Antidegradation Form 2G

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION (DEC)
Wastewater Discharge Authorization Program
555 Cordova Street, AK 99501
907-269-6285

Form 2G must be completed by all applicants. The applicant shall submit sufficient information for the department to complete an antidegradation analysis and make findings under 18 AAC 70.016 (b), (c), and (d). DEC may request additional information as necessary.

Antidegradation analysis is tier-specific and the department findings for Tier 1 and Tier 2 are on a parameter-by-parameter basis. Analysis and department findings for Tier 3 water are on a basis of a designated water.

The antidegradation review procedure is based on:

- The level of protection (i.e. Tier 1, 2, or 3) assigned to the pollutants of concern within the receiving water,
- The type of receiving water,
- Existing water quality of the receiving water,
- The necessity of degradation, and
- The social and economic importance of the regulated activity.

All discharges that require a permit under 18 AAC 83 Alaska Pollutant Discharge Elimination System (APDES) or an application for state certification of a federal permit under Section 401 of the Clean Water Act (CWA) are subject to antidegradation regulatory requirements under 18 AAC 70.016. [18 AAC 70.016(a)(1)(A & B)]

Submit completed form to DEC Division of Water to the address above, or via email to either of the following email addresses depending on the type of permit:

- 401 Certification for 404 CWA, or other federal permits: DEC-401Cert@alaska.gov
- APDES Permits: DEC.Water.WQPermit@alaska.gov
- Or, via other means as coordinated with DEC Division of Water.

Section 1- Facility Information [18 AAC 70.016(a)(5)(A – G)]

Facility Name: City of Wrangell Wastewater Treatment Plant **Permit Number**: AK0021466

1. Provide a list of Parameters of Concern in the discharge, the respective concentrations, persistence, and potential impacts to the receiving water.
2. Identify which Tier protection level should apply for each Parameter of Concern.

(For multiple parameters or if additional space is needed, attach separate sheet)

Receiving Waterbody or Wetland:

Zimovia Strait

Parameter of Concern:	Respective Concentrations:	Tier* Protection Level: *(*Note, complete this entry after completing the rest of the form)*
Ammonia, Fecal Coliform, Total Residual Chlorine (TRC)	28 mg-N/L, 60,000 col/100 mL, 100 µg/L	Tier 2

Persistence:

Ammonia has been tested 18 times between 2018-2022 as required by the current permit. The concentrations ranged from 3.3 to 28 mg-N/L and is a parameter that is typically found in wastewater discharge. Fecal coliform is consistently discharged from the WWTP with geometric means ranging from 72 to 60,000 col/100 mL. TRC was only required to be monitored in the current permit if disinfection was used. TRC data has not been collected.

Potential Impacts:

High concentrations of ammonia present in water bodies can cause aquatic organisms to not efficiently excrete ammonia, which leads to a toxic buildup in internal tissues and blood, and potentially death. The maximum concentration tested in the WWTP effluent was 28 mg-N/L which is over the AWQS. However, samples collected in the receiving waterbody at four (4) stations from 2018-2022 had concentrations ranging from non-detect to 0.21 mg-N/L.

Fecal coliform, found in human and animal feces, is used to indicate possible presence of disease-causing bacteria. Based on samples have been collected in the receiving waterbody at locations required by the current permit concentrations of fecal coliform have ranged from non-detect to 280 col/100 mL. The highest concentration was collected in May 2019 at Station 1. As described in the mixing zone Form 2-M and associated attachment, it is assumed that bacteria (fecal coliform, enterococcus) will be substantially reduced from current levels due to ADEC's determination that disinfection standards (18 AAC 72) will have to be met by the facility, which are 200 cfu/100 mL (average) applied at end of pipe. At these disinfection-reduced levels, bacteria will still need a mixing zone but the dilution and size needed will be controlled by other parameters.

TRC concentrations do not typically persist for long periods of time, but can potentially impact that microbial, fungi, and biofilm habitats in habitats in which it is discharged into. The WWTP has had a permit limit of 100 µg/L in the event that disinfection took place. There have been no samples collected of TRC.

If applicable, data is attached on the parameters that may alter the effects of the discharge to the receiving water. ☐ Yes, ☐ No, ☑ N/A

Section 2- Baseline Water Quality Provisions [18 AAC 70.016(a)(6)(A – C)]

If determined necessary and requested by the Department, submit sufficient and credible baseline water quality information for the receiving water which meets the requirements of 18 AAC 70.016(a)(6)(A – C).

Section 3- Tier 1 Protection Level and Analysis [18 AAC 70.016(b)]

1. Does a discharge of any parameter identified in Section 1 occur to a Category 4 [305(b)] or Category 5 [303(d)] waterbody listed in the current approved Alaska's Integrated Water Quality Monitoring and Assessment Report?

See http://dec.alaska.gov/water/water-quality/impaired-waters.aspx for the most recently approved integrated report and category listings.

☐ Yes ☑ No

a. If yes, list parameters from Section 1 that are present in the proposed discharge that will be included in the Tier 1 analysis in the following table.

Receiving Water and Wetlands Information (if additional space is needed, attach separate sheet):

a. Name of waterbodies or wetlands to which you discharge:	**Impaired Waters**					
	b. Is the proposed discharge(s) directly to any segment of a Category 4 or 5 waterbody?		If you answered yes to b, then answer the following three questions (c, d, and e).			
			c. What parameter(s) are causing the Category 4 or 5 water degradation?	**d**. Are the parameter(s) causing the degradation present in the proposed discharge?		**e**. Is the discharge consistent with the assumptions and requirements of applicable EPA approved or established Total Maximum Daily Load (TMDL)?
	Yes	No		Yes	No	Yes	No
	☐	☐		☐	☐	☐	☐
	☐	☐		☐	☐	☐	☐

Section 4- Tier 2 Protection Level and Analysis [18 AAC 70.016(c)]

If not identified as requiring only Tier 1 level of protection, Tier 2 is presumed for all water as the default protection level for all parameters [18 AAC 70.016(c)(1)].

1. Is the application for a *(Check all that apply)*:

☐ New Discharge* ☐ Existing Discharge ☑ Expanded Discharge*

*Note: "new or expanded," with respect to discharges means discharges that are regulated for the first time or discharges that are expanded such that they could result in an increase in permitted parameter load or concentration or other changes in discharge characteristics that could lower water quality or have other adverse environmental impacts.

2. Does a discharge of any parameter identified in Section 1 – Facility Information require Tier 2 analysis as defined under 18 AAC 70.016(c)(2)(A) – (E)?

☑ **Yes**, proceed to **Question 3**

☐ **No**, please **explain below** and proceed to **Section 5**

3. For each parameter requiring a Tier 2 analysis, provide a description per discharge (e.g., parameter specific per outfall) and analysis of a range of practicable alternatives that have the potential to prevent or lessen the degradation associated with the proposed discharge [18 AAC 70.016(c)(4)] (*if additional space is needed, attach separate sheet*). Include:

A. Identification of receiving water quality and accompanying environmental impacts on the receiving water for each of the practicable alternatives;

See Supplemental Attachment

B. Evaluation of the cost for each of the practicable alternatives, relative to the degree of water quality degradation;

See Supplemental Attachment

C. Identification of a proposed practicable alternative that prevents or lessens water quality degradation while also considering accompanying cross-media environmental impacts. (*If the applicant has selected a non-degrading alternative, the social or economic importance analysis in Question 4 is not required.*

See Supplemental Attachment

4. Social or Economic Importance [18 AAC 70.016(c)(5)]

Provide information that demonstrates the accommodation of important social or economic development. The applicant shall complete either a social OR economic importance analysis (or both) identifying each affected community in the area where the receiving water for the proposed discharge is located. *(if additional space is needed, attach separate sheet)*

(A) Social Importance Analysis: *(select one or more areas, and describe below)*	**(B) Economic Importance Analysis**: *(select one or more areas, and describe below)*:
☑ community services provided; ☑ public health or safety improvements; ☑ infrastructure improvements; ☑ education and training; ☐ cultural amenities; ☐ recreational opportunities	☑ employment, job availability, and salary impacts; ☐ tax base impacts; ☐ expanded leases and royalties; ☐ commercial activities; ☐ access to resources; ☐ access to a transportation network

Describe (checked items above or attach as separate document)

See Supplemental Attachment

Section 5- Tier 3 Protection Level and Analysis [18 AAC 70.016(d)]

1. Is the discharge to a designated Tier 3 water? ☐ Yes ☑ No

(Currently, the State of Alaska has not designated any Tier 3 waters).

See http://dec.alaska.gov/water/water-quality/standards/antidegradation.aspx for Tier 3 for further information.)

Section 6. Certification Information

An Alaska Pollutant Discharge Elimination System (APDES) permit application must be signed by an individual with the appropriate authority per 18 AAC 83.385 or for 401 certification of 404 permits or other federal permits per 18 AAC 15.030.

APDES Permits	
Corporate Executive Officer 18 AAC 83.385 (a)(1)(A)	For a corporation, a president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation.
Corporate Operations Manager 18 AAC 83.385 (a)(1)(B)	For a corporation, the manager of one or more manufacturing, production, or operating facilities, if (i) the manager is authorized to make management decisions that govern the operation of the regulated facility, including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental statutes and regulations; (ii) the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and (iii) authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.
Sole Proprietor or General Partner 18 AAC 83.385 (a)(2)	For a partnership or sole proprietorship, the general partner or the proprietor respectively.
Public Agency, Chief Executive Officer 18 AAC 83.385 (a)(3)(A)	For a municipality, state, or other public agency, the chief executive officer of the agency.
Public Agency, Senior Executive Officer 18 AAC 83.385 (a)(3)(B)	For a municipality, state, or other public agency, a senior executive officer having responsibility for the overall operations of a principal geographic unit or division of the agency.
401 Certifications	
Corporations 18 AAC 15.030(1)	In the case of corporations, by a principal executive officer of at least the level of vice president or his duly authorized representative, if the representative is responsible for the overall management of the project or operation.
Partnerships 18 AAC 15.030(2)	in the case of a partnership, by a general partner
Proprietorship 18 AAC 15.030(3)	in the case of a sole proprietorship, by the proprietor
Public Agency 18 AAC 15.030(4)	in the case of a municipal, state, federal or other public facility, by either a principal executive officer, ranking elected official, or other duly authorized employee.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Organization:	Name:	Title:
City and Borough of Wrangell	Tom Wetor	Public Works Director

Phone:	Fax (optional):	Email:
907-874-3904		twetor@wrangell.com

Mailing Address:	Street (PO Box):		
	P.O. Box 531		
	City:	State:	Zip:
	Wrangell	AK	99929

Thomas Wetor

Signature/Responsible Official

4/25/2023

Date

Section 7. Form 2G Preparer *(Complete if Form 2G was prepared by someone other than the certifier.)*

Organization:	Name:	Title:
HDR Engineering, Inc	Tom Dupuis	Senior Water Quality Engineer

Phone:	Fax (optional):	Email:
208-890-0464		thomas.dupuis@hdrinc.com

Mailing Address: ☐ Check if same as Certifiers Information	Street (PO Box):		
	582 E. 36th Avenue Suite 500		
	City:	State:	Zip:
	Anchorage	Alaska	99503

Form 2G Supplemental Attachment

Section 4-Tier 2 Protection Level and Analysis

The City of Wrangell effluent data indicates that ammonia is a pollutant of concern that will need a mixing zone to meet marine water quality standards. Additional treatment is the only potential practicable alternative for ammonia to further reduce concentrations in the wastewater treatment plant (WWTP) which would involve secondary treatment (nitrification).

It is also Wrangell's understanding that fecal coliform concentrations will be addressed by Alaska Department of Environmental Conservation (ADEC) as a technology based effluent limitation (TBEL) as described in 18 AAC 72. Additional treatment is the only potential practicable alternative for fecal coliform to further reduce concentrations in the effluent. The treatment alternatives include disinfection at the WWTP.

Without additional treatment, concentrations of ammonia and fecal coliform in the effluent are expected to be similar to historical values and are unlikely to impact the existing water quality of Zimovia Strait. The continued use of a multi-port diffuser will provide dilution sufficient to achieve water quality standards and avoid degradation of the receiving waterbody beyond the zone of initial dilution (ZID).

Wrangell will need to complete an analysis to determine the type of disinfection and the process it will institute for determining the best treatment solution (i.e., ultraviolet disinfection or chlorine) in order to have the disinfection process meet the new permit limits (TBELs). The TBELs for fecal coliform will reduce fecal coliform concentrations from the current levels once disinfection is implemented at the WWTF.

If chlorination is chosen for disinfection, then a dechlorination system would be required to remove total residual chlorine (TRC) from the effluent before discharge to Zimovia Strait.

It is Wrangell's understanding that there will be a compliance schedule and interim limits that will allow the WWTP the time needed to meet the new permit limits.

3A-Identification of Receiving Water Quality and Accompanying Environmental Impacts for Each Practicable Alternative

Wrangell has conducted receiving waterbody monitoring as part of the current discharge permit which has included water quality monitoring, fecal coliform testing and biological monitoring including sediment and benthic infauna sampling. Based on the results of this monitoring program the habitat of the receiving waterbody has not been impacted by the discharge of the effluent from the WWTP.

The practicable alternative of additional treatment for the WWTP would include secondary treatment (nitrification) and installation of ultraviolet disinfection or chlorination disinfection for fecal coliform. Impacts to Zimovia Strait for this alternative would include a decrease in the concentrations of both ammonia and fecal coliform. If chlorine disinfection were chosen, there would likely be the introduction of some total residual chlorine from the disinfection process, but

this would be monitored and if determined to be necessary based on analysis, a dechlorination system would be installed to meet the permit limit at the WWTP.

3B. Evaluation of the cost for each of the practicable alternatives, relative to the degree of water quality degradation

The cost of installing and operating the various treatment systems at the WWTP include the cost of the building improvements and/or construction required, and additional mechanical equipment, piping and chemicals. The analysis and cost of treatment for each parameter are provided as follows:

Cost for WWTP Improvements to Remove Ammonia

The existing WWTP is currently a primary treatment facility utilizing a primary clarification process to meet the discharge requirements of their NPDES permit/301(h) waiver. The WWTP includes influent pumping, influent mechanical screening, an aeration basin, sedimentation basin, and lab facilities/offices.

Influent wastewater is pumped via a force main to an influent mechanical screen. Screened wastewater then flows into an aeration basin that has a detention time of six days. Aeration is provided by fine bubble membrane diffusers that are attached to floating aeration chains which are moved across the basin by the air released from the diffusers. The wastewater then moves through a settling basin that has a detention time of two days. The effluent then leaves the settling basin via gravity flowing through the outfall into Zimovia Strait. Sludge from the settling basin is removed on a ten-year cycle by contracting sludge dewatering services. The service dewaters, adds lime and/or heat treat the sludge to create a Class A material. The material is then used as fertilizer on the local golf course or on other local lands.

Potential ammonia limits required to be met without a mixing zone would be restrictive and Wrangell's plant would need to make significant changes to the treatment process in order to achieve adequate nitrification for ammonia removal. A new mechanical, secondary treatment facility utilizing a conventional activated sludge process requires regular maintenance, advanced training for operational staff, and would be more operationally difficult to maintain than the current primary facility. Upgrading the existing primary plant to an activated sludge process (that can achieve nitrification) would generally require the addition of anoxic/aerobic bioreactors, secondary clarification, return activated sludge (RAS) pumping, and waste activated sludge (WAS) pumping to the aerobic digester for sludge stabilization and dewatering. For the purposes of this anti-degradation analysis, the two practicable alternatives that have been determined are a conventional activated sludge treatment system and a Membrane Bioreactor (MBR) treatment system have been assumed for plant upgrades to meet the potential low effluent ammonia limits. These alternatives would generally include upgraded influent fine screens, grit removal, anoxic/aerobic reactors and secondary clarifiers or membranes bioreactors for secondary solids separation, RAS and WAS pumping, solids thickening, aerobic digestion and solids dewatering.

Table 1 provides a rough order of magnitude (ROM) opinion of probable cost for the development of ammonia removal processes at the WWTP using MBR. It is assumed that a

separate building/structure would have to be constructed to house the treatment systems to have room on-site for the new facilities.

Table 1: Opinion of Probable Cost, MBR WWTP Treatment Process

Item	Quantity	Units	Unit Cost	Cost
New Equipment				
- Headworks improvements (screening, grit, etc.)	1	LS	$2,500,000	$2,500,000
- MBR (tanks, chemical systems, etc.)	1	LS	$2,822,000	$2,822,000
- Process pumps	1	LS	$150,000	$150,000
- Concrete basins	1	LS	$1,494,000	$1,494,000
- Process Piping	1	LS	$750,000	$750,000
- Solids Handling improvements	1	LS	$1,250,000	$1,250,000
- Ancillary equipment/systems	1	LS	$1,720,000	$1,720,000
New Building				
Additional Treatment Building (Structure and Mech)	5,200	SF	$800	$4,160,000
Misc Concrete and structures	1	LS	$860,000	$860,000
Site Work (excavation, grading, etc.)	1	LS	$2,150,000	$2,150,000
	Subtotal			**$17,856,000**
	Contingency (25%)			$4,464,000
	Electrical, Instrumentation, and Control (25%)			$4,464,000
	Engineering and Construction Management (20%)			$3,571,200
	City/Borough Administration and Legal (5%)			$892,800
	Operations (new FTEs in Utility Dept)			$380,000
	Total			**$31,628,000**

Table 2 provides a ROM opinion of probable cost for the development of ammonia removal processes at the WWTP using conventional activated sludge system. It is also assumed that a separate building/structure would have to be constructed to house the treatment systems to have room on-site for the new facilities.

Table 2: Opinion of Probable Cost, Conventional Activated Sludge WWTP Treatment Process

Item	Quantity	Units	Unit Cost	Cost
New Equipment				
- Headworks improvements (screening, grit, etc.)	1	LS	$2,500,000	$2,500,000
- Anoxic/Aerobic Bioreactors (tanks, chemical systems, etc.)	1	LS	$2,158,000	$2,158,000
- Clarifiers (including WAS Vault and Splitter Box)	1	LS	$4,050,400	$4,050,400
- Process pumps	1	LS	$415,000	$415,000
- Process Piping	1	LS	$750,000	$750,000
- Solids Handling improvements	1	LS	$1,250,000	$1,250,000
- Ancillary equipment/systems	1	LS	$1,720,000	$1,720,000
New Building				
Additional Treatment Building (Structure and Mech)	5,200	SF	$800	$4,160,000
Misc Concrete and structures	1	LS	$860,000	$860,000
Site Work (excavation, grading, etc.)	1	LS	$2,150,000	$2,150,000
	Subtotal			**$20,013,400**
	Contingency (25%)			$5,003,350
	Electrical, Instrumentation, and Control (25%)			$5,003,350
	Engineering and Construction Management (20%)			$4,002,680
	Borough Administration and Legal (5%)			$1,000,670
	Operations (new FTEs in Utility Dept)			$380,000
	Total			**$35,403,450**

Cost for WWTP Disinfection Improvements

To meet the potential technology-based, end-of-pipe permit limits for fecal coliform and enterococcus (18-AAC-72 technology basis), a new disinfection system would be required at the WWTP. If Wrangell continues the use of primary clarification without secondary treatment (nitrification) for ammonia then ultraviolet (UV) disinfection system would not be a viable alternative based on the treated effluent. If secondary treatment is provided, then ultraviolet disinfection should be compared to chlorine disinfection in a preliminary alternatives analysis and cost comparison.

For the purposes of this analysis, the use of sodium hypochlorite has been assumed for plant effluent disinfection. There are a number of potential alternatives to consider for a chlorine disinfection system including on-site generation versus storage, tote versus mini-bulk versus bulk storage of commercial hypochlorite, chemical transfer and metering pumping, chlorine contact basin versus pipeline for detention, etc. A detailed preliminary engineering evaluation

should be performed, taking into account capital costs, as well as life cycle costs, chemical delivery, facility footprint, and sensitivity to power costs and hypochlorite production costs before selecting the most viable alternative for the Wrangell WWTP. If it is determined that chlorination is the best alternative for Wrangell then, it is likely that dechlorination processes will be necessary to minimize the effects of potentially toxic chlorine residuals on the environment. As with a chlorination system, there are a number of potential alternatives to consider for a dechlorination system; which generally include reacting the residual chlorine with a reducing agent or by adsorption on and reaction with activated carbon. For the purposes of this conceptual analysis, the use of sodium bisulfite has been assumed for dechlorination. Sodium bisulfite would be injected in the disinfection channel to neutralize any chlorine remaining after the disinfection process is complete and would have a similar metering pump system and chemical storage requirements.

Table 3 provides a ROM opinion of probable cost for the development of chlorine disinfection and assumes on-site generation at the facility, associated ancillary equipment, and the construction of a concrete chlorine contact basin to achieve adequate detention time prior to discharge. It is assumed that a separate building/structure would have to be constructed to house the treatment systems.

Table 3: Opinion of Probable Cost, WWTP Treatment Process for Disinfection

Item	Quantity	Units	Unit Cost	Cost
General Requirements (Contractor, Sales Tax, Mob/De-mob)	1	LS	$1,640,000	$1,640,000
Site Work (excavation, grading, etc.)	1	LS	$450,000	$450,000
Concrete (containment and diversion walls, bases, suspended walls, etc.)	1	LS	$343,000	$343,000
Miscellaneous Metals, Woods, and Plastics	1	LS	$100,000	$100,000
Painting and Protective Coatings	1	LS	$30,000	$30,000
New Equipment (Onsite Gen of Hypochlorite 0.8% System)	1	LS	$890,000	$890,000
-Hypochlorite Induction Unit				
-Hypochlorite Storage Tanks				
-Onsite Generation System				
-Sump Pumps				
Dechlorination system (metering pumps, containment, etc.)	1	LS	$360,000	$360,000
Process Piping	1	LS	$400,000	$400,000
New Building				
Additional Treatment Building (Structure and Mech)	1,800	SF	$800	$1,440,000
Identification, Stenciling, and Tagging System, Package Scrubber, Emergency Eye Wash Stations	1	LS	$95,000	$95,000
Electrical	1	LS	$935,000	$935,000
	Subtotal			**$7,448,000**

Contingency (30%)	$ 2,234,400
Contractor or Owner change during Construction (10%)	$ 744,800
Engineering and Construction Management (20%)	$ 1,489,600
Borough Administration and Legal (5%)	$ 372,400
Operations (new FTEs in Utility Dept)	$285,000
Total	**$ 12,574,200**

The Class 5 (rough order of magnitude) opinions of probable cost (OPCC) for the development of treatment processes at the WWTP include estimated construction dollars, contingencies, administration, and engineering fees. Construction costs are based on conceptual alternatives. The costs have been estimated based on information from cost estimating guides and experience gained while designing similar facilities and does not include cost inflation, cost increases due to supply-chain shortages, and other factors that are unknown at the time the estimate was created.

Preliminary cost estimates include the costs to construct the improvements as well as a number of additional factors, including an allowance for the contractor's overhead and profit and mobilization/demobilization costs. The OPCC includes capital costs of the conceptual level alternatives to provide a planning-level comparison and an indication of the significant capital expenditure that would be required to construct such facilities. The cost estimates do not provide a life-cycle cost analysis of long-term impacts to Wrangell. On top of an overall increased operational complexity for more advanced treatment processes, long term costs for chemical addition, energy usage, and additional maintenance requirements would result in a significant annual O&M cost increase.

Before Wrangell considers moving ahead with any of the options put forth in this memorandum, HDR suggests a comprehensive alternatives analysis and financial evaluation of the wastewater treatment methods/alternatives, coupled with a detailed determination of how final WWTP effluent permit requirements can be met.

Overall, the only alternative for the WWTP is to further treat ammonia and fecal coliform at a cost that would range from $43-$47 million dollars.

With an authorized mixing zone, there are still costs associated with disinfection in order to meet the ADEC TBEL fecal coliform permit limits which as shown above is approximately twelve million dollars.

3C. Identification of Proposed Practicable Alternative that Prevents or Lessens Water Quality Degradation

The most practicable alternatives have been evaluated in the sections above. These are the only practicable alternatives that can be considered for reducing ammonia and fecal coliform in the effluent at the Wrangell WWTP. Overall costs to treat for the two parameters listed would range between $43 to $47 million.

4. Social and Economic Importance

Wastewater treatment facilities are important in providing communities social and economic development growth opportunities. It has been well documented that wastewater infrastructure is beneficial for the people within the community that they serve, the environment, and the economies in both the short and long term. Wastewater infrastructure investment is crucial in achieving and maintaining public health, improving the environment, and enhancing the quality of life. Wastewater collection and treatment is essential to preventing disease and protecting human health. Wrangell has provided these services at the WWTP in the current process configuration since 2001 and well before, which has allowed for stable population and economic growth in the area.

The existing WWTP is currently permitted for a monthly average flow of 0.6 MGD and a daily maximum flow of 3.0 MGD. The average flows to the WWTF from 2018-2022 have been approximately 0.5 MGD with the highest maximum daily flow at 1.88 MGD. This shows that Wrangell can continue to operate under the existing permitted flow rates or expand the WWTP to accommodate additional growth/flow. Based on the receiving water monitoring that has been conducted as part of Wrangell's discharge permit the existing primary treatment being conducted at the WWTP does not adversely impact aquatic life or the overall health of Zimovia Strait.

The WWTP currently employs 1.5 full time employees. In a small community these positions help provide economic stability to a number of residents. The WWTP also provides community services and associated infrastructure improvement for 1,150 service connections. Wrangell provides education and training to staff. The WWTP also has provided public tours of the facilities.

The social and economic impacts of not authorizing a mixing zone should be considered. The capital and on-going operation and maintenance costs associated with additional treatment alternatives discussed in previous sections would have significant impact on Wrangell and the customer base that fund the operation of the community utilities. Large increases in sewer rates to fund improvements and on-going operations could negatively impact the quality of life and make the region less attractive to individuals and companies looking to move or grow in the area.

If the WWTP were to be required to add additional treatment due to losing the mixing zone, not only would the costs of building in the additional treatment processes as discussed in previous sections be required, but Wrangell would also incur long term operational and maintenance

costs. For example, additional operators with higher levels of operator certifications to operate the more complex facility would need to be hired. Small communities in Alaska have an extreme level of difficulty in finding and retaining qualified operators to run more complex treatment facilities.