Effluent Limit Exceedance Evaluations

February 2020

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PREPARED FOR

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ACRONYMS

Acronym	Definition
APDES	Alaska Pollutant Discharge Elimination System
BMP	best management practice
BOD	biological oxygen demand
CBJ	City and Borough of Juneau
DEC	Alaska Department of Environmental Conservation
DMR	discharge monitoring report
FOG	fats, oils and grease
IU	industrial user
JDTP	Juneau-Douglas Wastewater Treatment Plant
mg/L	milligrams per liter
mgd	million gallons per day
MTP	Mendenhall Wastewater Treatment Plant
ppd	pounds per day
SBR	sequencing batch reactor
SIU	significant
SRT	solids retention time
TSS	total suspended solids
Tt	Tetra Tech
UV	ultraviolet

1. INTRODUCTION

1.1 PURPOSE

The City and Borough of Juneau (CBJ) hired Tetra Tech (Tt) to assist in determining the cause of and to propose solutions for effluent limit violations occurring between September 2015 and March 2019 at the Juneau-Douglas Wastewater Treatment Plant (JDTP) and the Mendenhall Wastewater Treatment Plant (MTP). This report evaluates circumstances behind the permit effluent limit exceedances during this period for both treatment plants, the corrective actions taken upon notice of the exceedances, actions the CBJ is taking to prevent future occurrences of the same causes, and an implementation strategy for these measures for the CBJ to present to the Alaska Department of Environmental Conservation (DEC) in order to achieve a feasible path to compliance.

1.2 BACKGROUND

The CBJ contacted Tt after receiving a "Notice of Intent to Seek Penalties for Clean Water Act Violations Opportunity to Confer" letter from the DEC dated July 22, 2019, concerning alleged federal Clean Water Act violations occurring from September 2015 through March 2019. The letter indicated that the alleged violations at the JDTP and the MTP placed the facilities out of compliance with their Alaska Pollutant Discharge Elimination System (APDES) individual permits. DEC specifically cited 31 permit effluent limit exceedances for the JDTP and 55 permit effluent limit exceedances for the MTP during the period under scrutiny.

In a subsequent phone call, the DEC agreed to allow the CBJ to continue operating both treatment plants while working with Tt to develop this report detailing each exceedance, why it occurred (if known), what measures were taken to resolve the issue, and recommendations for any further measures that should be taken to resolve the issue (as required).

In general, the CBJ operates both the JDTP and the MTP to be compliant with their individual permit limits. In the event of a non-compliant event, the CBJ contacts the DEC within 24 hours to give oral notification of noncompliance. Within five calendar days after operators become aware of the circumstances, the CBJ submits a written documentation of noncompliance (noncompliance notification) to the DEC's Division of Water and engages in corrective actions where applicable. The noncompliance notifications written by wastewater treatment staff provide information on what occurred when the exceedance was noticed (if known), and how the exceedance was resolved.

2. JUNEAU-DOUGLAS WASTEWATER TREATMENT PLANT

The CBJ owns, operates, and maintains the JDTP, located approximately 1 mile south of downtown Juneau. Limits on the JDTP's treated effluent are governed in accordance with the Clean Water Act by APDES Individual Permit AK0023213, effective June 1, 2015.

The JDTP was designed and constructed in 1973 with the capacity to treat average daily flows of 2.76 million gallons per day (mgd). An activated sludge facility, the JDTP serves a resident population of approximately 9,000 people as well as commercial businesses, cruise ships, and State of Alaska and CBJ offices. Figure 2-1 shows the boundaries of the plant's service area. As Juneau is a summer holiday destination, seasonal population fluctuations have an impact on wastewater volume at the JDTP. In addition, cruise ship discharges are a factor regarding seasonal changes in volume and strength.

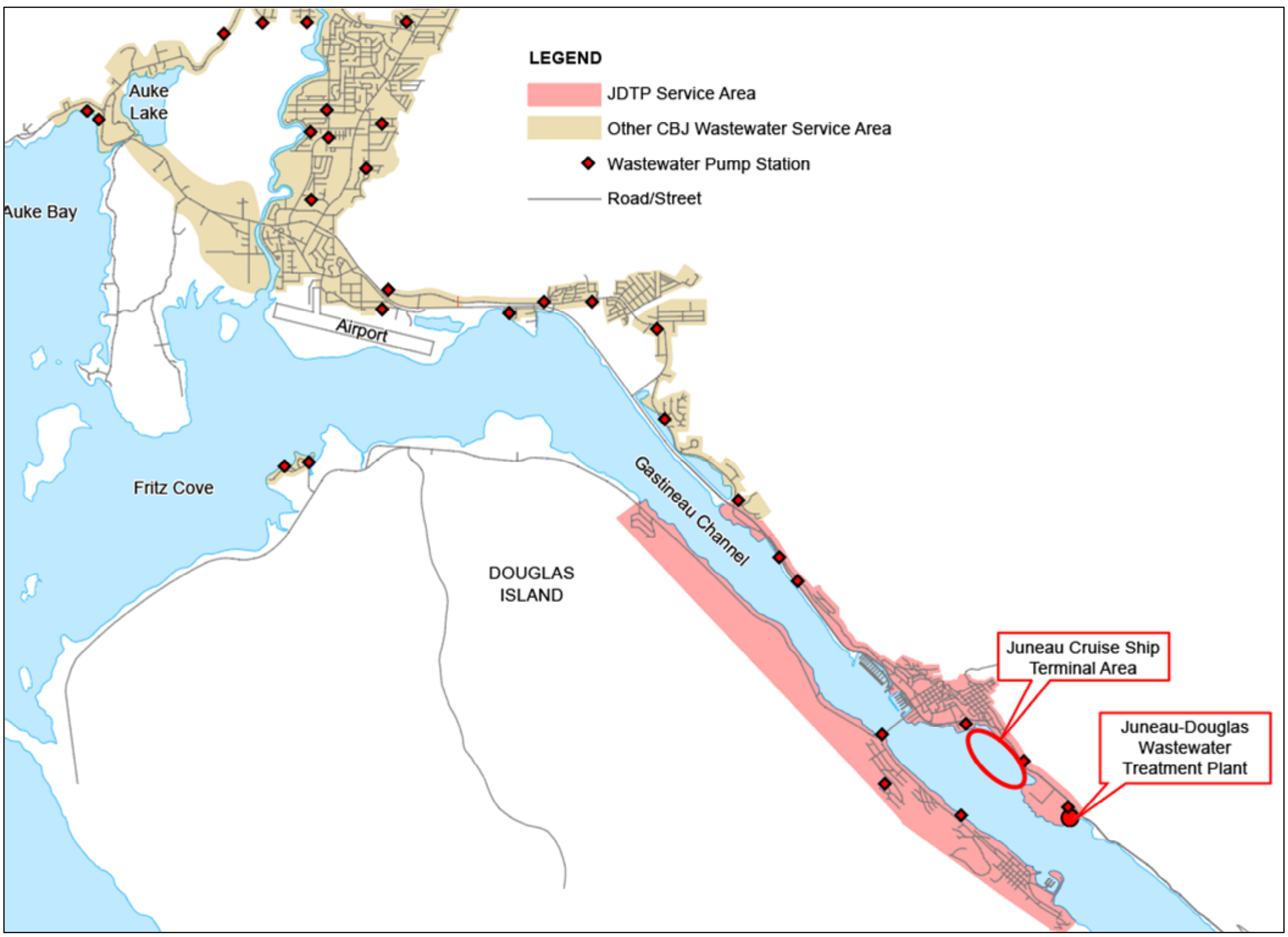

Figure 2-1. JDTP Service Area Map

The JDTP provides preliminary treatment of influent sewage by fine screening and grit removal in the headworks. Secondary biological treatment is completed in one or two aeration basins, each having two 30-hp aerators. Activated sludge mixed liquor flows by gravity to a distribution box and then into one of two clarifiers. Sludge removed during the treatment process is sent for further treatment to an aerobic digester with one 30-hp aerator. The digester stores thickened sludge until it can be sent to a belt filter press. Treated effluent from the clarifier is disinfected with ultraviolet (UV) light treatment.

The CBJ has made significant investment in capital improvements to the JDTP during the previous permit cycle (2014-2019), including the following:

- **Headworks upgrades—**The Auger Monster (a unit combining grinder, screen and compactor) was upgraded to two new 3-mm perforated plate automatic screens and screening washer/compactors
- **Aeration basin upgrades—**Upgrades included replaced platforms and access walkways, replacement of each of the five electric aerator motors, aeration guide pipe replacement, and resurfacing of sump and aeration basin floors with reinforced concrete overlay
- **Digester upgrades—**Digester aerator mixer impellers were replaced
- **Auxiliary pump upgrades—**Each of the two auxiliary pumps was replaced, and the new pumps were supplied with new control panels

2.1 EFFLUENT LIMIT EXCEEDANCES

DEC identified 31 effluent limit exceedances at the JDTP from September 2015 through March 2019. The records registered by DEC (in the U.S. Environmental Protection Agency Enforcement and Compliance History Online database) were compared to noncompliance notifications that the CBJ sent to DEC during this period. Noncompliance notifications include additional operator information about each exceedance incident, including possible causes. Using this information, the exceedances were categorized by parameter for further examination.

Following are the known exceedances for each parameter, including permitted limit type and value as compared to the value reported on the JDTP's discharge monitoring report (DMR). The percent by which the reported value from the DMR exceeded the permitted limit is shown where appropriate.

2.1.1 Parameter: Biological Oxygen Demand 5-Day, 20 °C

Daily maximum, weekly average and monthly average effluent biological oxygen demand (BOD) limits were exceeded during the period under evaluation, as summarized in Table 2-1. Based on noncompliance notifications and interviews with CBJ wastewater treatment staff, the following were reported causes for BOD exceedances:

- Hydraulic surge causing a loss of solids from the clarifiers
- Facility operating on one aeration basin
- BOD dilution for the effluent sample did not meet QA/QC parameters
- Unknown

Table 2-1. BOD Exceedances at JDTP—September 2015 through March 2019

Month	Limit Type	Limit Value	DMR Value	% Exceedance
June 2017	Weekly Average Load	1,035 ppd	2,205 ppd	113
July 2017	Daily Maximum Concentration	60 mg/L	78 mg/L	30
August 2017	Monthly Average Concentration	30 mg/L	35 mg/L	17
August 2017	Weekly Average Concentration	45 mg/L	57 mg/L	27
August 2017	Daily Maximum Load	1,380 ppd	1,830 ppd	33
August 2017	Daily Maximum Concentration	60 mg/L	120 mg/L	100

ppd = pounds per day; mg/L = milligrams per liter

Reported actions taken at the time of noncompliance to reduce BOD were as follows:

- Increase waste removal from the system
- Return operation to both aeration basins after completion of construction
- Reinforce QA/QC procedures for sampling and testing

CBJ wastewater staff reported the following long-term corrective actions:

- Operate both aeration basins
- Continue to reinforce QA/QC procedures for sampling and testing

2.1.2 Parameter: Total Suspended Solids

Daily maximum, weekly average, monthly average effluent total suspended solids (TSS) limits were exceeded during the time period under evaluation, as summarized in Table 2-2. Based on noncompliance notifications and interviews with CBJ wastewater treatment staff, the following were reported causes for TSS exceedances:

- Hydraulic surge causing a loss of solids from the clarifiers
- Facility operating on one aeration basin
- Unknown

Table 2-2. TSS Exceedances at JDTP—September 2015 through March 2019

Month	Limit Type	Limit Value	DMR Value	% Exceedance
July 2017	Weekly Average Concentration	45 mg/L	85 mg/L	89
July 2017	Monthly Average Concentration	30 mg/L	32 mg/L	7
July 2017	Daily Maximum Load	1,380 ppd	2,496 ppd	81
July 2017	Daily Maximum Concentration	60 mg/L	232 mg/L	287
August 2017	Minimum Percent Removal	85%	74%	--
August 2017	Daily Maximum Concentration	60 mg/L	290 mg/L	383
August 2017	Daily Maximum Load	1,380 ppd	4,824 ppd	250
August 2017	Weekly Average Concentration	45 mg/L	101 mg/L	124
August 2017	Weekly Average Load	1,035 ppd	1,652 ppd	60
August 2017	Monthly Average Concentration	30 mg/L	61 mg/L	103
August 2017	Monthly Average Load	690 ppd	715 ppd	4
September 2017	Daily Maximum Concentration	60 mg/L	115 mg/L	92
September 2017	Daily Maximum Load	1,380 ppd	2,103 ppd	52

Reported actions taken at time of noncompliance to reduce TSS were as follows:

- Increase waste removal from the system
- Return operation to both aeration basins after completion of construction

CBJ wastewater staff reported the following long-term corrective actions:

- Operate both aeration basins

2.1.3 Parameter: Ammonia Total (as Nitrogen)

The monthly average ammonia permit limit was exceeded a total of five times during this period, as summarized in Table 2-3. Based on noncompliance notifications and interviews with CBJ wastewater treatment staff, the following were reported causes for ammonia exceedances:

- Switching back and forth between basins
- Facility operating on one aeration basin
- Unknown

Table 2-3. Ammonia Exceedances at JDTP—September 2015 through March 2019

Month	Limit Type	Limit Value	DMR Value	% Exceedance
July 2016	Monthly Average Concentration	14 mg/L	15 mg/L	7
June 2017	Monthly Average Concentration	14 mg/L	18 mg/L	29
July 2017	Monthly Average Concentration	14 mg/L	17 mg/L	21
August 2017	Monthly Average Concentration	14 mg/L	15 mg/L	7
September 2017	Monthly Average Concentration	14 mg/L	17 mg/L	21

Reported actions taken at time of noncompliance to reduce ammonia were as follows:

- Cease switching basins during construction
- Stabilize treatment and mean cell reaction time
- Return operation to both aeration basins after completion of construction

CBJ wastewater staff reported the following long-term corrective actions:

- Operate both aeration basins

2.1.4 Parameter: pH

The monthly average pH permit limit was unmet a total of seven times during this period, as summarized in Table 2-4. Based on noncompliance notifications and interviews with CBJ wastewater treatment staff, the following were reported causes for pH readings outside the permit limits:

- Second basin put online and system still stabilizing from the change
- Mass of biosolids high, causing the process to go into nitrification
- Suspect influent shock load with low pH in influent
- Unknown

Table 2-4. pH Readings Outside Permit Limits at JDTP—September 2015 through March 2019

Month	Limit Type	Limit Value	DMR Value
April 2016	Monthly Average Minimum	6.5	6.3
September 2016	Monthly Average Minimum	6.5	6.3
October 2016	Monthly Average Minimum	6.5	5.9
April 2017	Monthly Average Minimum	6.5	6.0
November 2017	Monthly Average Minimum	6.5	6.3
December 2017	Monthly Average Minimum	6.5	6.0
January 2018	Monthly Average Minimum	6.5	6.3

The reported actions taken at time of noncompliance to address pH were as follows:

- Cease switching basins during construction
- Stabilize treatment and mean cell reaction time
- Return operation to both aeration basins after completion of construction
- Monitor the mixed liquor suspended solids (MLSS) and turbidity

CBJ wastewater staff reported the following long-term corrective actions:

- Increase return rate to aeration basins and increase wasting to lower the F/M ratio and biosolids balance in Aeration Basin #1 and Aeration Basin #2
- Increase pH testing frequency and analysis to adjust operation of aeration basins

2.2 PROBABLE CAUSES

The sections above listed the expected causes as observed and reported by CBJ wastewater operators. CBJ staff and Tt have reviewed the reported causes and have developed from them the three expected overriding causes detailed below.

2.2.1 Headworks Construction

Between May 1st and November 23rd 2017, the JDTP underwent a period of extensive headworks modification and construction. The previously installed Auger Monster system was not effective at removing all small debris such as rags and other items that could negatively affect the treatment process or items that cannot be broken down by the biological process.

CBJ removed the Auger Monster and upgraded the headworks screening system to two new 3-mm perforated plate automatic screens and screening washer/compactors. The project included new electrical connections to the screens and compactors, construction of new concrete influent channels, piping to connect the new channels to existing piping, and a headworks building addition to enclose the new channels. The screens have operated since 2017 with no incident and have improved solids removal at the JDTP.

The nature of the construction required that the upgrades take place during the warm weather of summer. Summer is also when the JDTP receives its highest flow rate (see Table 2-5). Typically, the JDTP operates on two aeration basins during the high-flow summer season, and only one aeration basin during the low-flow winter season. Due to construction of the headworks, the plant was required to operate on only one aeration basin during the summer of 2017. As described in the preceding section, staff indicated operational challenges related to construction (operating on one aeration basin, switching back and forth between basins, system still stabilizing) lead to effluent limit exceedances.

Table 2-5. JDTP Design and Observed Loading (Averaged from 2014 – 2019)

Parameter	Design	Observed	Percent of Design
Influent Flow			
Average Annual Flow	2.76 mgd	0.92 mgd	33%
Average Flow May-September	—	0.99 mgd	36%
Average Flow Winter	—	0.84 mgd	30%
Peak Day Flow	7.23 mgd	4.89 mgd[a]	68%
BOD			
BOD Load, Annual Average	3,290 pounds/day	1,987 pounds/day	60%
BOD Load, Peak Day	—	19,426 pounds/day[b]	
TSS			
TSS Load, Annual Average	4,259 pounds/day	1,547 pounds/day	36%
TSS Load, Peak Day	—	12,627 pounds/day[b]	

a. Occurred October 14, 2018

b. Corresponds with flow rate of 1.94 mgd, occurred September 9, 2015.

As shown in Table 2-1 through Table 2-4 above, the headworks construction period correlates with the time period during which 24 of the 31 identified effluent limit exceedances occurred, including all BOD, TSS and nearly all ammonia violations. It is likely that all BOD and TSS exceedances, and all but one ammonia limit exceedance were caused by the headworks construction (see Figure 2-2 and Figure 2-3).

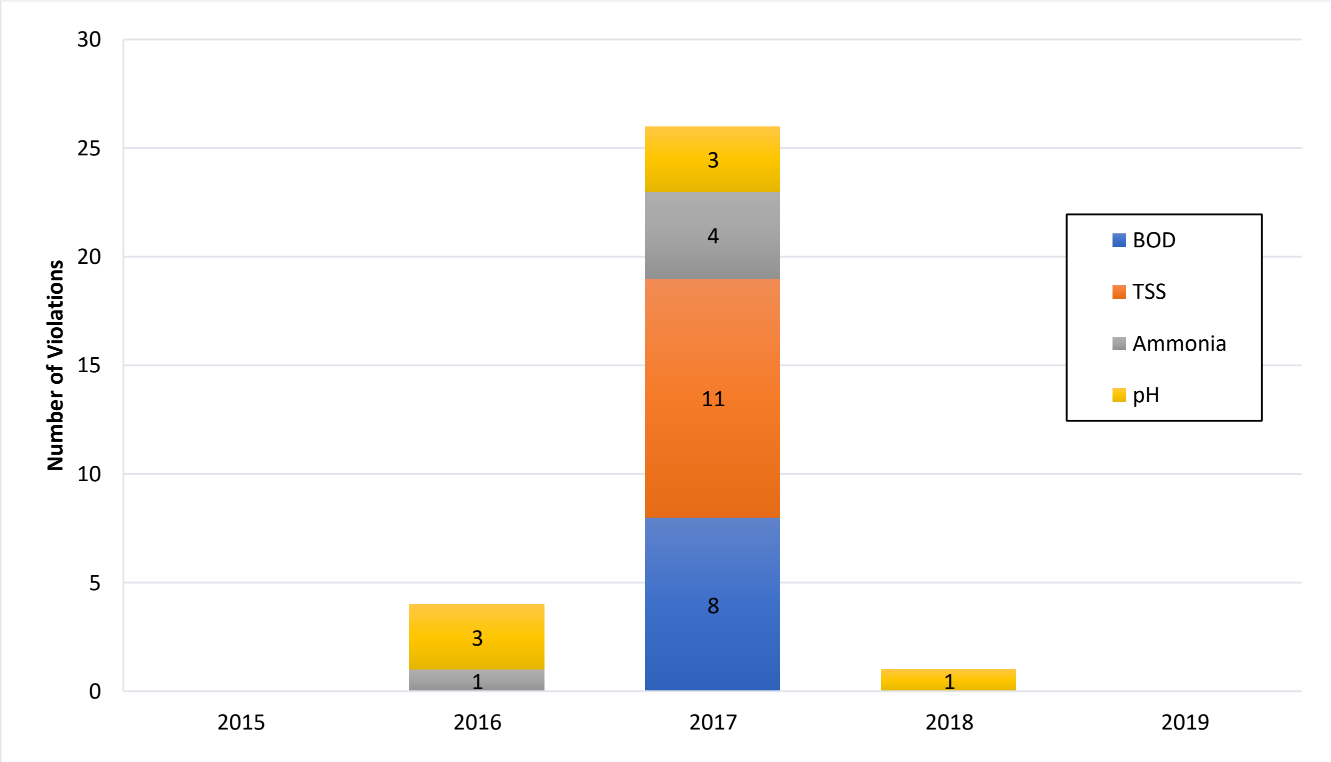

Figure 2-2. JDTP Effluent Limit Violations by Year, September 2015 – March 2019

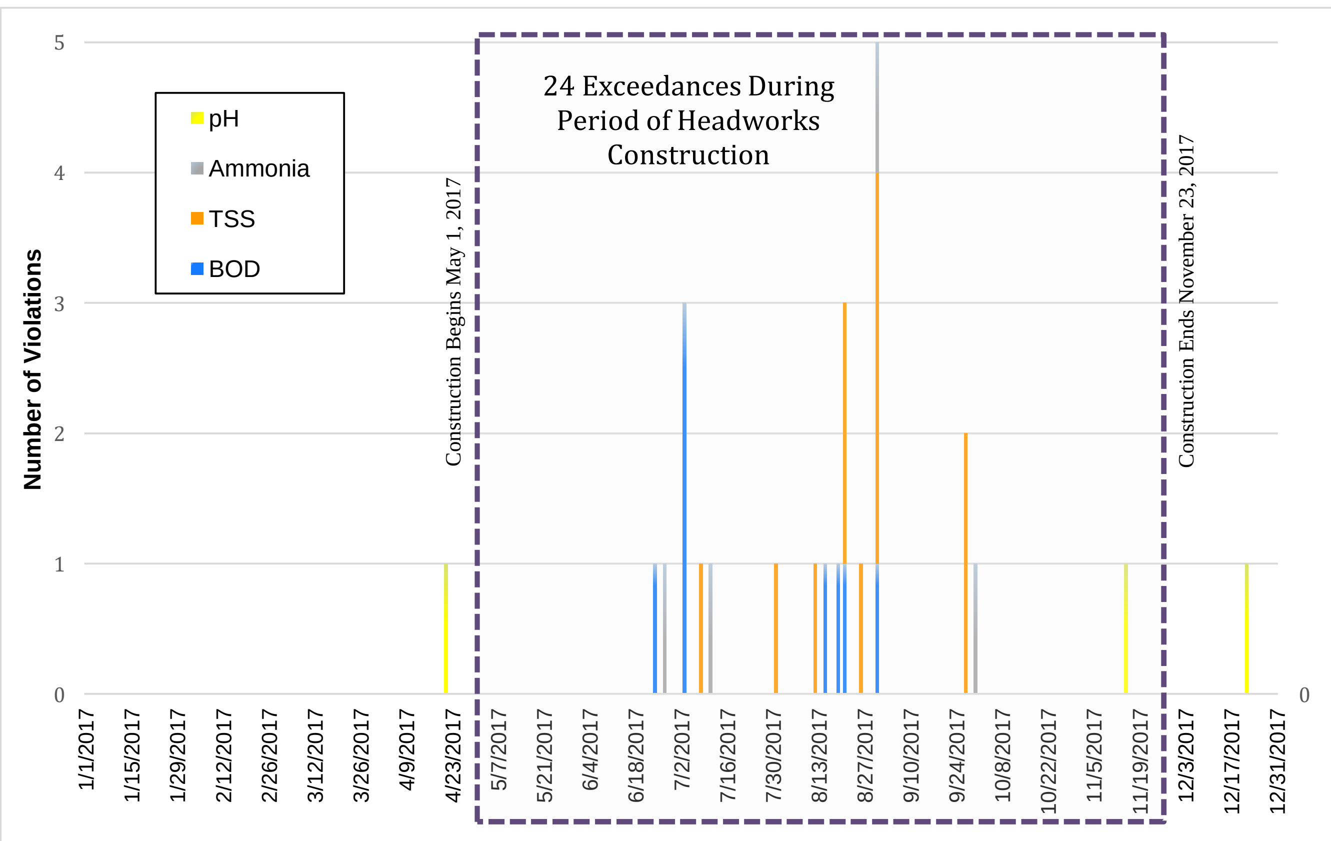

Figure 2-3. JDTP 2017 Effluent Limit Exceedance Timeline

2.2.2 Cruise Ship Impacts

Cruise ship wastewater discharge received by the plant may also have contributed to 23 of the effluent limit exceedances occurring during the summer of 2017. The JDTP has observed a steady seasonal volume increase of cruise ship wastewater during the previous permit cycle. From 2015 to 2019, 16 vessels discharged over 57 million gallons of wastewater to the JDTP. Figure 2-4 illustrates this steady seasonal volume increase.

In conjunction with a three-fold volume increase, the organic loading of the wastewater has also increased over the last five years, as shown on Figure 2-5 and Figure 2-6. Monthly average treatment plant TSS and BOD loadings are shown along with the monthly total cruise ship discharges from 2015 through 2019 in Figure 2-7. With all four cruise ship dock wastewater discharge facilities in operation, the average per day volume and loading from the docks is as summarized in Table 2-6.

The cruise ship contributions to wastewater loading are another likely cause of the BOD, TSS and ammonia violations during the summer of 2017. It is likely that the additional load received by the plant was more than the facility was capable of treating with only one aeration basin operating. The CBJ worked with cruise lines to try to reduce loading received at the plant. However, it is evident from Figure 2-4 through Figure 2-6 that while the cruise lines did reduce loading, it may not have been enough to prevent violations.

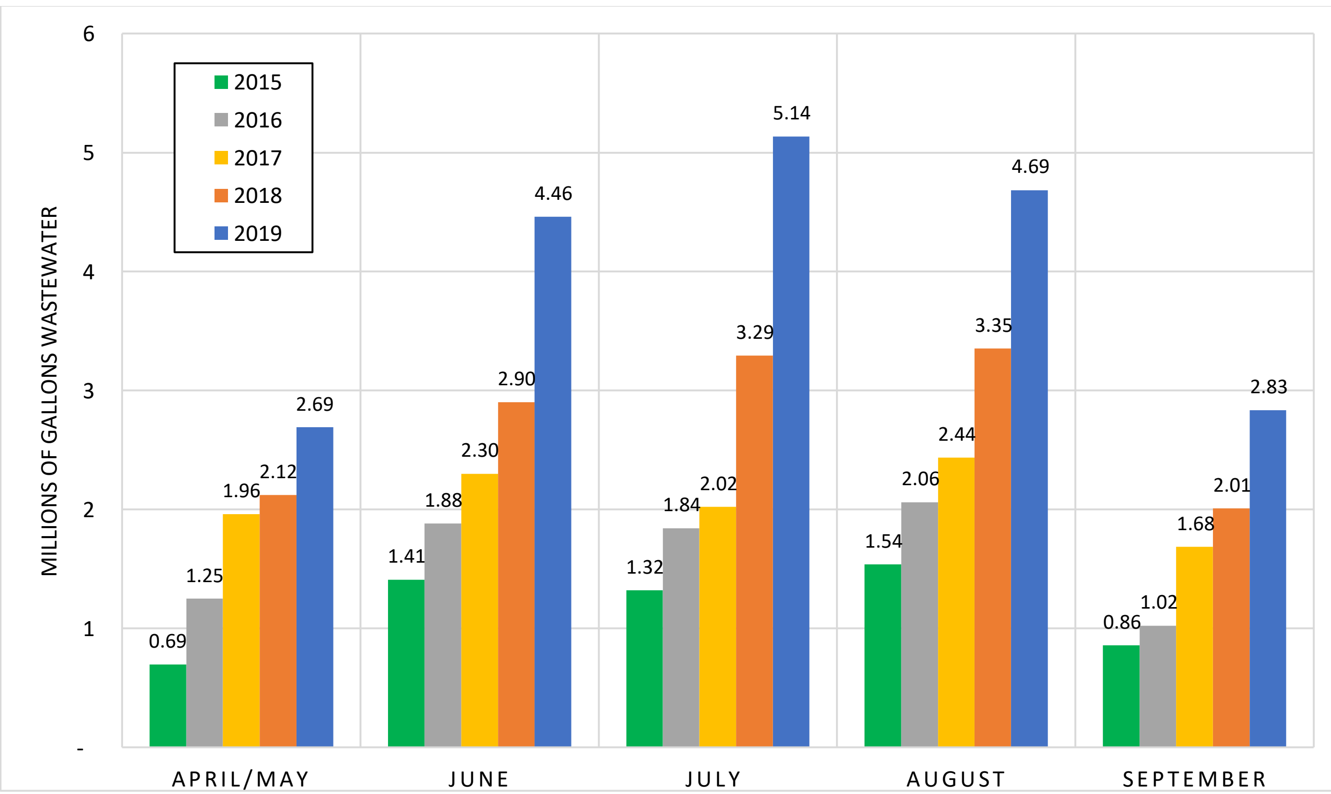

Figure 2-4. Monthly Cruise Ship Wastewater Discharge to JDTP (2015-2019)

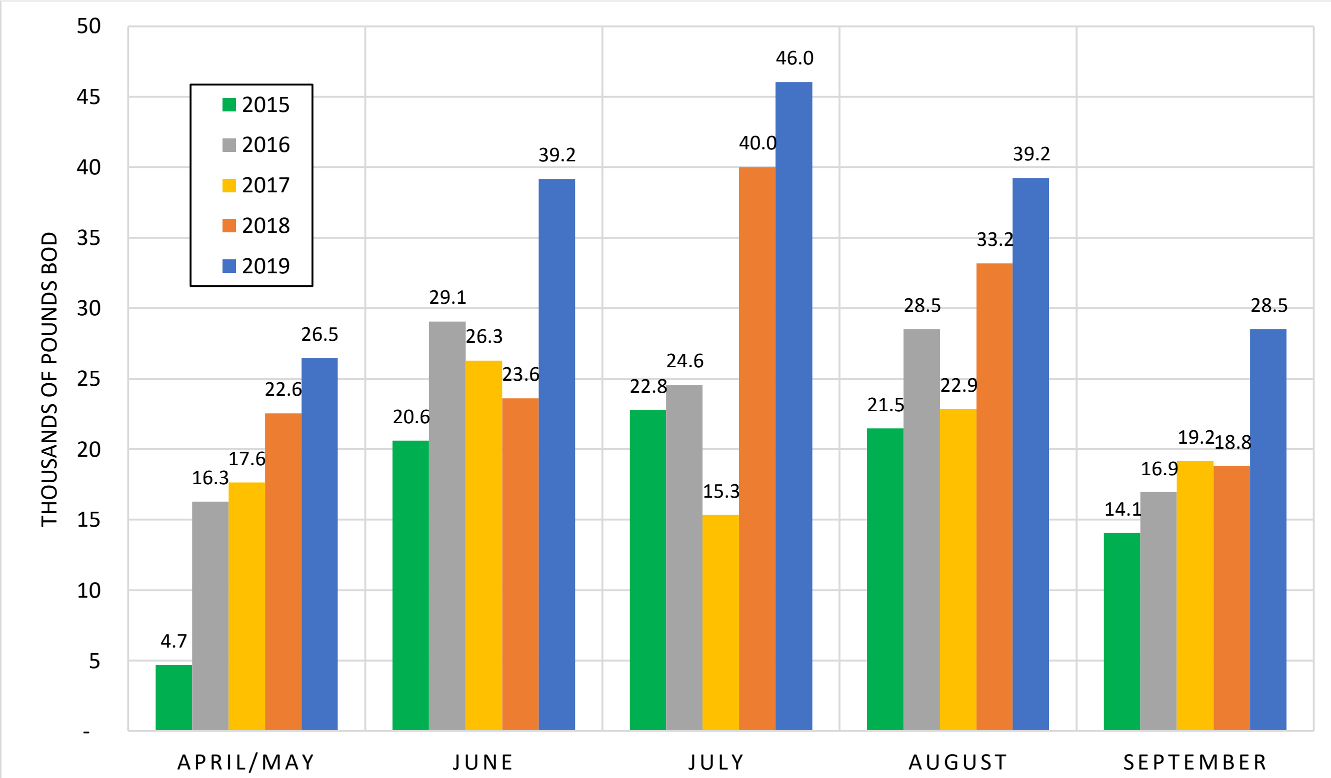

Figure 2-5. Monthly Cruise Ship BOD Loading to JDTP (2015-2019)

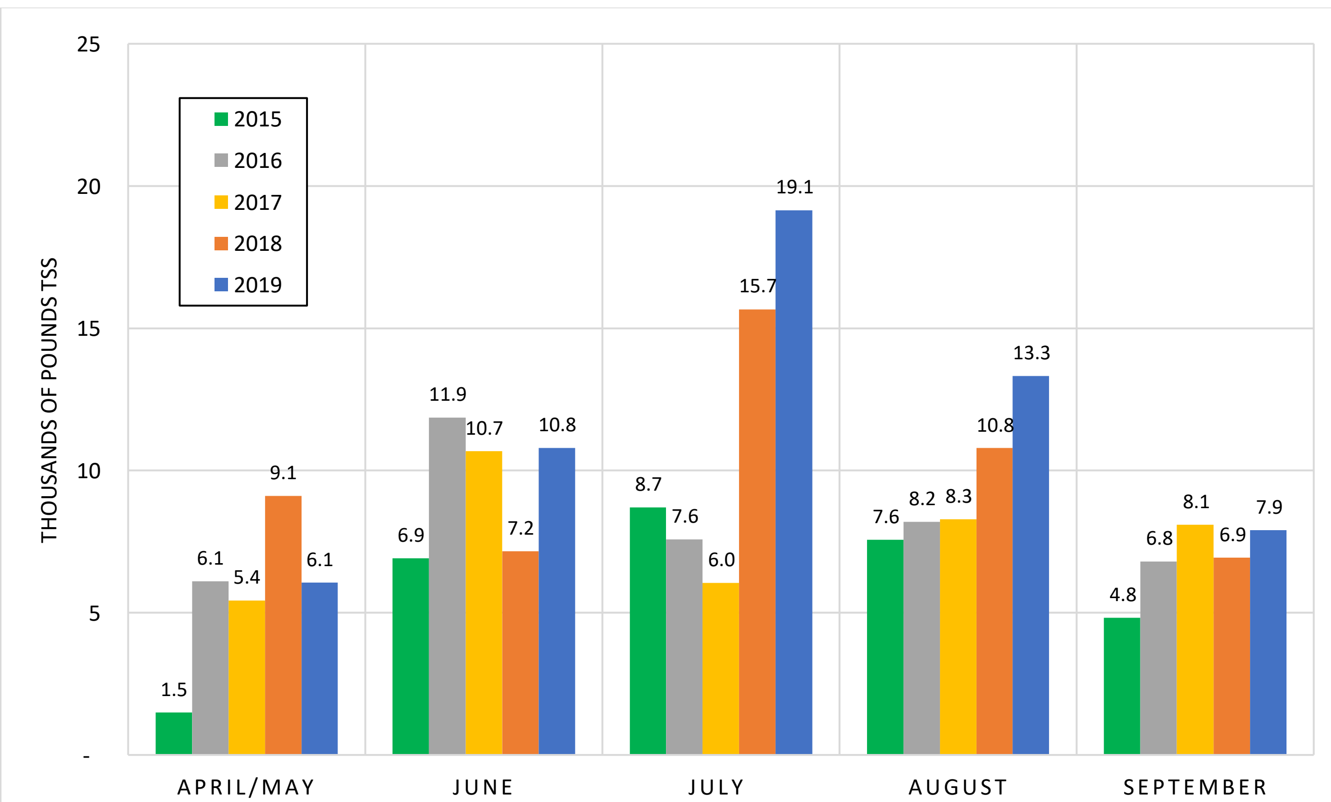

Figure 2-6. Monthly Cruise Ship TSS Loading to JDTP (2015-2019)

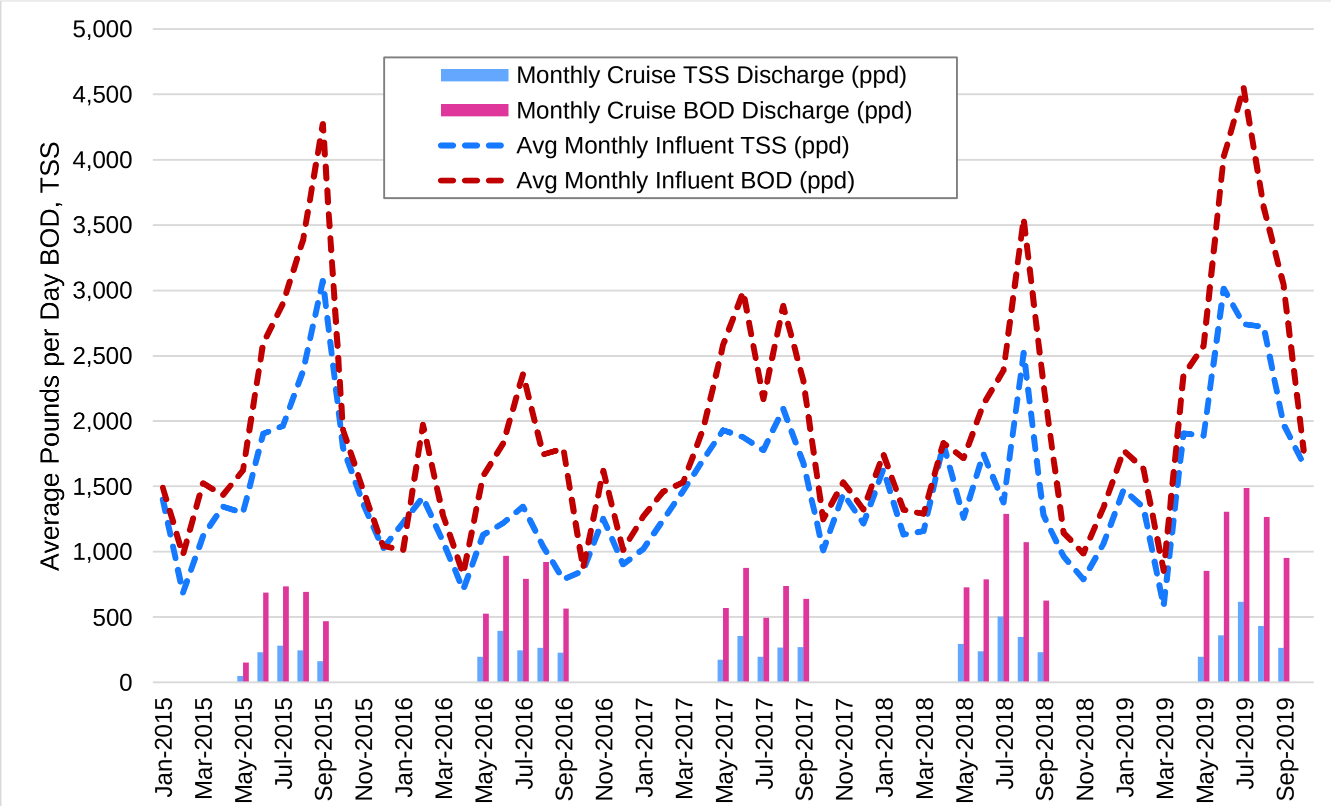

Figure 2-7. JDTP Monthly Plant Influent Loads and Cruise Ship Wastewater Contributions

Table 2-6. JDTP Cruise Ship Wastewater Flow and Load Summary – Combined Flow All Ships

Year	Wastewater Flow		BOD		TSS	
	Season Per Day Average (mgd)	Peak Day (mgd)	Per Day Average (ppd)	Peak Day (pounds)	Per Day Average (ppd)	Peak Day (pounds)
2015	0.04	0.12	626	5,451	220	2,935
2016	0.06	0.18	577	4,498	214	2,434
2017	0.07	0.19	718	6,170	273	3,719
2018	0.09	0.20	927	4,315	333	2,042
2019	0.13	0.22	1,196	3,990	383	4,423

2.2.3 Low pH in Effluent

Operational data for the treatment plant show that the influent pH appears to have an acceptable average value of 7.4 for the period in question, so it is likely not a cause for low pH in the effluent, aside from reported shock load incidents.

When influent pH is satisfactory (near 7.0), low effluent pH is usually caused by nitrification in combination with low alkalinity in the water supply. Alkalinity data was not available for the JDTP influent, as it is not presently measured. However, the water utility collections department provided alkalinity measurements of the treated source water prior to distribution, which is measured once weekly. Three year average (January 6, 2017 to December 6, 2019) alkalinity measurements are listed in Table 2-7.

Table 2-7. JDTP Source Water Alkalinity, 3-year Average

Year	Alkalinity as $CaCO_3$ (mg/L)
Maximum	33.4
Minimum	17.5

Year	Alkalinity as $CaCO_3$ (mg/L)
Average	26.6

The ideal minimum alkalinity in a drinking water supply is typically 20 mg/L. Alkalinity is added as people and businesses use water for potable purposes, so influent wastewater alkalinity at the JDTP will be higher than these values. For analysis, the average alkalinity of 26.6 mg/L is considered a low base amount of alkalinity at the plant. Low natural alkalinity in the influent wastewater in combination with nitrification (and associated anaerobic conditions) may be a cause of the low effluent pH when the plant attempts to fully nitrify high concentrations of influent ammonia nitrogen. In addition, nitrification conditions due to changes in seasonal operations (one aeration basin to two, or two aeration basins to one) may contribute to low pH in the effluent.

2.3 POSSIBLE SOLUTIONS

2.3.1 Construction Planning

Construction at a wastewater treatment facility is inherently different than other capital improvements in that the incoming flow cannot be stopped and construction cannot be completed in the winter. The 2017 headworks construction was a temporary condition endured and managed by the treatment plant staff. Although the new headworks screening system itself will likely not be modified in the near future, other capital improvement projects are scheduled for the JDTP that may disrupt typical treatment operations. Capital improvement projects identified by CBJ engineering include those listed in Table 2-8, as included in the CBJ 2020 fiscal year plan.

Table 2-8. JDTP Estimated 10-Year Capital Improvement Projects

Project	Total Estimated Cost	Timing of Expenditure	
		5 Years	10 Years
Pretreatment Improvements	$3,000,000	$3,000,000	-
Facility Structural Improvements	$3,200,000	$2,700,000	$500,000
SCADA and Instrumentation Upgrades	$850,000	$850,000	-
Outfall Maintenance and Rehabilitation	$400,000	$400,000	-
Site Improvements (lighting, security, access)	$1,500,000	$1,000,000	$500,000
Treatment Process Upgrades	$1,500,000	$1,000,000	$500,000

During these periods of construction and plant modification, it will be essential for wastewater treatment staff to develop a comprehensive plan to operate the plant on limited or modified facilities in conjunction with phasing construction to ensure the plant will remain in continuous compliance. As an example, if construction activities were to require the JDTP to operate at reduced capacity, the staff could utilize the currently empty sludge storage vault as a holding tank in periods of higher flows, and meter the wastewater into the plant gradually in periods of lower flows to maintain constant influent flow rate into the plant. The CBJ should plan to allocate resources during the design and construction phases to develop solutions in order to maintain permit compliance.

2.3.2 Prediction and Management of Cruise Ship Impacts

Because the JDTP summer waste loads—including intermittent high-strength waste streams from cruise ships—are increasing each year and may continue to increase, it is important for the CBJ to determine the maximum amount of waste load the plant can treat and remain within permitted effluent limits. A simple way to begin this evaluation is to compare the average loading of the plant during the summer cruise ship season with its design capacity. Table 2-9 presents this comparison using the 2019 summer season data, as it is the highest summer loading the plant has seen in recent years. The average hydraulic load rate during the summer was only 34 percent of design capacity, but the plant saw BOD loading of 108 percent of design capacity. The TSS loading was 59 percent of the design capacity.

Table 2-9. JDTP Design Loads and 2019 Summer Season Loading Comparison

	Design Loading	April 28 – October 2, 2019 Average Plant Loading	Difference	Average % Loading Contribution per Cruise Ship Discharge
Average Influent Flow (mgd)	2.76	0.94	1.82	12%
Average BOD (ppd)	3,290	3,551	(261)	28%
Average TSS (ppd)	4,259	2,502	1,757	13%

At the 2019 summer flow and loading rates, the plant was generally capable of achieving permitted effluent limits. Influent flow and TSS loading below the design level may have allowed the plant to accommodate a BOD load that was greater than the design level. However, the complexity of the treatment process does not lend itself to a simple determination of how much additional flow, BOD and TSS the plant can accommodate during the summer season.

In order to determine the maximum allowable cruise ship loadings and thereby define best management practices (BMPs) for the acceptance of cruise ship wastewater, the CBJ should devote resources to a re-evaluation of the plant design limits in consideration of flow rates below design capacity and increased biological loading. This will require an analysis of the capacity of each plant component given the changing characteristics of the load. This analysis should provide system operators with specific limits on waste loads that can be accepted at the plant without exceeding permitted effluent limits. In the near-term, the CBJ should carry out a planning meeting with cruise agencies prior to the 2020 season to develop a predictable schedule of cruise ship wastewater flows and loading.

The CBJ maintains oversight and control of the cruise ship wastewater discharges to the JDTP through contractual agreement. The following measures have already been put in place to ensure cruise ship discharge activity is monitored by the CBJ:

- Magnetic flow meters have been installed to measure flow of wastewater at each discharge location and report it to the CBJ.
- Composite samplers have been installed at each of the four docks to collect representative samples of the discharge from each ship. Samples are collected every 30 minutes at each dock during operation.
- Continuous TSS analyzers are installed at each of the four docks, although these have proven inaccurate due to the strength of the wastewater.
- Eccentric plug valves were installed at all four locations, but motor actuators have not yet been installed as flow regulation from the plant side has not yet been required.
- Control is maintained through contracts with the cruise lines.
- $500,000 has been dedicated to upgrade wastewater monitoring at the JDTP. These funds will be available for use beginning July 1, 2020.

Despite these efforts, hydraulic and biological overloading of the treatment plant is possible without set limits on volume, BOD and TSS. Further study is recommended to evaluate plant capacity given known loading conditions and to develop daily, weekly and monthly limits to ensure that the JDTP operates within permit limits.

2.3.3 Operational Adjustments and Alkalinity Monitoring

Given the normally underloaded condition of the JDTP, the activated sludge system may inadvertently go into nitrification even if operators try to maintain a low solids retention time (SRT) to avoid it. Should the plant be in the nitrification mode to meet the effluent limit of 14 mg-N/L, on/off aeration cycles can be used to periodically promote anoxic conditions and denitrification (i.e. nitrate reduction) throughout the day, recovering a portion of the alkalinity consumed by nitrification (ammonia oxidation). Another approach is to create an anoxic swing zone within each activated sludge basin and provide mixed liquor recycle pumps to recirculate nitrate from the end of the oxic zone to the beginning of the anoxic zone to foster nitrate reduction.

If neither of these is possible, then chemical addition may be an option to help correct the deficiency and raise the pH as an immediate solution. Common chemicals used to increase alkalinity and pH include:

- Calcium oxide or calcium hydroxide (as lime slurry)
- Sodium hydroxide (caustic soda)
- Sodium carbonate (soda ash) or sodium bicarbonate
- Magnesium hydroxide or magnesium bicarbonate

With respect to shock loads, the ultimate solution is to eliminate low-pH sources from the collection system by detailed analysis of known or suspected industrial users (IU) and working with these IUs to develop BMPs to prevent deleterious loads from entering the JDTP. Continuous monitoring will reveal the frequency and significance of shock loads on the system.

2.4 RECOMMENDATIONS

In recent years, the JDTP has had operational challenges, including headworks construction, that have contributed to the effluent violations described above. Given the normally underloaded condition at the JDTP, the principal concern seems to be jointly managing the need for nitrification to meet effluent ammonia limits coupled with the need for alkalinity supplementation when doing so. Following are prioritized recommendations that should allow the facility to work toward consistently operating within permit limitations.

2.4.1 Near-Term

Reevaluate Design Capacity of Plant at Current Average Flow Rate and Loads

Cruise ship wastewater contributes a significant amount of BOD and TSS to the JDTP by way of intermittent loads during the summer season. The maximum allowable cruise ship contributions are unknown but must be determined to ensure that the JDTP continues to operate within permitted discharge limits. The CBJ should devote resources to a re-evaluation of the plant design limits in consideration of current below design capacity flow rates and increased biological loading. The result of this analysis should provide system operators with specific limits on waste loads that can be accepted at the plant without exceeding permitted effluent limits.

On/Off Aeration

In the near-term, the JDTP may benefit from experimentation with on/off aeration, which may allow for denitrification when the plant is nitrifying. Denitrification would benefit the plant by recovering some of the alkalinity lost during the nitrification process, thereby preventing pH reduction in the effluent.

Alkalinity Study

Although on/off aeration may help to increase pH in the effluent, it is recommended to simultaneously carry out an alkalinity study. This investigation should begin by monitoring alkalinity in the influent wastewater and, depending on the results of that study, evaluating whether JDTP could benefit from chemical supplementation at the influent.

Cruise Ship Wastewater Instrumentation Upgrades

Cruise ship flow and load instrumentation upgrades at the influent would benefit JDTP operations. The additions of both a more accurate in-line ammonia sensor (used as a proxy for BOD) and UV backscatter instrumentation (for TSS) may allow for improved real-time plant loading estimates. Current contract documentation with the cruise ships permits all wastewater to be discharged to the JDTP. However, the CBJ should be made aware of any discharges of sludge and send it directly to the aerobic digestor to keep it out of the JDTP liquid stream. The CBJ has dedicated $500,000 in marine passenger fees to monitoring upgrades at the JDTP.

Host Annual Planning Session

The CBJ would benefit from an annual planning meeting with cruise agencies prior to each season, beginning with the 2020 season, to develop a predictable schedule of cruise ship wastewater flows and loading expected at the JDTP. The first meeting was already held February 6th, 2020.

Continue Managing Cruise Ship Wastewater Contributions

The contract already in place between the CBJ and cruise ship agencies is a critical component of managing cruise ship wastewater contributions. An improvement upon this would be to include in this contract the approximate maximum volume of wastewater and/or total weight of BOD and TSS the JDTP can accommodate during a summer season.

2.4.2 Mid-Term

Develop Best Management Practices for JDTP

The JDTP should develop comprehensive BMPs that include, but should not be limited to:

- Operational plans for seasonal transitions
- Source control strategies
- Operational strategies for treating waste of industrial users
- Operational strategies for cruise ship flow and load equalization, integrated with cruise ship planning

Develop Detailed Operational Plans Prior to Construction Activities

Increased waste loading during the summer tourist and construction season should not rely on a single aeration basin for treatment. Wastewater staff should work with the engineer and construction contractor to develop detailed, creative operational plans prior to construction to ensure treatment limits are met. Solutions may include using existing facilities to hold influent waste and meter it out at a period of lower flow, restricting cruise ship inputs during construction, or providing additional resources to accommodate reduced treatment capacity.

3. MENDENHALL WASTEWATER TREATMENT PLANT

The CBJ owns, operates, and maintains the MTP in the Mendenhall Valley area of Juneau. Limits on the MTP's treated effluent are governed in accordance with the federal Clean Water Act by APDES Individual Permit AK0022951 effective August 1, 2014.

The MTP is largest of three wastewater treatment facilities serving the Juneau area, with a design flow of 4.9 mgd. It is an activated sludge facility utilizing sequencing batch reactor (SBR) technology. The MTP serves a resident population of approximately 15,000 to 20,000 people as well as commercial businesses. Figure 3-1 shows the boundaries of the plant's service area. Although Juneau is a summer destination area, seasonal population fluctuations do not have a significant impact on wastewater volume at the MTP, as the residents and businesses served by the plant are generally present year-round.

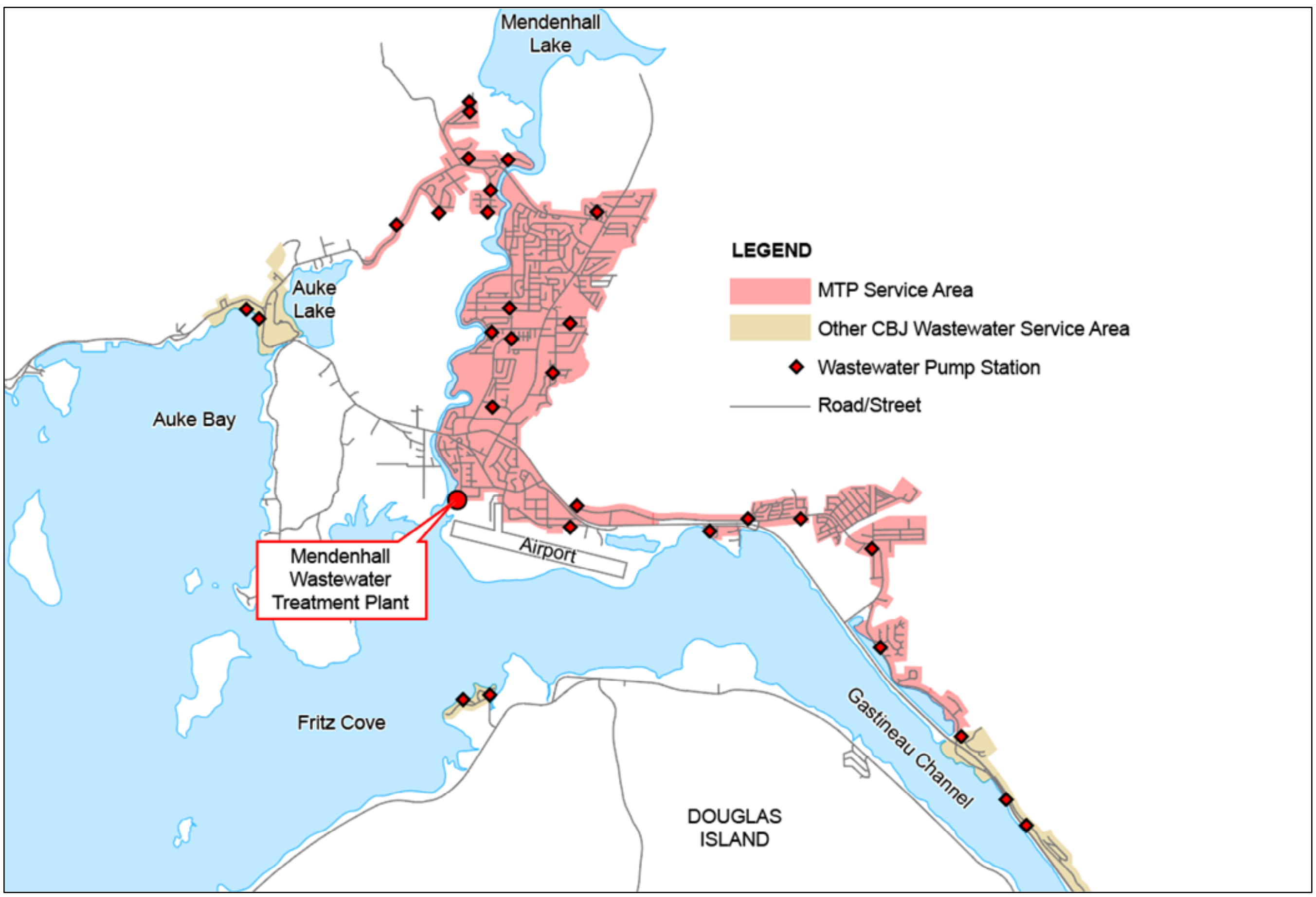

Figure 3-1. MTP Service Area Map

The MTP provides primary treatment of influent sewage by fine screening and grit removal and secondary biological treatment in a series of SBRs using aeration blowers and jet circulation pumps. Treated effluent is decanted and disinfected with UV light treatment. The MTP discharges secondary treated, disinfected effluent into the Mendenhall River though a submerged multi-port diffuser located approximately 5,800 feet downriver of the Brotherhood Bridge and 1.4 miles upstream from Gastineau Channel. The outfall pipeline is anchored along the river bottom, oriented perpendicular to the direction of flow.

The CBJ has made significant investment in capital improvements to the MTP during the previous permit cycle (2014-2019), including:

- **Headworks upgrades.** The bar screen and auger monster were upgraded in 2017 to (2) new 3-mm perforated plate automatic screens and screening washer/compactors. This project included new electrical connections and piping, totaling $2.87 million.
- **Biosolids upgrades.** The CBJ spent $16.9 million on a high efficiency belt filter press and biosolids dryer which was commissioned in early 2019. Improved press efficiency and reduced water content of the sludge will allow the sludge dryer to process biosolids to Class A quality, providing improved opportunities for disposal.

3.1 EFFLUENT LIMIT EXCEEDANCES

DEC identified 55 effluent limit exceedances at the MTP from September 2015 to March 2019. The records registered by DEC (in the U.S. Environmental Protection Agency Enforcement and Compliance History Online database) were compared to noncompliance notifications the CBJ sent to DEC during this period. Noncompliance notifications include additional operator information about each exceedance incident, including possible causes. Using this information, the exceedances were categorized by parameter for further examination.

Following are the known exceedances for each parameter, including permitted limit type and value as compared to the value reported on the MTP’s DMRs. The percent by which the reported value from the DMR exceeded the permitted limit value is shown where appropriate.

3.1.1 Parameter: BOD 5-Day, 20 °C

Daily maximum, weekly average and monthly average effluent BOD limits were exceeded during the time period under evaluation, as summarized in Table 3-1. Based on noncompliance notifications and interviews with CBJ wastewater treatment staff, the following were reported causes for BOD exceedances:

- Increased frequency of waste removal to alleviate excess accumulation of biomass caused by previous operational strategy adjustment of increasing SRT
- Shock load from Alaskan Brewing Company
- Unknown

Table 3-1. BOD Exceedances at MTP—September 2015 through March 2019

Month	Limit Type	Limit Value (mg/L)	DMR Value (mg/L)	% Exceedance
October 2016	Daily Maximum Concentration	60	74	23
March 2017	Monthly Average Concentration	30	37	23
October 2017	Daily Maximum Concentration	60	120	100
October 2017	Weekly Average Concentration	45	76	69
October 2017	Monthly Average Concentration	30	50	67
November 2017	Monthly Average Concentration	30	60	100
November 2017	Weekly Average Concentration	45	102	127
November 2017	Daily Maximum Concentration	60	150	150
January 2018	Monthly Average Concentration	30	31	3

Month	Limit Type	Limit Value (mg/L)	DMR Value (mg/L)	% Exceedance
February 2018	Monthly Average Concentration	30	31	3
March 2018	Monthly Average Concentration	30	33	10
January 2019	Daily Maximum Concentration	60	63	5
February 2019	Monthly Average Concentration	30	35	17
February 2019	Daily Maximum Concentration	60	71	18
February 2019	Weekly Average Concentration	45	47	4

Reported actions taken at time of noncompliance to reduce BOD were as follows:

- Manage process control inventory, adjusting to reduced mass in the system
- Modify aeration system from dissolved-oxygen control to manual control to increase oxygen in the treatment reactors
- Dose biomass inventory to improve settleability

CBJ wastewater staff reported the following long-term corrective actions:

- Increasing waste removal from system
- Stabilizing waste by optimizing chemical dosing to improve settleability

3.1.2 Parameter: TSS

Daily maximum, weekly average and monthly average effluent TSS limits were exceeded during the time period under evaluation, as summarized in Table 3-2.

Table 3-2. TSS Exceedances at MTP—September 2015 through March 2019

Month	Limit Type	Limit Value	DMR Value	% Exceedance
February 2016	Daily Maximum Concentration	60 mg/L	75 mg/L	25
October 2017	Weekly Average Load	1,839 ppd	2,128 ppd	16
October 2017	Monthly Average Concentration	30 mg/L	71 mg/L	137
October 2017	Weekly Average Concentration	45 mg/L	118 mg/L	162
October 2017	Daily Maximum Load	2,452 ppd	3,691 ppd	51
October 2017	Monthly Average Load	1,226 ppd	1,274 ppd	4
October 2017	Daily Maximum Concentration	60 mg/L	204 mg/L	240
October 2017	Minimum Percent Removal	85%	80%	--
November 2017	Minimum Percent Removal	85%	84%	--
November 2017	Monthly Average Load	1,226 ppd	1,288 ppd	5
November 2017	Weekly Average Concentration	45 mg/L	165 mg/L	267
November 2017	Weekly Average Load	1,839 ppd	2,460 ppd	34
November 2017	Daily Maximum Concentration	60 mg/L	260 mg/L	333
November 2017	Monthly Average Concentration	30 mg/L	89 mg/L	197
November 2017	Daily Maximum Load	2,452 ppd	3,447 ppd	41
December 2017	Daily Maximum Concentration	60 mg/L	66 mg/L	10
May 2018	Daily Maximum Concentration	60 mg/L	66 mg/L	10
June 2018	Daily Maximum Concentration	60 mg/L	65 mg/L	8
September 2018	Daily Maximum Concentration	60 mg/L	92 mg/L	53
October 2018	Weekly Average Concentration	45 mg/L	55 mg/L	22
October 2018	Daily Maximum Concentration	60 mg/L	74 mg/L	23

Month	Limit Type	Limit Value	DMR Value	% Exceedance
November 2018	Daily Maximum Concentration	60 mg/L	66 mg/L	10
January 2019	Daily Maximum Load	2,452 ppd	2,594 ppd	6
January 2019	Daily Maximum Concentration	60 mg/L	128 mg/L	113
January 2019	Weekly Average Concentration	45 mg/L	59 mg/L	31
February 2019	Weekly Average Concentration	45 mg/L	52 mg/L	16
January 2019	Daily Maximum Concentration	60 mg/L	112 mg/L	87

Based on noncompliance notifications and interviews with CBJ wastewater treatment staff, the following were reported causes for TSS exceedances:

- Increased frequency of waste removal to alleviate excess accumulation of biomass caused by previous operational strategy adjustment of increasing SRT
- Unknown

Reported actions taken at time of noncompliance to reduce TSS in the effluent were as follows:

- Increased waste removal from system
- Operational strategies were revised. The SRT was reduced to 11 days

CBJ wastewater staff reported the following long-term corrective actions:

- Increased waste removal from system
- Operational strategies were revised to shorten SRT

3.1.3 Parameter: Fecal Coliforms

Daily maximum and weekly geometric mean effluent fecal coliforms were out of permit limit during the time period under evaluation, as summarized in Table 3-3. Based on noncompliance notifications and interviews with CBJ wastewater treatment staff, the following were reported causes for fecal coliform exceedances:

- Inadequate disinfection
- UV lamps reaching end of anticipated effective life span
- Excess accumulation of biomass caused by previous operational strategy adjustment of increasing SRT
- Unknown

Table 3-3. Fecal Coliform Exceedances at MTP—September 2015 through March 2019

Month	Limit Type	Limit Value (#/100 mL)	DMR Value (#/100 mL)	% Exceedance
October 2015	Daily Maximum	800	1,400	75
November 2015	Daily Maximum	224	410	83
December 2015	Daily Maximum	224	4,000	1686
December 2015	Weekly Geometric Mean	168	823.4	390
January 2017	Daily Maximum	224	1,100	391
January 2017	Weekly Geometric Mean	168	187	11
March 2017	Daily Maximum	224	280	25
April 2017	Daily Maximum	224	270	21
November 2017	Weekly Geometric Mean	168	549	227
November 2017	Daily Maximum	224	4,300	1820
October 2018	Daily Maximum	800	2,200	175
December 2018	Daily Maximum	224	35,000	15,525
March 2019	Daily Maximum	224	240	7

Reported actions taken at time of noncompliance to reduce fecal coliforms in effluent were as follows:

- Institute weekly UV lamp cleaning (one of three banks in service each week)
- Measure effluent transmissivity to help diagnose issues
- Evaluate UV channel depth to confirm level is not above UV lamps during decant operations
- Increase frequency of waste removal

CBJ wastewater staff reported the following long-term corrective actions:

- Replace UV lamps annually
- Repair automatic level gate
- Repair and replace UV channel recirculation pumps
- Institute weekly UV lamp cleaning

3.2 PROBABLE CAUSES

The sections above listed the expected causes as observed and reported by CBJ wastewater operators. CBJ staff and Tt have reviewed the reported causes and have developed from them the expected overriding causes detailed below.

3.2.1 Plant Operating Conditions

Biological Overload

As was reported in the 2019 MTP Facility Plan, when compared to design loading, the plant is overloaded biologically (see Table 3-4). The per capita BOD and TSS loadings are very high—on the order of 0.5 pounds per capita per day. This is over twice what is expected for normal domestic wastewater (0.2 pounds per capita per day). The plant is not hydraulically overloaded, however, which may be the reason the plant has much of the time been able to meet effluent limits. It is likely the observed low influent flow volume has allowed for longer detention times, leading to improved effluent quality notwithstanding the settleability issues described below. Low flows observed during high BOD and TSS loading events indicate that the sources of high strength waste are likely not residential domestic waste streams. Despite the plant's general ability to meet effluent limits, the plant does not have the reserve capacity to meet projected future load.

Table 3-4. Plant Design and Observed Loading (Averaged from 2014-2019)

Parameter	Design	Observed	Percent of Design
Influent Flow			
Average Flow (mgd)	4.9	2.0	41%
Peak Day Flow (mgd)	7.8	5.8[a]	74%
BOD			
BOD Load, Average (ppd)	7,360	7,910	107%
BOD Load, Peak Day (ppd)		27,650[b]	
TSS			
TSS Load, Average (ppd)	8,990	11,130	124%
TSS Load, Peak Day (ppd)		103,440[c]	

a. Occurred January 14, 2014
b. Corresponds with flow rate of 1.95 mgd
c. Corresponds with flow rate of 2.0 mgd

Settleability

Due to the overloaded condition of the plant, settleability and foaming are chronic issues causing operators to limit SRT. Excessive growth of filamentous bacteria (*Microthrix parvicella, Nocardia*) is also contributing to the bulking and foaming issues present at the MTP.

3.2.2 Industrial Users

In previous years, the CBJ has put considerable effort into identifying significant industrial users (SIUs) discharging wastewater to the MTP. In 2002, a borough-wide survey of IUs was completed. In 2013, the CBJ carried out a study of fats, oils and grease (FOG) at the MTP. Despite these efforts, management and oversight of IUs remains deficient.

Identified Significant Industrial Users

Alaskan Brewing Company

The Alaskan Brewing Company was the only identified SIU in the most recent IU survey report (June 2002). At the time, the Alaskan Brewing Company was discharging approximately 36,000 gallons per day on average, including process wastewater, facility washdown, and boiler/tower blowdown. Despite this designation, the CBJ conducts only a quarterly grab sample out of the manhole downstream of the brewery. Brewery wastewater is not consistent in volume or composition. and the quarterly grab samples likely do not present an accurate characterization of the brewery waste received at the plant on a consistent basis.

Categorical Significant Industrial Users

For our purposes, Categorical Significant Industrial Users are defined here as all industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, subchapter N. These include:

Bartlett Regional Hospital

Despite being a categorical SIU, Bartlett Regional Hospital was not mentioned in the IU survey report of 2002. Hospital wastewater typically contains high concentrations of BOD, chemical oxygen demand, and heavy metals. The CBJ currently has no oversight of hospital wastewater contributions.

Capitol Disposal Landfill

Capitol Disposal Landfill, also a categorical SIU, was not named in the IU survey report of 2002, but the CBJ is aware of high-strength leachate contributing to the MTP waste stream. Sampling by CBJ collections staff typically takes place only as a troubleshooting measure when the MTP is experiencing a shock load from an unknown source. CBJ recently met with landfill staff and will begin reviewing leachate flow and strength data collected by landfill staff over the previous year.

Unidentified Industrial Users

Additional, unidentified IUs may be contributing to the excessively high biological loading at the MTP. The most recent industrial user survey was completed over 17 years ago and likely does not accurately represent the industries currently discharging to the MTP.

3.3 POSSIBLE SOLUTIONS

3.3.1 Plant Operating Conditions

The MTP is overloaded with BOD and TSS on average, and the appropriate corrective action to put the MTP on a path to compliance is to reduce industrial loads in the near-term. If industrial source control efforts are not sufficient to reduce the load below the current permitted capacity and prevent permit violations, it may be necessary in the long-term to expand or modify the plant.

The wastewater treatment staff has tried a variety of temporary settleability control measures with limited success. Some additional temporary control measures the operators may evaluate include a properly designed chlorine or oxidant (potassium permanganate) treatment or polyaluminum chloride filament control. The goal of this effort would be to improve settleability now as the plant is overloaded while other options are being considered.

3.3.2 Industrial Users

Per capita loadings significantly higher than domestic waste indicate a source control problem. Load reduction may be achieved with comprehensive BMPs. However, before load reduction can occur, the CBJ needs to identify the SIUs, quantify their loads and determine how these loads can be mitigated or otherwise managed. This will require a detailed study and long-term monitoring and oversight. Given that the potential high-strength dischargers are likely limited in number, a BMP program for management of industry specific industrial wastes is recommended over a formal industrial pretreatment program.

3.4 RECOMMENDATIONS

The MTP has had significant operational challenges in the last permit cycle. Chronic overloaded conditions at the plant have made it difficult for the MTP to operate within permit limits. The following prioritized recommendations should allow the facility to work toward consistently operating within permit limitations.

3.4.1 Near-Term

Reevaluate Design Capacity of Plant at Current Average Flow Rate and Loads

The CBJ should devote resources to a re-evaluation of the plant design limits in consideration of below design capacity flow rates and increased biological loading. The result of this analysis should provide system operators with specific limits on waste loads that can be accepted at the plant without exceeding permitted effluent limits.

Identify and Quantify Loading from Industrial Users

Overloading conditions at the MTP are not caused by residential users alone. At 0.5 pounds per capita per day, the MTP is receiving over twice what is expected for normal domestic wastewater. The CBJ must undertake a detailed analysis of the identified SIU and categorical SIUs to determine actual contributions to the plant and what can be done to reduce this load through BMPs or pre-treatment. More IUs may exist on the MTP system, but until the known IUs are accurately quantified, it will be difficult to identify other high-strength waste contributors.

Develop Comprehensive Source Control Strategies for MTP

Comprehensive source control strategies should be developed for the MTP. These should include:

- Source control implementation strategies
- IU monitoring strategies
- Guidelines for IUs

3.4.2 Mid-Term

Load Reduction

Implement source control strategies developed in the short term to reduce load received at the MTP. This may include CBJ-sponsored waste FOG pickup and disposal from restaurants and grocery stores or CBJ-sponsored commercial composting of produce waste.

Study Long-Term Options

Although population is not expected to contribute to load increase at the MTP, the CBJ will need to begin to evaluate long-term options to increase treatment capacity at the facility. Load reduction and source control initiatives may not be enough to reduce the load received by the MTP to below treatment capacity. It would be beneficial for the CBJ to begin long-term planning for the future of the facility.

Upgrade SCADA and Instrumentation

Upgrades to SCADA and instrumentation have been prioritized by CBJ treatment staff as a possible means for gaining treatment capacity at the existing facility; $2 million has been allocated to this major capital improvement project, which is moving forward. However, these changes should be utilized as enhancements to more fundamental change, such as load reduction. If the design capacity study indicates the plant is just on the edge of overload, this may be a viable option to fine-tune the plant until long-term plans can be realized.

3.4.3 Long-Term

Migrate from SBRs to Membrane Bioreactors

With the existing overloaded conditions and settling difficulties, the MTP could consider migrating from SBRs to membrane bioreactors. This system could be installed in phases, by refitting one SBR tank at a time. The facility may not need to migrate all SBRs to achieve the desired level of treatment capacity. However, the CBJ will need to have strict control of industrial users, to ensure the MTP does not receive high levels of FOG, which could cause operational difficulties

Consider Aqua Nereda or Equivalent Process

Another option may be to retrofit the SBRs with hydrocyclones and move to granular activated sludge treatment. Selection for faster settling particles, process configuration, and physical forces can encourage aerobic granular sludge formation. Hydrocyclones function by forcing denser flocs/solids to cyclone walls and down through the underflow to be recycled while the lighter solids move toward the cyclone center and are pushed upwards through the overflow to be wasted. With the use of an external mechanism for selective sludge wasting and biological process configuration, the MTP may be able to improve operations within its existing footprint.

Construct New Facility

It may be possible for the CBJ to acquire land surrounding the MTP to expand or rebuild the plant from the ground up. However, wastewater would need to be treated in the meantime. This option is likely the most costly option as a path forward.

4. Summary and Implementation Strategy

The following Table 4-1 through Table 4-3 summarize proposed borough-wide and facility-specific corrective actions to prevent future incidents of noncompliance. Implementation strategies and approximate schedules for completion are included for each action.

Table 4-1. Borough-Wide Corrective Actions

Action	Description	Implementation
Conduct weekly process control meetings	The CBJ has identified the need to evaluate plant operations and operational data on a frequent basis in an effort to better understand operational challenges as they occur.	This was implemented October 2019.
Hire utilities engineer to support compliance	In addition to weekly meetings, the CBJ identified the need for a full-time engineer on staff to ensure wastewater facilities come into and stay within compliance. The utilities engineer will also be responsible for hosting an annual planning session with the cruise ship agencies.	This was executed January 2020.
Hire second senior operator to support treatment operations	The CBJ identified the need for an additional senior operator on staff to support wastewater treatment operations and ensure compliance.	The CBJ expects to hire a senior wastewater treatment plant operator by February 2020.
Hire an additional wastewater treatment plant operator to support treatment operations	The CBJ identified the need for an additional operator on staff to support wastewater treatment operations and ensure compliance.	The CBJ expects to hire a wastewater treatment plant operator by February 2020.
Update and develop BMPs	The utilities engineer and wastewater staff will work together to develop a comprehensive set of BMPs, which may include but are not limited to the following: • Operational strategies for seasonal transitions • Source control strategies • Operational strategies for treating waste of industrial users utilizing all available CBJ wastewater treatment capacity • Guidelines for acceptance of cruise ship flow and load, integrated with cruise ship planning	Strategies and BMPs are expected to be completed by January 2021.
Improve construction planning	Construction planning period to be extended to the length of time necessary to develop detailed construction sequencing plans that ensure facilities remain in compliance throughout the construction period. When sequencing is not possible or construction activities are emergent in nature, the CBJ will alert and work closely with DEC to develop a mutually agreeable path toward compliance.	This is CBJ policy for all wastewater facilities beginning January 2020.

Table 4-2. Juneau-Douglas Wastewater Treatment Plant

Action	Description	Implementation
Better Prediction of Cruise Ship Wastewater Loads		
Initiate cruise line wastewater coordination meetings	In an effort to improve seasonal planning and communication with the cruise agencies, the CBJ has scheduled the first annual planning meeting, the focus of which will be predicting loading for the upcoming season. At this time, the CBJ is working with cruise agencies to accommodate ship wastewater.	Meeting took place February 2020.
Upgrade monitoring of cruise ship wastewater input and JDTP influent	Marine passenger fees have been dedicated to upgrade TSS, BOD and flow monitoring instrumentation.	Upgrades to instrumentation expected to be completed prior to the 2021 summer cruise ship season.
Reevaluate plant capacity	The result of this analysis will provide specific maximum waste loads that can be accepted at the plant without exceeding permitted effluent limits. This baseline plant design capacity can be then used to help design future improvements and evaluate the efficacy of implemented treatment strategies. Maximum allowable cruise ship contributions will be determined to ensure that the JDTP continues to operate within permitted discharge limits.	Study expected to be completed by January 2021.
Address pH Non-Compliance		
Evaluate alternative treatment strategies	Wastewater staff will begin experimenting with anoxic zone development and on/off aeration techniques, which may allow for denitrification when the plant is nitrifying. Denitrification may allow the plant to recover some of the alkalinity lost during the nitrification process, thereby preventing low pH in the effluent.	Wastewater staff will begin experimenting with anoxic zone development and on/off aeration techniques as soon as practicable, no later than June 2020.
Influent alkalinity study	The JDTP will carry out an alkalinity study. This investigation will begin by monitoring alkalinity in the influent wastewater, and may include chemical supplementation if alternative treatment techniques are unable to manage pH in the effluent.	Alkalinity study will begin after alternative treatment techniques are evaluated as alkalinity/pH control, no later than June 2021.

Table 4-3. Mendenhall Wastewater Treatment Plant

Action	Description	Implementation
SCADA and recontrol of the MTP	The CBJ has appropriated $2 million to implement SCADA and instrumentation upgrades to improve efficiency of plant operations. Utilities staff has begun working with the CBJ Assembly to utilize alternative procurement to ensure the MTP remains in compliance during construction.	This is currently underway with a design/build contract solicitation to be advertised by April 2020.
Study alternative long-term treatment options	The CBJ acknowledges that chronic biological overloading at the MTP must be addressed to ensure permit compliance in the long-term. Improvements to influent loading and treatment efficiency are expected with source control efforts and SCADA upgrades, but how much is unknown. For this reason, the CBJ will evaluate long-term options which may include: • Evaluation of new treatment technologies • Seasonal redirection of wastewater to the JDTP • Expansion or construction of a new facility	Long-term options are expected to be evaluated by January 2021.
Develop Source Control Program		
Implement source control measures	Source control measures may include, but are not limited to the following: • Conduct an industrial users survey and report for the MTP • Characterize loads from industrial wastewater contributors • Increase collections of FOG • Develop composting capacity and incentives for commercial contributors • Develop industry-specific BMPs for industrial users • Develop policy for industrial waste pre-treatment requirements	Source control efforts may begin immediately, while policy and BMPs are expected to be developed by June 2022.
Reevaluate plant capacity	The MTP design limits will be reevaluated in consideration of reduced flow rates and increased biological loading. The result of this analysis will provide specific maximum waste loads that can be accepted at the plant without exceeding permitted effluent limits. This baseline plant design capacity can be then used to help design future improvements and evaluate the efficacy of implemented treatment strategies.	Study expected to be completed by January 2021, concurrent with source control implementation above.