NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
PERMIT FACT SHEET
August 15, 2015

Permittee Name: Guam Waterworks Authority

Mailing Address: P.O. Box 3010
Hagatna, Guam 96910

Facility Location: Baza Gardens Sewage Treatment Plant
Baza Gardens Street
Talofofo, Guam 96915

Contact Person(s): Paul Kemp, Assistant General Manager
(671) 300 – 6885
Vangie Lujan, Senior Regulatory Analyst
(671) 300 – 6887

NPDES Permit No.: GU0020095

I. STATUS OF PERMIT

Guam Waterworks Authority (the "permittee") has applied for the renewal of its National Pollutant Discharge Elimination System ("NPDES") permit to authorize the discharge of treated effluent from the Baza Gardens Sewage Treatment Plant (the "facility" or "Baza Gardens STP") to the Togcha River. A completed application was submitted on April 10, 2014. The Environmental Protection Agency ("EPA") Region IX is reissuing this facility's permit pursuant to the Clean Water Act ("CWA") section 402. CWA section 402, and EPA's implementing regulations, contain provisions that govern EPA's authorization to require NPDES permit conditions. (40 CFR 122).

The permittee currently is discharging under NPDES permit GU0020095, which was issued on November 28, 2008. Pursuant to 40 CFR 122.21, the terms of the existing permit are administratively extended until the issuance of a new permit.

This permittee is classified as a minor discharger since its design flow is less than one million gallons per day ("mgd").

II. GENERAL DESCRIPTION OF FACILITY

The permittee operates a publicly owned treatment works ("POTW") or sewage treatment plant ("STP") serving the town of Talofofo and the Baza Gardens community. These communities have an approximate population of 3,070. The facility has a design flow of 0.60 mgd. The Baza Gardens STP was put into service in 1975. See Attachment A, "Location of Baza Gardens STP on Guam."

The facility provides secondary treatment of wastewater using an activated sludge package system. The STP uses a single process train, extended aeration activated sludge process, to meet

its design secondary treatment objective. Chlorination currently is not used at the facility. The treated effluent is discharged to the Togcha River through Outfall No. 001. See Attachment B, "Diagram of the Wastewater Treatment Process at Baza Gardens STP."

Biosolids are periodically pumped into a tanker truck and hauled to the Hagatna (Agana) STP or the Northern District STP for digestion and dewatering. Final dewatered cake disposal is at the Layon Landfill. See Attachment C, "Wastewater Flow Diagram for the Baza Gardens STP."

III. DESCRIPTION OF RECEIVING WATER

The facility discharges to the Togcha River through the Togcha River Exfiltration Trench at latitude 12º 22' 16" N and longitude 114º 44' 49" E. The previous factsheet explained that the trench consists of a limestone bed rock pit, layered with various sizes of limestone rock and clean crushed coral, and is approximately 60 feet from the banks of the Togcha River. The trench reduces the velocity of the effluent and diffuses the discharge into the receiving water (i.e. rock infiltrator). The Togcha River follows a two-mile course before flowing into the Pacific Ocean.

The Guam Environmental Protection Agency ("GEPA") adopted water quality standards ("WQS") for different surface waterbodies, depending on the level of protection required. The WQS, revised in 2001, provides water quality criteria by surface waterbody classification. The Togcha River is located within the area classified as Category S-3, low quality surface water(s). Category S-3 waters primarily are used for commercial, agricultural, and industrial activities. Aesthetic enjoyment and limited body contact recreation are acceptable in this zone, as well as maintenance of aquatic life. (GEPA 2001).

There are no known impairments for Togcha River. However, a downstream waterbody, Talofofa Bay (and neighboring beaches), is impaired for *Enterococci* bacteria. *Enterococci* bacteria are common indicators in marine environments, such as Talofofa Bay. (EPA 2014).

IV. DESCRIPTION OF DISCHARGE

The facility provides secondary treatment of wastewater using an activated sludge package treatment system. The wastewater influent enters the headworks and passes through an aerated grit chamber followed by a comminutor. If the flow exceeds the comminutor capacity, a channel equipped with a manually-cleaned bar rack allows de-gritted wastewater to bypass the comminutor. Once the wastewater enters the aeration section, it is aerated and mixed with return activated sludge. The mixed liquor from the aeration tank flows into the secondary clarifier and then into the chlorine contact tank. However, chlorination currently is not practiced at the STP. The activated sludge is stabilized in the aerobic digester before being pumped into a tanker truck and hauled to the Hagatna (Agana) STP or the Northern District STP. Final dewatered cake disposal is at the Layon Landfill. See Attachments B and C for a flow schematic and description of the wastewater treatment process at Baza Gardens STP.

Inspections in 2012 documented the treatment units in poor condition and as functioning improperly. Specifically, the inspectors observed corroded tanks walls, unfunctional gear boxes in the clarifier, and inefficient aeration. At the time of inspection, the facility was not configured

to remove nitrate or phosphorus and had no system in place for disinfection of the effluent (i.e. chlorination, UV treatment, etc.). With biosolid management, the inspectors recorded concentrations of the mixed liquor suspended solids ("MLSS") in the aeration tank below the target range. The inspectors also stated that the age of the mechanical components elevates the risk of major failures and makes it more difficult to secure replacement parts, as these are not readily in stock. These observations may explain why the facility exceeded its effluent limits for nutrients and bacteria.

The previous permit contained effluent limits for 11 parameters and monitoring requirements for an additional 5 parameters. Data provided from the application and DMRs are summarized in the subsequent sections, see sections "Application Discharge Data" and "Discharge Monitoring Report Data (2008-2013) below."

A. Application Discharge Data

As part of the application for permit renewal, the permittee provided data from an analysis of the facility's wastewater discharge. This data is presented in Table 1.

Table 1. Application Discharge Data from Permittee's Renewal Application.

Parameter	Units	Discharge Data	
		Max Daily	Average
Flow	mgd	1.16	0.10
pH	standard units	8.03 – 8.40 (min. – max.)	
Biochemical Oxygen Demand, 5-day (BOD_5)	mg/L	63.11	18.55
Total Suspended Solids (TSS)	mg/L	194.80	20.29
Temperature	°C	30.30	20.24
Fecal Coliform	cfu/100mL	241,966.00	173,085.00
Ammonia-N	mg/L	40.90	18.78
Total Residual Chlorine	mg/L	0.00(1)	0.00(1)
Dissolved Oxygen	mg/L	6.83(2)	5.40
Total Kjeldahl Nitrogen (TKN)	mg/L	53.20	21.11
Nitrate + Nitrite (as N)	mg/L	4.23	0.54
Oil and Grease	mg/L	(3)	(3)
Phosphorus (Total)	lbs/day	4.07	(3)
	mg/L	(3)	1.53
Total Dissolved Solids (TDS)	mg/L	0.00	(3)

(1) Facility does not disinfect and therefore, does not have chlorine in the discharge.

(2) The permittee corrected a typo on the permit application on 9/29/2014.

(3) Permit application left blank or data not provided.

B. Discharge Monitoring Report Data (2008-2013)

As reported in the Baza Gardens Wastewater System Evaluation, the sampled effluent, as recorded in the monthly DMRs, did not meet effluent limits at least once a month in 40 of the 60 month period [October 2008 to July 2013]. The most commonly exceeded parameters were *E. coli* (*Escherichia coli*) and nutrients (i.e. phosphorous and nitrogen). (Lekven and Constantinescu 2014).

EPA confirmed these exceedances by reviewing DMR data for the period of January 2009 to March 2014 (i.e. 63 months). Based on effluent monitoring data submitted by the facility during this 63-month timeframe, the permittee reported elevated concentrations of BOD, TSS, *E. coli*, fecal coliform, and nutrients (i.e. orthophosphate, nitrate-nitrogen, and ammonia-N). Table 2 (on the next page) provides a detail summary of effluent limitations and monitoring data during this timeframe.

Table 2. Discharge Monitoring Report Data for January 2009 to March 2014.

Parameter	Units	Previous (2008 – 2013) Permit Effluent Limitations			Discharge Monitoring Data (between 2009 – 2014)			Previous (2008 – 2013) Monitoring Req.	
		Average Monthly	Average Weekly	Maximum Daily	Highest Average Monthly	Highest Average Weekly	Highest Maximum Daily	Monitoring Frequency	Sample Type
Flow Rate	MGD	0.60	--	--	0.34	--	--	Continuous	Metered
pH	Std. Units	Between 6.5 – 8.5 at all time			6.5 – 7.9 (min – max)			Weekly	Discrete
Biochemical Oxygen Demand (5-day)	mg/L	30	45	--	34	50	--	Weekly	24-hr Composite
	lbs/day(1)	150	225	--	34	47	--		
	Percent Removal	Not less than 85% BOD_5 removal(2)			0.47 % (minimum)				
Total Suspended Solids	mg/L	30	45	--	28	95	--	Weekly	24-hr Composite
	lbs/day(1)	150	225	--	44	151	--		
	Percent Removal	Not less than 85% TSS removal(2)			0.70 % (minimum)				
E. coli	CFU/ 100 mL	The geometric mean shall not exceed 126.	--	406	1,413,600(7)	--	421,162(7)	Weekly	Discrete
Fecal Coliform	CFU/100 mL	200	400	--	1,413,768(7)	2,419,600(7)	--	Weekly	Discrete
Total Residual Chlorine(3)	µg/L	6.1(3)	--	12(3)	(3)	--	(3)	Weekly	Discrete
	lbs/day(1)	0.03(3)	--	0.06(3)	(3)	--	(3)		
Nitrate-Nitrogen (NO_4-N)	mg/L	0.41	--	0.82	3.32	--	4.58	Weekly	24-hr Composite
	lbs/day(1)	2.1	--	4.1	3.04	--	6.18		
Ammonia-Nitrogen (NH_3 + NH_4-N)	mg/L	0.65	--	1.31	31.31	--	32.8	Weekly	24-hr Composite
	lbs/day(1)	3.75	--	6.55	30.62	--	52.91		
Orthophosphate (PO_4-P)	mg/L	0.08	--	0.16	3.18	--	4.07	Weekly	24-hr Composite
	lbs/day(1)	0.41	--	0.82	3.23	--	6.00		
Oil and Grease	mg/L	10	--	15	Not reported	--	Not reported	Annually	Discrete
	lbs/day(1)	50	--	75	Not reported	--	Not reported		

Parameter	Units	Previous (2008 – 2013) Permit Effluent Limitations			Discharge Monitoring Data			Previous (2008 – 2013) Monitoring Req.	
		Average Monthly	Average Weekly	Maximum Daily	Highest Average Monthly	Highest Average Weekly	Highest Maximum Daily	Monitoring Frequency	Sample Type
Whole Effluent Toxicity	TU_C	1.0	--	1.6	0.0(7)	--	0.0(7)	Annually	24-hr Composite
Heavy Metals(4)	mg/L or ug/L	--	--	(5)	--	--	Not reported (8)	1x/Permit Term	24-hr Composite
Hardness ($CaCO_3$)	mg/L	--	--	(5)	--	--	Not reported (8)	Annually	24-hr Composite
Pesticides(6)	mg/L or ug/L	--	--	(5)	--	--	Not reported (8)	1x/Permit Term	24-hr Composite
Enterococci	CFU/100 mL	--	--	(5)	--	--	Not reported (8)	Weekly	Discrete

(1) Mass based limits calculated using 0.60 MGD design flow.

(2) Both the influent and the effluent shall be monitored. The arithmetic mean of the BOD and TSS values, by concentration, for effluent samples collected over a calendar month shall not exceed 15 percent of the arithmetic mean, by concentration, for influent samples collected at approximately the same times during the same period. The 30-day average percent removal shall not be less than 85 percent (i.e. $\geq$ 85% BOD_5 removal and $\geq$ 85 % TSS removal).

(3) Total residual chlorine effluent limitation and effluent monitoring requirement were effective upon implementation of a disinfection system using chlorination. The permittee was required to notify EPA and Guam EPA at least 30 day prior to operation of a disinfection system. Currently, no chlorination occurs at the facility, and monitoring was not required.

(4) Heavy metals mean: As, Cd, Cr3+, Cr6+, Cu, Hg, Pb, Ni, Ag, and Zn; both total recoverable and dissolved metal concentrations shall be reported; monitoring of heavy metals is part of the Priority Toxic Pollutants Scan required to be conducted on the fourth year of the permit term.

(5) Monitoring only. No effluent limits in the previous permit.

(6) For a listing of all pesticides (i.e. organochlorines, organophosphates, carbamates, herbicides, fungicides, defoliants, and botanicals) *see* EPA Water Quality Criteria Blue Book; monitoring of pesticides is part of the Priority Toxic Pollutants Scan required to be conducted on the fourth year of the permit term.

(7) 7-day chronic toxicity static renewal test completed once during permit term (2012) with *Ceriodaphnia dubia*. The permittee did not report toxicity for the other years during the permit term.

(8) Although monitoring was required, the permittee did not report any values.

V. SIGNIFICANT CHANGES FROM PREVIOUS PERMIT TERM (2008 – 2013)

EPA is establishing an ammonia impact ratio ("AIR") as the ammonia effluent limit. The permittee must monitor and report ammonia concentrations in addition to the AIR. The permittee is required to monitor quarterly. The AIR is calculated as the ratio of the ammonia concentration in the effluent to Guam's ammonia water quality criteria specified section C.3, "Nutrients." Using AIR is an accurate way to interpret GEPA's WQS. The previous permit contained a specific, fixed value for concentration and mass-based ammonia effluent limits.

EPA is removing mass-based effluent limits for all pollutants except BOD_5 and TSS. Because of the facility's low flows, mass-based limits are not needed as the permittee can't dilute its effluent in order to meet the concentration-based limits. The concentration-based effluent limits will ensure treatment efficiency during low-flow periods and require proper operation of the treatment units at all times. Also, the concentration-based limits are consistent with the units expressed by the water quality standards criteria (i.e. concentration-based (mg/L)). EPA is establishing a flow limit in absence of the pollutant mass-based limits.

EPA is establishing an *Enterococci* effluent limit because of downstream impairments. Because of establishing *Enterococci*, EPA is removing the *E. coli* and fecal coliform limits that would have been effective upon operation of a disinfection system.[1] EPA also clarifies in the permit that the *Enterococci* effluent limit is effective immediately in order to protect water quality.

EPA is requiring the recently developed Test of Significant Toxicity ("TST") statistical approach in assessing whole effluent toxicity ("WET"). The previous permit required WET testing with the traditional hypothesis testing approach outlined in EPA's TSD. (EPA 1991).

EPA is establishing effluent monitoring requirements temperature and dissolved oxygen. Monitoring for temperature and dissolved oxygen will characterize the effluent and can be used in assessing compliance with narrative water quality criteria compliance for temperature and dissolved oxygen.

EPA is removing in-stream monitoring requirements for the receiving water, Togcha River, because the STP will be decommissioned during this permit term.

EPA is requiring that the permittee be required to report monitoring and sampling data electronically after 6 months of the effective date of the permit.

EPA is retaining the remaining conditions of the previous permit. However, certain permit conditions from the last permit term were not met, and therefore, the permittee must submit, update, or develop the following:

- Priority pollutant scan and oil and grease monitoring results;

[1] EPA notes that the previous permit did not clearly express that the fecal coliform limit would be effective upon implementation of a disinfection system as it was only discussed in the previous factsheet and not in the permit.

- Laboratory documents [submitted with the permittee's DMR, as required by permit section III.C.7.b, "Reporting of Toxicity Monitoring Results for Chronic Toxicity"];[2]
- Biosolids annual report to both EPA Region IX Biosolids Coordinator and GEPA by the deadlines specified in the permit;
- Updated, if applicable, the quality assurance manual as required by permit section I.D.4, "General Monitoring and Reporting;" and
- Updated, if applicable, the one or two-page Toxics Reduction Evaluation ("TRE") Workplan for chronic toxicity testing.

VI. DETERMINATION OF NUMERICAL EFFLUENT LIMITATIONS

EPA developed effluent limitations and monitoring requirements in the permit based on an evaluation of the technology used to treat the pollutant (e.g., "technology-based effluent limits") and the water quality standards applicable to the receiving water (e.g., "water quality-based effluent limits"). EPA established, in the permit, the most stringent of the applicable technology-based or water quality-based standards, as described below.

A. Applicable Technology-Based Effluent Limitations

EPA developed technology-based treatment standards for municipal wastewater treatment plants in accordance with Section 301(b)(1)(B) of the Clean Water Act. The minimum levels of effluent quality attainable by secondary treatment for BOD_5, TSS, and pH, as defined in 40 CFR 133.102, are below. Mass limits, as required by 40 CFR 122.45(f), are included for BOD_5 and TSS in the permit.

BOD_5

Concentration-based Limits
30-day average – 30 mg/L
7-day average – 45 mg/L
Removal Efficiency – minimum of 85%

Mass-based Limits
30-day average – (30 mg/L)(0.60 MGD)(8.345 conversion factor) = 150 lbs/day
7-day average – (45 mg/L)(0.60 MGD)(8.345 conversion factor) = 225 lbs/day

TSS

Concentration-based Limits
30-day average – 30 mg/L
7-day average – 45 mg/L
Removal efficiency – Minimum of 85%

Mass-based Limits

[2] The permittee is required to maintain records of monitoring information that includes but not limited to a summary of the results produced by the laboratory and any comments. However, these records do not need to be submitted to EPA in the permittee's DMR forms, except for WET testing results.

30-day average – (30 mg/L)(0.60 MGD)(8.345 conversion factor) = 150 lbs/day
7-day average – (45 mg/L)(0.60 MGD)(8.345 conversion factor) = 225 lbs/day

pH

Instantaneous Measurement: 6.0 – 9.0 standard units (S.U.)

The effluent limits for BOD_5 and TSS, as stated above, are retained in the permit. EPA is retaining the more protective water-quality based effluent limit for pH, in the permit, due to anti-backsliding provisions. See section VI. C, "Rationale for Numeric Effluent Limits and Monitoring" of this factsheet for further discussion.

B. Water Quality-Based Effluent Limitations

Water quality-based effluent limitations are required in NPDES permits when the permitting authority determines a discharge causes, has the reasonable potential to cause, or contributes to an excursion above any water quality standard. (40 CFR 122.44(d)(1)).

When determining whether an effluent discharge causes, has the reasonable potential to cause, or contributes to an excursion above narrative or numeric criteria, the permitting authority shall use procedures that account for existing controls on point and non-point sources of pollution, the variability of the pollutant or pollutant parameter in the effluent, the sensitivity of the species to toxicity testing (when evaluating whole effluent toxicity) and where appropriate, the dilution of the effluent in the receiving water (40 CFR 122.44(d)(1)(ii)).

EPA evaluated the reasonable potential to discharge toxic pollutants according to guidance provided in the *TSD* (EPA 1991) and the *NPDES Permit Writers Manual* (EPA 2010). These factors are listed below and subsequently discussed:

1. Applicable standards, designated uses, and impairments of receiving water
2. Dilution in the receiving water
3. Type of industry
4. History of compliance problems
5. Reasonable Potential Analysis (using data from previous permit term 2008 to 2013)

1. Applicable Standards, Designated Uses, and Impairments of Receiving Water

To protect the designated uses of waters of the U.S., GEPA adopted water quality standards for waterbodies depending on the level of protection required. The Togcha River is considered a category S-3, low quality surface water. (GEPA 2001). The WQS identify the protected uses for category S-3 surface waters to include the following:

- aesthetic enjoyment;
- commercial, agricultural, and industrial activities;
- limited body-contact recreation; and
- maintenance of aquatic life.

The Togcha River is not listed as impaired according to the CWA Section 303(d) list of water quality limited segments. However, a downstream waterbody, Talofofa Bay (and neighboring beaches), is impaired for *Enterococci* bacteria. *Enterococci* bacteria are common indicators in marine environments where *E. coli* bacteria are common indicators in freshwater environments. (EPA 2014).

2. Dilution in the Receiving Water

Discharges from Outfall 001 are to the Togcha River, and the permittee has not requested a mixing zone. Dilution is not allowed and therefore, not considered by EPA in the development of water quality-based effluent limits applicable to the discharge. All effluent limits will apply at the outfall.

3. Type of Industry

Typical pollutants of concern in untreated and treated domestic wastewater include ammonia-N, nitrate-N, oxygen demand, pathogens, temperature, pH, oil and grease, and solids. Turbidity may be of concern due to treatment plant operations.

4. History of Compliance Problems

Guam Waterworks Authority has been working on compliance at all its POTWs, including Baza Gardens STP. Pursuant to a court order dated November 10, 2011, GWA is required to complete an evaluation of the Baza Gardens STP facility and submit a plan by April 30, 2014 that identifies improvements needed to achieve compliance with the facility's NPDES permit. (See http://www.epa.gov/region9/water/npdes/pdf/guam/gwa/gwa-order-for-prelim-relief2011.pdf). EPA received this evaluation report, Baza Gardens Wastewater System Evaluation, and is currently reviewing it.

In the evaluation report, the contractor discusses the following options for bringing the facility into compliance: ocean discharge, soil aquifer treatment, subsurface disposal, water recycling, irrigation reuse/disposal, and transfer to another STP. As stated in the report, continued surface water discharges to Togcha River or evaporation are not viable options for the facility [long term]. The contractor recommends that Baza Gardens STP design and construct a transfer network to the Agat-Santa Rita STP. However, facility improvements at Baza Gardens STP will be necessary under this scenario and include upgrading the head works and constructing an equalization tank. (Lekven and Constantinescu 2014). Regardless of the option chosen, the permittee is required by the court order to complete facility improvements and adequately stabilize and dewater the facility's biosolids by April 30, 2018.

5. Reasonable Potential Analysis using Existing Data from Previous Permit Term (2008 to 2013)

For pollutants with effluent data available, EPA conducted a reasonable potential analysis based on statistical procedures outlined in the *TSD* (EPA 1991). These statistical procedures calculate the projected maximum effluent concentration based on available monitoring data to account for effluent variability and a limited data set. EPA estimated the projected maximum effluent concentrations assuming a coefficient of variation of 0.6 and a 95 % confidence interval

(EPA 1991). EPA calculated the projected maximum effluent concentration for each pollutant using the following equation:

Projected maximum concentration = C_e × *reasonable potential multiplier factor.*

Where, "C_e" is the reported maximum effluent value, and the multiplier factor is obtained from Table 3-1 of the *TSD*. (EPA 1991).

Table 3. Reasonable Potential Statistical Analysis using Data from Previous Permit Term (2008 to 2013)

Parameter(1)	**Maximum Observed Concentration**	***n***	**RP Multiplier(2)**	**Projected Maximum Effluent Concentration**	**Most Stringent Water Quality Criterion**	**Statistical Reasonable Potential?**
E. Coli	1,413,600 CFU/100 mL	> 20	1.4	1,979,040 CFU/100 mL	126 CFU/100 mL	Yes.
Nitrate-Nitrogen (NO_3-N)	4.58 mg/L	> 20	1.4	6.41 mg/L	0.50 mg/L	Yes.
Ammonia-Nitrogen (NH_3 + NH_4-N)	32.8 mg/L(3)	> 20	1.4	45.92 mg/L	1.46 mg/L(3)	Yes.
Orthophosphate (PO_4-P)	4.07 mg/L	> 20	1.4	5.70 mg/L	0.10 mg/L	Yes.

(1) Only parameters with Maximum Observed Concentration >0 were included in the RP analysis.

(2) RP multiplier is based on 95 % probability using (n) and the coefficient of variation (CV). Because of data variability, EPA used a CV of 0.6 for all parameters.

(3) The permittee provided a higher ammonia-N concentration on the application form (than reported on the DMR form). These values represent the highest reported value reported on the DMR form.

(4) The ammonia water quality criterion was determined by using the highest reported pH (7.9 S.U). The WQS provides a sample table for acute and chronic ammonia criteria. The acute and chronic criteria at a pH of 7.9 are 1.46 and 10.14 mg N/L, respectively. The RP analysis uses the acute criteria (1.46 mg N/L) in order to be conservative. However, the reported value exceeds both the acute and chronic criteria. See additional rational below and attachment E for ammonia-N.

In addition to using the TSD approach, the exceedances of the previous permit limits for each to these pollutants indicate the facility may cause or contribute to an excursion above GEPA's water quality standards.[3] The permittee should have monitored weekly for *Enterococci* and annually for oil and grease. Because data was not submitted for these parameters, the reasonable potential analysis is indeterminate. The permittee did not submit a priority pollutant scan and hardness values. The permittee also only submitted one WET results, indicating no chronic toxicity. The permittee was required to submit annual WET results.

[3]EPA Region IX finds that the permittee has a reasonable potential to exceed the receiving water quality standards for the Togcha River because it cannot be demonstrated with a high confidence level that the upper bound of the lognormal distribution of effluent concentration is below the receiving water criteria.

C. Rationale for Numeric Effluent Limits and Monitoring

EPA evaluated the typical pollutants expected to be present in the effluent and selected the most stringent of applicable technology-based or water quality-based effluent limitations. Where effluent concentrations of toxic parameters are unknown or are not reasonably expected to be discharged in concentration that have the reasonable potential to cause or contribute to water quality violations, EPA may establish monitoring requirements in the permit. Where monitoring is required, data will be re-evaluated, and the permit may be re-opened to incorporate effluent limitations as necessary. EPA's rationale for each effluent limit in the permit is below.

- ***Flow:*** EPA is establishing a flow effluent limit consistent with the design capacity of the facility. This flow limit is used in all mass-based concentration effluent limit calculations (i.e. BOD_5 and TSS).

- ***Temperature***: EPA is requiring weekly monitoring. Because EPA is requiring temperature monitoring in the permit, EPA is remove receiving water temperature monitoring. The permittee reported 20.24°C for an average monthly temperature and 30.30°C for daily maximum.

- ***pH*:** Technology-based standards for POTWs require pH effluent limits between 6.0 and 9.0 S.U. The secondary treatment standards in GEPA WQS also require effluent values for pH to range from 6.0 to 9.0. However, the previous permit contained pH limits between 6.5 to 8.5 S.U. Based on effluent monitoring data, pH values ranged from 6.5 to 7.9 S.U. GEPA WQS for S-3 waters for pH is 6.5 to 9.0. EPA therefore finds that there is reasonable potential for the discharge to exceed the WQS and is retaining the previous limits. Retaining the pH effluent limit is also consistent with anti-backsliding provisions. The pH of the effluent shall be between 6.5 to 8.5 S.U.

- ***BOD_5 and TSS:*** The BOD_5 and TSS technology-based limits are described above, and the permit contains these limits. Under 40 CFR Section 122.45(f), mass limits are required for BOD_5 and TSS. Based on the design flow of 0.60 MGD, the mass-based limits are retained in the permit.

  Section 5104 of GEPA's WQS provides secondary treatment requirements that describe the minimum level of effluent quality to be attained when secondary treatment is required for BOD_5 and TSS. The WQS specify concentration-based effluent limits that are the same as the technology-based concentration limits.

- ***Enterococci:*** The previous permit required monitoring, but the permittee did not submit any data. However, because the facility does not disinfect, bacteria levels in the effluent are higher than GEPA's WQS criteria. With high reported levels of *E. coli* and fecal coliform, *Enterococci* values are likely to exceed GEPA's WQS. The WQS lists *Enterococci* and *E. coli* as its primary indicators for microbiological quality in marine and freshwater, respectively. Because downstream stream waters and beaches are impaired for *Enterococci*, EPA is establishing an *Enterococci* effluent limit as opposed to

only monitoring requirements. To protect the beneficial uses of S-3 category waters, EPA is establishing effluent limits based directly on the water quality standards (i.e. concentrations of *Enterococci* shall be no greater than 33 CFU/100 mL based upon the geometric mean of 5 sequential samples taken over a 30 day period, nor shall any instantaneous reading exceed 108 CFU/100 mL).

- ***Fecal coliform and E. coli:*** EPA is removing fecal coliform and *E. coli* effluent limits that would be effective upon operation of a disinfection system. EPA notes that the previous permit did not clearly express that the fecal coliform limit would be effective only upon implementation of a disinfection system (as it was only discussed in the previous factsheet). Fecal coliform, *E. coli*, and *Enterococci* are used as indicators to estimate the presence of pathogens. The previous permit established effluent limits for *E. coli* and fecal coliform with monitoring requirements for *Enterococci*. In the previous permit, the fecal coliform effluent limits would apply upon operation of a disinfection system. Because of the potential to exceed GEPA WQS, the effluent limits for *Enterococci* shall be effective immediately upon issuance of the final permit.

  Removing effluent limits for fecal coliform and *E. coli* is consistent with GEPA's WQS because the secondary treatment requirements allow for the appropriate GEPA microbiological indicator (such as *E. coli* and/or *Enterococci*) and/or fecal coliform values. EPA is establishing effluent limits for *Enterococci*.

- ***Total Residual Chlorine:*** The total residual chlorine effluent limit and monitoring requirement in the previous permit was effective upon implementation of a disinfection system using chlorination. The permittee was required to notify EPA and GEPA at least 30 days prior to operation of a disinfection system. Currently, the facility does not have the infrastructure necessary to disinfect its wastewater. Therefore, the discharge does not have reasonable potential to exceed water quality standards for chlorine.

  Once the facility does begin to disinfect, the permittee will be required to meet applicable chlorine criteria in GEPA WQS. As such EPA is retaining the total residual chlorine effluent limits in the permit effective upon initiation of disinfection. EPA also requires only concentration-based effluent limits effective upon initiation of disinfection is removing mass-based effluent limits. See Attachment F for effluent limit calculations that will be effective upon disinfection.

- ***Dissolved oxygen***: Monthly dissolved oxygen monitoring is required. Because EPA is requiring DO monitoring in the permit, EPA is remove receiving water DO monitoring. The permittee provided on the permit application that the maximum daily dissolved oxygen was 16.83 mg/L and 5.40 mg/L for an average monthly value. However, the permittee later corrected the maximum daily dissolved oxygen value to 6.83 mg/L.

- ***Nitrate-N*****:** There is reasonable potential to impact the waterbody due to the high concentrations of nitrate-N reported in the facility's DMRs. EPA calculated concentration-based WQBELs of 0.82 mg/L and 0.41 mg/L for nitrate-nitrogen, as the maximum daily limit and the average monthly limit respectively. EPA is removing the mass-based maximum daily limit ("MDL") and average monthly limit (AML") of 4.1 and

2.1 lbs/day, respectively, which were in the previous permit. Mass-based effluent limits for nutrients are unnecessary due to the flow limit. Quarterly monitoring for nitrate-N (and all other nutrients) is required; however, the permittee may sample more frequently for nitrate-N in order to ensure compliance. The permittee should report any additional sampling results on the DMR. See Attachment F for effluent limit calculations.

- ***Ammonia-N***: There is reasonable potential to impact the waterbody due to the high concentrations of ammonia-N reported in the facility's DMRs. EPA is establishing an ammonia-N effluent limit using the ammonia impact ratio ("AIR") and quarterly monitoring and reporting requirements for ammonia concentrations in the effluent. The permittee may sample more frequently for ammonia in order to ensure compliance. The permittee should report any additional sampling results on the DMR.

  The AIR is calculated as the ratio of the ammonia value in the effluent and the applicable ammonia standard. The GEPA WQS contain ammonia criteria which are pH-dependent. Therefore, pH and ammonia sampling must be concurrent. EPA is using the water quality criterion from the chronic tables in section 5103(C)(3), "Nutrients," because the chronic criterion is more protective of water quality. See Attachment E for a sample log to help calculate and record the AIR values and attachment F for calculations for the chronic criterion.

  An AIR value of one (1.0) is the enforceable effluent limit. The permittee also must monitor and report ammonia effluent values in addition to the AIR value. AIR provides more flexibility than a specific, fixed effluent concentration and is protective of water quality standards since the value (1.0) is set at the water quality standard. If the reported value exceeds 1.0, then the effluent ammonia-N concentration exceeded the ammonia water quality criterion. With an AIR value exceeding 1.0, the permittee would be in violation of the permit.

  The permittee is required to report a maximum daily and average monthly ammonia (as N) concentration in addition to an average monthly AIR. These values may be the same if the permittee only collects one sample per quarter. The permittee may sample more frequently for ammonia in order to ensure compliance.

- ***Orthophosphate***: There is statistical reasonable potential to impact the waterbody, and the effluent limits are retained in the permit. Section 5103(C)(3)(a) of the WQS provide that orthophosphate shall not exceed 0.10 mg/L (as P) in S-3 waters. EPA calculated WQBELs of 0.16 and 0.08 mg/L, as the MDL and AML, respectively.

  EPA is removing the mass-based MDL and AML of 0.82 and 0.41 lbs/day, respectively that were in the previous permit. Mass-based effluent limits for orthophosphate are unnecessary due to the flow limit. See Attachment F for effluent limit calculations.

- ***Oil and Grease***: EPA considers oil and grease to be a conventional pollutant pursuant to 304(a)(4) of the CWA and 40 CFR 401.16. The GEPA WQS indicates that waters shall not contain detectable as a visible film, or sheen of oil or petroleum. The permittee did not report oil and grease effluent data, and therefore, reasonable potential is indeterminate. Because of lack of data and anti-backsliding considerations, EPA is

retaining the effluent limitations of 15 mg/L maximum daily and 10 mg/L average monthly limit from the previous permit.

The effluent limits are EPA's interpretation of the narrative standard. Similar domestic wastewater treatment facilities have shown that a maximum daily limit of 15 mg/L and an average monthly limit of 10 mg/L can be easily achieved. Therefore, EPA retains effluent limits for oil and grease based on best professional judgment ("BPJ"), since there are no applicable guidelines and performance standards for oil and grease, no numeric values in GEPA's standards, and the existing permit limit is consistent with other POTW limits. In addition to these effluent limits, the narrative water quality-based limits for oil and grease, such as prohibiting visible sheen, are retained in the permit.

- ***Whole-Effluent Toxicity*:** WET testing is intended to demonstrate that the discharge is not toxic and prompt a response if toxicity is present. WET testing generally is required of all first-time permittees, and as needed thereafter. The permittee did not complete all required WET tests. Therefore, EPA is retaining the WET effluent limit. However, EPA is reducing the monitoring frequency, and the permit contains a one-time monitoring requirement (i.e. once per permit term, taken in the four year).

  The WET testing is required in the permit to implement the narrative toxic standards. The permit includes new WET requirements based on EPA's 2010 Test of Significant Toxicity. The new method is based on comparing the mean response of the test organism in the control and at the instream waste concentration ("IWC"). The permit trigger in the permit is a "Fail" at 100 percent effluent, since no dilution is allowed. Depending on the WET test results, the permit also requires certain follow-up actions, such as additional WET tests and a toxicity reduction evaluation to identify and correct the cause of any observed toxicity, as indicated by a "Fail" result.

- ***Metals and pesticides:*** The permittee did not submit any data this permit term. However, the previous factsheet said, "Analytical data on heavy metals and pesticides submitted in 2007 indicated all analytes tested were below detection limits and therefore, were considered to have no reasonable potential to exceed water quality standards, except for chromium. Chromium also was found to have no reasonable potential for violating Guam water quality standards when assessed using statistical procedures consistent with the TSD (the reported value for chromium was 1.4 ug/L; when assessed using the default coefficient of variation of 0.6 and a sample size of 1, a reasonable potential multiplying factor of 6.2 yields a projected receiving water concentration of 8.7 ug/L, which is below the most stringent standard for hexavalent chromium of 11 ug/L)." EPA is not establishing effluent limits for metals or pesticides but will continue to require a priority pollutant scan in the fourth year of the permit term. This data must be submitted as part of the priority pollutant scan with the next permit application.

D. Anti-Backsliding

Section 402(o) of the CWA prohibits the renewal or reissuance of an NPDES permit that contains effluent limits less stringent than those required in the previous permit, except as provided in the statute. Federal regulations, 40 CFR 122.44(l)(1), allow for backsliding in cases

where limits were not previously established appropriately or where new information is available to support a separate limit derivation.

The permit retains all applicable technology-based effluent limits. However, EPA establishes the ammonia and WET limit using a different methodology (i.e. TST approach and ammonia impact ratio). EPA also is requiring an ammonia impact ratio as opposed to a specific fixed value. EPA has used updated information to assure ammonia and WET effluent limitations are consistent with the intent of GEPA's WQS.

EPA is removing the fecal coliform and *E. coli* effluent limit and to establish *Enterococci* effluent limits because of downstream water quality impairments for *Enterococci*. The limits in the previous permit only applied if the permittee operated a disinfection system. Currently, the Baza STP does not have such a system in place. The GEPA WQS allow for *E. coli* and/or *Enterococci* to be used as indicators in microbiological analyses. If these indicators were not required, then EPA would need to retain fecal coliform limits. However, the permit contains new effluent limits for *Enterococci* that are based directly on the water quality criteria. Therefore, fecal coliform and *E. coli* effluent limits are not needed and are removed in the permit.

The permit removes mass-based limits for most pollutants (i.e. mass-based effluent limits for total residual chlorine (which was effective upon use of a disinfection system), orthophosphate, nitrate-N, ammonia-N, and oil and grease). Mass limitations are not needed when applicable standards and limitations are expressed in terms of other units of measurements, such as mg/L. In addition to retaining the concentration-based limits for these parameters, establishing a flow limit ensures equal stringency for these parameters. However, EPA is retaining the mass-based effluent limits for BOD_5 and TSS, pursuant to 40 CFR 122.45(f).

E. Antidegradation Policy

EPA's antidegradation policy at 40 CFR 131.12 and the GEPA WQS at Section 5101.B. specify existing water uses and the level of water quality necessary to protect these uses.

The permit contains effluent limits and monitoring requirements to ensure that all applicable water quality standards are met. The permit does not include a mixing zone, and therefore, all effluent limits will apply at the end-of-pipe without consideration of dilution in the receiving water. The permit also contains flow effluent limits that do not increase or decrease the volume of the discharge. Effluent limits *Enterococci* will ensure downstream waterbodies are not further impaired for bacteria.

In addition to permit requirements, EPA has an Administrative Order on Consent ("AOC") with the permittee. The AOC includes milestone deadlines for specific actions which both parties believe will help bring the facility into compliance with the Clean Water Act. The final deadline for full compliance is April 30, 2018. Due to these factors, EPA expects the quality of the effluent will match or exceed the current water quality and will have no negative, or *de minimis* negative effect, on the receiving waterbody.

VII. NARRATIVE WATER QUALITY-BASED EFFLUENT LIMITS

The GEPA WQS, Section 5103, contains narrative water quality standards applicable to the receiving water. EPA is retaining the narrative effluent limits in order to implement these water quality standards.

VIII. MONITORING AND REPORTING REQUIREMENTS

The permit requires the permittee to conduct monitoring for all pollutants or parameters with effluent limits, at the minimum frequency specified. Where effluent concentrations of toxic parameters are unknown or where data are insufficient to determine reasonable potential, monitoring may be required for pollutants or parameters where effluent limits have not been established by EPA. This data may be re-evaluated, and the permit re-opened to incorporate effluent limitations, if necessary.

A. Monitoring and Reporting for Effluent Limits

The permittee will be required to conduct effluent monitoring to evaluate compliance with the permit conditions. The permittee shall perform all monitoring, sampling, and analyses in accordance with the methods described in the most recent edition of 40 CFR 136, unless otherwise specified in the permit. All monitoring data shall be reported on monthly DMR forms and submitted quarterly as specified in the permit.

EPA is changing the frequency of bacteria, nutrient, hardness, and WET monitoring. Bacteria monitoring will occur monthly, nutrient monitoring quarterly, and WET and hardness monitoring occur once per permit term, taken in the fourth year of permit coverage. The sample results from the WET and priority pollutant scan will inform the development of the next permit requirements. EPA is retaining the monitoring frequency for all other parameters – continuous for flow, weekly for the other conventional pollutants, once per permit term for priority pollutant scan monitoring.

Composite samples are required for BOD_5, TSS, WET, and for the priority pollutant scan in the permit. If the discharge is less than 24 hours, composite samples shall be taken at regular intervals for the duration of the discharge. Discrete, or grab, samples are required for pH, bacteria, total residual chlorine (as appropriate), nutrients, and oil and grease, in the permit. (40 CFR 136). Discrete samples are appropriate when a sample is needed to monitor a noncontinuous discharge and allow collection of a variable sample volume. Continuous metered monitoring of flow rate is retained in the permit.

B. Whole Effluent Toxicity Testing

The permit retains the WET test requirement and a trigger for increased monitoring if the test does not reject the null hypothesis. Chronic toxicity testing evaluates reduced growth/reproduction at 100 percent effluent concentration, since no dilution is allowed. The presence of chronic toxicity shall be determined as specified by the methods in the 40 CFR Part 136 as amended on November 19, 2002. The permittee shall conduct static renewal toxicity tests with the fathead minnow, *Pimephales promelas* (Larval Survival and Growth Test Method 1000.0); the daphnid, *Ceriodaphnia dubia* (Survival and Reproduction Test Method 1002.01); and the green alga, *Selenastrum capricornutum* (also named *Raphidocelis subcapitata*) (Growth Test Method 1003.0).

C. Priority Pollutant Scan

A priority toxic pollutants scan shall be conducted during the fourth year of the five-year permit term to ensure that the discharge does not contain toxic pollutants in concentrations that may cause a violation of water quality standards.

The permittee shall perform all effluent sampling and analyses for the priority pollutants scan in accordance with the methods described in the most recent edition of 40 CFR 136, unless otherwise specified in the permit or by EPA. 40 CFR 131.36 provides a complete list of Priority Toxic Pollutants.

IX. SPECIAL CONDITIONS

A. Biosolids

Standard requirements for the monitoring, reporting, recordkeeping, and handling of biosolids, in accordance with 40 CFR Part 503, are contained in the permit. Part 503 regulations are self-implementing, which means that the facilities must comply with them whether or not a permit has been issued.

B. Development and Implementation of Best Management Practices

Pursuant to 40 CFR 122.44(k)(4), EPA may impose Best Management Practices ("BMPs") which are "reasonably necessary…to carry out the purposes of the Act." The permittee shall develop and implement BMPs designed to control site runoff, spillage or leaks, sludge or waste disposal, and drainage from collection system, storage/supply, and treatment/operational/process areas that may contribute pollutants to surface waters within 90 days from the effective date of this permit (section 304(e) of the CWA and 40 CFR 122.44(k)). BMPs shall include but are not limited to those necessary to control oil and grease and bacteria. Through the implementation of BMPs described in a BMP Plan, the permittee shall prevent or minimize the generation and discharge of wastes and pollutants from the facility to waters of the U.S. The BMP plan shall be located at the facility and be made available upon request by EPA and/or GEPA.

C. Development of an Initial Investigation Toxics Reduction Evaluation Workplan for Whole Effluent Toxicity

The permit requires the permittee to develop and implement a TRE Workplan. The Workplan would be followed if the effluent sample "fails" the toxicity test. Within 90 days of the permit effective date, the permittee shall prepare and submit an updated copy, if applicable, of its Initial Investigation TRE Workplan (1-2 pages) for chronic toxicity to EPA for review.

This plan shall include steps the permittee intends to follow if toxicity is measured above a chronic WET permit limit or trigger and should include, at minimum:

- A description of the investigation and evaluation techniques that would be used to identify potential causes and sources of toxicity, effluent variability, and treatment system efficiency.

- A description of methods for maximizing in-house treatment system efficiency, good housekeeping practices, and a list of all chemicals used in operations at the facility.
- If a Toxicity Identification Evaluation (TIE) is necessary, an indication of who would conduct the TIEs (i.e., an in-house expert or outside contractor).

X. OTHER CONSIDERATIONS UNDER FEDERAL LAW

A. Impact to Threatened and Endangered Species

Section 7 of the Endangered Species Act of 1973 (16 U.S.C. § 1536) requires federal agencies to ensure that any action authorized, funded, or carried out by the federal agency does not jeopardize the continued existence of a listed or candidate species, or result in the destruction or adverse modification of its habitat. Since the issuance of NPDES permits by the EPA is a federal action, consideration of the permitted discharge and its effect on any listed or candidate species or their critical habitat is appropriate.

To determine whether the discharge would affect any endangered or threatened species, EPA reviewed a list of species with habitats or known populations in Guam. (US FWS 2011). A discussion of each of these species is below.

Table 5. Listed species, designated under the U.S. Endangered Species Act for Guam (as of 4/9/2015).

Type	Common Name	Scientific Name	Status	Critical Habitat Designated
National Marine Fisheries Service				
Fish	Scalloped hammerhead shark, Indo-West Pacific	*Sphyrna lewini*	Threatened (T)	
Mammals	Blue whale	*Balaenoptera musculus*	Endangered (E)	
	Fin whale	*Balaenoptera physalus*	E	
	Sperm whale	*Physeter catodon*	E	
	Humpback whale	*Megaptera novaeangliae*	E	
	Dugong[2]	*Dugong dugon*	E	
	Sei Whale	*Balaenoptera borealis*	E	
Sea Turtles[2]	Olive ridley sea turtle	*Lepidochelys olivacea*	T	
	Leatherback turtle	*Dermochelys coriacea*	E	
	Green Sea turtle	*Chelonia mydas (incl. agassizi)*	T	
	Loggerhead turtle, North Pacific	*Caretta caretta*	T	
	Hawksbill turtle	*Eretmochelys imbricate*	E	
Corals		*Seriatopora aculeata*	T	
		Acropora globiceps	T	
		Acropora retusa	T	
U.S. Fish and Wildlife Service Species Associated with Ocean Habitats				
Mammals	Little Mariana Fruit Bat	*Pteropus tokudae*	E	Guam

	Mariana Fruit Bat	*Pteropus mariannus mariannus*	T	Guam
Birds	Mariana Swiftlift	*Aerodramus bartschi*	E	
	Mariana Crow	*Corvus kubaryi*	E	Guam
	Mariana Common Moorhen	*Gallinula chloropus guami*	E	
	Guam Micronesian Kingfisher	*Halcyon cinnamominus cinnammominus*	E	Guam
	Micronesian Megapode	*Megapodius laperouse*	E	
	Guam Rail	*Rallus owstoni*	E	
	Guam Bridled White-eye	*Zosterops conspicillatus conspicillatus*	E	
Plants	Hayun lagu	*Serianthes nelsonii*	E	

Source: NOAA 2015 and US FWS Environmental Conservation Online System.
[1] Critical habitat is defined as: (1) specific areas within the geographical area occupied by the species at the time of listing, if they contain physical or biological features essential to conservation, and those features may require special management considerations or protection; and (2) specific areas outside the geographical area occupied by the species if the agency determines that the area itself is essential for conservation.
[2] The species is also under the jurisdiction of the U.S. FWS.

Fish: Scalloped Hammerhead Shark (Indo-West Pacific DPS)

The scalloped hammerhead shark is found worldwide, residing in coastal warm temperature and tropical seas. Scalloped hammerhead sharks are highly mobile and partly migratory and are likely the most abundant of the hammerhead species. In the Indo-West Pacific DPS, overutilization by industrial/commercial and artisanal fisheries, as well as IUU fishing and the high at-vessel mortality of the sharks were ranked as high risks, with habitat degradation, inadequacy of current regulatory mechanisms, and schooling behavior ranked as moderate risks. The facility's small discharge, less than 0.6 mgd average monthly, 2 miles upstream of the Pacific Ocean will not effect the scalloped hammerhead shark. NMFS 2013b.

Mammals: Whales and Bats

All the listed whales are endangered. No critical habitat rules have been published. However, the humpback whale is proposed to be delisted. 78 FR 53391. Humpback whales feed in cold, productive coastal waters and when migrating, stay near the surface of the ocean. Blue and fin whales are the largest of the species and are thought to occur more offshore than humpback whales. Sperm whales spend most of their time in deep waters (1968 feet deep) and are uncommon in water less than 984 feet deep. Sei whales are usually observed in deeper waters of oceanic areas far from the coastline. The North Pacific right whale is the rarest of all large whale species, and among the rarest of all marine mammal species. Because of their rare occurrence and scattered distribution, assessing threats to the North Pacific right whale is nearly impossible. However, as with all whale species, ship strikes, harassment, habitat impacts, and entanglement are possible threats. NMFS 2013. Because the discharge is to an inland water, approximately 2 miles upstream of the ocean, and because the listed whales described in Table 5, generally spend more time in deep waters, the discharge will not effect the listed whale species.

The Little Mariana Fruit Bat (*Pteropus tokudae*) and the Mariana Fruit Bat (*Pteropus mariannus mariannus*) are listed as endangered and threatened, respectively, due to habitat lost/degradation, over hunting, predation by the brown treesnake, and natural disturbances. On islands inhabited by humans, bat colonies usually occur in remote sites, especially near or along clifflines. The Mariana Fruit Bat is known to forage on military lands and at the Guam National Wildlife Refuge, which are miles away from this facility's discharge. The facility is not located in an area designated as critical habitat for the Mariana Fruit Bat. (US FWS 2009; US FWS 2012). The facility's discharge will not effect the bats' food, habitat, or the bat itself.

Sea Turtles

The facility discharges to the Togcha River via the Togcha River Exfiltration Trench. See attachment D, Description of the Togcha River Monitoring Program, for a map of discharge points and receiving waters. The Togcha River then follows a two-mile course before flowing into the Pacific Ocean. The facility's small discharge, less than 0.6 mgd average monthly, will not effect the listed turtles in Table 5.

Corals

The *Seriatopora aculeate*, *Acropora globiceps*, and *Acropora retusa* has been reported from Guam. *Seriatopora aculeate* occurs in a broad range of habitats on the reef slope and back-reef, including but not limited to upper reef slopes, mid-slope terraces, lower reef slopes, reef flats, and lagoons in a depth range to 3 to 40 meters. *Acropora globiceps* occurs on upper reef slopes, reef flats, and adjacent habitats in depths ranging from 0 to 8 meters. *Acropora retusa* occurs in shallow reef slope and back-reef areas, such as upper reef slopes, reef flats, and shallow lagoons, and its depth range is 0 to 5 meters. *Acropora retusa* is also characterized as rare where it is found. *Acropora retusa* is also characterized as rare where it is found.

Corals, in general, are susceptible to the three major threats: ocean warming, disease, and ocean acidification. Corals that occur in shallow reef areas, such as the *Acropora retusa* and the possibly the *Acropora globiceps*, are subjected to frequent changes in environmental conditions, extremes, high irradiance, and simultaneous effects from multiple stressors, both local and global in nature. Because the discharge is to an inland water, approximately 2 miles upstream of the Pacific Ocean, the discharge will not effect the listed species described in Table 5.

Birds: Seven Endemic Bird Species

The U.S. FWS lists as threatened or endangered seven bird species: 1) Mariana Swiftlet (Aerodramus bartschi); 2) Mariana Crow (Corvus kubaryi); 3) Mariana Common Moorhen (Gallinula chloropus guami); 4) Guam Micronesian Megapode (Megapodius laperouse); 5) Guam Rail (Rallus owstoni); 6) Guam Bridled White-eye (Zosterops conspicillatus conspicillatus); and Guam Micronesian Kingfisher (*Halcyon cinnamominus cinnammominus*). Many endemic birds, especially flightless birds like the Guam Rail, are listed as threatened or endangered due to predation by the brown treesnake or predation by other animals such as lizards, rats, and feral cats. The Kingfisher was listed as endangered solely from the predation by the brown treesnake and there are no known populations on Guam.

Many of these seven bird species are known to occur in the northern part of the island, miles away from the facilities discharge. Specifically, the Mariana Swiftlet populations are known to occur in 3 locations on Guam, in natural and manmade caves. The Mariana Crow is known to occur in the northern cliffline forests as well as the Guam bridled white-eye bird.

Similar to the Mariana fruit bat, the Guam Micronesian kingfisher has critical habitat on the northern part of Guam. The Mariana Crow critical habitat also occurs in the northern tip of Guam (by Ritidian Point). Baza gardens is on the southern part of Guam and is not located within the critical habitat area for these species.

The Mariana Common Moorhen are found primarily at natural and manmade wetlands and feed on a variety of plant and animal matter located in and around the wetlands. The nearest wetland that could potentially support the species is Talfofo floodplain. The most serious threat to the Marian Common Moorhen is the disappearance of suitable wetland habitat. (US FWS 1991). The facility and its discharge will not effect the existence of any natural or manmade wetlands.

The Micronesian Megapode is listed as endangered. No populations are known to exist on Guam. Current threats to megapodes in the pacific islands include habitat destruction by feral ungulates and commercial/residential development; competition with introduced species; and predation by lizards, cats, rats, pigs, dogs, and the brown treesnake. (US FWS 1998). The discharge will not effect the Micronesian Megapode.

Plants: Hayun Iagu

Only one mature tree on Guam is known to exist and is endangered primarily by the browsing of introduced ungulates and infestations of herbivorous insects. The tree is not in the discharge area. The facility's discharge will not effect the Hayun Iagu (*Serianthes nelsonii*). (US FWS 1993).

In addition to the discussion above, the permittee is considered a minor discharger that discharges less than 0.6 MGD into the Togcha River, approximately 2 miles upstream of the Pacific Ocean. There are no known industrial discharges to the treatment plant. This permit incorporates effluent limits and narrative conditions to ensure that the discharge meets GEPA WQS, without any mixing zones. All effluent limits will apply at end of pipe.

EPA drafted this permit to protect the beneficial uses of the river, which include propagation and preservation of aquatic wildlife. Therefore, EPA believes that the permit conditions will not effect the availability or distribution of prey species or produce undesirable aquatic life within the Togcha River that may directly impact threatened or endangered species. In consideration of the factors stated above, EPA believes that a NO EFFECT determination is appropriate for the above listed endangered or threatened species in Guam. EPA provided the U.S. Fish and Wildlife Service with a copy of this factsheet and the permit for review.

B. Impact to Coastal Zones

The Coastal Zone Management Act (CZMA) requires that Federal activities and licenses, including Federally permitted activities, must be consistent with an approved state Coastal Management Plan (CZMA Sections 307(c)(1) through (3)). Section 307(c) of the CZMA and implementing regulations at 40 CFR 930 prohibit EPA from issuing a permit for an activity affecting land or water use in the coastal zone until the applicant certifies that the activity complies with the State (or Territory) Coastal Zone Management program, and the State (or Territory) or its designated agency concurs with the certification.

At this time, EPA has not received a consistency certification from the Guam Department of Commerce for the Baza Gardens STP discharge. At the time the certification is received, EPA will review the certification and will make any necessary modification to the permit to ensure compliance with the Guam Coastal Management Plan.

C. Impact to Essential Fish Habitat

The 1996 amendments to the Magnuson-Stevens Fishery Management and Conservation Act (MSA) set forth a number of new mandates for the National Marine Fisheries Service, regional fishery management councils and other federal agencies to identify and protect important marine and anadromous fish species and habitat. The MSA requires Federal agencies to make a determination on Federal actions that may adversely impact Essential Fish Habitat (EFH).

The permit contains technology-based effluent limits and numerical and narrative water quality-based effluent limits as necessary for the protection of applicable aquatic life uses. The permit does not directly discharge to areas of essential fish habitat. Therefore, EPA is not required to make a determination on whether this action may adversely impact Essential Fish Habitat, as defined under the MSA.

D. Impact to National Historic Properties

Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies to consider the effect of their undertakings on historic properties that are either listed on, or eligible for listing on, the National Register of Historic Places. Pursuant to the NHPA and 36 CFR §800.3(a)(1), EPA is making a determination that issuing this NPDES permit does not have the potential to affect any historic properties or cultural properties. As a result, Section 106 does not require EPA to undertake additional consulting on this permit reissuance.

XI. STANDARD CONDITIONS

A. Reopener Provision

In accordance with 40 CFR 122 and 124, this permit may be modified by EPA to include effluent limits, monitoring, or other conditions to implement new regulations, including EPA-approved water quality standards; or to address new information indicating the presence of effluent toxicity or the reasonable potential for the discharge to cause or contribute to exceedances of water quality standards.

B. Standard Provisions

The permit requires the permittee to comply with EPA Region IX Standard Federal NPDES Permit Conditions, dated July 1, 2001.

XII. ADMINISTRATIVE INFORMATION

A. Public Notice (40 CFR 124.10)

The public notice is the vehicle for informing all interested parties and members of the general public of the contents of a NPDES permit or other significant action with respect to an NPDES permit or application.

B. Public Comment Period (40 CFR 124.10)

Notice of the permit will be placed in a daily or weekly newspaper within the area affected by the facility or activity, with a minimum of 30 days provided for interested parties to respond in writing to EPA. After the closing of the public comment period, EPA is required to respond to all significant comments at the time a final permit decision is reached or at the same time a final permit is actually issued.

C. Public Hearing (40 CFR 124.12(c))

A public hearing may be requested in writing by any interested party. The request should state the nature of the issues proposed to be raised during the hearing. A public hearing will be held if EPA determines there is a significant amount of interest expressed during the 30-day public comment period or when it is necessary to clarify the issues involved in the permit decision.

D. Water Quality Certification Requirements (40 CFR 124.53 and 124.54)

The GEPA has approved water quality standards. EPA is requesting certification from the GEPA that the permit will meet all applicable water quality standards. Certification under section 401 of the CWA shall be in writing and shall include the conditions necessary to assure compliance with referenced applicable provisions of sections 208(e), 301, 302, 303, 306, and 307 of the CWA and appropriate requirements of Territory law.

XIII. CONTACT INFORMATION

Comments, submittals, and additional information relating to this proposal may be directed to:

EPA Region IX
Attn: Becky Mitschele
75 Hawthorne Street (WTR 2-3)
San Francisco, California 94105

or

Becky Mitschele
mitschele.becky@epa.gov
(415) 972 – 3492

XIV. REFERENCES

District Court of Guam. 2011. *Civil Case No. 02-00035. Order for Preliminary Relief Regarding Deadlines for Outstanding Projects Under the Amended Stipulated Order*. U.S. District Court of Guam. http://www.epa.gov/region9/water/npdes/pdf/guam/gwa/gwa-order-for-prelim-relief2011.pdf.

EPA. 1991. *Technical Support Document for Water Quality-based Toxics Control*. Office of Water, EPA. EPA/505/2-90-001.

EPA. 1996. *Regions IX & X Guidance for Implementing Whole Effluent Toxicity Testing Programs*, Interim Final, May 31. 1996.

EPA. 2002a. *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms* - Fifth Edition. Office of Water, EPA. EPA-821-R-02-012.

EPA. 2002b. *National Recommended Water Quality Criteria*. Office of Water, EPA. EPA-822-R-02-047.

EPA. 2010. *U.S. EPA NPDES Permit Writers' Manual*. Office of Water, EPA. EPA-833-K-10-001.

EPA. 2013. *Wastewater Collection and Treatment Inspection for the Guam Waterworks Authority*. Office of Enforcement and Compliance Assurance, Office of Criminal Enforcement, Forensics, and Training, and National Enforcement Investigations Center, EPA. NEICVP0989E02. http://www.epa.gov/region9/water/npdes/pdf/guam/gwa/wwr-2013/guam-wastewater-final-report-2013-01.pdf.

EPA. 2014. 303(d) Impaired Waterbody History Report for GUS-11. http://iaspub.epa.gov/tmdl_waters10/attains_wb_history.control?p_listed_water_id=GUS-11&p_cycle=2010

GEPA. 2001. *Guam Water Quality Standards*. Guam Environmental Protection Agency.

Lekven and Constantinescu. 2014. *Baza Gardens Wastewater System Evaluation.* Brown and Caldwell.

National Ocean and Atmospheric Administration (NOAA). 2015. Email from David Nichols to EPA regarding species list in the Marinas. April 9, 2015.

National Marine Fisheries Service (NMFS). 2013. Recovery Plan for the North Pacific Right Whale (*Eubalaena japonica*). National Marine Fisheries Service, Office of Protected Resources, Silver Spring, MD. http://www.fisheries.noaa.gov/pr/recovery/plans/rightwhale_northpacific.pdf

National Marine Fisheries Service. 2013b. Status Review Report: Scalloped Hammerhead Shark (*Sphyrna lewini*). Report to National Marine Fisheries Service, Office of Protected Resources. March 2013.131 pp. http://www.nmfs.noaa.gov/pr/pdfs/statusreviews/scallopedhammerheadshark.pdf

U.S. Fish and Wildlife Service (US FWS). 1991. Recovery Plan for the Mariana Common Moorhen (*Gallinula chloropus guami*). http://ecos.fws.gov/docs/recovery_plan/910928.pdf

U.S. Fish and Wildlife Service. 1993. Recovery Plan for *Serianthes nelsonii*. http://ecos.fws.gov/docs/recovery_plan/940202b.pdf

U.S. Fish and Wildlife Service. 1998. Recovery Plan for the Micronesian Megapode (*Megapodius laperouse laperouse*). http://ecos.fws.gov/docs/recovery_plan/980410b.pdf

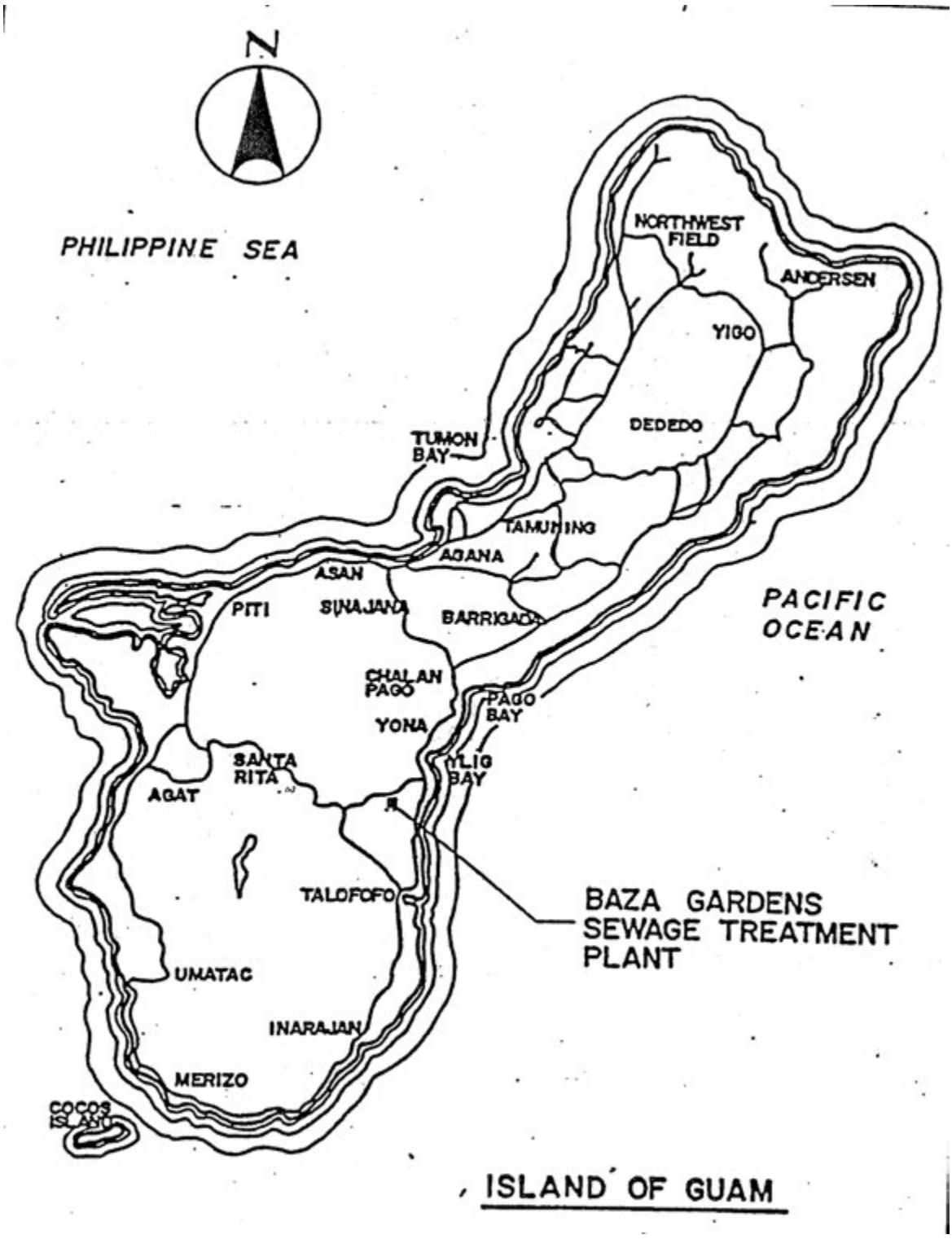
U.S. Fish and Wildlife Service. 2004. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Mariana Fruit Bat and Guam Micronesian Kingfisher on Guam and the Mariana Crow on Guam and in the Commonwealth of the Northern Mariana Islands; Final Rule. http://ecos.fws.gov/docs/federal_register/fr4349.pdf

U.S. Fish and Wildlife Service. 2009. Draft Revised Recovery Plan for the Mariana Fruit Bat or Fanihi (*Pteropus mariannus mariannus*). http://ecos.fws.gov/docs/recovery_plan/100330.pdf

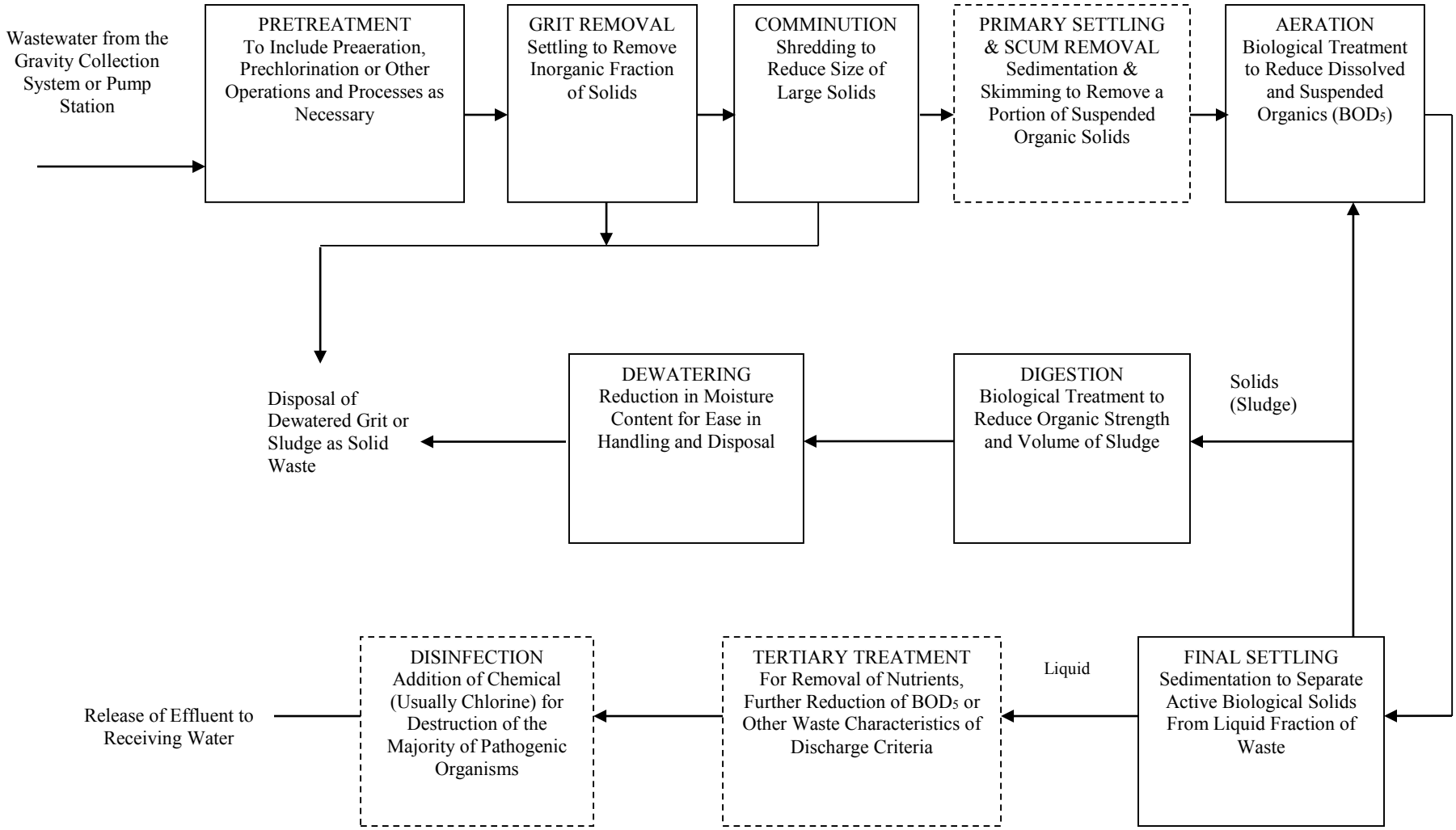
U.S. Fish and Wildlife Service. 2011. Guam and Commonwealth of the Northern Mariana Islands Animals & Plants: Updated February 2, 2011; Listed Species, as Designated under the U.S. Endangered Species Act. http://www.fws.gov/pacificislands/Publications/Guam%20and%20Commonwealth%20of%20the%20Northern%20Mariana%20Islands%20Animals_ListedSpp.pdf

U.S. Fish and Wildlife Service. 2012. Endangered Species in the Pacific Islands. http://www.fws.gov/pacificislands/fauna/marianabat.html

ATTACHMENT A. Location of Baza Gardens STP on Guam

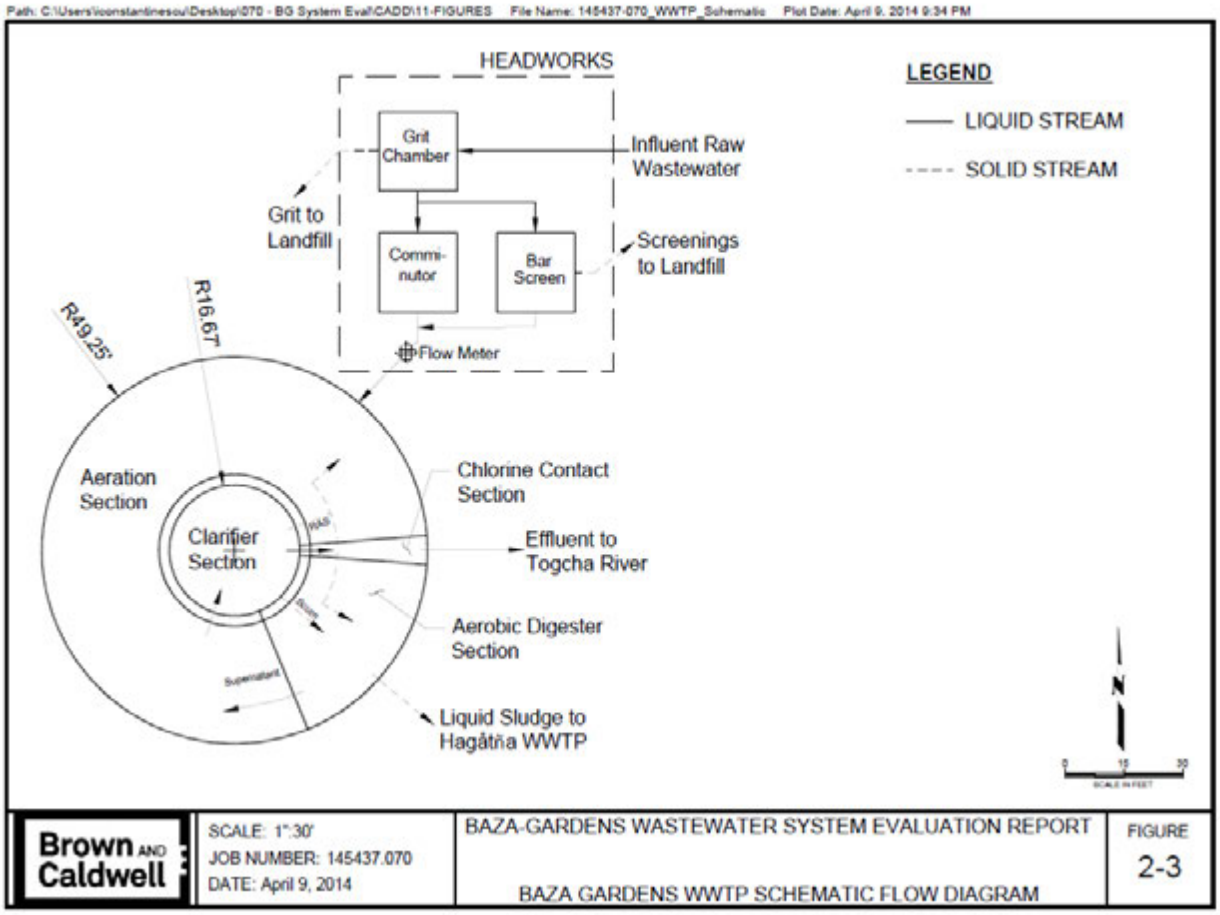


Attachement B. Diagram of the Wastewater Treatment Process at Baza Gardens STP



Note: Those operations and processes that comprise the Baza Gardens plant are identified in solid lines.

ATTACHMENT C. Wastewater Flow Diagram for the Baza Gardens STP.



ATTACHMENT D. Ammonia Data Log and Ammonia Chronic Criteria from the Guam Environmental Protection Agency Water Quality Standards

A	B	C	E	F
Date of Sample	Ammonia-N Concentration In Effluent (mg/L N)	Effluent pH (S.U.)	Ammonia Standard Determined from Ammonia Chronic Criteria Tables or Formula (attached on next page)	Ammonia Toxicity **(Column B /Column E)**

Please copy and complete for each quarter of each year for permit term. Permittee may sample more frequently and record any additional results. Attach any additional pages as necessary.

Signature of Authorized Representative: _____

ATTACHMENT D. (cont.) Guam Environmental Protection Agency Water Quality Standards, Section "3. Nutrients"

c. Ammonia nitrogen per liter limits vary with pH:

i. The one (1) hour average concentration of total ammonia nitrogen (mg N/l) does not exceed, more than once every three (3) years on the average, the Criteria Maximum Concentration ("CMC") (see Section 5105 Definitions) calculated using the following equation:

$$CMC = \frac{0.411}{1 + 10^{(7.204 - pH)}} + \frac{58.4}{1 + 10^{(pH - 7.204)}}$$

ii. The thirty-(30) day average concentration of total ammonia nitrogen (mg N/l) does not exceed, more than once every three (3) years on the average, the Criteria Chronic Concentration ("CCC") (see Section 5105 Definitions) calculated using the following equation:

$$CCC = \frac{0.0858}{1 + 10^{(7.688 - pH)}} + \frac{3.70}{1 + 10^{(pH - 7.688)}}$$

iii. CMC and CCC (mg N/l) at a few example pH Values.

pH	CMC	CCC
6.5	48.8	3.48
7.0	36.1	3.08
7.5	19.9	2.28
8.0	8.40	1.27
8.5	3.20	0.57
9.0	1.32	0.25

iv. The ambient concentration, averaged over a period of thirty (30) days, should not exceed the CCC. The ambient concentration, averaged over four (4) days, should not exceed a concentration two (2) times greater than the CCC. The averaging period applicable to the CMC is one (1) hour.

S-1, S-2, S-3

pH	Ammonia Criterion (mg N/L)		pH	Ammonia Criterion (mg N/L)
6.5	3.48		7.8	1.66
6.6	3.43		7.9	1.46
6.7	3.36		8.0	1.27
6.8	3.29		8.1	1.09
6.9	3.19		8.2	0.94
7.0	3.08		8.3	0.80
7.1	2.96		8.4	0.67
7.2	2.81		8.5	0.57
7.3	2.65		8.6	0.48
7.4	2.47		8.7	0.41
7.5	2.28		8.8	0.35
7.6	2.08		8.9	0.29
7.7	1.87		9.0	0.25

ATTACHMENT E. WQBEL Calculations for Total Residual Chlorine and Nutrients

Total Chlorine Residual using Two-value, Steady-state Model	Acute	Chronic
Freshwater Aquatic Life Criteria, ug/L[(1)]	19	11
No Dilution Credit Authorized	0	0
Background Concentration, ug/L	0	0
WLA, ug/L	19	11
Coefficient of Variation	0.6	0.6
WLA Multiplier (99^{th}%)	0.321	0.527
LTA, ug/L	6.099	5.797
LTA_{MDL} Multiplier (99^{th}%)	--	3.11
MDL, ug/L[3]	--	18
LTA_{AML} Multiplier (95^{th}%)[(2)]	--	1.55
AML, ug/L[(3)]	--	9

[(1)] EPA's National Recommended Water Quality Criteria for non-priority pollutants for chlorine in freshwater is a CMC of 19 ug/l and a CCC of 11 ug/l. GEPA WQS Table IV includes fresh water maximum numerical limits at 0.011 mg/L, which is consistent with EPA's National Recommended Water Quality Criteria. EPA uses the criteria from the national recommendation in order to use the two-value, steady-state model to calculate effluent limits.

[2] LTA multiplier based on sampling frequency of four times per month per section 5.5.3 of EPA's TSD.

[3] Baza Gardens STP does not currently have the infrastructure necessary to disinfect using chlorine but may have the capability to do so during the permit term. Therefore, EPA is retaining the previous effluent limits for total residual chlorine, which will only become effective upon operation of a chlorination/dechlorination system.

Orthophosphate using Single, Steady-state Model	Chronic[(1)]
Water Quality Criterion, mg/L	0.10
No Dilution Credit Authorized	0
Background Concentration, mg/L	0
WLA, mg/L	0.10
WLA Multiplier (99^{th}%)	0.527
LTA, mg/L	0.0527
LTA_{MDL} Multiplier (99^{th}%)	3.11
MDL, mg/L	0.16
LTA_{AML} Multiplier (95^{th}%)[(2)]	1.55
AML, mg/L	0.08

[(1)]Derivation of permit limit based on Section 5.4.1 of EPA's TSD.

[(2)]LTA multiplier based on sampling frequency of four times per month per section 5.5.3 of EPA's TSD (in situations where monitoring frequency is once per month or less, a higher value of n must be assumed for AML derivation purposes…using an assumed number of samples of at least four).

ATTACHMENT E. (cont.) WQBEL Calculations for Total Residual Chlorine and Nutrients

Nitrate-nitrogen using Single, Steady-state Model	Chronic[1]
Water Quality Criterion, mg/L	0.50
No Dilution Credit Authorized	0.00
Background Concentration, mg/L	0.00
WLA, mg/L	0.50
WLA Multiplier (99th%)	0.527
LTA, mg/L	0.2635
LTA_{MDL} Multiplier (99th%)	3.11
MDL, mg/L	0.82
LTA_{AML} Multiplier (95th%)[2]	1.55
AML, mg/L	0.41

[1]Derivation of permit limit based on Section 5.4.1 of EPA's TSD.

[2]LTA multiplier based on sampling frequency of four times per month per section 5.5.3 of EPA's TSD (in situations where monitoring frequency is once per month or less, a higher value of n must be assumed for AML derivation purposes…using an assumed number of samples of at least four).

Ammonia Nitrogen using Two-value, Steady-state Model	Acute	Chronic
Freshwater Aquatic Life Criteria, mg/L	9.98[2]	1.46[2]
No Dilution Credit Authorized	0.00	0.00
Background Concentration, mg/L	0.00	0.00
WLA, mg/L	9.98	1.46
WLA Multiplier (99th%)	0.321	0.527
LTA, mg/L	3.204	0.769
LTA_{MDL} Multiplier (99th%)	--	3.11
MDL, mg/L	--	2.39[3]
LTA_{AML} Multiplier (95th%)[1]	--	1.55[1]
AML, mg/L	--	1.19[3]

[1] LTA multiplier based on sampling frequency of four times per month per section 5.5.3 of EPA's TSD (in situations where monitoring frequency is once per month or less, a higher value of n must be assumed for AML derivation purposes…using an assumed number of samples of at least four).

[2] EPA calculated the applicable criteria, 9.98 and 1.46 mg N/L, based on a pH of 7.9 S.U. using the following formulas in the GEPA's WQS:

CMC (mg N/l) = { 0.4110 / [1 + 10^(7.204 - pH)] } + { 58.4 / [1 + 10^(pH - 7.204)] } = 9.98
CCC (mg N/l) = { 0.0858 / [1 + 10^(7.688 - pH)] } + { 3.70 / [1 + 10^(pH - 7.688)] } = 1.46

[3] EPA will use an ammonia impact ratio ("AIR") with a value of (1) to determine compliance instead of these fixed effluent limits. The AIR is calculated as the ratio of the ammonia value in the effluent and the applicable ammonia standard.