ALASKA POLLUTANT DISCHARGE ELIMINATION SYSTEM

PERMIT FACT SHEET – PRELIMINARY DRAFT

Permit Number: **AK0022951**

Mendenhall Wastewater Treatment Plant

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Wastewater Discharge Authorization Program
555 Cordova Street
Anchorage, AK 99501

Public Comment Period Start Date: DRAFT

Public Comment Period Expiration Date: DRAFT

Alaska Online Public Notice System

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Proposed issuance of an Alaska Pollutant Discharge Elimination System (APDES) permit to:

CITY AND BOROUGH OF JUNEAU

For wastewater discharges from
Mendenhall Wastewater Treatment Plant
2009 Radcliffe Road
Juneau, AK 99801

The Alaska Department of Environmental Conservation (the Department or DEC) proposes to reissue an APDES individual permit (permit) to the City and Borough of Juneau (CBJ). The permit authorizes and sets conditions on the discharge of pollutants from this facility to waters of the United States. In order to ensure protection of water quality and human health, the permit places limits on the types and amounts of pollutants that can be discharged from the facility and outlines best management practices to which the facility must adhere.

This fact sheet explains the nature of potential discharges from the Mendenhall Wastewater Treatment Plant (WWTP) and the development of the permit including:

- information on public comment, public hearing, and appeal procedures
- a listing of effluent limitations and other conditions
- technical material supporting the conditions in the permit
- monitoring requirements in the permit

Public Comment

Persons wishing to comment on or request a public hearing for the draft permit for this facility, may do so in writing by the expiration date of the public comment period.

Commenters are requested to submit a concise statement on the permit condition(s) and the relevant facts upon which the comments are based. Commenters are encouraged to cite specific permit requirements or conditions in their submittals.

A request for a public hearing must state the nature of the issues to be raised, as well as the requester's name, address, and telephone number. The Department will hold a public hearing whenever the Department finds on the basis of requests, a significant degree of public interest in a draft permit. The Department may also hold a public hearing if a hearing might clarify one or more issues involved in a permit decision or for other good reason, in the Department's discretion. A public hearing will be held at the closest practicable location to the site of the operation. If the Department holds a public hearing, the Director will appoint a designee to preside at the hearing. The public may also submit written testimony in lieu of or in addition to providing oral testimony at the hearing. A hearing will be tape recorded. If there is sufficient public interest in a hearing, the comment period will be extended to allow time to public notice the hearing. Details about the time and location of the hearing will be provided in a separate notice.

All comments and requests for public hearings must be in writing and should be submitted to the Department at the technical contact address, fax, or email identified above (see also the public comments section of the attached public notice). Mailed comments and requests must be postmarked on or before the expiration date of the public comment period.

After the close of the public comment period and after a public hearing, if applicable, the Department will review the comments received on the draft permit. The Department will respond to the comments received in a Response to Comments document that will be made available to the public. If no substantive comments are received, the tentative conditions in the draft permit will become the proposed final permit.

The proposed final permit will be made publicly available for a five-day applicant review. The applicant may waive this review period. After the close of the proposed final permit review period, the Department will make a final decision regarding permit issuance. A final permit will become effective 30 days after the Department's decision, in accordance with the state's appeals process at 18 Alaska Administrative Code (AAC) 15.185.

The Department will transmit the final permit, fact sheet (amended as appropriate), and the Response to Comments to anyone who provided comments during the public comment period or who requested to be notified of the Department's final decision.

Informal Reviews and Adjudicatory Hearings

A person authorized under a provision of 18 AAC 15 may request an informal review of a contested decision by the Division Director in accordance with 18 AAC 15.185 and/or an adjudicatory hearing in accordance with 18 AAC 15.195 – 18 AAC 15.340. See DEC's "Appeal a DEC Decision" web page https://dec.alaska.gov/commish/review-guidance/ for access to the required forms and guidance on the appeal process. Please provide a courtesy copy of the adjudicatory hearing request in an electronic format to the parties required to be served under 18 AAC 15.200. Requests must be submitted no later than the deadline specified in 18 AAC 15.

Documents are Available

The permit, fact sheet, application, and related documents can be obtained by visiting or contacting DEC between 8:00 a.m. and 4:30 p.m. Monday through Friday at the addresses below. The permit, fact sheet, application, and other information are located on the Department's Wastewater Discharge Authorization Program website: https://dec.alaska.gov/water/wastewater/.

Alaska Department of Environmental Conservation Division of Water Wastewater Discharge Authorization Program 555 Cordova Street **Anchorage**, AK 99501 (907) 269-6285	Alaska Department of Environmental Conservation Division of Water Wastewater Discharge Authorization Program **Mail**: P.O. Box 111800 **In Person**: 410 Willoughby Avenue, Suite 303 **Juneau**, AK 99811-1800 (907) 465-5180
Alaska Department of Environmental Conservation Division of Water Wastewater Discharge Authorization Program 610 University Avenue **Fairbanks**, AK 99709 (907) 451-2183	

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1.0 APPLICANT

1.1 Applicant

This fact sheet provides information on the APDES permit for the following entity:

Permittee:	City and Borough of Juneau
Facility:	Mendenhall Wastewater Treatment Plant
APDES Permit Number:	AK0022951
Facility Location:	2009 Radcliffe Road, Juneau, AK 99801
Mailing Address:	2009 Radcliffe Road, Juneau, AK 99801
Facility Contact:	Mr. Brian McGuire, Engineering & Public Works Operation Superintendent

1.2 Authority

Section 301(a) of the Clean Water Act (CWA) and AAC 18 AAC 83.015 provide that the discharge of pollutants to water of the U.S. is unlawful except in accordance with an APDES permit. The individual permit reissuance is being developed per 18 AAC 83. A violation of a condition contained in the Permit constitutes a violation of the CWA and subjects the permittee of the facility with the permitted discharge to the penalties specified in Alaska Statutes (AS) 46.03.760 and AS 46.03.761.

1.3 Permit History

The Mendenhall WWTP was originally permitted under National Pollutant Discharge Elimination System (NPDES) Permit Number AK0022951 in 2006 by the Environmental Protection Agency (EPA). The 2006 permit expired in 2011 but was administratively extended until August 1, 2014 when DEC issued an APDES permit. DEC reissued the permit in 2020 and later modified it in 2023 by substituting 5-day biochemical oxygen demand (BOD_5)effluent limits with Carbonaceous Biochemical Oxygen Demand ($CBOD_5$) effluent limits. The 2019 permit expired on May 31, 2025. Under the Administrative Procedures Act and state regulations at 18 AAC 83.155(c), an APDES permit may be administratively extended (i.e., continues in force and effect) provided that the permittee submits a timely and complete application for a new permit prior to the expiration of the current permit. A timely and complete application for a new permit was submitted by CBJ in December 2024; therefore, the 2019 permit is administratively extended until such time a new permit is reissued.

2.0 BACKGROUND

2.1 Facility Information

CBJ owns, operates, and maintains the Mendenhall WWTP located in Juneau, Alaska. The sequential batch reactor (SBR) secondary treatment plant discharges treated municipal wastewater to the Mendenhall River though a submerged multi-port diffuser located approximately 5,800 feet downriver of the Brotherhood Bridge, and 1.4 miles upstream of Gastineau Channel. Figure 1 shows the location of the Mendenhall WWTP.

The design flow of the Mendenhall WWTP is 4.9 million gallons per day (mgd) and is the largest of three WWTPs in the Juneau area. The plant services a residential population of approximately 20,000 and supports commercial businesses. Juneau is a summer season destination area; therefore, the actual population is higher during the summer months. The Mendenhall WWTP only receives wastewater from

the domestic wastewater collection system. Storm water is conveyed through a separate sewer collection system.

2.2 Wastewater Treatment

The Mendenhall WWTP provides preliminary treatment of the influent sewage by fine screening and grit removal. The influent flows into the plant where solids are removed by two 3-millimeter perforated plate screens fitted with a washer compacter. These fine screenings are disposed of at the local landfill. The wastewater settles in the influent well and is lifted into teacup strainers that remove grit. The grit falls into a grit clarifier where it is removed. From the influent pump station, the wastewater is distributed to one of eight SBRs where it receives secondary biological treatment facilitated by the use of aeration blowers and jet circulation pumps. When an SBR completes a reaction cycle, the treated effluent is decanted and disinfected by ultra-violet (UV) light treatment prior to discharge to Mendenhall River. Treated effluent is discharged on an intermittent basis from the Mendenhall WWTP coinciding with the decanting of each SBR. Each SBR is decanted at a rate of approximately 5,000 to 6,000 gallons per minute for approximately 20 minutes at the end of each respective SBR reaction cycle. Sludge removed from the SBRs is stored in the sludge storage tank, dewatered in a belt filter press, and dried in a sludge dryer process and disposed of at the local landfill.

The treated effluent is conveyed through a 48-inch diameter high density polyethylene outfall pipeline that is anchored to the river bottom and oriented perpendicularly to the direction of flow in the Mendenhall River. The outfall line is fitted with a diffuser with an effective length (the distance between the two ports on either end) of approximately 17 meters. The diffuser contains 13 eight-inch ports spaced approximately 1.5 meters apart with the exception of the two ports located furthest out in the river that are approximately 0.3 meters apart from one another.

The Mendenhall WWTP receives approximately 25,000 gallons per day (gpd) of wastewater from the Alaskan Brewing Company on an intermittent basis. Standard operations at the Alaskan Brewing Company include the use of a mash filter press that reduces the amount of water, malt, and hops used in the brewing process. This procedure also reduces the overall flow of wastewater to the Mendenhall WWTP. The Alaskan Brewing Company also removes high strength brewing products from the wastestream upon completion of the brewing process. After beer is pumped from the tanks, the remaining yeast and hops are pumped into a series of four holding tanks where solids settle and the liquid from each tank decants into the next. The high strength waste removed from the bottom of each tank is shipped to Washington for use as stock feed. The decanted liquid is titrated from the last of the holding tanks as needed, at an average rate of 1,100 gpd, and mixes with water used for cleaning and rinsing tanks and new beer bottles (the brewing company does not reuse bottles) prior to discharge to the Mendenhall WWTP. Spent grain is dried and used as a sole source of fuel for a steam boiler. Any cleaning products used are food grade in nature.

By definition, at 40 Code of Federal Regulations (CFR) 403.3(v)(1)(ii), the Alaskan Brewing Company, is a significant industrial user (SIU); however, the Alaskan Brewing Company's discharge has not had an adverse effect on operations at the Mendenhall WWTP. It has not caused interference, passed through the treatment plant untreated, nor has it caused upsets at the plant. The Mendenhall WWTP can, as demonstrated by effluent monitoring results, adequately treat the discharge from the Alaskan Brewing Company. Therefore, the Alaskan Brewing Company's discharge to the Mendenhall WWTP poses no threat to either public health or the environment.

40 CFR 403.3(v)(3) states that upon a finding that an industrial user (IU) meeting the criteria in paragraph 40 CFR 403.3(v)(1)(ii), has no reasonable potential for adversely affecting the publicly owned treatment work's (POTW) operation or for violating any pretreatment standard or requirement, DEC may at any time determine that such an IU is not a SIU. Therefore, based on the available evidence, and in accordance with 40 CFR 403.3(v)(3), DEC had determined during the development of the prior permit that the Alaskan Brewing Company was not a SIU. DEC re-evaluated this determination for the permit reissuance and maintains the determination that the Alaskan Brewing Company is not a SIU. Because DEC has determined, in accordance with 40 CFR 403(v)(3), that the Alaskan Brewing Company is not a SIU, DEC is not including pretreatment requirements in the Mendenhall WWTP's permit. General prohibitions which state that a user may not introduce into a POTW any pollutant which causes pass through or interference and specific prohibitions at 40 CFR 403.5, continue to apply to not only the Alaskan Brewing Company, but to any user introducing pollutants into a POTW regardless of whether or not the user is subject to pretreatment standards or requirements. Figure 2 illustrates the process flow of the Mendenhall WWTP.

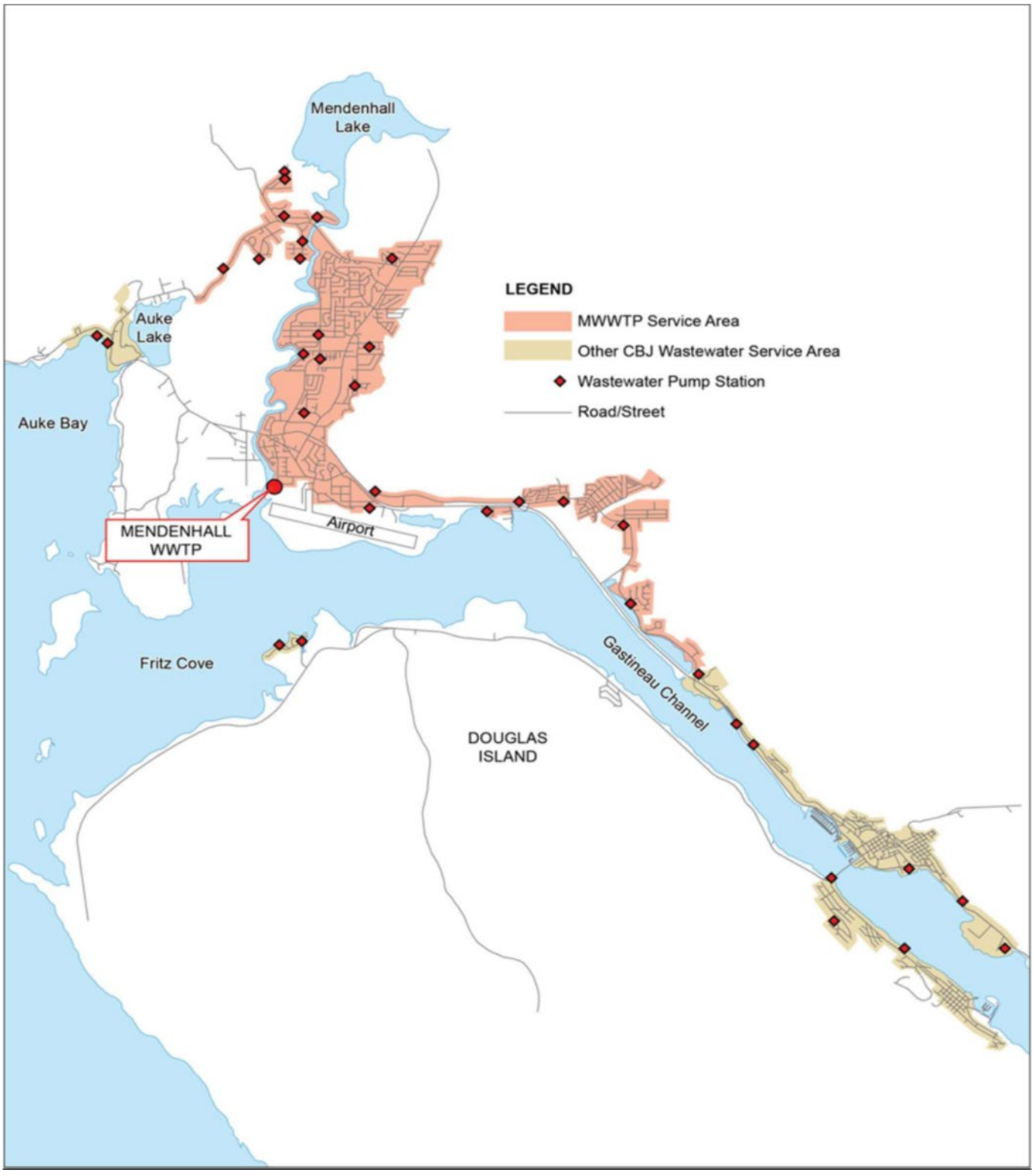

Figure 1- Mendenhall WWTP Location

figure from 2019 Mendenhall WWTP Facility Plan (Tetra Tech)

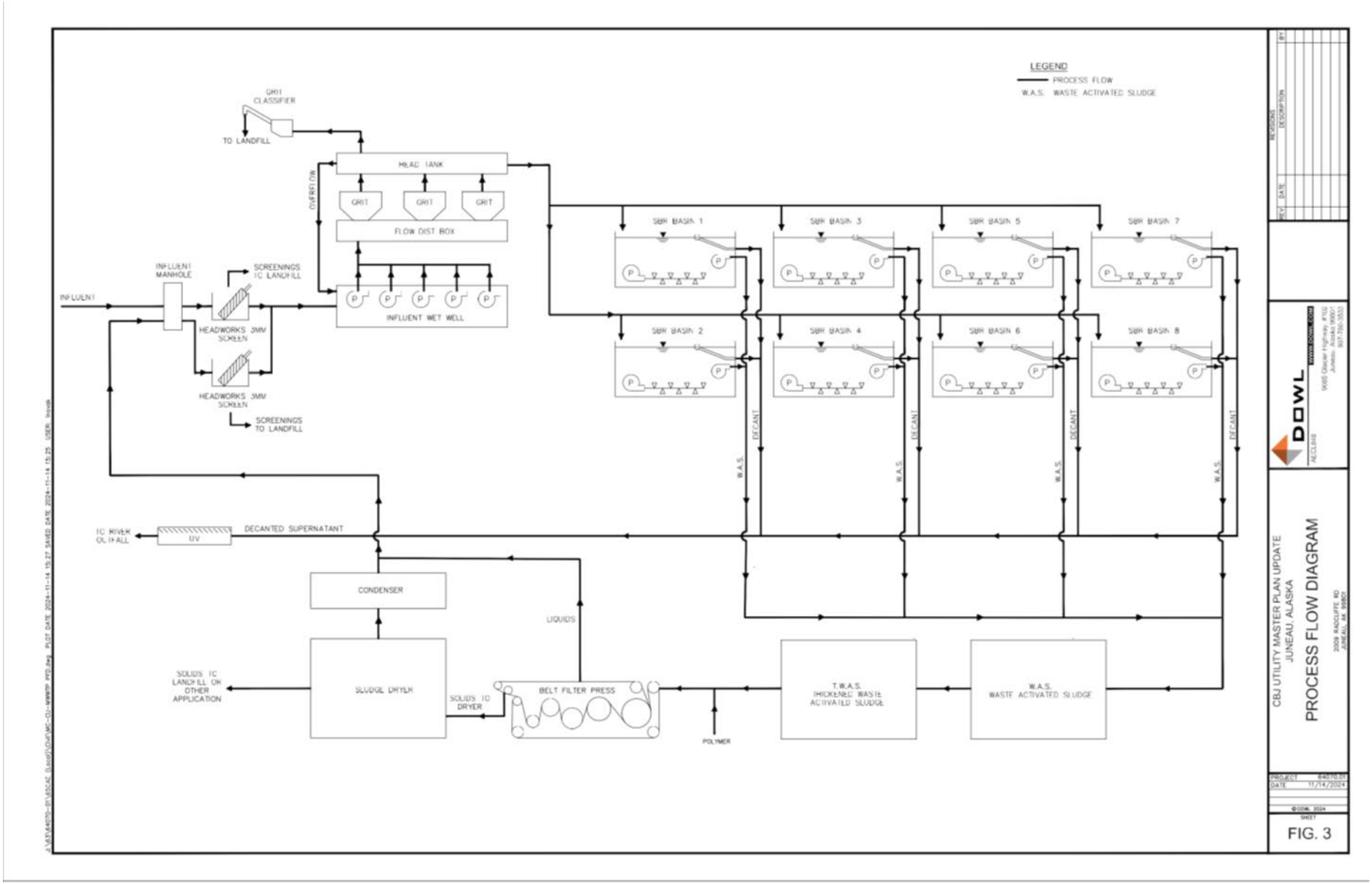

Figure 2- Mendenhall WWTP Process Flow

figure from Mendenhall WWTP Facility Plan Update 2024 (DOWL)

2.3 Pollutants of Concern

Pollutants of concern in treated domestic wastewater include the conventional pollutants: BOD_5, total suspended solids (TSS) pH, fecal coliform (FC) Bacteria and oil and grease. Total ammonia as Nitrogen (N), copper, zinc, whole effluent toxicity (WET), and temperature were detected in the effluent above water quality criteria. Dissolved oxygen (DO) was detected in the effluent below water quality criteria; therefore, in addition to the conventional pollutants listed above, DEC identified these additional pollutants as pollutants of concern. The monitoring results submitted with the permit reissuance application did not indicate any other pollutants of concern. Pollutants observed in the effluent at least once above water quality criteria or an effluent limit between June 2020 and July 2025 are depicted in Table 1.

Table 1 - Pollutants Observed in Effluent above Water Quality Criteria or Permit Limit

Pollutant	Units	Maximum Observed Concentration or Measurement	Water Quality Criteria or Permit Limit
Ammonia	milligrams per liter (mg/L)	26	15.7 acute, 4.8 chronic May 1- October 31 20.4 acute, 5.5 chronic November 1- April 30
BOD_5	mg/L	220	60 daily maximum
TSS	mg/L	340	60 daily maximum
FC Bacteria	FC/100 milliliter (mL)	100,000	200 monthly average 400 weekly average 800 daily maximum
Escherichia coli (E.coli)	cfu/100 mL (colony forming units)	370	In a 30-day period, the geometric mean shall not exceed 126 cfu/100 mL.
Copper	micrograms per liter (µg/L)	70	54 acute, 34chronic May 1- October 31 97 acute, 52 chronic November 1- April 30
Zinc	µg/L	57	24.6 acute and chronic May 1-October 31 100.5 acute and chronic November 1-April 30
WET	chronic toxic units (TUc)	10 Nov-April, 2.1 May-October	1.0 daily maximum
DO	mg/L	1.2 daily minimum	7 daily minimum
Temperature	Degrees Celsius (°C)	21.3	13 daily maximum

2.4 Compliance History

DEC reviewed Discharge Monitoring Reports (DMRs) from June 2020 to July 2025 to determine the facility's compliance with permit effluent limits.

Table 2- Outfall 001A Permit Limit Exceedances

Parameter	Units	Basis	Permit Limit	Number of Exceedances	Maximum Reported Value	Date of Maximum Reported Value
FC Bacteria	FC/100 mL	Maximum Daily	800	10	31,000	August 2024
FC Bacteria	FC/100 mL	Average Weekly	400	4	2,071	October 2020
BOD_5	mg/L	Maximum Daily	60	15	220	August 2021
BOD_5	mg/L	Average Monthly	30	26	83	August 2021
BOD_5	mg/L	Average Weekly	45	19	140	August 2021
BOD_5	pounds per day (lbs/day)	Maximum Daily	2,452	3	4,055	August 2021
BOD_5	lbs/day	Average Monthly	1,226	1	1,340	August 2021
BOD_5	lbs/day	Average Weekly	1,839	3	2,431	August 2021
BOD_5	Percent (%)	Minimum Monthly % Removal	85	1	84 (minimum)	August 2021
TSS	mg/L	Maximum Daily	60	9	340	August 2021
TSS	mg/L	Average Monthly	30	8	111	August 2021
TSS	mg/L	Average Weekly	45	9	222	August 2021
TSS	lbs/day	Maximum Daily	2,452	3	6,267	August 2021
TSS	lbs/day	Average Monthly	1,226	1	1,838	August 2021
TSS	lbs/day	Average Weekly	1,839	2	3,823	August 2021
TSS	%	Minimum Monthly % Removal	85	1	83 (minimum)	August 2021
Copper, total recoverable	µg/L	Maximum Daily	54	1	70	June 2023
Copper, total recoverable	µg/L	Average Monthly	34	2	40	May 2024
Flow	mgd	Maximum Daily	4.9	5	6.3	January 2022

Table 3- Compliance and Enforcement Actions

Date	Activity	Summary
March 5, 2021	Compliance Order by Consent (jointly Issued to CBJ for both Mendenhall and Juneau Douglas WWTPs)	Corrective actions to address facility effluent, monitoring, operational, and other violations include the submittals of a control source strategy to state how influent from cruise ships will be received by the Juneau Douglas WWTP, an Industrial User Survey, a Long-Term Treatment Option Study, an evaluation of the seasonal redirection of wastewater from the Mendenhall WWTP to the Juneau Douglas WWTP, and an examination of the current treatment capacity of the Mendenhall WWTP in terms of hydraulic and organic/solids loading. Additionally, CBJ was required to provide an interim update on progress of supervisory control and data acquisition upgrades at the Mendenhall WWTP and examine inflow and infiltration (I&I) rates at both the Mendenhall and Juneau Douglas WWTPs. A mitigation plan for I&I where I&I is identified as a "significant" contributor to influent to the facility shall be agreed upon by August 1, 2025. Potential controls, construction schedules, and a threshold of "significant" shall be included in the plan.

Date	Activity	Summary
March 24, 2021	Routine Inspection	50 BOD_5, FC bacteria, TSS, copper, pH, and flow effluent limit violations occurring between September 10, 2019 and March 24, 2021, missed receiving water monitoring January 2020, missed effluent monitoring for lead, copper, silver, zinc April 2020. (Many of these violations occurred prior to the June 2020 effective date of the current permit. A compliance inspection typically includes five years and may extend back to the previous permit cycle.)
April 23, 2021	Notice of Violation (NOV)	50 BOD_5, FC bacteria, TSS, copper, pH, and flow effluent limit violations occurring between September 10, 2019 and March 24, missed receiving water monitoring January 2020, missed effluent monitoring for lead, copper, silver, zinc April 2020
June 18, 2021	NOV Closeout Letter	Deliverables requested by DEC submitted by CBJ and April 23, 2021 NOV closed out.
December 14, 2023	Routine Inspection	BOD_5, FC bacteria, TSS, copper, and flow effluent limit violations, failure to update facility Quality Assurance Project Plan (QAPP), missed monitoring events for pH, temperature, DO. pH and DO test units not calibrated on two occasions.
February 16, 2024	Notice of Violation	94 effluent violations, QAPP lacked updated maps designating background sampling location, QAPP was not updated after the May 2023 permit modification, five missed pH, temperature, DO monitoring events, three missed pH and DO meter calibrations.

3.0 EFFLUENT LIMITS AND MONITORING REQUIREMENTS

3.1 Basis for Permit Effluent Limits

Per 18 AAC 83.015, the Department prohibits the discharge of pollutants to waters of the U.S. unless the permittee has first obtained a permit issued by the APDES Program that meet the purposes of AS 46.03 and is in accordance with the CWA Section 402. Per these statutory and regulatory provisions, the Permit includes effluent limits that require the discharger to (1) meet standards reflecting levels of technological capability, (2) comply with 18 AAC 70 – Water Quality Standards (WQS), and (3) comply with other state requirements that may be more stringent.

The CWA requires that the limits for a particular pollutant be the more stringent of either technology-based effluent limits (TBELs) or water quality-based effluent limits (WQBELs). TBELs are set according to the level of treatment that is achievable using available technology. A WQBEL is designed to ensure that the WQS of a water body are met and may be more stringent than TBELs. Both TBELs and WQBELs are included in the permit. A detailed discussion of the basis for the effluent limits contained in AK0022951 is provided in Appendix A.

3.2 Basis for Effluent and Receiving Water Monitoring

In accordance with AS 46.03.110(d), the Department may specify in a permit the terms and conditions under which waste material may be disposed. Monitoring in a permit is required to determine compliance with effluent limits. Monitoring may also be required to gather effluent and surface water data to determine if additional effluent limits are required and/or to monitor effluent impact on the receiving waterbody quality. The permittee is responsible for conducting the monitoring and for reporting results on NetDMR or with the application for reissuance, as appropriate, to the Department. The prior permit required upstream monitoring for pH, temperature, hardness, and copper twice per season. DEC has determined that CBJ submitted ample data upon which to calculate water quality criteria and continued receiving waterbody monitoring is not required in the reissued permit.

3.3 Effluent Limits and Monitoring Requirements

Monitoring is required to determine compliance with effluent limitations and/or for use in future reasonable potential analyses (RPA). The permit requires monitoring of secondary treated domestic wastewater effluent that is discharged through Outfall 001A. Flow, $CBOD_5$, TSS, FC Bacteria, ammonia, copper, pH, DO, and WET all have associated effluent limits. See Appendix A for details regarding the basis of effluent limits for these parameters.

Monitoring frequencies are based on the nature and effect of a pollutant, as well as a determination of the minimum sampling necessary to adequately monitor the facility's performance. Permittees have the option of taking more frequent samples than are required under the permit. These samples must be used in calculations and used for averaging if they are conducted using Department-approved test methods (generally found in 18 AAC) 70 and 40 CFR Part 136 [adopted by reference in 18 AAC 83.010]) and if the method detection limits are less than the effluent limits. Monitoring frequencies are based on the nature and effect of the pollutant, as well as a determination of the minimum sampling necessary to adequately monitor the facility's performance. The monitoring in this permit is required to determine compliance with the effluent limits and to gather information for permit reissuance.

The following summarizes the monitoring requirements for those parameters that are required to be monitored but do not contain specified effluent limits.

Escherichia coli (E.coli)

Alaska WQS at 18 AAC 70.020(b)(2)(B)(i) provides protection for freshwater contact recreation. The WQS requires that in a 30-day period, the geometric mean shall not exceed 126 cfu/100 mL. In the same 30-day period, not more than one sample, or more than 10 percent of the samples if there are more than 10 samples, may exceed a statistical threshold value of 410 cfu/100 mL. Contact recreation includes activities where there is direct contact with the water such as swimming, bathing, water skiing, and similar water contact activities where immersion and ingestion are likely. These activities typically only take place during the summer season, May to September.

DEC reviewed CBJ's E. coli monitoring data from June 2020- July 2025. Results ranged from 2 cfu/100 mL to 370 cfu/100 mL. Two results were greater than 126 cfu/100 mL. Because the plant did not consistently meet E. coli bacteria water quality criteria, E. coli monitoring shall continue as in the previous permit as report only requirement May- September and is included in the mixing zone sized for ammonia.

Temperature

The most stringent water quality criterion for the protection of spawning, egg and fry incubation areas (13°C) is found at 18 AAC 70.020(a)(10). DEC conducted an RPA for temperature using individual 5/week effluent temperature data from June 2020-December 2024. Effluent temperature ranged from 6.2 ºC to 21.2 ºC. The RPA calculated the maximum expected temperature as 21.2 ºC. Temperature requires less dilution than ammonia during both seasons and fits within the chronic mixing zones sized for ammonia. The reissued permit requires continued effluent temperature monitoring five times per week.

Dissolved Oxygen

Alaska WQS at 18 AAC 70.020(a)(3)(C) states that DO must be greater than 7 mg/L in waters used by anadromous or resident fish. In no case may DO be greater than 17 mg/L. DEC reviewed Mendenhall WWTP effluent monitoring data between June 2020 and July 2025. Monitoring data shows that effluent DO concentrations consistently fell below the minimum water quality criterion of 7 mg/L. Monitoring results ranged from 1.2 mg/L to 6.8 mg/L. It can be reasonably expected that DO will continue to not meet water quality criteria at the end of pipe; therefore, DO is included in both the November 1- April 30 and May 1-October 31 mixing zones. Monitoring DO shall continue as in the prior permit, five times per week.

Residues

18 AAC 70.020(a)(8), Residues for Fresh Water Uses, states that residues are not allowed in surface waters of the state in concentrations or amounts that impair designated uses, cause nuisance or objectionable conditions, result in undesirable or nuisance species, or produce objectionable taste. Between June 2020 and July 2025, CBJ reported one instance whereby they noted either floating solids or visible foam in February 2024. Continued monthly visual monitoring requirement for floating solids or visible foam is required in the reissued permit.

Table 4 contains Outfall 001A effluent limits and monitoring requirements and Table 5 contains effluent limit changes from the last permit issuance.

Table 4- Effluent Limitations and Monitoring Requirements

Parameter	Effluent Limits					Monitoring Requirements		
	Units [a]	Daily Minimum	Monthly Average	Weekly Average	Daily Maximum	Sample Location	Sample Frequency	Sample Type
Total Discharge Flow	mgd	N/A	Report	N/A	4.9	Effluent	Continuous	Recorded
$CBOD_5$	mg/L	N/A	25	40	55	Influent and Effluent [b]	2/Month	24-hour Composite [c]
	lbs/day		1,022	1,635	2,248			Calculated [d]
TSS	mg/L	N/A	30	45	60	Influent and Effluent	2/Month	24-hour Composite
	lbs/day		1,226	1,839	2,452			Calculated
$CBOD_5$ & TSS Minimum % Removal [e]	%	N/A	85	N/A	N/A	Influent and Effluent	1/Month	Calculated
pH	S.U.	6.5	N/A	N/A	8.5	Effluent	5/Week	Grab
Temperature	° C	N/A	N/A	N/A	Report	Effluent	5/Week	Grab
DO	mg/L	Report	N/A	N/A	Report	Effluent	5/Week	Grab
Total Ammonia as N November 1- April 30	mg/L	N/A	20	N/A	29	Effluent	1/Month	24-hour Composite
	lbs/day		815		1,216			Calculated
Total Ammonia, as N May 1- October 31	mg/L	N/A	32	N/A	47	Effluent	1/Month	24-hour Composite
	lbs/day		1,308		1,921			Calculated
FC Bacteria	FC/ 100 mL	N/A	200	400	800	Effluent	2/week [f]	Grab
E.coli May-September	cfu/ 100 mL	N/A	Report	N/A	Report	Effluent	1/Month [f]	Grab
Copper, total recoverable November 1- April 30	µg/L	N/A	Report	Report	Report	Effluent	1/Month	24-hour Composite
	lbs/day	N/A	Report	Report	Report			Calculated
Copper, total recoverable May 1- October 31	µg/L	N/A	Report	Report	Report	Effluent	1/Month	24-hour Composite
	lbs/day	N/A	Report	Report	Report			Calculated
Zinc, total recoverable	µg/L	N/A	N/A	N/A	Report	Effluent	2/Year	24-hour Composite
Floating Solids or Visible Foam	Visual	N/A	N/A	N/A	Report	Effluent	1/Month	Visual

Parameter	Effluent Limits					Monitoring Requirements		
	Units [a]	Daily Minimum	Monthly Average	Weekly Average	Daily Maximum	Sample Location	Sample Frequency	Sample Type

Footnotes:

a. Units: mgd = million gallons per day, mg/L = milligrams per liter, lbs/day = pounds per day, S.U.= standard units, °C= degrees Celsius, FC/100 mL = Fecal Coliform per 100 milliliters, cfu/100 mL = colony forming units per 100 milliliters, µg/L = micrograms per liter

b. Limits apply to effluent. Report average monthly influent concentration. Influent and effluent composite samples shall be collected during the same 24-hour period.

c. See Appendix C for a definition.

d. lbs/day = concentration (mg/L) x flow (mgd) x 8.34 (conversion factor)

e. Minimum % Removal = [(monthly average influent concentration in mg/L – monthly average effluent concentration in mg/L) / (monthly average influent concentration in mg/L)] x 100. The monthly average percent removal must be calculated using the arithmetic mean of the influent value and the arithmetic mean of the effluent value for that month.

f. If more than one FC bacteria or E. coli sample is collected within the reporting period, the average result must be reported as the geometric mean. When calculating the geometric mean, replace all results of zero, 0, with a one, 1. The geometric mean of "n" quantities is the "nth" root of the product of the quantities. For example, the geometric mean of 100, 200, and 300 is $(100 \text{ X } 200 \text{ X } 300)^{1/3} = 181.7$.

g. One E.coli bacteria shall be sampled each month, May-Sept, on the same day as FC bacteria sampling.

Table 5- Effluent Limit Changes from Prior Permit

Parameter	Units [a]	Monthly Average		Weekly Average		Daily Maximum	
		2020 Permit	2025 Permit	2020 Permit	2025 Permit	2020 Permit	2025 Permit
BOD_5	mg/L	Report	N/A	N/A	N/A	Report	N/A
Total Ammonia, as N November 1- April 30	mg/L	Report	20	N/A	N/A	Report	29
			815	N/A	N/A	Report	1,216
Total Ammonia, as N May 1- October 31	mg/L	Report	33	N/A	N/A	Report	47
	lbs/day	Report	1,308	N/A	N/A	Report	1,921
Copper, total recoverable November 1- April 30	µg/L	52	Water Quality Criteria. 2020 limits and requirements remain in 2025 permit as interim limits. See Section 7.6 Compliance Schedule.	N/A	Water Quality Criteria. 2020 limits and requirements remain in 2025 permit as interim limits. See Section 7.6 Compliance Schedule.	97	Water Quality Criteria. 2020 limits and requirements remain in 2025 permit as interim limits. See Section 7.6 Compliance Schedule.
	lbs/day	2.1		N/A		4.0	
Copper, total recoverable May 1- October 31	µg/L	34	Water Quality Criteria. 2020 limits remain in 2025 permit as interim limits. See Section 7.6 Compliance Schedule.	N/A	Water Quality Criteria. 2020 limits remain in 2025 permit as interim limits. See Section 7.6 Compliance Schedule.	54	Water Quality Criteria. 2020 limits remain in 2025 permit as interim limits. See Section 7.6 Compliance Schedule.
	lbs/day	1.4		N/A		2.2	
Units: mg/L = milligrams per liter, lbs/day = pounds per day, µg/L = micrograms per liter							

3.4 Whole Effluent Toxicity Monitoring

Alaska WQS at 18 AAC 70.030 require that an effluent discharged to a water may not impart chronic toxicity to aquatic organisms, expressed as 1.0 TUc, at the point of discharge, or if the Department authorizes a mixing zone in a permit, approval, or certification, at or beyond the mixing zone boundary, based on the minimum effluent dilution achieved in the mixing zone.

WET tests are laboratory tests that measure the total toxic effect of an effluent on living organisms. WET tests use small vertebrate and invertebrate species and/or plants to measure the aggregate toxicity of an effluent. There are two different durations of toxicity test: acute and chronic. Acute toxicity tests measure survival over a 96-hour exposure. Chronic toxicity tests measure reductions in survival, growth, and reproduction over a 7-day exposure. State regulation 18 AAC 83.335 recommends chronic testing for facilities with dilution factors that are less than 100:1 at the boundary of the mixing zone, acute testing for facilities with dilution factors greater than 1000:1 at the boundary of the mixing zone, and either acute or chronic for dilution factors between 100:1 and 1000:1 at the boundary of the mixing zone.

The previous permit required testing twice per year with the stipulation that one sample be conducted between May 1 and October 31, and the other sample between November 1 and April 30. *Ceriodaphnia dubia* (water flea) and *Pimpehales promelas* (fathead minnow) were required for the first three tests. After this initial screening period, the more sensitive species was required for use in all subsequent tests. Test results indicated that *Ceriodaphnia dubia* was the more sensitive species. The organisms were tested at the following effluent

concentrations: 3.0%, 6.0%, 12%, 24%, and 48% and a control (0%) for samples between November 1 and April 30, and 0.6%, 1.3%, 2.6%, 5.2%, and 10% and a control (0%) for samples between May 1 and October 31.

DEC conducted two WET RPAs, one for the winter season and one for the summer, using the results of CBJ's WET tests conducted on *Ceriodaphnia dubia* during the term of the permit. The highest reported TUc between November 1 and April 30 was 10 TUc and the highest reported TUc between May 1 and October 31 was 2.1 TUc.

The results of the RPAs demonstrate that WET has reasonable potential to exceed water quality criteria at the boundary of both the winter and summer chronic mixing zones. However, both data sets only contained five samples. Small data sets produce large reasonable potential multipliers that lead to larger maximum expected concentrations, or in the case of WET, a larger maximum expected TUc than actual WET testing has indicated.

WET is not chemical specific; rather, WET measures the effluent in its entirety with its mixture of various chemicals. The permit contains new ammonia effluent limits and a compliance schedule that requires compliance with copper water quality criteria at the end of the pipe as soon as possible, but no later than five years after the effective date of the permit. DEC expects that these improvement.to the quality of the overall effluent will result in lower TUc test results in both the winter and summer seasons. In order to continue evaluating the quality of the effluent in its entirely, WET testing shall continue in the reissued permit and will be included in both the winter and summer chronic mixing zones sized for ammonia.

The dilution test series for WET testing must bracket the instream waste concentrations (IWC)s for each season and must include the IWC, two dilutions above the IWC, two dilutions below the IWC, and a control. No concentration shall be greater than two times that of the next lower concentration. Accelerated testing is required if any test result exceeds either the IWC in the winter or the IWC in the summer and requires six bi-weekly WET tests (every two weeks) over a twelve-week period. If the permittee demonstrates through an evaluation of the facility operations that the cause of the exceedance is known and corrective actions have been implemented, only one accelerated test is required. If toxicity is greater than either of the toxicity triggers in any of the accelerated tests, the permittees must initiate a Toxicity Reduction Evaluation (TRE). A TRE is a site-specific process designed to identify the cause of effluent toxicity, isolate the sources of toxicity, evaluate the effectiveness of toxicity control options, and confirm effluent toxicity reduction. The permittee may initiate a toxicity identification evaluation (TIE) as a part of the TRE. A TIE is a set of procedures that characterize, identify, and confirm the specific chemicals responsible for effluent toxicity. TREs and TIEs must be performed in accordance with EPA guidance manuals (see Permit Section 1.4.4 for further details).

3.5 Additional Effluent Monitoring Requirements

The permittee must perform the additional effluent testing in the APDES application Form 2A, Section 11 as well as all applicable supplemental monitoring listed in Section 12. The permittee must submit the results of this additional testing with their application for renewal of this APDES permit. Monitoring results must be included with the application for permit reissuance and will be used as a screening tool to identify pollutants that may exceed State WQS.

4.0 RECEIVING WATERBODY

4.1 Description of Receiving Waterbody

Mendenhall Lake, at the base of the Mendenhall Glacier, forms the headwaters of the Mendenhall River. As such, melting snow and ice is the predominant source of streamflow to the river. The Mendenhall River flows approximately six miles to Gastineau Channel.

4.2 Outfall Location

The Mendenhall WWTP discharges secondary treated domestic wastewater through a 48-inch diameter HDPE pipe that is anchored into the Mendenhall River bottom at 58° 21'43" North latitude and 134° 35' 53" West longitude.

4.3 Low Flow Conditions

The Technical Support Document for Water Quality-Based Toxics Control (TSD)(EPA, 1991) and the WQS recommend the flow conditions for use in calculating WQBELs using steady state modeling. The TSD and WQS state the WQBELs intended to protect aquatic life uses should be based on the lowest seven-day average flow rate expected to occur once every ten years (7Q10) for chronic criteria and the lowest one-day average flow rate expected to occur once every ten years (1Q10) for acute criteria.

Flow data from United States Geological Survey (USGS) gage 15052500, located upstream of the Mendenhall WWTP's outfall in Mendenhall Lake, and gage 15052800, in Montana Creek, which flows into the Mendenhall River upstream of the Mendenhall WWTP, were used during the last permit cycle to derive low flow values for two seasons, November-April, and May-October. The November–April 7 Q10 flow is 35 cubic feet per second (cfs) while the1Q10 flow is 30 cfs. The May-October 7Q10 is 292 cfs while the1Q10 flow is183 cfs. The Department determined during the development of the 2014 permit that this seasonal division results in a permit that is best aligned with historical flow data. However; the Montana Creek gage was removed from service in 2012. The Brotherhood Bridge gage, a requirement of the NPDES 2006 permit, did not produce reliable data and was not required in the APDES 2014 permit. Solely using data from The Mendenhall River gage, which, as indicated above, is located upstream of the Mendenhall WWTP in Mendenhall Lake, will not provide representative flow data for the Mendenhall River at the location of the WWTP. DEC had recommended in the 2020 permit's fact sheet that CBJ obtain updated low flow data during the permit reissuance for the Mendenhall River that is representative of Mendenhall River flow conditions in the area of the WWTP outfall. CBJ did not provide DEC with any updated low flow data for this permit reissuance; therefore, DEC used the low flow data calculations from the 2014 permit for this permit reissuance. DEC recommends that CBJ obtain, if possible, Mendenhall River low flow data that is representative of river flow near the Mendenhall WWTP outfall.

4.4 Water Quality Standards

Regulations in 18 AAC 70 require that the conditions in permits ensure compliance with the Alaska WQS. The State's WQS are composed of use classifications, numeric and/or narrative water quality criteria, and an Antidegradation Policy. The use classification system identifies the designated uses that each waterbody is expected to achieve. The numeric and/or narrative water quality criteria are the criteria deemed necessary by the state to support the designated use classification of each waterbody. The Antidegradation Policy ensures that the existing water uses and the level of water quality necessary to protect the uses are maintained and protected.

Waterbodies in Alaska are protected for all uses unless the water has been reclassified under 18 AAC 70.230, as listed under 18 AAC 70.230(e). Some waterbodies in Alaska can also have site– specific water quality criterion per 18 AAC 70.235, such as those listed under 18 AAC 70.236(b).

The Mendenhall River has not been reclassified pursuant to 18 AAC 70.230, nor does it have site-specific water quality criteria pursuant to 18 AAC 70.235. Therefore, the Mendenhall River must be protected for all fresh water use classes listed in 18 AAC 70.020(a)(1). These fresh water use classes consist of the following: water supply for drinking, culinary, and food processing; water supply for agriculture, including irrigation and stock watering; water supply for aquaculture and industry; contact and secondary recreation, and growth and propagation of fish, shellfish, other aquatic life, and wildlife.

4.5 Water Quality Status of Receiving Water

Any part of a waterbody for which the water quality does not or is not expected to meet applicable WQS is defined as a "water quality limited segment" and placed on the state's impaired waterbody list. For an impaired waterbody, Section 303(d) of the CWA requires states to develop a Total Maximum Daily Load (TMDL) management plan. The TMDL documents the amount of a pollutant a waterbody can assimilate without violating a state's WQS and allocates that load to known point sources and nonpoint sources. The Mendenhall River is not included in Alaska's 2024 Integrated Water Quality and Assessment Report.

4.6 Mixing Zone Analysis

In accordance with State regulations at 18 AAC 70.240, the Department may authorize a mixing zone in a permit. A chronic mixing zone is sized to protect the ecology of the waterbody as a whole and an acute mixing zone is sized to prevent lethality to passing organisms.

DEC had determined during the development of the prior permit that due to variation in ambient conditions such as river flow between the summer and winter months and subsequently river temperature and hardness upon which some freshwater metals are dependent, it would be more appropriate to authorize seasonal mixing zones, one for November 1- April 30, and one for May 1- October 31. This variation of ambient conditions remains and has been accounted for in this permit reissuance with the authorization of seasonal mixing zones.

CBJ submitted a request for seasonal mixing zones and included the results of their CORMIX modeling in their submittal. In order to ensure that the requested mixing zones comply with 18 AAC 70.240, DEC reviewed the permittee's mixing zone application for accuracy and consistency with State regulations and guidance.

As a part of the review, DEC also conducted an RPA using the last five years of effluent data and modeled chronic and acute mixing zones for each season (November 1– April 30 and May 1– October 31) using Cornell Mixing Zone Expert System (CORMIX) modeling software. CORMIX is a widely used and broadly accepted modeling tool for accurate and reliable point source mixing analysis. Inputs to CORMIX included the maximum expected effluent concentrations of the pollutant requiring the most dilution to achieve water quality criteria for each season (November 1-April 30 and March 1-October 31), acute and chronic water quality criteria, receiving water characteristics at the outfall such as depth of the receiving water at the outfall, river and wind velocity, and outfall and diffuser specifications, such as size, direction, and number of ports. Based on the inputs, CORMIX predicts the distance at which the modeled parameter meets water quality criteria as well as the corresponding dilution at that point.

Based on the maximum expected concentrations and chronic and acute water quality criteria, DEC initially determined that copper required the most dilution (11.6:1) of the parameters that demonstrated reasonable potential to exceed acute and chronic water quality criteria in the winter season (November 1 – April 30). However, upon further analysis, it became evident that the discharge could not be shown to prevent lethality to passing organisms in the acute mixing zone.

According to EPA (1991) acute lethality to organism passing through the mixing zone may be prevented with the use of a high-velocity discharge with an initial velocity of 3 meters per second or more together with a mixing zone spatial limitation of 50 times the discharge length scale in any direction. This would ensure that the acute criterion (CMC or criterion maximum concentration) is met within a few minutes in any direction.

For lower discharge velocities (less than 3 meters per second), lethality can be prevented by showing that the most restrictive of the following conditions are met:

1. The CMC must be met within 10% of the distance from the edge of the outfall structure to the edge of the regulatory mixing zone in any spatial direction
2. The CMC must be met within a distance of 50 times the discharge length scale in any spatial direction. The discharge length scale is defined as the square root of the cross-sectional area of any discharge outlet.

3. The CMC must be met within a distance of five times the local water depth in any horizontal direction. The local water depth is defined as the natural water depth (existing prior to the installation of the discharge outlet) prevailing under mixing zone design condition (e.g. low flow for rivers). This restriction will prevent locating the discharge in very shallow environments or very close to shore, which would result in significant surface and bottom concentrations.

Additionally, according to EPA, lethality is generally not expected to organisms passing through the plume along the path of maximum exposure if the organism is not exposed to concentrations exceeding the acute criteria when averaged over a one-hour time period. Specifically, the travel time of a drifting organism traveling through the path of maximum exposure should occur within 15 minutes if a one-hour exposure is not to exceed the acute criterion.

The CORMIX toxic mixing zone summary for the winter acute mixing zone indicates that the discharge fails to meet the above criteria for preventing lethality; the discharge has a low discharge velocity (0.51 meters per second) of less than 3 meters per second, the computed distance from the port opening to the CMC location is beyond 50 times the discharge length scale, and the computed horizontal distance from the port opening to the CMC is beyond 5 times the ambient water depth. Furthermore, the CORMIX prediction files show that it takes approximately 21 minutes for an organism to drift through the winter acute mixing zone.

According to18 AAC 70.240(d)(7), the Department will approve a mixing zone only if the department finds that available evidence reasonably demonstrates that within the mixing zone the pollutants discharged will not cause lethality to passing organisms Based on the CORMIX modeling results, it cannot be reasonably demonstrated that copper discharged in the effluent from the Mendenhall WWTP in the winter months will not cause lethality to passing organisms. Therefore, copper is not authorized in the winter mixing zone. Copper water quality criteria must be met prior to discharge into the Mendenhall River. A compliance schedule has been established in the permit that requires the attainment of copper water quality criteria as soon as possible but no later than five years after the effective date of the permit. The compliance schedule contains a requirement for the permittees to conduct Copper Biotic Ligand Model (BLM) sampling to support the development of site-specific copper water quality criteria. The Copper BLM is a tool used to assess the bioavailability and toxicity of copper in aquatic environments that provides site-specific water quality criteria based on various water chemistry parameter.

Copper during the summer season, (May 1-October 31) also has reasonable potential to exceed water quality criteria; however, during the summer, Mendenhall River monitoring data demonstrates that copper is present in the river at concentrations that exceed water quality criteria; therefore, because there is no assimilative capacity for a mixing zone for copper, summer copper water quality criteria must also be met prior to discharge into the Mendenhall River. A compliance schedule has been established in the permit that requires the attainment of copper water quality criteria as soon as possible but no later than five years after the effective date of the permit

Following copper, ammonia requires the most dilution for both the winter (winter chronic dilution 6.1) and summer seasons (summer chronic dilution 7.0) to meet chronic water quality. For the winter season, ammonia drives both the chronic and acute mixing zones, for the summer season, ammonia drives the chronic, while zinc drives the acute. Therefore, DEC conducted the modeling of the winter mixing zone using ammonia as the driver of both the chronic and acute and the modeling of the summer using ammonia as the driver of the chronic and zinc for the acute.

CBJ found that ammonia required the most dilution (21.1) to meet chronic water quality criteria in the summer. They provided 9.58 mg/L as the acute criterion, 3.77 mg/L as the chronic, and the maximum expected concentration (MEC) as 34.98 mg/L. DEC's summer RPA resulted in an ammonia MEC of 29.42 mg/L and 15.7 mg/L acute and 4.8 mg/L as chronic water quality criterion. DEC determined that zinc with a dilution of 3.1 drives the May-Oct acute mixing zone. CBJ's submittal did not include the analysis of zinc.

Some of differences between DEC and CBJ's submittal may be attributed to the range of data sets selected for the RPAs. For example, treatment of the domestic wastewater should not vary seasonally; rather, it is the

receiving water characteristics such as the ambient flow that determines the seasonal nature of the Mendenhall mixing zones. Therefore, DEC did not analyze the effluent data by season, rather DEC used the entire yearly effluent monitoring results in the RPA (June 2020-July 2025). However, to account for seasonal characteristics of the Mendenhall River, DEC seasonally sorted the pH, temperature, copper, and hardness receiving water data.

CORMIX predicted that the travel time of an organism drifting through the summer acute mixing zone with zinc as the driver to be approximately less than one second; therefore, in accordance with18 AAC 70.240(d)(7), there will be no lethality to organisms passing through the May 1- October 31 acute mixing zone.

DEC's modeling predicted that the distance to the summer ammonia chronic water quality criterion as 0.77 meters downstream with a half width of 8.26 meters. CBJ provided a dilution of 21 and a mixing zone 199.6 meters long and 58 meters wide; however, CBJ's ammonia session report for the mixing zone modeling for the chronic ammonia criterion (or the CCC, the criterion continuous concentration) at the 7Q10 flow (292 cfs) shows a dilution of 9.3 and a distance from the port location to the chronic criterion as 4.26 meters with a half width of 7.64 meters. In CORMIX CBJ had specified a regulatory mixing zone width of 53.34 meters or 175 feet. This is not a DEC regulatory mixing zone; therefore, selecting the dilution and mixing zone from this location is incorrect.

Appendix D outlines regulatory criteria that must be met in order for the Department to authorize a mixing zone. These criteria include the size of the mixing zone, treatment technology, existing uses of the waterbody, human consumption, spawning areas, human health, aquatic life, and endangered species.

The following summarizes this analysis:

Size

18 AAC 70.240(k) states that mixing zone must be as small as practicable. In order to ensure that the mixing zone is as small as practicable, DEC used CORMIX version 12.0GTD to model the chronic and acute and mixing zones. CORMIX is a widely used and broadly accepted modeling tool for accurate and reliable point source mixing analysis and predicts the distance at which a modeled parameter meets water quality criteria as well as the corresponding dilution at that point.

18 AAC 70.240(b)(2) requires the Department to consider the characteristics of the effluent after treatment of the wastewater. DEC reviewed the facility's effluent monitoring data from June 2020 through July 2025 to identify pollutants of concern and to determine which pollutants have reasonable potential to exceed water quality criteria and then which pollutant requires the most dilution to meet both chronic and acute water quality criteria. As indicated above, in the summer, because copper will not be authorized in the mixing zone due to lack of assimilative capacity, ammonia requires the most dilution for the chronic mixing zone and zinc requires the most dilution for the acute mixing zone. In the winter, because copper will not be authorized in the mixing zone due to lethality in the acute mixing zone, ammonia requires the most dilution for both the chronic and acute mixing zones. Therefore, the seasonal mixing zones were modeled using the drivers of the acute and chronic mixing zones.

The smallest practicable mixing zones are defined below. The mixing zone is bordered to river left (the left-hand side of the river facing downstream) by the riverbank. The river is bounded at approximately 100 meters. Therefore, these restrictions were accounted for in the sizing of the mixing zones. All of the mixing zones are centered over the diffuser. The half-width as predicted by CORMIX was established at this point.

FC Bacteria, E. coli, temperature, dissolved oxygen, and WET are included in the winter chronic mixing zone sized for ammonia and FC Bacteria, E. coli, temperature, dissolved oxygen, zinc, and WET are included in the summer chronic mixing zone sized for ammonia.

Chronic:

The chronic mixing zone with ammonia as the driving parameter between November 1 and April 30 has a dilution factor of 6.1 and is defined as centered over the diffuser and extending 29 meters downstream with a width extending 17 meters river right and 14 meters river left.

The chronic mixing zone sized for ammonia as the driving parameter between May 1 and October 31 has a dilution factor of 7.0 and is defined as centered over the diffuser extending 0.77 meters downstream with a width of 17 meters.

Acute:

The acute mixing zone with ammonia as the driving parameter between November 1 and April 30 has a dilution factor of 1.5 and is defined as centered over the diffuser and extending 0.28 meters downstream with a width of 16 meters.

The acute mixing zone with zinc as the driving parameter between May 1 and October 31 has a dilution factor of 3.1 and is defined as centered over the diffuser extending 0.22 meters downstream with a width of 17 meters.

The May- October zinc acute mixing zone width is slightly larger (half width 8.3 meters) than the May- October ammonia chronic mixing zone width (prior to rounding half width 8.26 meters). This may be attributed to the unidirectional perpendicular coflowing multiport diffuser. Such diffusers create an acceleration zone where the net horizontal momentum flux to effluent discharge provided by the diffuser jets leads to a wholescale acceleration of the ambient water that flows across the diffuser line, leading to rapid entrainment and mixing in this zone. The diffuser plume is mixed over the full layer depth, and contracts laterally in the direction of the flow (acceleration process). The length of this zone is about one half the diffuser length (16.764 meters).

Table 6 summarizes data used in CORMIX to model the winter and summer mixing zones.

Table 6- Summary of CORMIX Version 12.0GTD Inputs

Parameter Modeled	Discharge Excess Concentration (MEC - ambient concentration)	Ambient Concentration	Water Quality Criteria Excess (water quality criterion - ambient concentration)
Total Ammonia, as N November-April	28.598 mg/L	0.822 mg/L (15% of most stringent water quality criterion)	19.258 mg/L 4.678 mg/L
Total Ammonia, as N May- October	28.701 mg/L	0.719 mg/L (15% of most stringent water quality criterion)	14.981 mg/L 4.081 mg/L
Zinc, total recoverable May-October)	65.647 µg/L	3.693 µg/L (15% of most stringent water quality criterion)	24.6 µg/L (acute and chronic)
Outfall and Receiving Waterbody Characteristics			
Discharge Geometry	55-foot multiport diffuser		
Discharge Location	left bank		
Diffuser Length	16.764 meters		
Number & Size of Ports	13 openings, 8 inch-diameter		
Nozzle Direction	Same direction		
Port Height	0.3 meters		
Depth at Discharge	1.5 meters		

Parameter Modeled	Discharge Excess Concentration (MEC - ambient concentration)	Ambient Concentration	Water Quality Criteria Excess (water quality criterion - ambient concentration)
Ambient Velocity	Nov-April ammonia 7Q10 35 cfs and 1Q10 30 cfs May-October ammonia 7Q10 292 cfs May-October zinc 1Q10 183 cfs		
Wind Velocity	2 meters per second		
Effluent Characteristics			
Flow Rate	4.9 million gallons per day		
Average Temperature	14.6 °C		

Technology

In accordance with 18 AAC 70.240(c)(1), the most effective technological and economical methods should be used to disperse, treat, remove, and reduce pollutants. Wastewater operations at the Mendenhall WWTP generally meet and occasionally exceed secondary treatment requirements. The wastewater treatment system includes preliminary treatment of influent by fine screening and grit removal followed by clarification, treatment by one of eight SBRs where it is treated using aeration blowers, jet circulation pumps and UV disinfection. The treatment methods incorporated at the Mendenhall WWTP are commonly employed and accepted for treatment of similar discharges throughout the United States.

Low Flow Design

In accordance with 18 AAC 70.240(l), DEC incorporated low flow data from USGS Mendenhall River gage 150525000 and USGS Montana Creek gage 150552800 into the CORMIX mixing zone models. The November–April 7Q10 flow is 35 cfs while the1Q10 flow is 30 cfs. The May-October 7Q10 is 292 cfs while the1Q10 flow is183 cfs.

Existing Use

In accordance with 18 AAC 70.240(c)(2)and (3) and 18 AAC 70.240(c)(4)(B) and (C), the mixing zones are appropriately sized to fully protect the existing uses of the Mendenhall River. The Mendenhall River's existing uses and biological integrity have been maintained and protected under the terms of the previous permit and shall continue to be maintained and protected under the terms of the reissued permit. Water quality criteria are developed to specifically protect the uses of the waterbody as a whole. Because water quality criteria for pollutants that demonstrated reasonable potential to exceed water quality criteria will be met prior to or at the boundary of the mixing zones, designated and existing uses in the Mendenhall River that are beyond the boundary of the mixing zones will be maintained and protected.

Human Consumption

In accordance with the conditions of the permit, and in accordance with 18 AAC 240(d)(6),the pollutants discharged cannot produce objectionable color, taste, or odor in aquatic resources harvested for human consumption. There is no indication that the pollutants discharged have produced objectionable color, taste, or odor in aquatic resources harvested for human consumption. The permit requires the permittee to post a sign on the shoreline near the discharge area to inform the public that certain activities such as harvesting of aquatic life for raw consumption should not take place in the mixing zone.

Spawning Areas

In accordance with 18 AAC 70.240(f), the mixing zone may not be authorized in a known spawning area for anadromous fish or resident fish spawning redds for Arctic grayling, northern pike, rainbow trout, brook trout, cutthroat trout, whitefish, sheefish, Arctic char (Dolly Varden), burbot, and landlocked coho, king, and sockeye

salmon. The Alaska Department of Fish and Game's (ADF&G) Catalog of Waters Important for Spawning, Rearing or Migration of Anadromous Fishes-Southeastern Region, Effective June 1, 2019, indicates the presence of chum, coho, chinook, pink, sockeye, cutthroat trout, Dolly Varden, and steelhead trout at the mouth of the Mendenhall River. All of these fish species with the exception of chinook are also present at the outlet of Mendenhall Lake into the Mendenhall River. The catalog; however, does not show any spawning or rearing areas in the Mendenhall River nor in the vicinity of the Mendenhall WWTP wastewater discharge outfall.

Human Health

In accordance with 18 AAC 70.240(d)(1), the mixing zone must not contain bioaccumulating, bioconcentrating, or persistent chemicals above natural or significantly adverse levels. 18 AAC 70.240(d)(2), states that the mixing zone must not present an unacceptable risk to human health from carcinogenic, mutagenic, teratogenic, or other effects as determined using risk assessment methods approved by DEC and consistent with 18 AAC 70.025.An analysis of the effluent data that was included with the Mendenhall WWTP wastewater discharge application, DMRs, and the results of the RPAs conducted on pollutants of concern indicate that the level of treatment at the Mendenhall WWTP is protective of human health. The effluent data was used in conjunction with applicable water quality criteria, which serve the purpose of protecting human and aquatic life to size the mixing zones to ensure all water quality criteria are met in the waterbody at the boundary of the mixing zones.

Aquatic Life and Wildlife

In accordance with 18 AAC 70.240, the mixing zones authorized in the permit shall be protective of aquatic life and wildlife. The mixing zones do not form a barrier to migratory fish species or fish passage nor will they result in a reduction of fish population levels. A toxic effect will not occur in the water column, sediments, or biota outside the boundaries of the mixing zones. CORMIX modeling conducted for this discharge to the Mendenhall River incorporated the most stringent water quality criteria in the models for protection of the growth and propagation of fish, shellfish, other aquatic life, and wildlife, and all water quality criteria will be met at the boundary of the authorized mixing zones.

Endangered Species

In accordance with 18 AAC 70.240(c)(4)(F), the authorized mixing zone will not cause an adverse effect on threatened or endangered species. On October 8, 2019, DEC contacted the United States Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) and requested them to identify any threatened or endangered species under their jurisdiction in the vicinity of the Mendenhall WWTP wastewater discharge outfall. USFWS did not identify any threatened or endangered species. NMFS stated that the Steller sea lion, Western Distinct Population Segment (DPS) and the humpback whale may be present in the vicinity of the Mendenhall WWTP and discharge location. NMFS clarified that although most sea lions in this area are from the delisted eastern population, some animals from the western population may be present in this area and that similarly, most humpbacks in this area are from the delisted Hawaii DPS, but that approximately 6% are from the threatened Mexico DPS. See Fact Sheet Section 8.1 for more information regarding endangered species.

DEC will provide a copy of the permit and fact sheet to NMFS and USFWS when it is publicly noticed. Any comments received from the agencies regarding endangered species will be considered prior to issuance of the permit.

5.0 ANTIBACKSLIDING

18 AAC 83.480 requires that "interim effluent limitations, standards, or conditions must be at least as stringent as the final effluent limitations, standards, or conditions in the previous permit.". 18 AAC 83.480(c) also states that a permit may not be reissued "to contain an effluent limitation that is less stringent than required by effluent guidelines in effect at the time the permit is renewed or reissued."

EPA's *Interim Guidance for Performance-Based Reduction of NPDES Monitoring Frequencies (EPA, 1996),* states that monitoring requirements are not considered effluent limitations under the Clean Water CWA, and therefore Antibacksliding prohibitions would not be triggered by reductions in monitoring frequencies.

Effluent limitations may be relaxed under 18 AAC 83.480, CWA Section 402(o) and CWA Section 303(d)(4). 18 AAC 83.480(b) allows relaxed limitations in renewed, reissued, or modified permits when there have been material and substantial alterations or additions to the permitted facility that justify the relaxation, or where new information is available that justifies the relaxation, or if the Department determines that technical mistakes or mistaken interpretations of the law were made.

All permit effluent limits, standards, and conditions are as stringent as in the previously issued permit and are consistent with 18 AAC 83.480. Accordingly, no further backsliding analysis is required for this permit reissuance.

6.0 ANTIDEGRADATION

Section 303(d)(4) of the CWA states that, for water bodies where the water quality meets or exceeds the level necessary to support the waterbody's designated uses, WQBELs may be revised as long as the revision is consistent with the State's Antidegradation policy. The State's Antidegradation policy is found in the 18 AAC 70 WQS regulations at 18 AAC 70.015. The Department's approach to implementing the Antidegradation policy is found in 18 AAC 70.016 *Antidegradation implementation methods for discharges authorized under the federal Clean Water Act.* Both the Antidegradation policy and the implementation methods are consistent with 40 CFR 131.12 and approved by EPA. This section analyzes and provides rationale for the Department's decisions in the permit issuance with respect to the Antidegradation policy and implementation methods.

Using the policy and corresponding implementation methods, the Department determines a Tier 1 or Tier 2 classification and protection level on a parameter-by-parameter basis. A Tier 3 protection level applies to a designated water. At this time, no Tier 3 waters have been designated in Alaska.

18 AAC 70.015(a)(1) states that the existing water uses and the level of water quality necessary to protect existing uses must be maintained and protected (Tier 1 protection level).

The Mendenhall River is not included in Alaska's 2024 Integrated Water Quality and Assessment Report; therefore, this antidegradation analysis conservatively assumes that the Tier 2 protection level applies to all parameters, consistent with 18 AAC 70.016(c)(1).

18 AAC 70.015(a)(2) states that if the quality of water exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, that quality must be maintained and protected, unless the Department authorizes a reduction in water quality (Tier 2 protection level).

The Department may allow a reduction of water quality only after the specific analysis and requirements under 18 AAC 70.016(b)(5)(A-C), 18 AAC 70.016(c), 18 AAC 70.016(c)(7)(A-F), and 18 AAC 70.016(d) are met.

The Department's findings are as follows:

18 AAC 70.016(b)(5)

> ***(A)*** *existing uses and the water quality necessary for protection of existing uses have been identified based on available evidence, including water quality and use related data, information submitted by the applicant, and water quality and use related data and information received during public comment;*
>
> ***(B)*** *existing uses will be maintained and protected; and*
>
> ***(C)*** *the discharge will not cause water quality to be lowered further where the department finds that the parameter already exceeds applicable criteria in 18 AAC 70.020(b), 18 AAC 70.030, or 18 AAC 70.236(b).*

18 AAC 70.020 and 18 AAC 70.050 specify the protected water use classes for the State; therefore, the most stringent water quality criteria found in 18 AAC 70.020 and in the *Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances* (DEC 2022) apply and were evaluated. This will ensure existing uses and the water quality necessary for protection of existing uses of the receiving waterbody are fully maintained and protected.

The permit places limits and conditions on the discharge of pollutants. The limits and conditions are established after comparing TBELs and WQBELs and applying the more restrictive of these limits. The water quality criteria, upon which the permit effluent limits are based, serve the specific purpose of protecting the existing and designated uses of the receiving water. WQBELs are set equal to the most stringent water quality criteria available for any of the protected water use classes. This also ensures that the resulting water quality at and beyond the boundary of any authorized mixing zone will fully protect all existing and designated uses of the receiving waterbody as a whole.

The Department concludes the terms and conditions of the permit will be adequate to fully protect and maintain the existing uses of the water and that the findings under 18 AAC 70.016(b)(5) are met.

18 AAC 70.016(c)(7)(A –F) *if, after review of available evidence, the department finds that the proposed discharge will lower water quality in the receiving water, the department will not authorize a discharge unless the department finds that*

18 AAC 70.016(c)(7)(A) the reduction of water quality meets the applicable criteria of 18 AAC 70.020(b), 18 AAC 70.030, or 18 AAC 70.236(b), unless allowed under 18 AAC 70.200, 18 AAC 70.210, or 18 AAC 70.240;

Permit Section 1.2.2 requires that the discharge shall not cause contamination of surface or ground waters or a violation of the WQS at 18 AAC 70 except if excursions are allowed in the permit and the excursions are authorized in accordance with applicable provisions in 18 AAC 70.200 – 70.240 (e.g., variance, mixing zone). As a result of the facility's reasonable potential to exceed water quality criteria for ammonia, zinc, temperature, and WET, a mixing zone is authorized in the CBJ's Mendenhall WWTP's wastewater discharge permit in accordance with 18 AAC 70.240. The resulting effluent end-of-pipe limitations and monitoring requirements in the permit (See Fact Sheet Table 4) protect WQS, and therefore, will not violate the water quality criteria found at 18 AAC 70.020.

Alaska WQS at 18 AAC 70.030 requires that an effluent discharged to a waterbody may not impart chronic toxicity to aquatic organisms, expressed as 1.0 TUc, at the point of discharge, or if the Department authorizes a mixing zone in a permit, approval, or certification, at or beyond the mixing zone boundary, based on the minimum effluent dilution achieved in the mixing zone. DEC has authorized a winter chronic mixing zone in this permit with a dilution of 6.1 and a summer chronic mixing zone with a dilution of 7.0. DEC also established chronic WET triggers based on the minimum effluent dilution achieved in the mixing zone of 16 TUc in the winter and 14 TUc in the summer. If the WET triggers are met, the Mendenhall WWTP will not violate 18 AAC 70.030.

There are no site-specific criteria associated with 18 AAC 70.236(b).The permit does not authorize short term variances or zones of deposit under 18 AAC 70.200 or 18 AAC 70.210.

DEC determined that the reduction in water quality will not violate the criteria of 18 AAC 70.020(b), 18 AAC 70.030, or 18 AAC 70.236(b) and that the finding is met.

18 AAC 70.016(c)(7)(B) *each requirement under (b)(5) of this section for a discharge to a Tier 1 water is met;*

See 18 AAC 70.016(b)(5) analysis and findings above.

18 AAC 70.016(c)(7)(C) *point source and state-regulated nonpoint source discharges to the receiving water will meet requirements under 18 AAC 70.015(a)(2)(D); to make this finding the department will (i) identify point sources and state-regulated nonpoint sources that discharge to, or otherwise impact, the receiving water; and (ii) consider whether there are outstanding noncompliance issues with point source permits or required*

state-regulated nonpoint source best management practices, consider whether receiving water quality has improved or degraded over time, and, if necessary and appropriate, take actions that will achieve the requirements of 18 AAC 70.015(a)(2)(D); and (iii) coordinate with other state or federal agencies as necessary to comply with (i) and (ii) of this subparagraph;

The requirements under 18 AAC 70.015(a)(2)(D) state:

(D) *all wastes and other substances discharged will be treated and controlled to achieve*

(i) *for new and existing point sources, the highest statutory and regulatory requirements; and*

(ii) for nonpoint sources, all cost-effective and reasonable best management practices;

The highest statutory and regulatory requirements are defined at 18 AAC 70.015(d):

(d) For purposes of (a) of this section, the highest statutory and regulatory requirements are

(1) any federal technology-based effluent limitation identified in 40 C.F.R. 122.29 and 125.3, revised as of July 1, 2017, and adopted by reference;

(2) any minimum treatment standards identified in 18 AAC 72.050;

(3) any treatment requirements imposed under another state law that is more stringent than a requirement of this chapter; and

(4) any water quality-based effluent limitations established in accordance with 33 U.S.C. 1311(b)(1)(C) (Clean Water Act, sec. 301(b)(1)(C)).

The first part of the definition includes all federal technology-based effluent limit guidelines (ELGs) including "For POTWs, effluent limitations based upon…Secondary Treatment" at 40 CFR § 125.3(a)(1) defined at

40 CFR § 133.102, adopted by reference at 18 AAC 83.010(e). The ELGs set standards of performance for existing and new sources and are incorporated in the permit.

The second part of the definition references the minimum treatment standards for domestic wastewater discharges found at 18 AAC 72.050. The conditions of this permit require the permittee to meet or exceed the minimum treatment standards described in 18 AAC 72.050. The CBJ Mendenhall WWTP provides secondary treatment of domestic wastewater using a SBR process with UV disinfection. The Department finds that this requirement is met.

The third part of the definition refers to treatment requirements imposed under another state law that are more stringent than 18 AAC 70. Other regulations beyond 18 AAC 70 that apply to this permitting action include 18 AAC 15 and 18 AAC 72. Neither the regulations in 18 AAC 15 and 18 AAC 72, nor another state law that the Department is aware of impose more stringent requirements than those found in 18 AAC 70.

The fourth part of the definition refers to WQBELS. WQBELs are designed to ensure that the WQS of a waterbody are met and may be more stringent than TBELs. Section 301(b)(1)(C) of the CWA requires the development of limits in permits necessary to meet WQS by July 1, 1977. WQBELs included in APDES permits are derived from EPA-approved 18 AAC 70 WQS. APDES regulation 18 AAC 83.435(a)(1) requires that permits include WQBELs that can "achieve WQS established under CWA §303, including state narrative criteria for water quality." The permit requires compliance with the 18 AAC 70 and includes WQBELs developed for ammonia that are protective of water quality criteria at the boundary of the mixing zone.

After review of the applicable statutory and regulatory requirements, including 18 AAC 70, 18 AAC 72, and 18 AAC 83, the Department finds that the discharge from the CBJ Mendenhall WWTP meets the highest applicable statutory and regulatory requirements and that the finding is met.

18 AAC 70.016(c)(7)(D)(i-ii) the alternatives analysis provided under (4)(C-F) of this subsection demonstrates that

(i) a lowering of water quality under 18 AAC 70.015(a)(2)(A) is necessary; when one or more practicable alternatives that would prevent or lessen the degradation associated with the proposed discharge are identified, the department will select one of the alternatives for implementation; and

(ii) (ii) the methods of pollution prevention, control, and treatment applied to all waste and other substances to be discharged are found by the department to be the most effective and practicable.

CBJ submitted the following information on Antidegradation Form 2G:

Form 2G Sections 1 and 3- Facility Information (18 AAC 70.16(a)(5)(A-G))

Parameter of Concern: ammonia and copper

Respective Concentrations: ammonia 15.54 mg/L, copper 16.11 µg/L

Potential Impacts:

When ammonia concentrations in water rise above safe thresholds, aquatic organisms can no longer efficiently excrete the compound through their gills or other physiological processes. This causes ammonia to accumulate in their tissues and bloodstream, leading to internal toxicity that can impair respiration, reduce growth, and in severe cases, cause death. The toxicity of ammonia is not fixed but varies with environmental conditions: higher pH increases the proportion of un-ionized ammonia (NH_3), which is the more toxic form, while warmer water temperatures amplify its harmful effects by speeding up metabolic rates and reducing dissolved oxygen availability. Copper toxicity in fish often targets the gills, damaging epithelial cells and interfering with ion regulation, osmoregulation, and oxygen uptake. This damage can be directly lethal, but even sublethal exposure makes fish more vulnerable to stress, disease, and predation. Environmental conditions strongly influence copper's toxicity: in acidic waters, copper remains in its more bioavailable form, making it more harmful; soft waters with low calcium and magnesium lack the protective ions that would otherwise compete with copper for uptake sites on the gills. Low alkalinity or buffering capacity further worsens the effect, because there are fewer dissolved minerals to mitigate copper's impact.

Form 2G Section 3-Tier 1 Protection and Analysis (18 AAC 70.016(b)):

There are no parameters identified in Section 1 occurring 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.

Form 2G Section 4– (Questions 1-3) Tier 2 Protection and Analysis (18 AAC 70.016(c)):

1 and 2. The antidegradation application is for an existing discharge. The discharge of a parameter identified in Section 1 requires a Tier 2 analysis.

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

Corrosion of copper, brass, bronze, and galvanized metals is likely to be the single largest contributor of metals within the collection system; as the City lacks smelting, semiconductor, electroplating, paint manufacturing, large volume color printing, or wood preservative operations - industries that typically release large quantities of heavy metals into municipal sewer systems. Within homes, older structures still largely have copper water pipes with newer construction switching to cross-linked Polyethylene pipe (such as PEX). CBJ receiving water monitoring indicates that naturally elevated concentrations of copper exist in the background water quality. Background copper levels (sampled above the discharge) routinely exceed the calculated water quality standards, indicating the presence of natural/external copper sources. Methods of copper treatment have not been well explored at the treatment plant, as background and effluent copper levels have increased in recent years. Management controls could include drinking water treatment with orthophosphates alone or blending with polyphosphates; which have been recommended by the United States Environmental Protection Agency for reducing lead and copper corrosion in plumbing systems for compliance with the federal Lead and Copper

Rule. To reduce plant loading, wastewater intended to be processed at the Mendenhall WWTP could be redirected to the Juneau Douglas treatment facility. Other options to decrease effluent copper levels could include increased activated sludge wasting (as copper binds to solids), or the addition of treatment processes to remove copper and other metals from the discharge (chemical precipitation and removal of the particles with enhanced clarification or filtration - alternatively reverse osmosis options after current treatment).Conversion of the SBRs to MBRs may also decrease effluent copper levels.

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

The rough order of magnitude opinions of probable cost for the development of copper removal processes at the WWTP have not been investigated. It is currently unknown if additional options exist, or if these options alone, or in combination, are practicable:

Option 1 (Drinking water treatment): $21 million

Option 2 (Increase WAS wasting): unknown

Option 3 (Redirection of wastewater): $20 million (2022 MWTP Long Term Treatment Options Study)

Option 4 (Effluent metals treatment/RO): $91 million

Option 5 (MBR conversion): $60 million (2022 MWTP Long Term Treatment Options Study)

The City has conducted rate studies and proposed rate increases in recent years to cover increase operating and maintenance costs. Capital improvement costs are typically approved through bonding packages which are put forward for public vote.

3.A. Identification of a proposed practicable alternative that prevents or lessens water qualitydegradation while also considering accompanying cross-media environmental impacts:

Additional evaluation of the treatment plant is required to determine if an identified option (3b) is practicable. Treatment options likely include a combination of options which could include the five identified, or alternatives options not yet identified. Treatment processes must be evaluated to determine long-term options. Alternatively, due to the naturally occurring background copper levels being elevated, a site-specific criteria may be requested. Currently, receiving water copper monitoring is intended to calculate the copper acute and chronic standards utilizing hardness. However, DEC recently (August 2025) published 'Implementation of the Biotic Ligand Model for Derivation of Freshwater Aquatic Life Criteria for Copper on a Site-Specific Basis in State Water Quality Standards' which explores calculating receiving water copper levels considers how copper binds to biological receptor sites; typically, fish gill surfaces. The model incorporates multiple water quality parameters (pH, hardness, alkalinity, DOC, sodium, potassium, chloride, and sulfate) because all of these influence copper speciation and bioavailability. By simulating how much “free copper” is left to interact with aquatic organisms, it gives a more site-specific water quality standard.

> ***18 AAC 70.016(c)(7)(E)*** *except if not required under (4)(F) of this subsection, the social or economic importance analysis provided under (4)(G) and (5) of this subsection demonstrates that a lowering of waterquality accommodates important social or economic development under 18 AAC 70.015(a)(2)(A);*

Form 2G Section 4 (Question 4)- Social or Economic Importance (18 AAC 70.16(d))

The MWTP is considered critical infrastructure within the community and provides service to approximately 2/3 of the population of Juneau. Treatment of domestic wastewater is among the most significant costs associated with CBJ infrastructure for residential units and commercial/industrial customers and provides significant public health and safety benefits to residents. Ongoing capital costs associated with infrastructure maintenance and facility operation provide year-round employment to

local residents who operate and maintain the facility. Through treatment of domestic wastewater, the MWTP provides enhanced safety to residents who recreate in the Mendenhall River area. Without the treatment plant, individual treatment systems (such as leach fields) would be required which do not provide similar treatment levels - typically only primary treatment which require sludge pumping and disposal.

Form 2G Section 5 Tier 3 Protection and Analysis (18 AAC 70.16(c)(5))
The discharge is not to a designated Tier 3 water.

> ***18 AAC 70.016(c)(7)(F)*** *18 AAC 70.015 and this section have been applied consistent with 33 U.S.C. 1326(Clean Water Act, sec. 316) with regard to potential thermal discharge impairments.*

Discharges authorized under the permit are not associated with a potential thermal discharge impairment;therefore, the finding is not applicable.

7.0 OTHER PERMIT CONDITIONS

7.1 Quality Assurance Project Plan (QAPP)

The permittee is required to develop procedures to ensure that the monitoring data submitted are accurate and to explain data anomalies if they occur. The permittee is required to review and update as necessary, the facility's QAPP within 180 days of the effective date of the final permit. The QAPP shall consist of standard operating procedures the permittee must follow for collecting, handling, storing and shipping samples; laboratory analysis; precision and accuracy requirements; data reporting, including method detection/reporting limits; and quality assurance/quality control criteria. The permittee is required to amend the QAPP whenever any procedure addressed by the QAPP is modified. The QAPP shall be retained electronically or physically at the facility's office of record and made available to the Department upon request.

7.2 Operation and Maintenance Plan (O&M Plan)

The permit requires the permittee to properly operate and maintain all facilities and systems of treatment and control. Proper operation and maintenance is essential to meeting discharge limits, monitoring requirements, and all other permit requirements at all times. The permittee is required to review and update as necessary, the facility's O&M Plan within 180 days of the effective date of the permit. The plan must be reviewed annually and retained electronically or physically at the facility's office of record and made available to the Department upon request.

7.3 Industrial User Survey

18 AAC 83.340 requires POTWs to identify and locate all SIUs that discharge process wastewaters and associated pollutants to their wastewater treatment system. General and specific pretreatment prohibitions at 40 CFR 403.5, adopted by reference at 18 AAC 83.010(g)(2), contain prohibitions that apply to each industrial user introducing pollutants into a POTW whether or not the industrial user is subject to other National Pretreatment Standards, or any national, State, or local pretreatment requirements. Therefore, in order to assess whether an industry or business has the potential to violate any general or specific pretreatment prohibition, and to determine if a pretreatment program should be developed and/or if pretreatment requirements should be included in the Mendenhall WWTP wastewater discharge permit, the permittee is required to submit with their permit reissuance application a list of those industries or businesses that discharge and/or have the potential to discharge non-domestic wastewater to the Mendenhall WWTP's collection system. DEC may request further information on specific industries or businesses to assist in this evaluation.

7.4 Electronic Discharge Monitoring Report

The permittee must submit DMR data electronically through NetDMR per Phase I of the E-Reporting Rule (40 CFR 127) upon the effective date of the permit. Authorized persons may access permit information by logging into the NetDMR Portal https://cdxnodengn.epa.gov/oeca-netdmr-web/action/login). DMRs submitted in compliance with the E-Reporting Rule are not required to be submitted as described in permit Appendix A – Standard Conditions unless requested or approved by the Department. Any DMR data required by the Permit that cannot be reported in a NetDMR field (e.g. mixing zone receiving water data), shall be included as an attachment to the NetDMR submittal. DEC has established an e-Reporting Information website at https://dec.alaska.gov/water/compliance/electronic-reporting-rule that contains general information about this new reporting format.

Phase II of the E-Reporting rule will integrate electronic reporting for all other reports required by the Permit (e.g., Annual Reports and Certifications) and implementation is expected to begin in December 2020. Permittees should monitor DEC's E-Reporting Information website (https://dec.alaska.gov/water/compliance/electronic-reporting-rule) for updates on Phase II of the E-Reporting Rule and will be notified when they must begin submitting all other reports electronically. Until such time, other reports required by the Permit may be submitted in accordance with Appendix A – Standard Conditions.

7.5 Standard Conditions

Appendix A of the permit contains standard regulatory language that must be included in all APDES permits. These requirements are based on the regulations and cannot be challenged in the context of an individual APDES permit action. The standard regulatory language covers requirements such as monitoring, recording, reporting requirements, compliance responsibilities, and other general requirements.

7.6 Schedules of Compliance

Schedules of compliance authorized under 18 AAC 83.560(b) require that if a permit establishes a schedule of compliance that exceeds one year, the schedule must set out interim requirements and dates for their achievement. If the time necessary to complete any interim requirement is more than one year, the schedule shall require reports on progress towards completion of the interim requirements.

The copper RPAs that DEC conducted, one for November 1-April 30 (winter) and one for May 1-October 31(summer) both demonstrated that copper has reasonable potential to exceed water quality criteria at the end of pipe. Typically, if a pollutant has reasonable potential to exceed water quality criteria, the permittee may request a mixing zone for that pollutant. However, ambient monitoring conducted by CBJ for copper and hardness (used to determine freshwater hardness-dependent water quality criteria) during the term of the previous permit, indicates that copper is present in the Mendenhall River in the summer in concentrations above water quality criteria. Because copper concentrations have exceeded water quality criteria in the Mendenhall River, there is not enough assimilative capacity for copper to be included in a mixing zone. Additionally, after conducting the acute mixing zone modeling for copper in the winter, DEC determined that it is not reasonable to assume that lethality to organisms traveling through the path of maximum exposure in the acute mixing zone will not occur. Therefore, copper will not be authorized in the winter mixing zone.

DEC has therefore included a compliance schedule in the reissued permit. Copper water quality criteria must be met as soon as possible, but no later than 5 years after the effective date of the permit. Until compliance with copper water quality criteria, DEC has established the prior permit's copper limits

(November 1-April 30 AML 52 µg/L, DML 97µg/L, May 1- October 31 AML 34 µg/L, DML 54 µg/L) as interim limits in the reissued permit.

As a condition of the compliance schedule, the permittee is required to develop a Copper BLM sampling plan to support the development of site-specific copper water quality criteria, conduct the sampling, and submit the results to DEC. The Copper BLM is a tool used to assess the bioavailability and toxicity of copper in aquatic environments, providing site-specific water quality criteria based on various water chemistry parameter. BLM software, and other resources are available at Copper Biotic Ligand Model | US EPA

Additionally, the compliance schedule contains annual milestones including the submittal of a description of potential upgrades to the WWTP, CBJ's selection of an upgrade and a construction schedule, the submittal of construction plans to ESPR, and the completion of the construction of the WWTP upgrades.

8.0 OTHER LEGAL REQUIREMENTS

8.1 Endangered Species Act

The Endangered Species Act (ESA) requires federal agencies to consult with the USFWS and NMFS to determine whether their authorized actions could beneficially or adversely affect any threatened and endangered species or habitats. NMFS is responsible for administration of the ESA for listed cetaceans, seals, sea lions, sea turtles, anadromous fish, marine fish, marine plants, and corals. All other species (including polar bears, walrus, and sea otters) are administered by the USFWS.

As a state agency, DEC is not required to consult with these federal agencies regarding permitting actions; however, DEC voluntarily contacts the agencies to notify them of the proposed permit issuance and to obtain listings of threatened and endangered species near the discharge.

During the development of the prior permit, DEC contacted USFWS and NMFS to provide them with early notification of DEC's intent to reissue AK0022951 and to provide them the opportunity to share concerns with DEC regarding listed species. USFWS replied with a statement that there are not any federal species listed or designated critical habitat under USFWS jurisdiction in the vicinity of Juneau, AK and NMFS provided DEC the following list of ESA-listed species that may be present in the vicinity of the Mendenhall WWTP discharge location:

Steller sea lion, Western DPS (although most sea lions in this area are from the delisted eastern population, some animals from the western population may be present in this area), Humpback whale, Mexico DPS (similarly, most humpbacks in this area are from the delisted Hawaii DPS, but approximately 6% are from the threatened Mexico DPS).

DEC confirmed that the above species are still listed as endangered on the National Oceanic and Atmospheric Administration's (NOAA) website: https://www.fisheries.noaa.gov/species-directory/threatened-endangered. DEC also accessed USFWS's website at https://ecos.fws.gov/ipac/ and found that the endangered Short-tailed Albatross may be present in the vicinity of the Mendenhall outfall.

This permit and fact sheet will be provided to the agencies for review during the public notice period. Any comments received from these agencies will be considered prior to issuance of the permit.

8.2 Essential Fish Habitat (EFH)

EFH includes the waters and substrate (sediments, etc.) necessary for fish from commercially fished species to spawn, breed, feed, or grow to maturity. The Magnuson-Stevens Fishery Conservation and Management Act (January 21, 1999) requires federal agencies to consult with NOAA when a proposed

discharge has the potential to adversely affect (reduce quality and/or quantity of) EFH. As a State agency, DEC is not required to consult with NMFS regarding permitting actions but voluntarily contacts NMFS to notify them of the proposed permit issuance and to obtain listings of EFH in the area.

During the development of the prior permit, DEC contacted NMFS and provided them the opportunity to share concerns with DEC regarding EFH. NMFS sent DEC the following list of species and life stages that may be present in the vicinity of the Mendenhall WWTP discharge location:

Salmon:
Chinook salmon (immature)
Coho salmon (juvenile and mature)
Chum salmon (immature, juvenile, and mature)
Pink salmon (juvenile and mature)
Sockeye salmon (immature, juvenile, and mature)

Groundfish:

Kamchatka flounder (adult)	Walleye pollock (egg and larvae)	Pacific ocean perch (larvae)
Alaska plaice (egg and larvae)	Arrowtooth flounder (larvae)	Sablefish (larvae)
Dover sole (egg and larvae)	Northern rock sole (larvae)	Southern rock sole (larvae)
Flathead sole (egg and larvae)	Pacific cod (larvae)	Yellowfin sole (egg)
Rex sole (egg and larvae)		

DEC accessed NOAA's Alaska EFH Mapper at https://www.fisheries.noaa.gov/national/habitat-conservation/essential-fish-habitat#essential-fish-habitat-mapper which showed results to those listed above; however, Sockeye salmon EFH is indicated as westward of Admiralty Island, approximately 13 miles from the outlet of the Mendenhall River, as is the EFH for juvenile Pink salmon and immature Chum salmon.

DEC will provide NMFS with copies of the permit and fact sheet during the public notice period. Any comments received from NMFS regarding EFH will be considered prior to issuance of the permit.

8.3 Sludge (Biosolids) Requirements

Sludge means any solid, semi-solid, or liquid residue removed during the treatment of municipal wastewater or domestic sewage. State and federal requirements regulate the management and disposal of sewage sludge (biosolids). The permittees must consult both state and federal regulations to ensure proper management of the biosolids and compliance with applicable requirements.

State Requirements

The Department separates wastewater and biosolids permitting. The permittees should contact the Department's Solid Waste Program for information regarding state regulations for biosolids. The permittees can access the Department's Solid Waste Program webpage for more information and who to contact.

Federal Requirements

EPA is the permitting authority for the federal sewage sludge regulations at 40 CFR Part 503. Biosolids management and disposal activities are subject to the federal requirements in Part 503. The Part 503 regulations are self-implementing, which means that a permittee must comply with the regulations even if no federal biosolids permit has been issued for the facility.

A POTW is required to apply for an EPA biosolids permit. The permittees should ensure that a biosolids permit application has been submitted to EPA. In addition, the permittees are required to submit a biosolids permit application to EPA for the use or disposal of sewage sludge at least 180 days before this

APDES permit expires in accordance with 40 CFR §§122.21(c)(2) and 122.21(q) [See also 18 AAC 83.110(c) and 18 AAC 83.310, respectively]. NPDES Form 2S can be found on EPA's website, www.epa.gov, under NPDES forms. A completed NPDES Form 2S should be submitted to:

U.S. Environmental Protection Agency
Region 10, NPDES Permits Unit OWW-130
Attention: Biosolids Contact
1200 Sixth Avenue, Suite 900
Seattle, WA 98101-3140

The EPA Region 10 telephone number is 1-800-424-4372. Information about EPA's biosolids program and CWA Part 503 is available at https://www.epa.gov/biosolids and either search for 'biosolids' or go to the EPA Region 10 website link and search for 'NPDES Permits'.

8.4 Permit Expiration

The permit will expire five years from the effective date of the permit.

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U.S. Environmental Protection Agency. USEPA, 1991. Technical support document for water quality-based toxics control, EPA/505/2-90-001, USEPA Office of Water, Washington D.C., March 1991.

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APPENDIX A- BASIS FOR EFFLUENT LIMITATIONS

A.1 Statutory and Regulatory Basis

18 Alaska Administrative Code (AAC) 70.010 prohibits conduct that causes or contributes to a violation of the water quality standards (WQS). 18 AAC 15.090 requires that permits include terms and conditions to ensure criteria are met, including operating, monitoring, and reporting requirements.

The regulations require the permitting authority to make this evaluation using procedures that account for existing controls on point and nonpoint sources of pollution, the variability of the pollutant in the effluent, species sensitivity (for toxicity), and where appropriate, dilution in the receiving waterbody. The limits must be stringent enough to ensure that WQS are met and must be consistent with any available wasteload allocation (WLA). The Clean Water Act (CWA) requires a Publicly Owned Treatment Works (POTW) to meet effluent limits based on available wastewater treatment technology, specifically, secondary treatment effluent limits. The Alaska Department of Environmental Conservation (the Department or DEC) may find, by analyzing the effect of an effluent discharge on the receiving waterbody, that secondary treatment effluent limits are not sufficiently stringent to meet water quality WQS. In such cases, the Department is required to develop more stringent water quality-based effluent limits (WQBELs), which are designed to ensure that the WQS of the receiving waterbody are met.

Secondary treatment effluent limits for POTWs do not limit every parameter that may be present in the effluent. Limits have only been developed for five-day carbonaceous oxygen demand ($CBOD_5$), total suspended solids (TSS), and pH. Effluent from a POTW may contain other pollutants, such as bacteria, chlorine, ammonia, or metals, depending on the type of treatment system used and the quality of the influent to the POTW (e.g., industrial facilities, as well as residential areas discharging into the POTW). When technology-based effluent limits (TBELs) do not exist for a particular pollutant expected to be in the effluent, the Department must determine if the pollutant may cause or contribute to an exceedance of a water quality criterion for the waterbody. If a pollutant causes or contributes to an exceedance of a water quality criterion, a WQBEL for the pollutant must be established in the permit. Table A-1 summarizes the basis for effluent limits contained in the permit. Further details for each effluent limit follows in this section.

Table A-1 - Basis for Effluent Limits

Parameter	Units [a]	EFFLUENT LIMITS				
		Daily Minimum	Monthly Average	Weekly Average	Daily Maximum	Basis for Limit
Flow	mgd	N/A	N/A	N/A	4.9	18 AAC 72.245
$CBOD_5$	mg/L	N/A	25	40	55	18 AAC 83.010(e) 18 AAC 83.540
	lbs/day	N/A	1,266	1,839	2,452	
TSS	mg/L	N/A	30	45	60	18 AAC 83.010(e) 18 AAC 83.540
	lbs/day	N/A	1,266	1,839	2,452	
$CBOD_5$ & TSS Minimum Percent (%) Removal	%	85				18 AAC 83.010(e)
Fecal Coliform Bacteria	FC/100 mL	N/A	200	400	800	18 AAC 72.990(21) 18 AAC 83.435(b) 18 AAC 83.480
Ammonia, as N November 1-April 30	mg/L	N/A	20	N/A	29	18 AAC 83.435(b) 18 AAC 83.540 18 AAC 70.020(b)(11)
	lbs/day		817		1,216	
Ammonia, as N May 1- October 31	mg/L	N/A	32	N/A	47	18 AAC 83.435(b) 18 AAC 83.540 18 AAC 70.020(b)(11)
	lbs/day		1,308		1,921	

Parameter	Units [a]	EFFLUENT LIMITS				
		Daily Minimum	Monthly Average	Weekly Average	Daily Maximum	Basis for Limit
Copper, total recoverable [b] interim November 1-April 30	µg/L	N/A	52	N/A	97	18 AAC 83.435(b) 18 AAC 83.540 18 AAC 83.560(b) 18 AAC 70.020(b)(11)
	lbs/day		2.1	N/A	4.0	
Copper, total recoverable [b] interim May 1- October 31	µg/L	N/A	34	N/A	54	18 AAC 83.435(b) 18 AAC 83.540 18 AAC 83.560(b) 18 AAC 70.020(b)(11)
	lbs/day		1.4	N/A	2.2	
pH	S.U.	6.5	N/A	N/A	8.5	18 AAC 70.020(b)(6)

Footnotes:

a. Units: mgd = million gallons per day, mg/L = milligrams per liter, lbs/day = pounds per day, S.U.= standard units, °C= degrees Celsius, FC/100 mL = Fecal Coliform per 100 milliliters, cfu/100 mL = colony forming units per 100 milliliters, µg/L = micrograms per liter.

b. 2020 copper effluent limits remain in 2025 permit as interim limits. Copper water quality criteria must be met as soon as possible, but no later than five years after the effective date of the permit. See Fact Sheet Section 7.6.

A.2 Technology-Based Effluent Limitations in the Mendenhall WWTP Permit

A.2.1 *$CBOD_5$ and TSS*

The CWA requires a POTW to meet requirements based on available wastewater treatment technology. Section 301 of the CWA established a required performance level, referred to as "secondary treatment," that all POTWs were required to meet by July 1, 1977. The Department has adopted the "secondary treatment" effluent limits, 18 AAC 83.010(e), which are found in Title 40 Code of Federal Regulations (CFR) §133.102. The TBELs apply to all municipal wastewater treatment plants and identify the minimum level of effluent quality attainable by application of secondary treatment in terms of BOD_5, TSS, and pH. In addition to the federal secondary treatment regulations in 40 CFR Part 133.102, the State of Alaska requires maximum daily limitations of 60 mg/L for BOD_5 and TSS in its definition of secondary treatment found in its waste disposal regulations (18 AAC 72.990); however, the waste disposal regulations do not specify the percent removal requirements that are required by 40 CFR 133, so the more stringent 40 CFR 133 requirements are applied.

40 CFR §133.102(4) provides the permitting authority the option to substitute BOD_5 effluent limits with associated $CBOD_5$ effluent limits. The City and Borough of Juneau (CBJ) requested this substitution during the 2020-2025 permit term for the Mendenhall Wastewater Treatment Plant (WWTP) because the monitoring data indicated nitrogenous oxygen demand interference with the BOD_5 test. Nitrifying microorganisms present in wastewater deplete oxygen during BOD_5 sample incubation which leads to higher BOD_5 test concentrations. The BOD_5 test results are therefore an unreliable indicator of effluent quality. Because the monitoring data supported CBJ's request, the Department substituted the Mendenhall WWTP's BOD_5 effluent limits with associated $CBOD_5$ effluent limits. Neither 40 CFR 133.102 nor 18 AAC 72.990 contain a $CBOD_5$ maximum daily limit; however, DEC is requiring, similar, to the average monthly and average weekly $CBOD_5$ concentration limits which are 5 mg/L less than their associated BOD_5 concentration limits, a maximum daily $CBOD_5$ effluent limit of 55 mg/L. The secondary treatment effluent limits are listed in Table A-2.

Table A-2- Secondary Treatment Effluent Limits

Parameter	Units	Monthly Average	Weekly Average	Daily Maximum	Monthly Average Minimum Removal
$CBOD_5$	mg/L	25	44	55	85%
TSS	mg/L	30	45	60	85%
pH	S.U.	Between 6.0 – 9.0 S.U. at all times			

A.2.2 *Fecal Coliform (FC) Bacteria*

Alaska Wastewater Regulations at 18 AAC 72.050. Minimum treatment (a)(3) states that the department may authorize a person to discharge domestic wastewater into or onto water or land if the discharge to surface waters has received secondary treatment and has been disinfected. 18 AAC 72.990(25) defines disinfect as meaning to treat by means of chlorination, ozonation, application of ultraviolet light (UV), sterilization, or another chemical, physical, or other process designed to reduce or eliminate pathogenic organisms and produce an effluent with the following characteristics:

(A) an arithmetic mean of the values for a minimum of five effluent samples collected in 30 consecutive days that does not exceed 200 FC/100 mL; and
(B) an arithmetic mean of the values for effluent samples collected in seven consecutive days that does not exceed 400 FC/100/mL.

The above limits are based on the technological capability of disinfection; therefore, DEC is applying them as TBELs in the permit. In order to ensure the attainment of the mean FC Bacteria concentrations, DEC has also established 800 FC/100 mL as a daily maximum TBEL. Establishing a maximum limit creates an upper boundary whereby if FC Bacteria concentrations do not exceed the daily maximum limit, there will be an increased likelihood that the FC Bacteria concentrations used for averaging will comply with the monthly and weekly FC Bacteria concentration average limits.

A.3 Water Quality – Based Effluent Limitations

WQBELs included in Alaska Pollutant Discharge Elimination System (APDES) permits are derived from WQS. APDES regulation 18 AAC 83.435(a)(2) requires that permits include WQBELs that can achieve WQS established under CWA Section 303, including state narrative criteria for water quality. The State's WQS are composed of use classifications, numeric and/or narrative water quality criteria, and an antidegradation policy. The use classification system identifies the designated uses that each waterbody is expected to achieve. The numeric and/or narrative water quality criteria are the criteria deemed necessary by the state to support the designated use classification of each waterbody. Designated uses are those uses specified in WQS for each waterbody or segment whether or not they are being attained [40 CFR Section 131.3(f)]. Existing uses are those uses actually attained in a waterbody on or after November 28, 1975, whether or not they are included in the WQS [40 CFR Section 131.3].

Waterbodies in Alaska are designated for all uses unless the water has been reclassified under 18 AAC 70.230 as listed under 18 AAC 70.230(e). Some waterbodies in Alaska can also have site–specific water quality criteria per 18 AAC 70.235, such as those listed under 18 AAC 70.236(b).

Permit AK0022951 authorizes discharges of secondary treated domestic wastewater to fresh water. The designated uses for fresh water, that have not been reclassified are water supply for drinking, culinary, and food processing; water supply for agriculture, including irrigation and stock watering; water supply for aquaculture and industry; contact and secondary recreation, and growth and propagation of fish, shellfish, other aquatic life, and wildlife.

A.4 Reasonable Potential Analysis

The Department used the process described in the Technical Support Document (TSD) for Water Quality-Based Toxics Control (Environmental Protection Agency, 1991) and DEC's guidance, APDES *Permits Reasonable Potential Analysis and Effluent Limits Development Guide* (June 30, 2014) to evaluate Mendenhall WWTP's effluent. Discharge monitoring reports (DMRs) from June 2020 to July 2025 and Form 2A Application to Discharge were reviewed to identify pollutants of concern. Pollutants of concern are those pollutants that already have a TBEL or WQBEL for a particular pollutant, pollutants with a total maximum load waste load allocation or watershed analysis, pollutants identified as present in the effluent through monitoring, or those pollutants that are likely to be present in the effluent based on the nature of the operation. The monitoring of the Mendenhall WWTP's effluent as reported in the above documents indicated the presence of ammonia, copper, zinc, temperature, and WET at levels above water quality criteria; therefore, these pollutants are pollutants of concern and were selected for further reasonable potential analysis (RPA).

When evaluating the effluent to determine if WQBELs based on chemical-specific numeric criteria are needed, the Department projects the receiving waterbody concentration downstream of where the effluent enters the receiving waterbody for each pollutant of concern. The chemical-specific concentration of the effluent and receiving waterbody and, if appropriate, the dilution available from the receiving waterbody, are factors used to project the receiving waterbody concentration. If the projected concentration of the receiving waterbody exceeds the numeric criterion for a limited parameter, then there is reasonable potential that the discharge may cause or contribute to an excursion above the applicable water quality criterion. DEC assesses reasonable potential to exceed both acute and chronic criterion. Appendix B contains more details on the RPA conducted for this permit.

The Department may authorize a small volume of receiving water to provide dilution of the effluent; this volume is called a mixing zone. Mixing zone allowances will increase the allowable mass loadings of the pollutant to the waterbody. A mixing zone can be used only when there is adequate receiving waterbody flow volume, and the concentration of the pollutant of concern in the receiving waterbody is below the numeric water quality criterion necessary to protect the designated uses of the waterbody.

A.5 Specific Effluent Limits in the Mendenhall WWTP Permit

A.5.1.1 pH

Alaska WQS at 18 AAC 70.020(b)(6) for freshwater uses provide protection for the growth of fish, shellfish, other aquatic life, and wildlife. The WQS for freshwater pH may not be less than 6.5 S.U. or greater than 8.5 S.U. DEC reviewed effluent monitoring results from June 2020 and July 2025. CBJ consistently met pH water quality criteria. Therefore, pH is not included in the mixing zones and CBJ must meet pH water quality criteria prior to discharge into the Mendenhall River.

A.5.1.2 Total Ammonia, as Nitrogen

Alaska WQS at 18 AAC 70.020(b)(11) states that the concentration of substances in water may not exceed the numeric criteria in the Alaska Water Quality Criteria Manual. Total ammonia is the sum of ionized (NH_4^+) and un-ionized ammonia (NH_3). Temperature and pH affect which form, NH_4^+ or NH_3 is present. NH_3 is more toxic to aquatic organisms than NH_4^+ and predominates with higher temperature and pH. Biological wastewater treatment processes reduce the amount of total nitrogen in domestic wastewater; however, without advanced treatment, wastewater effluent may still contain elevated levels of ammonia as nitrogen. Excess ammonia as nitrogen in the environment can lead to dissolved oxygen depletion, eutrophication, and toxicity to aquatic organisms.

DEC used the 85th percentile of pH and temperature receiving water data for each season (November 1- April 30 and May 1- October 31) collected by CBJ between May 2020 and December 2023, split into the winter and summer seasons from the Mendenhall River upstream of the facility's outfall to establish

ammonia water quality criteria of 20.4 mg/L (acute) and 5.5 mg/L (chronic) for the winter and 15.7 mg/L (acute) 4.8 mg/L (chronic) for the summer. Effluent ammonia monitoring from June 2020 to July 2025 daily maximum results ranged from 5.6 mg/L to 26 mg/L. The RPAs demonstrate that there is reasonable potential for ammonia to exceed water quality criteria at the end of pipe during both seasons. Since there is reasonable potential for ammonia to exceed water quality criteria at the end of the pipe, DEC developed ammonia WQBELs. The development of WQBELs incorporates the available dilution in the receiving water. The available dilution in the November – April season is 1.5 in the acute mixing zone and 6.1 in the chronic mixing zone and resulted in of 29 mg/L as the daily maximum limit and 20 mg/L as the monthly average limit. The available dilution in the May- October season is 3.1 in the acute mixing zone (the available dilution for zinc which requires the most dilution to meet water quality criteria for May-Oct) and 7.0 in the chronic mixing zone and resulted in 47 mg/L as the daily maximum limit and 32 mg/L as the monthly average limit.

A.5.1.3 Copper

Alaska WQS at 18 AAC 70.020(b)(11) states that the concentration of substances in water may not exceed the numeric criteria in the Alaska Water Quality Criteria Manual. Copper freshwater water quality criteria are hardness dependent. The 15th percentile of ambient hardness monitoring results for each season (November 1- April 30 and May 1- October 31) collected by CBJ between May 2020 and December 2023, split into the winter and summer seasons, was used to determine copper water quality criteria. The resultant acute aquatic life copper water quality criterion (total recoverable) between November 1 and April 30 is 11.5 µg/L and the chronic aquatic life copper water quality criterion (total recoverable) is 7.8 µg/L. The resultant acute aquatic life copper water quality criterion (total recoverable) between May 1 and October 31, is 2.4 µg/L and the chronic aquatic life copper water quality criterion (total recoverable) is 1.9 µg/L. DEC conducted and RPA for November 1- April 30 and an RPA for May 1- October 31 using copper effluent data from June 2020 - July 2025. During both seasons, copper demonstrated reasonable potential to exceed water quality criteria; however, ambient copper monitoring conducted by the permittee indicates that copper, in the summer, is present in the Mendenall River in concentrations (85th percentile May 2020-Oct 2023 5.92 µg/L) above copper water quality criteria; therefore, there is not enough assimilative capacity in the Mendenhall River for copper to be included in a mixing zone. Additionally, CORMIX modeling of copper in the winter 1Q10 ambient flow condition, indicates that the discharge fails to meet criteria for preventing lethality in the acute mixing zone (See Fact Sheet Section 4.6). Therefore, copper will not be included in the winter mixing zone. Rather, copper in both the summer and winter seasons are required to meet water quality criteria at the end of the pipe. The reissued permit contains a compliance schedule that requires the attainment of copper water quality criteria as soon as possible, but no later than 5 years after the effective date of the permit. Until compliance with the copper water quality criteria are met, the prior permit's copper limits are designated as interim limits (November 1-April 30 AML 52 µg/L, DML 97µg/L, May 1- October 31 AML 34 µg/L, DML 54 µg/L).

APPENDIX B- REASONABLE POTENTIAL DETERMINATION

The following describes the process the Alaska Department of Environmental Conservation (the Department or DEC) used to determine if the discharge authorized in the draft permit has the reasonable potential to cause or contribute to a violation of Alaska Water Quality Standards (WQS). The Department used the process described in the *Technical Support Document* (TSD) *for Water Quality-Based Toxics Control* (Environmental Protection Agency, 1991) and DEC's guidance, *Alaska Pollutant Discharge Elimination System Permits Reasonable Potential Analysis and Effluent Limits Development Guide* (June 30, 2014) (RPA Guide) to determine the reasonable potential for any pollutant to exceed a water quality numeric criterion.

To determine if there is reasonable potential for the discharge to cause or contribute to an exceedance of water quality criteria for a given pollutant, the Department compares the maximum projected receiving waterbody concentration to the criteria for that pollutant. Reasonable potential to exceed exists if the projected receiving waterbody concentration exceeds water quality criteria, and a water quality-based effluent limit (WQBEL) must be included in the permit (18 Alaska Administrative Code 83.435).

The ambient concentration in the mass balance equation is based on a reasonable worst-case estimate of the pollutant concentration upstream from the discharge. For criteria that are expressed as maxima, the 85th percentile of the ambient data is generally used as an estimate of the worst case. If ambient data is not available, DEC uses 15% of the most stringent given pollutant's criteria as a worst-case example. Ammonia is used as an example to demonstrate the reasonable potential determination process.

B.1 Mass Balance

For a discharge to a flowing waterbody, the maximum projected receiving waterbody concentration is determined using a steady state model represented by the following mass balance equation:

$$C_d Q_d = C_e Q_e + C_u Q_u \qquad \text{(Equation B-1)}$$

Where,

C_d = Receiving waterbody concentration downstream of the effluent discharge

C_e = Maximum projected effluent concentration

C_u = Assumed receiving waterbody ambient concentration

Q_d = Receiving waterbody flow rate = $Q_e + Q_u$

Q_e = Effluent flow rate (set equal to the design flow of the wastewater treatment plant (WWTP)

Q_u = Receiving waterbody flow rate

When the mass balance equation is solved for C_d, it becomes:

$$C_d = \frac{C_e Q_e + C_u Q_u}{Q_e + Q_u} \qquad \text{(Equation B-2)}$$

The above form of the equation assumes that the discharge is rapidly and completely mixed with the receiving waterbody. If a mixing zone based on a percentage of the critical flow in the receiving waterbody is authorized based on the assumption of incomplete mixing with the receiving waterbody, the equation becomes:

$$C_d = \frac{C_e Q_e + C_u (Q_U \times MZ)}{Q_e + (Q_u \times MZ)} \qquad \text{(Equation B-3)}$$

Where, MZ = the fraction of the receiving waterbody flow available for dilution.

Where mixing is rapid and complete, MZ is equal to 1 and equation B-2 is equal to equation B-3 (i.e., all of the critical low flow volume is available for mixing). If a mixing zone is not authorized, dilution is not considered when projecting the receiving waterbody concentration, and

$$C_d = C_e \quad \text{(Equation B-4)}$$

In other words, if a mixing zone is not authorized, the Department considers only the concentration of the pollutant in the effluent regardless of the upstream flow and concentration. If the concentration of the pollutant in the effluent is less than the WQS numeric criteria, the discharge cannot cause or contribute to a water quality violation for that pollutant. In this case, the mixing or dilution factor (% MZ) is equal to zero and the mass balance equation is simplified to $C_d = C_e$.

Equation B-2 can be simplified by introducing a dilution factor (D):

$$D = \frac{Q_e + Q_u}{Q_e} \quad \text{(Equation B-5)}$$

After the D simplification, this becomes:

$$C_d = \frac{(C_e - C_u)}{D} + c_u \quad \text{(Equation B-6)}$$

B.2 Maximum Projected Effluent Concentration

To calculate the maximum projected effluent concentration, the Department used the procedure described in Section 3.3 of the TSD, "*Determining the Need for Permit Limits with Effluent Monitoring Data*" and the process described in Section 2.4 of DEC's RPA Guide. In this procedure, the 99th percentile of the effluent data is the maximum projected effluent concentration which is used in the calculation of the maximum projected receiving waterbody concentration.

Since there are a limited number of data points available, the 99th percentile is calculated by multiplying the maximum observed effluent concentration (MOC) by a reasonable potential multiplier (RPM). The RPM is the ratio of the 99th percentile concentration to the MOC and accounts for the statistical uncertainty in the effluent data. The RPM is calculated from the coefficient of variation (CV) of the data and the number of data points. The CV is defined as the ratio of the standard deviation of the data set to the mean. When fewer than 10 data points are available, the TSD and DEC's RPA Guide recommends assuming that the CV is equal to 0.6. A CV value of 0.6 is a conservative estimate that assumes a relatively high variability. In the example of copper, the Department used ProUCL, a statistical software program, to determine a CV of 0.5. ProUCL indicated that the data set follows a normal statistical distribution. Therefore, the RPM equation in Section 2.4.2.1 of the RPA Guide is used to determine the RPM for total ammonia as Nitrogen (N).

$$RPM = \frac{\hat{\mu}_n + z_{99}\,\hat{\sigma}}{\hat{\mu}_n + p_n\,\hat{\sigma}} \quad \text{(Equation B-7)}$$

Where,

z_{99} = the z − statistic at the 99th percentile = 2.326

$\hat{\mu}_n$ = mean calculated by ProUCL = 16.07

$\hat{\sigma}$ = the standard deviation calculated by ProUCL = 4.607

p_n = the z − statistic at the 95th percent confidence level of $(1 - 0.95)^{\frac{1}{n}} = 0.950$

n = number of valid data samples = 59

RPM = 1.1

The maximum expected concentration (MEC) is determined by multiplying the MOC by the RPM:

$$\mathrm{MEC} = (\mathrm{RPM})(\mathrm{MOC}) \qquad \text{(Equation B-8)}$$

MOC = 26 milligrams per liter (mg/L)

In the case of ammonia,

MEC = (1.1)(26) = 28.6 mg/L

* The above MEC calculation is simplified. The Department's RPA tool calculates the MEC using unrounded figures than contain a higher degree of precision. The actual MEC as calculated in the RPA tool is 29.42 mg/L.

Comparison with ammonia water quality criteria

In order to determine if reasonable potential exists for this discharge to exceed water quality criteria, the highest projected concentration is compared with the most stringent water quality criteria.

MEC = 29.42 mg/L > 4.8 mg/L (chronic aquatic life)

YES, there is reasonable potential for total ammonia, as N to exceed water quality criteria; therefore, effluent limits must be developed. See Appendix C for a description of the development of WQBELs.

Table B-1 summarizes the data, multipliers, and criteria used to determine reasonable potential to exceed water quality criteria. For each parameter, the MEC equals the maximum observed effluent concentration times the RPM producing a number based on wastewater treatment plant performance, which was used to determine if there is a reasonable potential for the effluent to exceed water quality criteria.

Table B-1- Reasonable Potential Determination at the End of Pipe

Parameter	Max Observed Effluent Conc.	Number of Samples	Coefficient of Variation (CV)	Reasonable Potential Multiplier (RPM)	Max Expected Effluent Conc. (MEC)	Most Stringent Water Quality Criterion	Reasonable Potential to Exceed WQ criteria?
Ammonia as N (mg/L)	26	59	0.2867	1.1	29.42	4.8 (chronic aquatic life May-Oct) 5.5 (chronic aquatic life Nov-April)	Yes
Copper, total recoverable (µg/L)	50	61	0.5912	1.2	59.84	1.9 (chronic aquatic life May-Oct) 7.816 (chronic aquatic life Nov-April)	Yes
WET (TUc)	2.1 May-Oct 10 Nov-April	5 May-Oct 5 Nov-April	0.6	3.4	7.0 May-Oct 34 Nov-April	1.0	Yes
Zinc, total recoverable	57	22	0.2302	1.2	69.34	24.6 (acute, chronic aquatic life May-Oct)	Yes
						100.5 (acute, chronic aquatic life Nov-April)	No
Temperature(º C)	21.2	1,184	0.6	1.0	21.2	13	Yes
Units: mg/L = milligrams per liter, µg/L = micrograms per liter, TUc = chronic toxic units, °C= degrees Celsius							

APPENDIX C- SELECTION OF EFFLUENT LIMITS

If the Alaska Department of Environmental Conservation (the Department or DEC) does not authorize a mixing zone, water quality standards (WQS) numeric criteria are applied at the end of the pipe, and technology-based effluent limits (TBELs) are selected for those parameters that are solely technology based.

When DEC authorizes a mixing zone, parameters are identified in the mixing zone that will require dilution to meet WQS numeric criteria. If there are TBELs for an identified parameter in the mixing zone, TBELs apply at the end of the pipe, and WQS numeric criteria for that parameter, apply at the boundary of the mixing zone. If the reasonable potential analysis (RPA) requires the development of water-quality based effluent limits (WQBELs) for specific parameters in order to protect human health criteria at the boundary of the mixing zone, WQBELs are applied as end-of-pipe effluent limits. Those parameters that are not identified in the authorized mixing zone, must meet applicable water quality numeric criteria at the end of pipe. In the absence of water quality criteria for a particular pollutant, such as for 5-day carbonaceous oxygen demand ($CBOD_5$) and total suspended solids (TSS), TBELs are applied as end-of pipe effluent limits.

For the Mendenhall WWTP, ammonia demonstrated reasonable potential to exceed at the end of pipe during the summer season (May 1-Oct 31) and required the most dilution to meet the ammonia chronic water quality criterion at the boundary of the authorized mixing zone; therefore, the Department developed ammonia WQBELs.

C.1 Effluent Limit Calculation

Once the Department determines that the effluent has a reasonable potential to exceed a WQS, a WQBEL for the pollutant is developed. The Department used the process described in the *Technical Support Document* (TSD) *for Water Quality-Based Toxics Control* (Environmental Protection Agency, 1991) and DEC's guidance, *Alaska Pollutant Discharge Elimination System RPA and Effluent Limits Development Guide* (June 30, 2014) (RPA Guide) to calculate WQBELs for copper. The first step in calculating WQBELs is the development of a wasteload allocation (WLA) for the pollutant.

C.2 Mixing Zone-based WLA

When the Department authorizes a mixing zone for the discharge, the WLA is calculated using the available dilution, background concentrations of the pollutant, and the WQS. For human health criteria, the WLA is applied directly as an average monthly limit (AML). The daily maximum limit (DML) is then calculated from the AML by applying a multiplier.

C.3 "End-of-Pipe" WLAs

In many cases, there is no dilution available, either because the receiving waterbody exceeds the criteria or because the Department does not authorize a mixing zone for a particular pollutant. When there is no dilution available, the criterion becomes the WLA. Establishing the criterion as the WLA ensures that the permittee's discharge does not contribute to an exceedance of the criterion. When a human health criteria applies to a pollutant, the chronic dilution factor is used to calculate a WLA.

C.4 Permit Limit Derivation

The Department applies the statistical approach described in Chapter 5 of the TSD to calculate the DML and AML. This approach accounts for effluent variability (using the coefficient of variation (CV)) and sampling frequency.

The DML is based on the CV of the data and the probability basis, while the AML is dependent on these two variables and the monitoring frequency. As recommended in the TSD, the Department used a probability basis of 95% for the AML calculation and 99% for the DML calculation.

The following is a summary of the steps to derive WQBELs from WQS numeric criteria for pollutants that have reasonable potential to exceed water quality numeric criteria. These steps are found in the RPA Guide. The guidance and its accompanying Excel RPA tool were used to calculate the Mendenhall WWTP's ammonia effluent limits. Ammonia in the summer season is illustrated below as an example.

Step 1- Determine the WLA

The first step in developing a WQBEL is to develop a wasteload allocation (WLA) for the pollutant. A WLA is the concentration or loading of a pollutant that the permittee may discharge without causing or contributing to an exceedance of water quality criteria or a total maximum daily load in the receiving waterbody.

In cases where a mixing zone is not authorized, either because the receiving waterbody already exceeds the criterion, the receiving waterbody flow is too low to provide dilution, or for some other reason one is not authorized, the criterion becomes the WLA. Establishing the criterion as the WLA ensures that the permittee will not cause or contribute to an exceedance of the criterion.

The acute and chronic aquatic life criteria are converted to WLAs using the following equation:

$$WLA_{a,c,hh} = \left(WQC_{a,c,hh}\right)\left(D_{a,c,hh}\right) + C_s\left(1 - D_{a,c,hh}\right)$$

$$WLA_{a,c,hh} = WQC_{a,c,hh}\left(\frac{Q_d + Q_s}{Q_d}\right) + C_s\left(1 - \left[\frac{Q_d + Q_s}{Q_d}\right]\right)$$

Where: $D_{a,c} = Dilution = \frac{(Q_d + Q_s)}{Q_d}$

$D_{hh} = (Dilution\ [Human\ Health]) = D_c\ (Dilution[Chronic\ Aquatic\ Life])$

$Q_d = Critical\ Discharge\ Flow$

$C_s = Critical\ Upstream\ Concentration$

$WLA_{a,c} = Wasteload\ Allocation\ (\ acute, copper, or\ human\ health)$

$WQC_{a,c} = C_r = Water\ Quality\ Criterion(acute, chronic, or\ human\ health)$

For ammonia,

$D_a = 3.1$

$D_c = 7.0$

$C_s = 0.719\ milligrams\ per\ liter$ (mg/L)

$WLA_a = 47.29\ mg/L$

$WQC_c = 29.22\ mg/L$

Step 2 - Determine the Long-Term Average (LTA)

The WLAs are converted to LTAs using multipliers that are derived from equations in Section 5.4 of the TSD:

$$LTA_a = WLA_a * exp(0.5\sigma^2 - z_{99}\sigma)$$

$$LTA_c = WLA_c * exp(0.5\sigma_4^2 - z_{99}\sigma_4)$$

Where:

$z_{99} = the\ z - statistic\ at\ the\ 99^{th} percentile = 2.326$

$LTA_a\ only$: $\sigma = ln[CV^2 + 1]^{1/2}$

$LTA_a\ only$: $\sigma^2 = ln[CV^2 + 1]$

$$LTA_c\ only\text{: } \sigma_4 = \ ln\left[\left(\frac{CV^2}{4}\right) + 1\right]^{1/2}$$

$$LTA_c\ only\text{: } \sigma_4^2 = ln\left[\left(\frac{CV^2}{4}\right) + 1\right]$$

$$CV = coefficient\ of variation$$

For ammonia:

$$LTA_a = \ 25.58\ mg/L$$

$$LTA_c = \ 25.91\ mg/L$$

Step 3 – Choosing the More Limiting LTA

To protect a waterbody from both acute and chronic effects, the more limiting of the two LTAs is used to derive the effluent limits. In the case of ammonia, the LTA_a is more limiting.

Step 4 - Calculate the Permit Limits

The DML and AML are calculated using the following equations that are found in Table 5-2 of the TSD:

$$DML_{aquatic\ life} = LTA * exp(z_{99}\sigma - 0.5\sigma^2)$$

Where:

$$z_{99} = the\ z - statistic\ at\ the\ 99^{th} percentile = 2.326$$

$$\sigma_n = ln[CV^2 + 1]^{1/2}$$

$$\sigma_n^2 = ln[CV^2 + 1]$$

$$CV = coefficient\ of variation$$

$$AML_{aquatic\ life} = LTA * exp(z_{95}\sigma_n\ - 0.5\sigma_n^2)$$

Where:

$$z_{95} = the\ z - statistic\ at\ the\ 95^{th} percentile = 1.645$$

$$\sigma_n = \ ln\left[\left(\frac{CV^2}{n}\right) + 1\right]^{1/2}$$

$$\sigma_n^2 = ln\left[\left(\frac{CV^2}{n}\right) + 1\right]$$

$$CV = coefficient\ of variation$$

$$n = number\ of\ samples\ per\ month$$

For ammonia:

$$DML = 47\ mg/L$$

$$AML = 32\ mg/L$$

C.5 Mass-Based Limits

Alaska Pollutant Discharge Elimination System regulations at 18 Alaska Administrative Code (AAC) 83.540 require that effluent limits be expressed in terms of mass unless they cannot appropriately be expressed by mass, if it is infeasible, or if the limits can be expressed in terms of other units of measurement. In addition, 18 AAC 83.520 requires that effluent limits for a publicly owned treatment works be calculated based on the design flow of the facility. Expressing limitations in terms of concentration as well as mass encourages the proper operation of a facility at all times. The mass-based limits are expressed in pounds per day and are calculated as follows:

mass-based limit (pounds (lbs)/day) = concentration limit (milligrams per liter) × design flow (million gallons per day (mgd)) × 8.34 (lbs/gallon)

C.6 Flow

Flow is based on the hydraulic design capacity of the WWTP (flow rate as gallons or mgd) and is determined by a professional engineer and approved by the Department during the WWTP plan review process conducted per 18 AAC 72. A flow limit based on the design capacity ensures that the WWTP operates within its capabilities to receive and properly treat sustained average flow quantities and specific pollutants.

C.7 Effluent Limit Summary

The following table indicates where the bases for effluent limits in the Mendenhall WWTP discharge are located.

Table C-1- Summary of Effluent Limitations

Parameter	Fact Sheet Reference
$CBOD_5$	Appendix A-Section A.2.1
TSS	Appendix A- Section A.2.1
Fecal Coliform Bacteria	Appendix A- Section A.2.2
pH	Appendix A- Section A.5.1.1
Ammonia as Nitrogen	Appendix A- Section A.5.1.2
Copper	Appendix A- Section A.5.1.3

APPENDIX D- MIXING ZONE ANALYSIS CHECKLIST

The purpose of the Mixing Zone Checklist is to guide the permit writer through the mixing zone regulatory requirements to determine if all the mixing zone criteria at 18 AAC 70.240 are satisfied, as well as provide justification to authorize a mixing zone in an Alaska Pollutant Discharge Elimination System permit. See Fact Sheet Section 4.6 for the Mendenhall Wastewater Treatment Plant mixing zone analysis.

Criteria	Description	Resources	Regulation
Size	Is the mixing zone as small as practicable?	Technical Support Document for Water Quality-Based Toxics Control DEC's Reasonable Potential Analysis Guidance Environmental Protection Agency's Permit Writers' Manual CORMIX	18 AAC 70.240(k)
Technology	Were the most effective technological and economical methods used to disperse, treat, remove, and reduce pollutants?		18 AAC 70.240(c)(1)
Low Flow Design	For streams, rivers or other flowing fresh waters. Determine low flow calculations or documentation for the applicable parameters.		18 AAC 70.240(l))
Existing Use	Does the mixing zone… (1) maintain and protect designated and existing uses of the waterbody as a whole? If yes, mixing zone may be approved as proposed or authorized with conditions.		18 AAC 70.240(c)(2)
	(2) impair overall biological integrity of the waterbody? If yes, mixing zone may be approved as proposed or authorized with conditions.		18 AAC 70.240(c)(3)
	(3) create a public health hazard that would preclude or limit existing uses of the waterbody for water supply or contact recreation? If yes, mixing zone may be approved as proposed or authorized with conditions.		18 AAC 70.240(c)(4)(B)
	(4) preclude or limit established processing activities or established commercial, sport, personal use, or subsistence fish and shellfish harvesting?		18 AAC 70.240(c)(4)(C)

	If yes, mixing zone may be approved as proposed or authorized with conditions.		
Human consumption	Does the mixing zone… (1) produce objectionable color, taste, or odor in aquatic resources harvested for human consumption? If yes, mixing zone may be approved as proposed or authorized with conditions.		18 AAC 70.240(d)(6)
Spawning Areas	Does the mixing zone… (1)discharge in a spawning area for anadromous fish or Arctic grayling, northern pike, rainbow trout, lake trout, brook trout, cutthroat trout, whitefish, sheefish, Arctic char (Dolly Varden), burbot, and landlocked coho, chinook, and sockeye salmon? If yes, mixing zone prohibited.		18 AAC 70.240(f)
Human Health	Does the mixing zone… (1) contain bioaccumulating, bioconcentrating, or persistent chemical above natural or significantly adverse levels? If yes, mixing zone may be approved as proposed or authorized with conditions.		18 AAC 70.240(d)(1)
	2) contain chemicals expected to present an unacceptable risk to human health from carcinogenic, mutagenic, teratogenic, or other effects as determined using risk assessment methods approved by the Department? If yes, mixing zone may be approved as proposed or authorized with conditions.		18 AAC 70.240(d)(2)
	(5) occur in a location where the department determines that a public health hazard reasonably could be expected? If yes, mixing zone may be approved as proposed or authorized with conditions.		18 AAC 70.240(k)(4)
Aquatic Life	Does the mixing zone… (1) result in a reduction in fish or shellfish population levels? If yes, mixing zone may be approved as proposed or authorized with conditions.		18 AAC 70.240(c)(4)(d)

	(2) form a barrier to migratory species or fish passage? If yes, mixing zone may be approved as proposed or authorized with conditions.		18 AAC 70.240(c)(4)(G)
	(3) result in undesirable or nuisance aquatic life? If yes, mixing zone may be approved as proposed or authorized with conditions.		18 AAC 70.240(d)(5)
	(4) result in permanent or irreparable displacement of indigenous organisms? If yes, mixing zone may be approved as proposed or authorized with conditions.		18 AAC 70.240(c)(4)(E)
	(5) result in a reduction in fish or shellfish population levels? If yes, mixing zone may be approved as proposed or authorized with conditions.		18 AAC 70.240(c)(4)(D)
	(6) prevent lethality to passing organisms; or exceed acute aquatic life criteria at and beyond the boundaries of a smaller initial mixing zone surrounding the outfall, the size of which shall be determined using methods approved by the Department? If yes, mixing zone may be approved as proposed or authorized with conditions.		18 AAC 70.240(d)(7) 18 AAC 70.240(d)(8)
	(7) cause a toxic effect in the water column, sediments, or biota outside the boundaries of the mixing zone? If yes, mixing zone may be approved as proposed or authorized with condition		18 AAC 70.240(c)(4)(A)
Endangered Species	Are there threatened or endangered species (T/E spp) at the location of the mixing zone? If yes, are there likely to be adverse effects to T/E spp based on comments received from the United States Fish and Wildlife Service or National Oceanic and Atmospheric Association? If yes, will conservation measures be included in the permit to avoid adverse effects?		18 AAC 70.240(c)(4)(F)