Benefits (20)	\$473,734	\$432,572	\$475,829	\$523,412	\$575,753	\$633,329	\$696,662	10.00% 10% factor
Benefits (20) new staff	\$0	(0.20) \$0	(0.58) (\$25,265)	0.29 (\$14,039)	0.00 (\$15,443)	0.00 (\$16,988)	0.00 (\$18,686)	
Supplies (30)	\$349,594	\$358,309	\$369,058	\$380,130	\$391,534	\$403,280	\$415,378	3.00% CPI of 3% average
Professional Svcs (40)	\$1,877,985	\$2,053,574	\$2,115,181	\$2,194,009	\$2,259,829	\$2,327,624	\$2,252,531	3.00% CPI of 3% average
Intergovernmental (50)	\$260,894	\$263,119	\$274,328	\$286,014	\$298,198	\$310,902	\$324,146	4.26% pop at 1.26% plus CPI of 3%
Utility Tax	\$769,312	\$779,759	\$784,961	\$793,385	\$801,869	\$810,497	\$819,352	10%, similar to water
Other Transfers (90)	\$55,477	\$0	\$15,500	\$15,500	\$15,500	\$15,500	\$15,500	sick leave/bond reserve out/facilities transfer
Transfer Out - F530 (90)	\$50,000	\$0	\$0	\$0	\$0	\$0	\$0	facilities prepay
Capital (60)	\$10,000	\$88,335	\$0	\$0	\$0	\$0	\$0	
subtotal expenses	\$4,835,839	\$4,829,036	\$4,864,704	\$5,097,541	\$5,292,327	\$5,497,485	\$5,568,891	
rev over/under exp	\$4,053,966	\$5,176,612	\$3,779,109	\$3,643,816	\$3,523,925	\$3,413,820	\$3,499,418	
Debt Service (70-80)	\$1,941,763	\$1,877,617	\$1,879,953	\$1,564,272	\$1,442,577	\$1,807,790	\$2,313,740	
Subtotal Fund Balance	\$2,112,203	\$3,298,995	\$1,899,156	\$2,079,544	\$2,081,348	\$1,606,030	\$1,185,678	
reserve target	\$806,655	\$794,198	\$807,499	\$797,558	\$806,329	\$874,773	\$944,056	
Amount to transfer to CIP	\$722,152	\$2,504,797	\$1,091,657	\$1,281,986	\$1,275,020	\$731,257	\$241,622	
CAPITAL								
Beginning Fund Balance	\$7,621,515	\$7,588,043	\$9,929,371	\$10,698,872	\$14,421,994	\$7,798,168	\$5,390,469	
Grants/Loans proceeds			\$1,300,000					
Bond Proceeds			\$2,000,000	\$4,000,000	\$4,000,000	\$9,000,000	\$0	
Transfer In from Operations	\$722,152	\$2,504,797	\$1,091,657	\$1,281,986	\$1,275,020	\$731,257	\$241,622	
Interest Earnings & Other	\$110,510	\$151,780	\$198,607	\$213,997	\$288,459	\$155,983	\$107,829	
Capital Fees	\$1,300,000	\$820,160	\$745,600	\$596,480	\$596,480	\$596,480	\$596,480	
subtotal revenues	\$9,754,177	\$11,064,780	\$15,265,235	\$16,791,335	\$20,581,953	\$18,281,888	\$6,336,400	
Salaries (10)	\$205,703	\$168,471	\$176,895	\$185,739	\$195,026	\$204,778	\$215,016	5.00% CPI and merit
Salaries (10) new staff	\$0	(0.75) \$0	0.04 \$2,681	0.11 \$11,113	0.00 \$11,669	0.00 \$12,252	0.00 \$12,865	
Benefits (20)	\$90,609	\$74,844	\$82,328	\$90,561	\$99,617	\$109,579	\$120,537	10.00% 10% factor
Benefits (20) new staff	\$0	(0.75) \$0	0.04 \$1,655	0.11 \$7,187	0.00 \$7,906	0.00 \$8,697	0.00 \$9,566	
Professional Svcs (40)	\$107,690	3.00% \$178,509	3.00% \$183,864	3.00% \$189,380	3.00% \$195,061	3.00% \$200,913	3.00% \$206,940	3.00% CPI of 3% average
Capital (60)	\$1,731,452	\$616,391	\$4,024,518	\$1,804,312	\$12,186,011	\$12,279,954	\$5,657,554	
Utility Tax	\$141,051	\$97,194	\$94,421	\$81,048	\$88,494	\$75,247	\$70,431	
subtotal expenses	\$2,276,505	\$1,135,409	\$4,566,363	\$2,369,341	\$12,783,785	\$12,891,419	\$6,292,910	
rev over/under exp (EFB)	\$7,477,672	\$9,929,371	\$10,698,872	\$14,421,994	\$7,798,168	\$5,390,469	\$43,490	
total available for debt coverage	\$5,464,476	\$6,148,552	\$4,723,316	\$4,454,293	\$4,408,864	\$4,166,283	\$4,203,727	
debt service	\$1,941,763	\$1,877,617	\$1,879,953	\$1,564,272	\$1,442,577	\$1,807,790	\$2,313,740	
debt service ratio (>1.25)	2.81	3.27	2.51	2.85	3.06	2.30	1.82	
Total Utility Tax to General Fund	\$910,363	\$876,953	\$879,382	\$874,433	\$890,363	\$885,744	\$889,783	
Monthly rate	\$92.15	0.00% \$92.15	0.00% \$92.15	0.00% \$92.15	0.00% \$92.15	0.00% \$92.15	0.00% \$92.15	0.00% rate adjustment(s)

	2019 Projected	2020	2021	2022	2023	2024	2025	Notes
OPERATIONS								
Beginning Fund Balance	\$325,680	\$284,529	\$255,605	\$269,476	\$314,430	\$326,706	\$343,631	
Service Charges	\$1,894,749	13.76% \$2,155,466	13.76% \$2,452,059	13.76% \$2,789,462	11.26% \$3,103,555	11.26% \$3,453,016	11.26% \$3,841,825	1.26% est 1.26% pop growth per year + annual rate increase
Grants	\$50,000	0.00% \$0	0.00% \$0	0.00% \$0	0.00% \$0	0.00% \$0	0.00% \$0	0.00%
Charges for Services	\$16,000	0.00% \$16,000	0.00% \$16,000	0.00% \$16,000	0.00% \$16,000	0.00% \$16,000	0.00% \$16,000	0.00%
Misc. Revenues	\$6,780	2.00% \$6,690	2.00% \$6,112	2.00% \$6,389	2.00% \$7,288	2.00% \$7,534	2.00% \$7,872	2.00% bulk is interest earnings
Other/Transfer In	\$12,646	\$1,837						latecomers/bond reserve in
subtotal revenues	\$2,305,855	\$2,464,522	\$2,729,775	\$3,081,327	\$3,441,274	\$3,803,255	\$4,209,328	
Expenditures								
Salaries (10)	\$564,822	\$662,257	\$695,370	\$730,138	\$766,645	\$804,978	\$845,226	5.00% CPI and merit
Salaries (10) new staff	\$0	1.42 \$0	(0.59) (\$41,419)	0.29 (\$22,226)	0.00 (\$23,338)	0.00 (\$24,505)	0.00 (\$25,730)	
Benefits (20)	\$320,407	\$345,172	\$379,689	\$417,658	\$459,424	\$505,366	\$555,903	10.00% 10% factor
Benefits (20) new staff	\$0	1.42 \$0	(0.59) (\$25,570)	0.29 (\$14,375)	0.00 (\$15,812)	0.00 (\$17,394)	0.00 (\$19,133)	
Supplies (30)	\$51,025	\$84,809	\$87,353	\$89,974	\$92,673	\$95,453	\$98,317	3.00% CPI of 3% average
Professional Svcs (40)	\$636,117	\$689,813	\$710,507	\$731,823	\$753,777	\$776,391	\$799,682	3.00% CPI of 3% average
Intergovernmental (50)	\$150,068	\$130,868	\$132,517	\$134,187	\$135,877	\$137,589	\$139,323	1.26% pop at 1.26%
Utility Tax								
Other Transfers (90)	\$76,130	\$0	\$7,606	\$7,606	\$7,606	\$7,606	\$7,606	sick leave/bond reserve out/facilities transfer
Capital (60)	\$27,846	\$86,335	\$0	\$0	\$0	\$0	\$0	
subtotal expenses	\$1,826,415	\$1,999,254	\$1,946,054	\$2,074,784	\$2,176,853	\$2,285,485	\$2,401,195	
rev over/under exp	\$479,440	\$465,268	\$783,721	\$1,006,542	\$1,264,421	\$1,517,770	\$1,808,133	
Debt Service (70-80)	\$198,713	\$217,119	\$307,181	\$553,075	\$553,301	\$585,708	\$565,288	
Subtotal Fund Balance	\$280,727	\$248,150	\$476,540	\$453,467	\$711,120	\$932,062	\$1,242,845	
reserve target	\$230,538	\$255,605	\$269,476	\$314,430	\$326,706	\$343,631	\$355,065	
Amount to transfer to CIP	\$50,188	(\$7,455)	\$207,064	\$139,037	\$384,414	\$588,432	\$887,780	
CAPITAL								
Beginning Fund Balance	\$724,473	\$431,723	\$478,925	\$2,211,777	\$1,364,127	\$1,380,009	\$1,246,117	
Bond Proceeds/Loans		\$900,000	\$3,000,000		\$500,000	\$0		
Blueberry Grant		\$2,600,000						
Transfer In from Operations	\$518,524	\$0	\$207,064	\$139,037	\$384,414	\$588,432	\$887,780	
Interest Earnings & Other	\$9,329	\$8,634	\$9,578	\$44,235	\$27,282	\$27,600	\$24,922	
Capital Fees	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
subtotal revenues	\$1,252,326	\$3,940,357	\$3,695,567	\$2,395,049	\$2,275,823	\$1,996,041	\$2,158,818	
Salaries (10)	\$197,953	\$185,160	\$194,418	\$204,139	\$214,346	\$225,063	\$236,316	5.00% CPI and merit
Salaries (10) new staff	\$0	(0.45) \$0	0.04 \$2,681	0.11 \$11,113	0.00 \$11,669	0.00 \$12,252	0.00 \$12,865	
Benefits (20)	\$87,880	\$84,676	\$93,144	\$102,458	\$112,704	\$123,974	\$136,372	10.00% 10% factor
Benefits (20) new staff	\$0	(0.45) \$0	0.04 \$1,655	0.11 \$7,187	0.00 \$7,906	0.00 \$8,697	0.00 \$9,566	
Professional Svcs (40)	\$43,390	3.00% \$52,939	3.00% \$54,527	3.00% \$56,163	3.00% \$57,848	3.00% \$59,583	3.00% \$59,583	3.00% CPI of 3% average
Capital (60)	\$491,380	\$3,138,657	\$1,137,365	\$649,862	\$491,341	\$320,355	\$916,802	
Utility Tax								
subtotal expenses	\$820,603	\$3,461,432	\$1,483,790	\$1,030,922	\$895,814	\$749,924	\$1,371,504	
rev over/under exp (EFB)	\$431,723	\$478,925	\$2,211,777	\$1,364,127	\$1,380,009	\$1,246,117	\$787,314	
total available for debt coverage	\$488,769	\$473,902	\$793,299	\$1,050,777	\$1,291,703	\$1,545,370	\$1,833,055	
debt service	\$198,713	\$217,119	\$307,181	\$553,075	\$553,301	\$585,708	\$565,288	
debt service ratio (>1.25)	2.46	2.18	2.58	1.90	2.33	2.64	3.24	
Total Utility Tax to General Fund	\$0	\$0	\$0	\$0	\$0	\$0	\$0	

Monthly rate per ERU \$12.28 12.50% \$13.82 12.50% \$15.54 12.50% \$17.48 10.00% \$19.23 10.00% \$21.16 10.00% \$23.27 12.50% 12.5% yearly rate increase

Project	Budget		Estimate					Project Total	
	2019 (\$&B)	2019 (Capital)	2020	2021	2022	2023	2024		2025
Water Utility									
132nd Street Watermain Replacement	\$ 51,210	\$ 1,010,018							\$ 1,061,228
134th SE/133rd St/208th SE/209th SE (Graden) Watermain Replacement	65,000	643,625							\$ 708,625
177th PS/Replace Equip & PLC/SCADA				1,220,517					\$ 1,220,517
182nd-154th to 150th (Under SR522)	61,960	555,000		30,000	298,667				\$ 945,627
4" Servicing fire hydrant replacement					8,041	80,406	84,426	88,647	\$ 261,520
Asbestos Cement Pipe Replacement							28,142	191,617	\$ 219,759
Adams Lane Utility Replacement	16,390	11,463	335,951						\$ 363,804
Cascade View Drive Water Main	47,460	850,599					45,000		\$ 898,059
Circle Drive 2" galvanized main replace						16,801	129,453		\$ 45,000
Circle Drive to Sumac main replacement									\$ 146,254
Dickinson Utility Replacement Project				448,671					\$ 448,671
DOC Storage	30,000	455,333	3,810,705						\$ 4,296,038
Flow Meters install					19,144				\$ 19,144
Flushing Devices at dead ends			11,576						\$ 11,576
Lewis/Blakely/Fremont/McDougal parallel alley WMR						23,117	186,089		\$ 209,206
Lord Hill PS-Pump Replacement	8,000	32,000							\$ 40,000
Lord Hill-Generator	1,500	20,000							\$ 21,500
Madison/Sams/McDougal/Pike alley WMR						26,132	210,362		\$ 236,494
Main/Ferry/N Blakely/N Madison parallel alley WMR						57,289	461,177		\$ 518,466
North Madison Utility Replacement		40,000	25,000	408,324					\$ 473,324
Orr to Kelsey-abandon line under houses						10,051	80,908		\$ 90,959
Replace Asbestos Cement Watermain (171st/173rd 161st north of West Main Street)					26,000				\$ 173,000
Replace 4" Asbestos Cement Watermain (Main St behind Monroe Shopping Center)						27,300	154,350		\$ 181,650
SCADA PLC Replacement (North Hill PS, Trombley PS, Ingraham)			92,610						\$ 92,610
Short Columbia Watermain Replacement				24,614	198,143				\$ 222,757
South Taft Lane Watermain Replacement	2,500	141,115							\$ 143,615
Spring Hill PS-Pump Replacement	8,000	32,000							\$ 40,000
Strawberry Lane Watermain Replacement				82,418	1,312,000				\$ 1,394,418
Sump Pumps install (Foothills Pressure (reducing valve & Trombley Reservoir)							42,213		\$ 42,213
Tester Rd Emergency Water Main Repair	5,000	70,456							\$ 75,456
Trombley Hill Reservoir to Airport/179th SE WMR					402,029	3,236,331			\$ 3,638,360
Trombley Reservoir 12" Watermain Fire Flow Upside		65,000	65,000						\$ 130,000
Wilson Lane Watermain Replacement						16,584	133,499		\$ 150,083
Raimier View Rd PRV			277,830						\$ 277,830
Install 8" along 127th						19,096	153,726		\$ 172,822
Thrive Alley Replacement							27,966	225,127	\$ 253,093
Destination Alley							32,715	263,356	\$ 296,071
Woods Cr Road - US2 to Tjerne			297,596	1,249,905					\$ 1,547,501
Woods Cr Road - Tjerne to Ingraham				312,476	1,312,400				\$ 1,624,876
Woods Cr Road - Ingraham Rd to Ingraham Reservoir					656,200	2,756,041			\$ 3,412,241
Replace 6" along Old Owen Rd				45,581	366,931				\$ 412,512
Total Water Utility Capital	\$ 297,020	\$ 3,926,609	\$ 4,916,268	\$ 3,822,506	\$ 4,599,555	\$ 6,416,148	\$ 1,770,026	\$ 768,747	\$ 26,516,879

Sewer Utility									
Computer upgrades (O&M) capital	\$ 10,000								\$ 10,000
Adams Lane Utility Replacement	16,390	10,000	335,951						\$ 362,341
Cates PS Upgrades					191,422	804,057			\$ 995,479
Dickinson Utility Replacement				318,897					\$ 318,897
North Madison Utility Replacement		40,000	25,000	1,920,305					\$ 1,985,305
Pipe Replacement Projects					500,000	670,048	703,550	738,728	\$ 2,612,326
Sayer Street Porous Concrete Driveway Access									\$ 0
South Taft Lane 6/8" Concrete Main Replacement			16,800	64,999					\$ 81,799
South Taft Emergency Sewer Repair	2,500	269,336				670,048	4,924,851		\$ 271,836
Valley View PS (179th)& Force Main Upgrades					191,442	804,057			\$ 5,594,899
West Main Pump Station Upgrades									\$ 995,499
WWTP Engineering Reports	35,000	348,226	252,780						\$ 636,006
WWTP capital maintenance			35,000	50,000	51,000	52,020	53,060	54,122	\$ 295,202
Ops & Dewatering Roof Replacement				303,877					\$ 303,877
Frylend's PS & FM upgrades							387,832	4,316,571	\$ 4,704,403
South Frylend's PS upgrades								254,560	\$ 254,560
Old Owen Rd PS upgrades							77,566	651,558	\$ 729,124
WWTP 1,3,5,6			194,175	1,630,000	1,165,049	9,500,000	6,468,400	0	\$ 18,957,624
WWTP energy efficiency upgrades	10,000	1,000,000							\$ 1,010,000
Total Sewer Utility Capital	\$ 63,890	\$ 1,677,562	\$ 859,706	\$ 4,288,078	\$ 2,098,913	\$ 12,500,230	\$ 12,615,259	\$ 6,015,539	\$ 40,119,177

Stormwater Utility									
Blueberry/Kelsey Infiltration	\$ 130,000		\$ 1,000,000						\$ 1,130,000
Blueberry Lane Infiltration	37,380	250,000	2,131,000						\$ 2,418,380
Crystalwood Drainage						125,634	70,355	1,061,921	\$ 1,257,910
Dickinson Utility Replacement				756,176					\$ 756,176
Lake Tye Bio-Swale Design	12,000	62,000	277,493	559,133	917,327				\$ 910,626
Monroe Street & Kelsey Street				113,954	28,716	231,166			\$ 1,031,281
Monroe Street & Park Street					28,716	231,166			\$ 259,882
Park Street & Roberts Street					28,716	231,166			\$ 259,882
Stormwater retrofits						250,000	250,000		\$ 750,000
Total Stormwater Utility Capital	\$ 49,380	\$ 442,000	\$ 3,408,493	\$ 1,429,263	\$ 974,759	\$ 837,966	\$ 320,355	\$ 1,311,921	\$ 8,774,137

Issue	2019	2020	2021	2022	2023	2024	2025
Water Debt							
All	694,940						
2017 Revenue Bonds		156,114	156,951	157,707	165,132	376,704	305,640
2016 Revenue Bonds		89,540	89,188	88,803	89,485	89,001	89,584
2011 W/S Bonds		252,075	252,757	253,067	243,705	-	-
2002 PWTF Loan		143,253	140,550	137,847			
2005 Bonds		113,163	113,003				
2.25M 20Y in 2021							
5.25M 20Y in 2022					410,000	410,000	410,000
5.25M 20Y in 2023						246,000	246,000
2.1M 20Y in 2024							
Total Water Debt Service	694,940	754,144	752,449	637,424	908,322	1,121,705	1,051,224
Sewer Debt							
All	1,941,763						
2017 Revenue Bonds		375,830	377,845	379,665	397,540	906,880	735,800
2016 Revenue Bonds		81,400	81,080	80,730	81,350	80,910	81,440
2011 W/S Bonds		487,887	489,207	489,807	471,687	-	-
2001 DOE Loan		371,320	371,320	371,320			
2003 DOE Loan		78,750	78,750	78,750			
2005 Bonds		482,430	481,751				
2.2M 20 Y in 2021				164,000	164,000	164,000	164,000
4.4M 20Y in 2022					328,000	328,000	328,000
3.3M 20Y in 2023						328,000	328,000
6.6M 20Y in 2024							676,500
Total Sewer Debt Service	1,941,763	1,877,617	1,879,953	1,564,272	1,442,577	1,807,790	2,313,740
Stormwater debt service							
All	198,713						
2017 Revenue Bonds		46,256	46,504	46,728	48,928	111,616	90,560
2016 Revenue Bonds		97,680	97,296	96,876	97,620	97,092	97,728
2011 W/S Bonds		73,183	73,381	73,471	70,753	-	-
3.3M 20Y in 2021				246,000	246,000	246,000	246,000
DOE loan \$900K placeholder			90,000	90,000	90,000	90,000	90,000
						41,000	41,000
Total Storm Debt Service	198,713	217,119	307,181	553,075	553,301	585,708	565,288
Scheduled bond issue							
Water	\$ -	\$ -	\$ -	\$ 5,000,000	\$ 3,000,000		\$ -
Sewer	\$ -	\$ -	\$ 2,000,000	\$ 4,000,000	\$ 4,000,000	\$ 9,000,000	\$ -
Storm	\$ -	\$ -	\$ 3,000,000	\$ -	\$ 500,000	\$ -	\$ -
premiums/issue costs	\$ -	\$ -	\$ 500,000	\$ 900,000	\$ 750,000	\$ 900,000	\$ -
Total annual issue	\$ -	\$ -	\$ 5,500,000	\$ 9,900,000	\$ 8,250,000	\$ 9,900,000	\$ -

	2019	2020	2021	2022	2023	2024	2025	
Position salary								
position one	64,000	67,200	70,560	74,088	77,792	81,682	85,766	5% CPI & Merit
Position benefits								
position one	36,000	39,600	43,560	47,916	52,708	57,978	63,776	10% consistent with main n

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	2020	2021	2022	2023	2024	2025
CURRENT STRUCTURE						
Monthly Storm rate per ERU	\$12.77	\$13.28	\$13.81	\$14.37	\$14.94	\$15.54
Monthly water base rate	\$26.05	\$28.00	\$30.10	\$32.36	\$34.79	\$37.39
Monthly sewer rate	\$92.15	\$92.15	\$92.15	\$92.15	\$92.15	\$92.15
Total Rate	<u>\$130.97</u>	<u>\$133.43</u>	<u>\$136.06</u>	<u>\$138.87</u>	<u>\$141.88</u>	<u>\$145.08</u>
ALTERNATE SCENARIO						
Monthly Storm rate per ERU	12.50% \$13.82	12.50% \$15.54	12.50% \$17.48	10.00% \$19.23	10.00% \$21.16	10.00% \$23.27
Monthly water base rate	3.00% \$24.96	3.00% \$25.71	3.00% \$26.48	3.00% \$27.27	3.00% \$28.09	3.00% \$28.93
Monthly sewer rate	0.00% \$92.15	0.00% \$92.15	0.00% \$92.15	0.00% \$92.15	0.00% \$92.15	0.00% \$92.15
Total Rate	<u>\$130.92</u>	<u>\$133.40</u>	<u>\$136.11</u>	<u>\$138.65</u>	<u>\$141.40</u>	<u>\$144.35</u>
Current rate structure	\$130.97	\$133.43	\$136.06	\$138.87	\$141.88	\$145.08
Alternate scenario	\$130.92	\$133.40	\$136.11	\$138.65	\$141.40	\$144.35
difference	<u>(\$0.05)</u>	<u>(\$0.04)</u>	<u>\$0.05</u>	<u>(\$0.22)</u>	<u>(\$0.48)</u>	<u>(\$0.73)</u>
yearly increase current structure	\$2.31	\$2.46	\$2.63	\$2.81	\$3.00	\$3.21
yearly increase alt scenario	\$2.26	\$2.48	\$2.71	\$2.54	\$2.74	\$2.96
difference	<u>(\$0.05)</u>	<u>\$0.01</u>	<u>\$0.08</u>	<u>(\$0.27)</u>	<u>(\$0.26)</u>	<u>(\$0.25)</u>