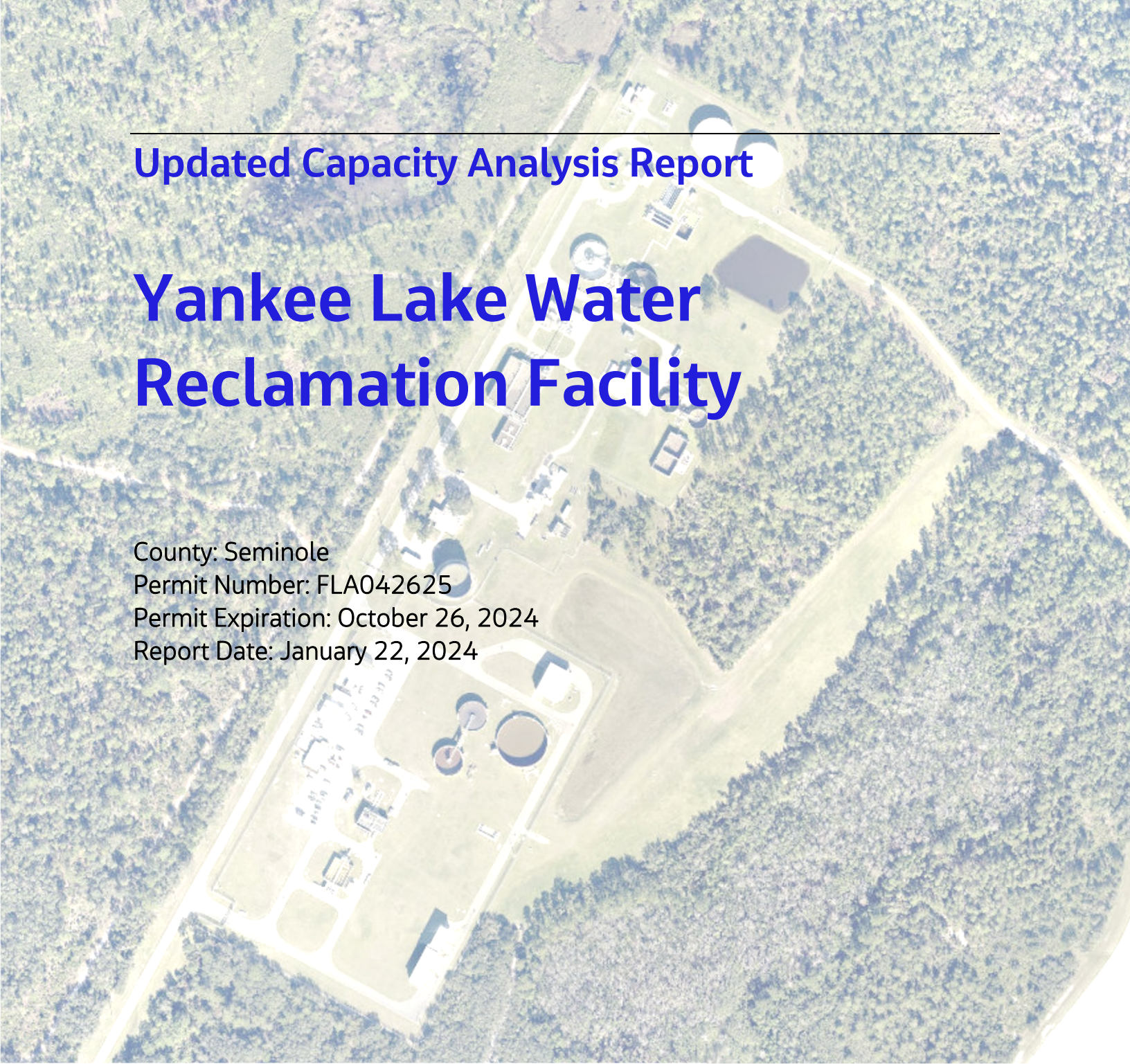




Updated Capacity Analysis Report

Yankee Lake Water Reclamation Facility

County: Seminole

Permit Number: FLA042625

Permit Expiration: October 26, 2024

Report Date: January 22, 2024



Jacobs

Certifications

Permittee:

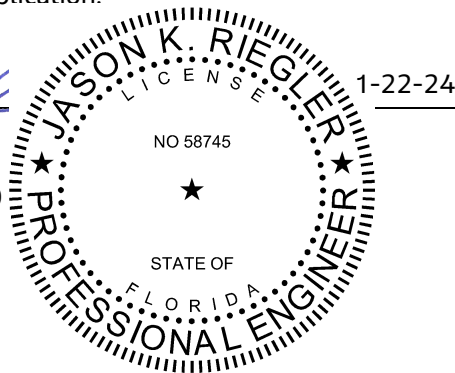
The Permittee is fully aware and intends to comply with the recommendations and schedules included in the report.

William (Johnny) Edwards, P.E.
Seminole County Utilities Department
500 West Lake Mary Boulevard
Sanford, FL 32773
Phone: 407-665-2005
Email: wedwards@seminolecountyfl.gov

Professional Engineer:

The information contained in this report is true and correct to the best of my knowledge, the report was prepared in accordance with sound engineering principles, and I have discussed the recommendations and schedules with the permittee or the permittee's delegated representative and the lead operator and agrees that if the recommended schedules for corrective action are met, the facilities, when properly operated and maintained, will comply with all applicable statutes of the State of Florida and rules of the Florida Department of Environmental Protection, or for temporary operation permits, that the wastewater facilities, when properly operated and maintained, will discharge an effluent that complies with the limitations specified in the permit application.


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1. Introduction

The Yankee Lake Water Reclamation Facility (WRF) is rated at 3.5 MGD annual average daily flow (AADF) capacity under Florida Department of Environmental Protection (FDEP) Permit No. FLA042625, which was issued on October 27, 2014, and expires on October 26, 2024. It is located at 501 Yankee Lake Rd. (SR 46), Sanford, FL, 32771.

The WRF was constructed in 1990 with a treatment capacity of 2.5 MGD. It was upgraded to the current capacity of 3.5 MGD AADF in 2008 during Phase I of a two-phased expansion plan. These improvements included a new equalization basin and pumps, new aeration diffusers, replacement of existing slide gates, replacement of existing return pumps, new sludge transfer pumps, a new biosolids dewatering building with equipment, a new 1,000-kW generator, and the removal of a below-ground fuel tank, which was replaced with a new aboveground fuel storage tank. The facility was subsequently upgraded as part of the Phase 2a project but there was no increase in treatment capacity.

The Yankee Lake WRF operates as a modified 5-stage biological nutrient removal (BNR) process. It consists of influent screening, grit removal, flow equalization, fermentation, anoxic basin followed by aeration chamber, chemical feed, clarification, tertiary filtration, disinfection by chlorination, and aerobic digestion of biosolids. Residuals are transported to the County's landfill for disposal.

Raw wastewater from the sewer system enters the Yankee Lake WRF through a 16-inch-diameter force main and discharges into the preliminary treatment structure. The function of the preliminary treatment structure is to remove large solids, sand, and inorganic solids. Large solids are captured on the two automatic bar screens. Following the screening process, the forced vortex grit removal system removes sand and small inorganic solids from the raw wastewater. Screened and degritted wastewater then either flows by gravity to the equalization tank lift station or to the biological nutrient removal (BNR) process. Air and odor from the preliminary treatment structure are pulled into the odor control facility and treated biologically.

Belt filter press filtrate from the biosolids dewatering building is pumped into the headworks to mix with the raw influent. If needed, the RAS may be diverted to the equalization basin lift station for increased biological phosphorous removal capability.

The raw wastewater flows by gravity from the preliminary treatment structure to the flow equalization pump station where the wastewater is pumped into the equalization tank. Flow from the equalization tank flows by gravity into the BNR process. The influent goes through a sequence of anoxic and aerobic zones. Effluent from the BNR process enters the two secondary clarifiers. WAS and scum are pumped to the aerobic digestion tanks for further treatment. Secondary clarifier effluent goes through deep bed sand filters for additional suspended solids removal. Filtered effluent is chlorinated with sodium hypochlorite in the chlorine contact chamber. Chlorinated effluent is then pumped to the reclaimed water ground storage tanks or the rapid infiltration basins (RIBs). The reclaimed high-service pumps pump to the PAR or to spray field disposal. Reclaimed water pumped to the public-access reuse (PAR) system can be stored and repumped at either the Markham reclaimed booster pump station or the Greenwood Lakes WRF reclaimed/RIB site. Reclaimed water can be disposed of at the Greenwood Lakes WRF reclaimed site RIBs.

Figure 1-1. Location Map



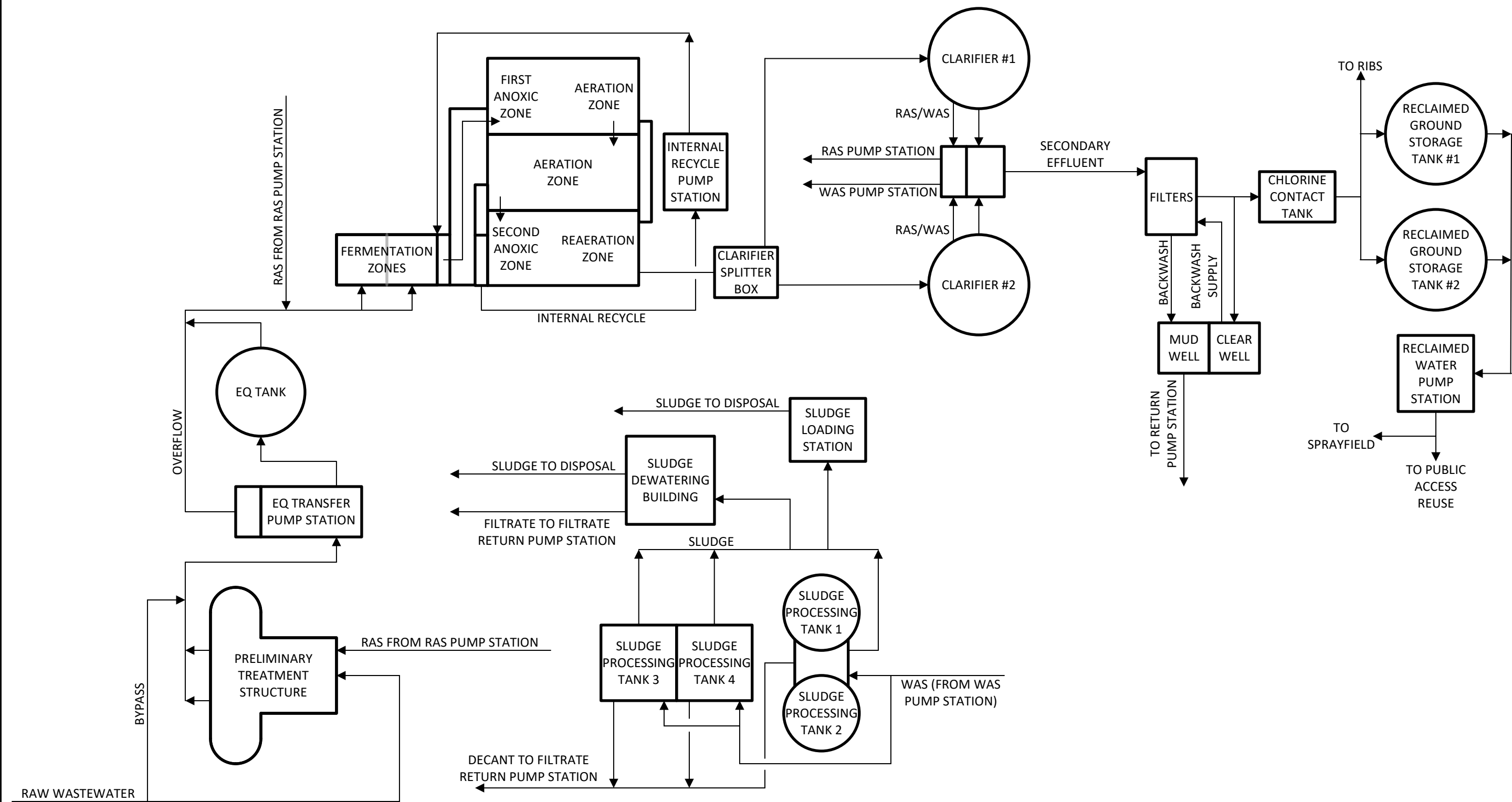
Figure 1-2. Overall Site Plan



Figure 1-3. Yankee Lake WRF Site Plan



Figure 1-4. Yankee Lake WRF Process Flow Diagram



2. Existing Conditions

2.1 Permitted Capacities

The permitted capacity of the Yankee Lake Water Reclamation Facility (YLWRF) is 3.50 million gallons per day (MGD) based on the annual average daily flow (AADF). The YLWRF applies reclaimed water to three reuse systems as follows:

1. Land Application R-001: 0.35 MGD AADF slow-rate restricted public access system consisting of 15.7 acres of plant site irrigation, 10.2 acres of private right-of-way, and 46.7 acres at the plant south site.

Table 2-1. R-001 Slow-rate Restricted Public Access System Reclaimed Water Limits

Parameter	Units	Max/Min	Annual Average	Monthly Average	Weekly Average	Single Sample
CBOD ₅ ⁽¹⁾	mg/L	Max	20.0	30.0	45.0	60.0
TSS ⁽²⁾	mg/L	Max	20.0	30.0	45.0	60.0
Fecal Coliform	#/100 mL	Max	200	200 ⁽⁵⁾	---	800
pH	S.U. ⁽⁶⁾	Min - Max	---	---	---	6.0-8.5
TRC ⁽³⁾	mg/L	Min	---	---	---	0.5
TN ⁽⁴⁾	mg/L	Max	10.0	Report	---	---

Notes:

- (1) CBOD₅: 5-day Carbonaceous Biochemical Oxygen Demand
- (2) TSS: Total Suspended Solids
- (3) TRC: Total Residual Chlorine
- (4) TN: Total Nitrogen as N
- (5) Monthly Geometric Mean
- (6) S.U.: Standard Units

2. Land Application R-002: 6.5 MGD AADF slow-rate public access system consisting of a reclaimed water transmission/distribution system for irrigation of recreation areas, residential lawns, golf courses, urban landscapes, road medians, nurseries, and citrus groves within the Reuse Service Area. Additionally, 0.5 MGD AADF of reclaimed water may be directed to the Greenwood Lakes Water Reclamation Facility rapid infiltration basins via the reclaimed water transmission/distribution system. The YLWRF and Greenwood Lakes WRF have a combined reuse service area.

Table 2-2. R-002 Slow-rate Public Access System Reclaimed Water Limits

Parameter	Units	Max/Min	Annual Average	Monthly Average	Weekly Average	Single Sample
CBOD ₅ ⁽¹⁾	mg/L	Max	20.0	30.0	45.0	60.0
TSS ⁽²⁾	mg/L	Max	---	---	---	5.0
Fecal Coliform	#/100 mL	Max	---	---	---	25
% Fecal Coliform ⁽³⁾	percent	Min	---	75 ⁽¹³⁾	---	---
pH	S.U. ⁽¹⁴⁾	Min - Max	---	---	---	6.0-8.5
TRC ⁽⁴⁾	mg/L	Min	---	---	---	1.0
TN ⁽⁵⁾	mg/L	Max	10.0	Report	---	Report
TP ⁽⁶⁾	mg/L	Max	---	---	---	Report
TSS (SW) ⁽⁷⁾	mg/L	Max	---	---	---	5.0
Fecal Coliform (SW) ⁽⁸⁾	#/100 mL	Max	---	---	---	25
% Fecal Coliform (SW) ⁽⁹⁾	percent	Min	---	75 ⁽¹³⁾	---	---
TRC (SW) ⁽¹⁰⁾	mg/L	Min	---	---	---	1.0
pH (SW) ⁽¹¹⁾	S.U. ⁽¹⁴⁾	Min - Max	---	---	---	6.0-8.5
Giardia (SW) ⁽¹²⁾	cysts/100 L	Max	---	---	---	Report
Cryptosporidium (SW) ⁽¹²⁾	oocysts/100 L	Max	---	---	---	Report

Notes:

- (1) CBOD₅: 5-day Carbonaceous Biochemical Oxygen Demand
- (2) TSS: Total Suspended Solids
- (3) % Fecal Coliform: Fecal coliform % less than detection
- (4) TRC: Total Residual Chlorine
- (5) TN: Total Nitrogen as N
- (6) TP: Total Phosphorus as P
- (7) TSS (Total Suspended Solids) from Surface Water Treatment Plant
- (8) Fecal coliform from Surface Water Treatment Plant

- (9) Fecal coliform % less than detection from Surface Water Treatment Plant
- (10) Total Residual Chlorine (TRC) from Surface Water Treatment Plant
- (11) pH from Surface Water Treatment Plant
- (12) Giardia or Cryptosporidium from Surface Water Treatment Plant
- (13) Monthly Total
- (14) S.U.: Standard Units

3. Land Application R-003: 0.36 MGD AADF rapid infiltration basin system consisting of five rapid infiltration basins.

Table 2-3. R-003 Rapid Infiltration Basin System Reclaimed Water Limits

Parameter	Units	Max/Min	Annual Average	Monthly Average	Weekly Average	Single Sample
CBOD ₅ ⁽¹⁾	mg/L	Max	20.0	30.0	45.0	60.0
TSS ⁽²⁾	mg/L	Max	20.0	30.0	45.0	60.0
Fecal Coliform	#/100 mL	Max	200	200 ⁽⁶⁾	---	800
pH	S.U. ⁽⁷⁾	Min - Max	---	---	---	6.0-8.5
TRC ⁽³⁾	mg/L	Min	---	---	---	0.5
TN ⁽⁴⁾	mg/L	Max	3.0	Report	---	---
Total Nitrate ⁽⁵⁾	mg/L	Max	---	---	---	12.0

Notes:

- (1) CBOD₅: 5-day Carbonaceous Biochemical Oxygen Demand
- (2) TSS: Total Suspended Solids
- (3) TRC: Total Residual Chlorine
- (4) TN: Total Nitrogen as N
- (5) Total Nitrate Nitrogen as N
- (6) Monthly Geometric Mean
- (7) S.U.: Standard Units

Reclaimed water supply is augmented by a 10 MGD reuse Actiflo system which meets high level disinfection requirements using surface water from the St. Johns River. Withdrawal of water from the St. Johns River is permitted by the St. Johns River Water Management District with an allocation of 5.5 MGD annual average (CUP #95581). This system is located adjacent to the YLWRF. Additionally, treated drinking water may be used to augment the supply of reclaimed water at the Markham Road reclaimed water tank.

2.2 Historical Flows

A Capacity Analysis Report (CAR) is required in accordance with Florida Administrative Code 62-600.405 *Planning for Wastewater Facilities Expansion* to provide for the timely planning, design, and construction of wastewater facilities necessary to provide proper treatment and reuse or disposal of domestic wastewater and management of biosolids. The rule states that the capacity analysis report shall evaluate the capacity of the treatment plant and reuse or disposal systems and contain data showing the permitted and design capacities; monthly average daily flows, three-month average daily flows, and annual average daily flows for the past 10 years. In accordance with Guidelines for Preparation of Capacity Analysis Reports (FDEP, July 1992), this information has been tabulated and presented in Tables 2-4 through 2-6 and Figures 2-1 through 2-4. Influent flow data is from the flow meter located at the headworks (Monitoring Site Number FLW-7).

Table 2-4. Historical Monthly Average Daily Flows ⁽¹⁾

Month/Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
January	2.073	2.234	2.263	2.319	2.366	2.372	2.370	2.325	2.468	2.546
February	2.139	2.235	2.246	2.341	2.399	2.359	2.365	2.357	2.465	2.502
March	2.123	2.234	2.245	2.307	2.372	2.340	2.324	2.327	2.463	2.455
April	2.121	2.206	2.242	2.321	2.383	2.405	2.210	2.376	2.506	2.461
May	2.114	2.169	2.286	2.286	2.413	2.328	2.245	2.407	2.479	2.495
June	2.100	2.159	2.270	2.330	2.367	2.307	2.301	2.395	2.420	2.488
July	2.146	2.185	2.160	2.283	2.327	2.363	2.279	2.439	2.458	2.459
August	2.213	2.274	2.268	2.423	2.427	2.428	2.297	2.460	2.550	2.508
September	2.216	2.277	2.245	2.429	2.363	2.331	2.379	2.387	2.752	2.580
October	2.194	2.190	2.310	2.417	2.340	2.398	2.374	2.372	2.619	2.499
November	2.215	2.208	2.287	2.348	2.352	2.354	2.349	2.426	2.626	--
December	2.225	2.211	2.322	2.361	2.410	2.394	2.326	2.474	2.566	--

Notes:

(1) Flows are in units of million gallons per day (MGD)

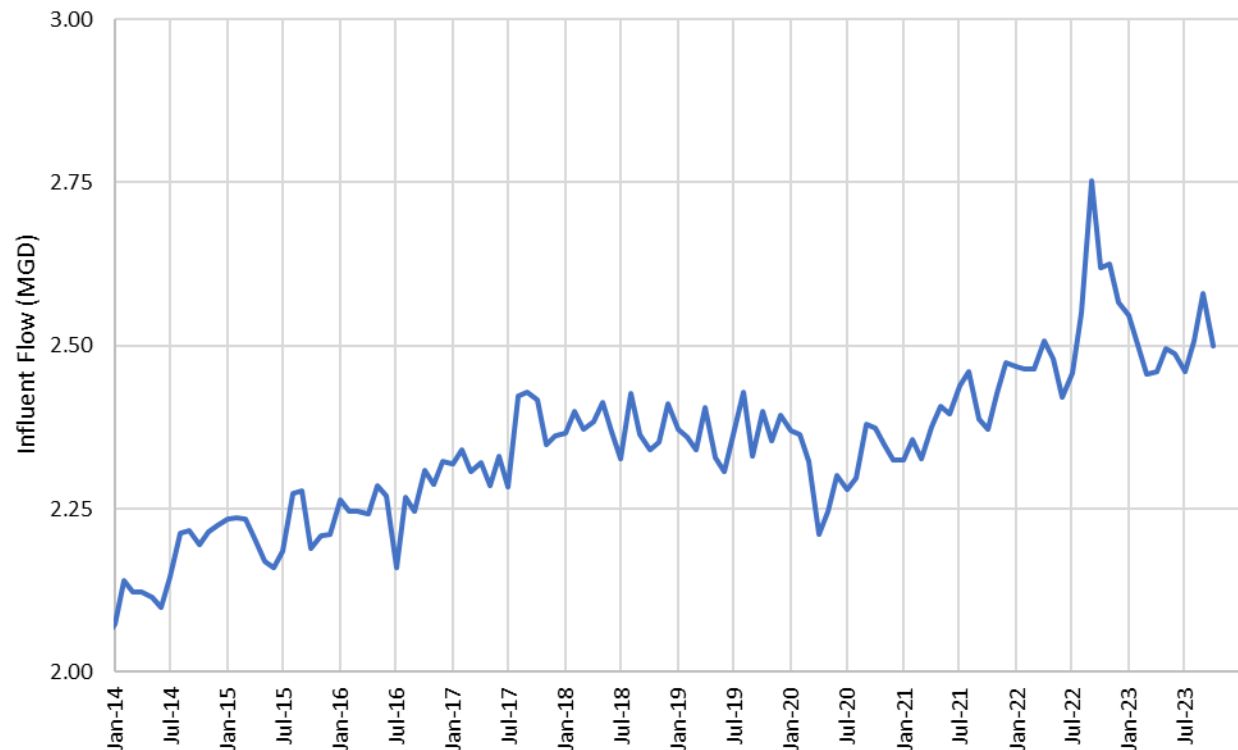
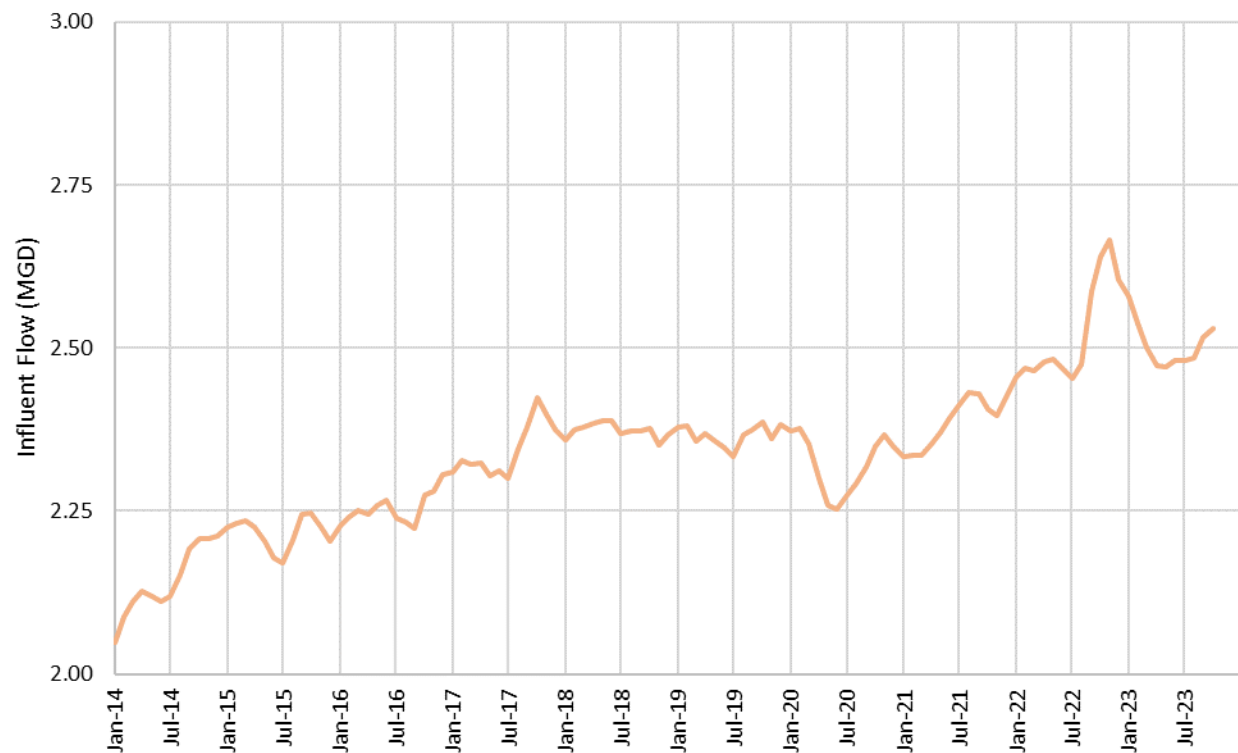
Figure 2-1. Historical Monthly Average Daily Flows


Table 2-5. Historical Three-month Average Daily Flows ⁽¹⁾

Month/Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
January	2.049	2.225	2.227	2.309	2.359	2.378	2.373	2.333	2.456	2.579
February	2.088	2.231	2.240	2.327	2.376	2.381	2.376	2.336	2.469	2.538
March	2.112	2.235	2.252	2.322	2.379	2.357	2.353	2.336	2.465	2.501
April	2.128	2.225	2.245	2.323	2.385	2.368	2.299	2.353	2.478	2.473
May	2.119	2.203	2.258	2.305	2.389	2.358	2.260	2.370	2.483	2.470
June	2.112	2.178	2.266	2.313	2.388	2.347	2.252	2.393	2.469	2.481
July	2.120	2.171	2.239	2.300	2.369	2.333	2.275	2.414	2.452	2.481
August	2.153	2.206	2.232	2.345	2.374	2.366	2.292	2.431	2.476	2.485
September	2.192	2.245	2.224	2.378	2.372	2.374	2.318	2.429	2.586	2.516
October	2.208	2.247	2.274	2.423	2.377	2.386	2.350	2.407	2.640	2.529
November	2.208	2.225	2.281	2.398	2.352	2.361	2.367	2.395	2.666	--
December	2.211	2.203	2.306	2.375	2.367	2.382	2.349	2.424	2.604	--

Notes:

(1) Flows are in units of million gallons per day (MGD)

Figure 2-2. Historical Three-month Average Daily Flows


Updated Capacity Analysis Report

Table 2-6. Historical Annual Average Daily Flows ⁽¹⁾

Year	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
AADF	2.157	2.215	2.262	2.347	2.377	2.365	2.318	2.396	2.531	2.499

Notes:

(1) Flows are in units of million gallons per day (MGD)

Figure 2-3. Historical Annual Average Daily Flows

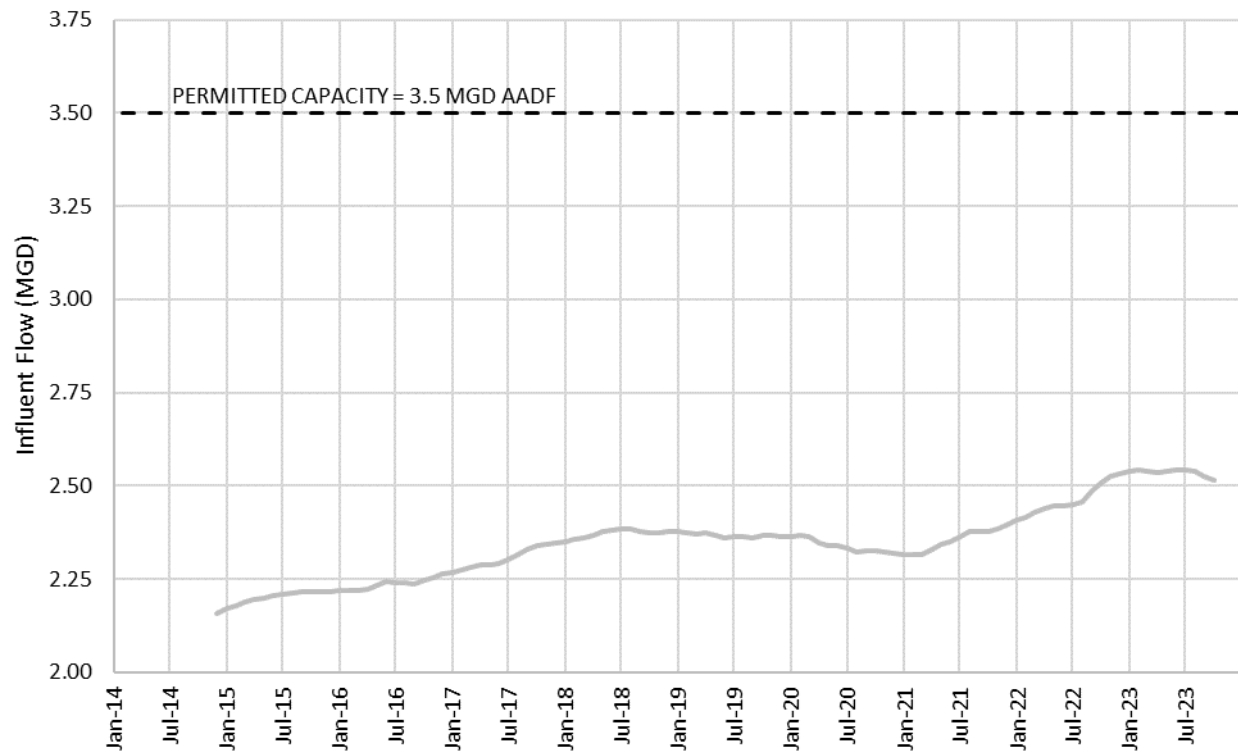
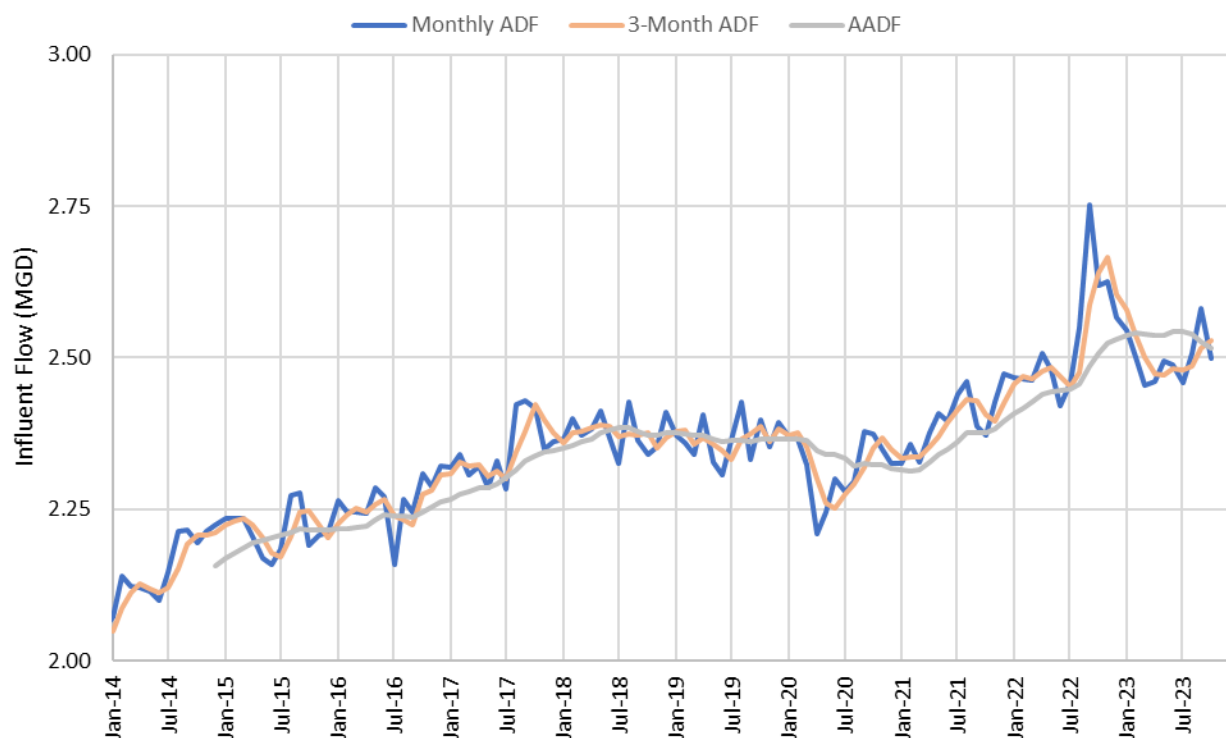


Figure 2-4. Historical Monthly, Three-month and Annual Average Daily Flows



2.3 Seasonal Variations in Flow

In addition to presenting historical flow data, FDEP's Guidelines for Preparation of Capacity Analysis Reports require an analysis of seasonal variations in flow over the past 10 years. This analysis includes identifying the maximum 3-Month ADF for each year and calculating the ratio of the 3-Month ADF and annual average daily flow. Tabulation of the maximum 3-Month ADF, AADF and maximum 3-Month ADF to AADF ratios are presented in Table 2-7.

Based on the information in Table 2-7, there appears to be a slight seasonal variation typically seen between October and December with a few months outside this time frame during the 10-year analysis. The average seasonal variation is 1.02 which indicates there is not a significant variation in flows over the year.

Table 2-7. Seasonal Flow Variation ⁽¹⁾

Year	Maximum 3-Month ADF	Month with Maximum 3-Month	AADF	3-Month ADF to AADF Ratio
2014	2.211	December	2.157	1.03
2015	2.247	October	2.215	1.01
2016	2.306	December	2.262	1.02
2017	2.423	October	2.347	1.03
2018	2.389	May	2.377	1.01
2019	2.386	October	2.365	1.01
2020	2.376	February	2.318	1.03
2021	2.431	August	2.396	1.01
2022	2.666	November	2.531	1.05
2023	2.579	January	2.499	1.03
			Average Ratio:	1.02

Notes:

(1) Flows are in units of million gallons per day (MGD)

2.4 Updated Flow and Loading Information

As part of updating the capacity analysis report, FDEP's Guidelines for Preparation of Capacity Analysis Reports, current loadings to the plant using the past year's influent monitoring data should be calculated, tabulated, and presented to compare with design loadings. Design loadings from *Preliminary Design Report for Yankee Lake Water Reclamation Facility Rerating & Expansion* (Boyle Engineering Corporation, November 2006) are presented in Table 2-8.

The WRF permit requires 5-day carbonaceous biochemical oxygen demand (CBOD₅) and total suspended solids (TSS) to be sampled from the headworks weekly. In addition to CBOD₅ and TSS influent sampling, total Kjeldahl nitrogen (TKN) is sampled at the headworks weekly. Historical loading data has been tabulated and presented in Tables 2-9 through 2-11 and Figures 2-5 through 2-7.

Current effluent water quality for CBOD₅, total suspended solids, total nitrogen (TN) and total phosphorus (TP) are tabulated in Tables 2-12 through 2-15 and presented in Figures 2-8 through 2-11.

The current flows and loadings are within the design capacity established in the preliminary design report.

Table 2-8. Design Loadings ⁽¹⁾

Parameter	Basis of Design Value
Flow:	
Annual Average Daily Flow	3.50 MGD
Three-month Average Daily Flow	3.68 MGD
Maximum Month Average Daily Flow	3.85 MGD
Maximum Daily Flow	5.50 MGD
Peak Hourly Flow	8.75 MGD
CBOD ₅ :	
Concentration ⁽²⁾	270 mg/L
Loading ⁽³⁾	8,670 lbs/day
Total Suspended Solids:	
Concentration ⁽²⁾	299 mg/L
Loading ⁽³⁾	9,600 lbs/day
Total Kjeldahl Nitrogen:	
Concentration ⁽²⁾	58 mg/L
Loading ⁽³⁾	1,870 lbs/day
Ammonia Nitrogen:	
Concentration ⁽²⁾	52 mg/L
Loading ⁽³⁾	1,670 lbs/day
Total Phosphorus:	
Concentration ⁽²⁾	8.3 mg/L
Loading ⁽³⁾	267 lbs/day

Notes:

- (1) Design loadings from *Preliminary Design Report for Yankee Lake Water Reclamation Facility Rerating & Expansion*, Boyle Engineering Corporation, November 2006
- (2) Concentrations are 90th percentile of historical influent data as described in *Preliminary Design Report for Yankee Lake Water Reclamation Facility Rerating & Expansion*, Boyle Engineering Corporation, November 2006
- (3) Loadings basis is maximum month as described in *Preliminary Design Report for Yankee Lake Water Reclamation Facility Rerating & Expansion*, Boyle Engineering Corporation, November 2006

Table 2-9. Current Influent CBOD₅ Concentrations and Loadings (Monthly Averages)

	Influent CBOD ₅ Concentrations (mg/L)	Influent CBOD ₅ Loadings (lbs/day)
November 2022	186	4,026
December 2022	171	3,662
January 2023	204	4,403
February 2023	229	4,817
March 2023	195	4,019
April 2023	225	4,713
May 2023	214	4,480
June 2023	212	4,340
July 2023	180	3,716
August 2023	168	3,499
September 2023	170	3,688
October 2023	179	3,776
Average	194	4,095
Maximum	229	4,817

Table 2-10. Current Influent TSS Concentrations and Loadings (Monthly Averages)

	Influent TSS Concentrations (mg/L)	Influent TSS Loadings (lbs/day)
November 2022	70	1,521
December 2022	66	1,417
January 2023	116	2,516
February 2023	113	2,385
March 2023	84	1,723
April 2023	134	2,810
May 2023	118	2,462
June 2023	119	2,423
July 2023	90	1,863
August 2023	108	2,256
September 2023	110	2,357
October 2023	78	1,643
Average	101	2,115
Maximum	134	2,810

Table 2-11. Current Influent TKN Concentrations and Loadings (Monthly Averages)

	Influent TKN Concentrations (mg/L)	Influent TKN Loadings (lbs/day)
November 2022	47	1,008
December 2022	34	739
January 2023	58	1,255
February 2023	52	1,097
March 2023	46	951
April 2023	47	977
May 2023	43	889
June 2023	31	640
July 2023	43	887
August 2023	49	1,030
September 2023	32	704
October 2023	45	955
Average	44	928
Maximum	58	1,255

Figure 2-5. Current CBOD₅ Concentrations and Loadings (Monthly Averages)

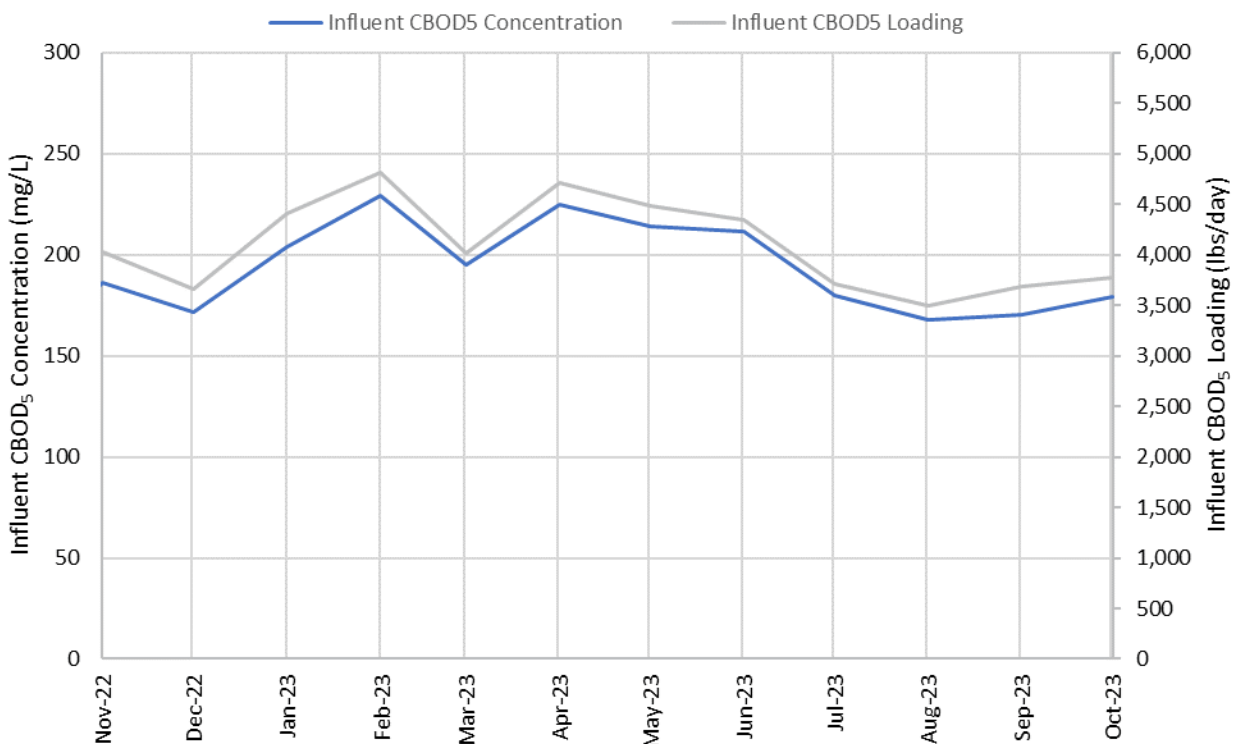


Figure 2-6. Current TSS Concentrations and Loadings (Monthly Averages)

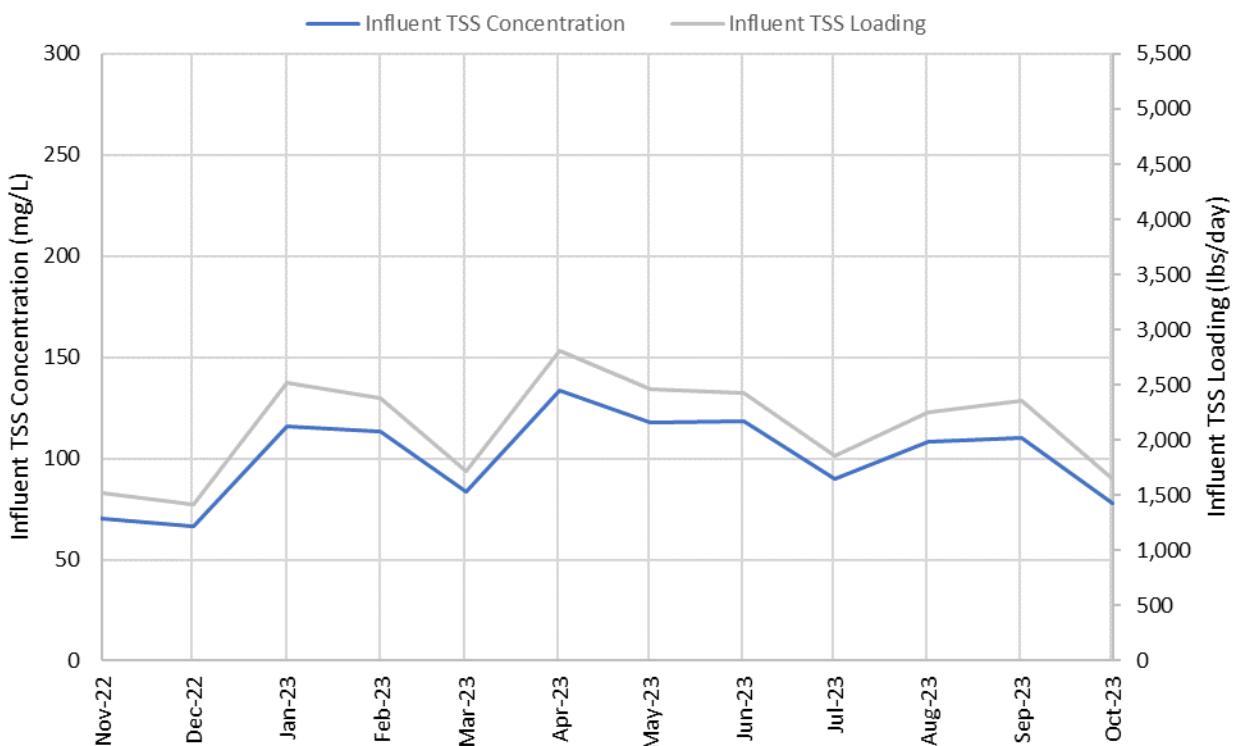


Figure 2-7. Current TKN Concentrations and Loadings (Monthly Averages)

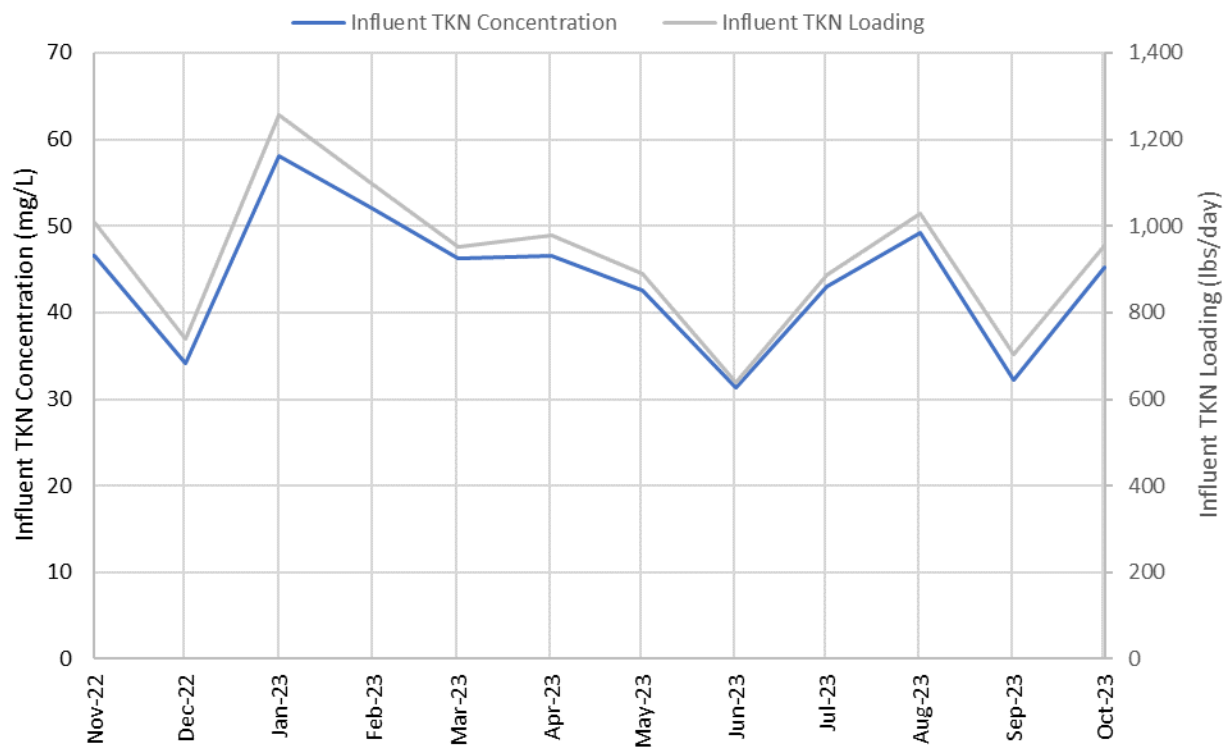


Table 2-12. Effluent CBOD₅ Concentrations and Permit Limit

	Monthly Average Daily Flow (MGD)	Effluent CBOD ₅ Concentrations	
		Permit Limit (mg/L)	Monthly Average (mg/L)
November 2022	2.626	30	2.0
December 2022	2.566	30	2.0
January 2023	2.546	30	2.0
February 2023	2.502	30	2.0
March 2023	2.455	30	2.0
April 2023	2.461	30	2.0
May 2023	2.495	30	2.6
June 2023	2.488	30	3.2
July 2023	2.459	30	8.5
August 2023	2.508	30	3.3
September 2023	2.580	30	4.3
October 2023	2.499	30	3.9
Average	2.515	30	3.1
Maximum	2.626	30	8.5

Table 2-13. Effluent TSS Concentrations and Permit Limit

	Monthly Average Daily Flow (MGD)	Effluent TSS Concentrations	
		Permit Limit (mg/L)	Maximum (mg/L)
November 2022	2.626	5	1.0
December 2022	2.566	5	1.6
January 2023	2.546	5	9.0
February 2023	2.502	5	4.0
March 2023	2.455	5	1.7
April 2023	2.461	5	2.2
May 2023	2.495	5	1.6
June 2023	2.488	5	1.6
July 2023	2.459	5	1.2
August 2023	2.508	5	2.5
September 2023	2.580	5	1.7
October 2023	2.499	5	1.0
Average	2.515	5	2.4
Maximum	2.626	5	9.0

Table 2-14. Effluent Total Nitrogen Concentrations and Permit Limit

	Monthly Average Daily Flow (MGD)	Effluent TN Concentrations	
		Permit Limit ⁽¹⁾ (mg/L as N)	Monthly Average (mg/L as N)
November 2022	2.626	3	1.1
December 2022	2.566	3	2.0
January 2023	2.546	3	1.0
February 2023	2.502	3	0.9
March 2023	2.455	3	1.0
April 2023	2.461	3	1.1
May 2023	2.495	3	1.6
June 2023	2.488	3	0.8
July 2023	2.459	3	0.9
August 2023	2.508	3	1.3
September 2023	2.580	3	1.2
October 2023	2.499	3	1.1
Average	2.515	3	1.2
Maximum	2.626	3	2.0

Notes:

- (1) Monthly TN averages are reported. Permit limit for TN is 3 mg/L annual average.

Table 2-15. Effluent Total Phosphorus Concentrations and Permit Limit

	Monthly Average Daily Flow (MGD)	Effluent TP Concentrations	
		Permit Limit ⁽¹⁾ (mg/L as P)	Maximum (mg/L as P)
November 2022	2.626	---	0.5
December 2022	2.566	---	0.7
January 2023	2.546	---	0.7
February 2023	2.502	---	1.5
March 2023	2.455	---	1.8
April 2023	2.461	---	1.1
May 2023	2.495	---	1.3
June 2023	2.488	---	1.0
July 2023	2.459	---	0.6
August 2023	2.508	---	0.8
September 2023	2.580	---	1.6
October 2023	2.499	---	0.7
Average	2.515	---	1.0
Maximum	2.626	---	1.8

Notes:

- (1) Monthly maximum TP is reported. No permit limit for TP.

Figure 2-8. Monthly Average Effluent CBOD₅ Concentrations and Loadings

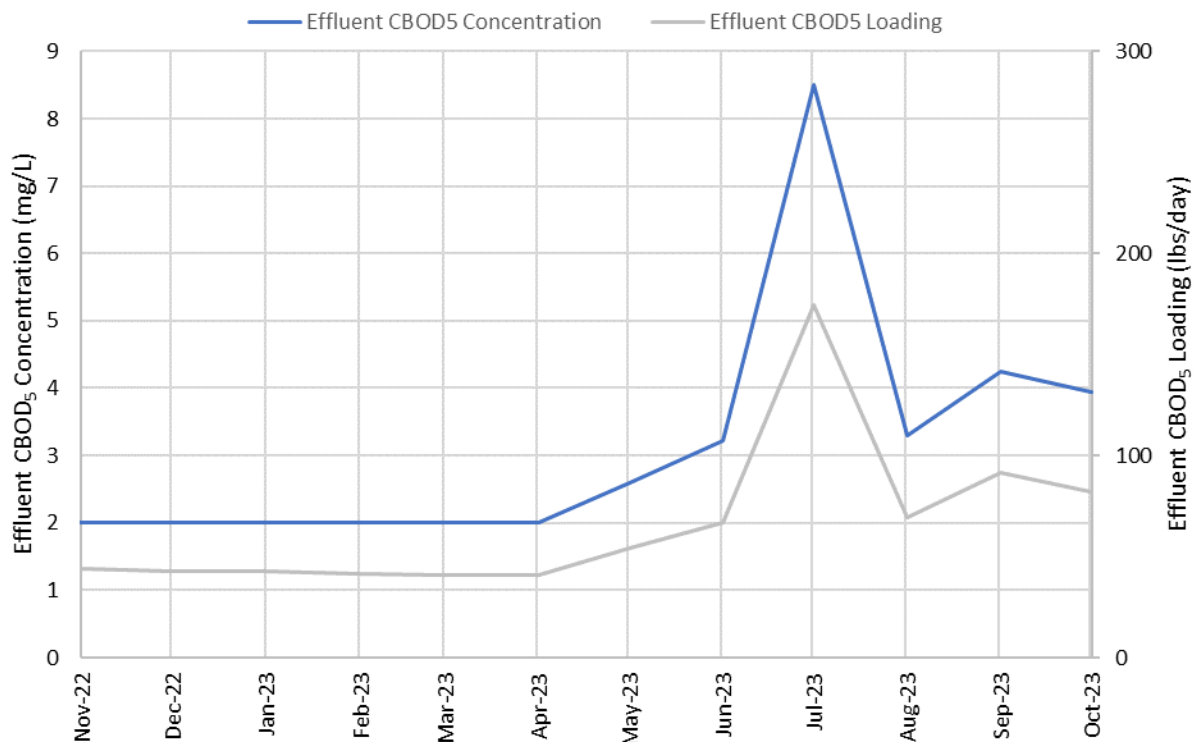


Figure 2-9. Maximum Monthly Effluent TSS Concentrations and Loadings

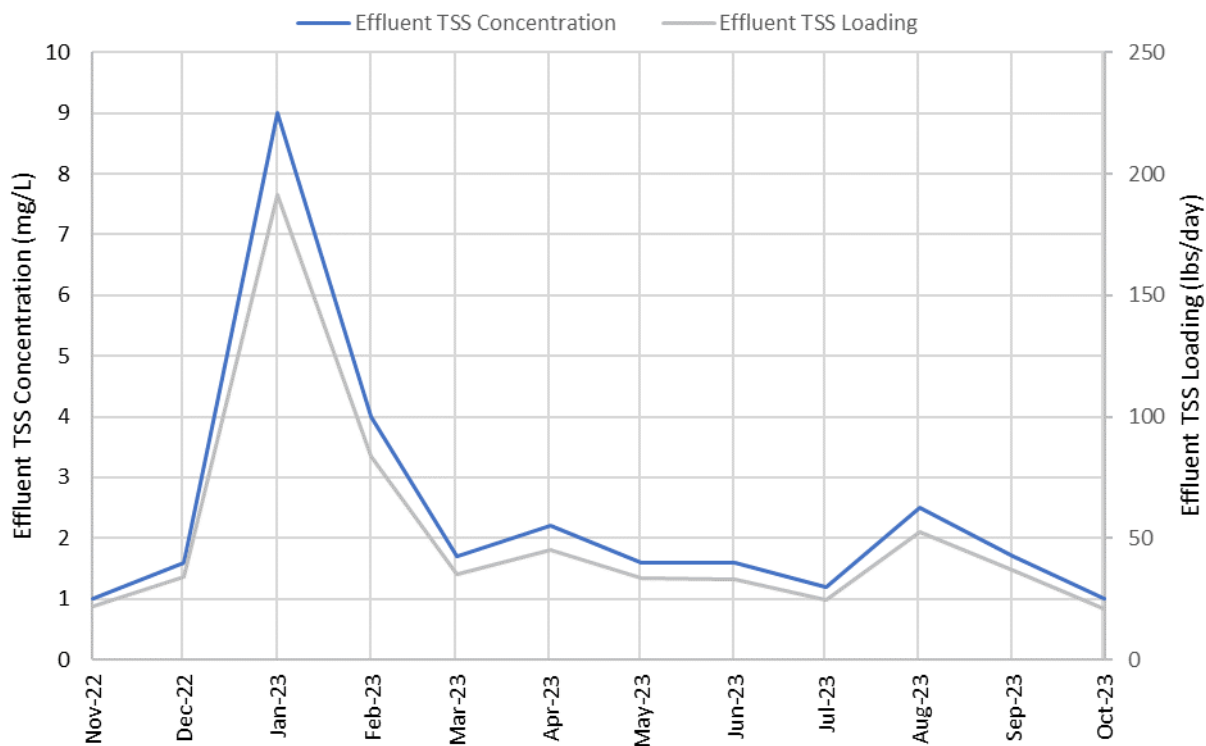


Figure 2-10. Monthly Average Effluent Total Nitrogen Concentrations and Loadings

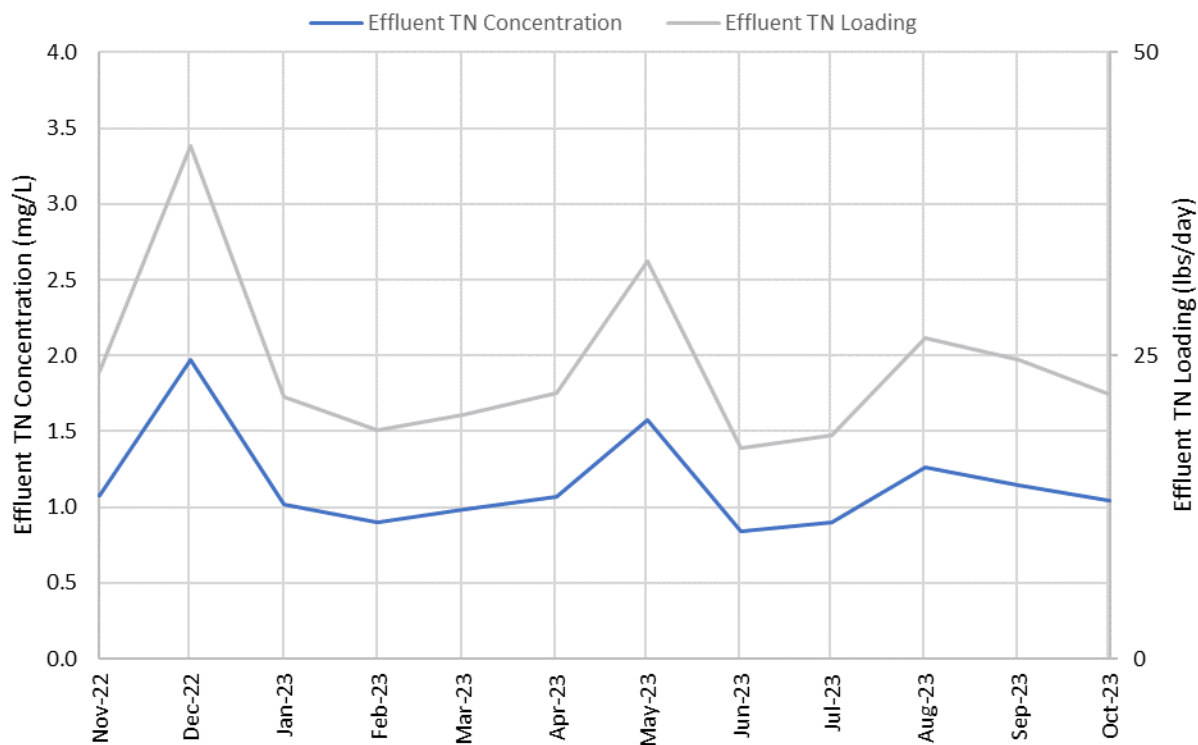
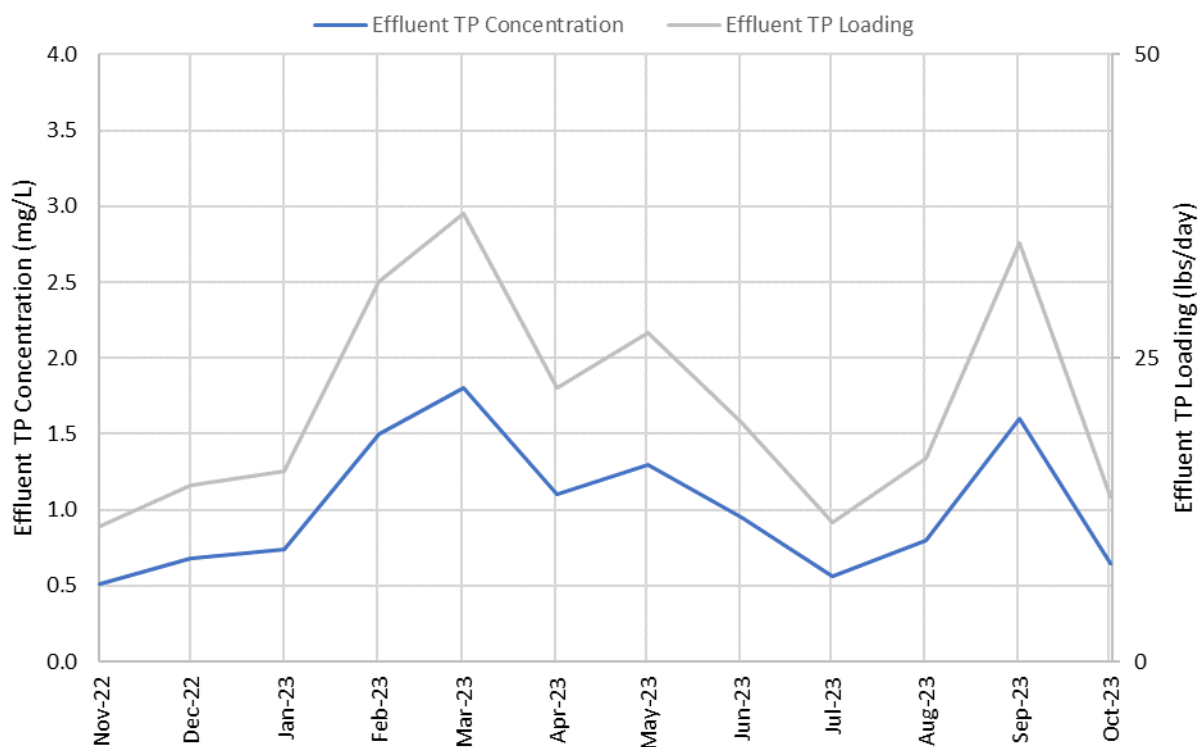


Figure 2-11. Maximum Monthly Effluent Total Phosphorus Concentrations and Loadings



3. Future Conditions

3.1 Population and Flow Projections

The Seminole County Utilities Department (SCUD) undertakes master planning on a regular basis for the proper planning of water, wastewater, and reclaimed water capacity requirements. SCUD completed a 2013 Master Plan and is presently updating their Master Plan. The current master plan report, *Utilities Master Plan Update, Draft Final, December 2021*, represents the latest information with regards to wastewater projections and this update to the 2013 Master Plan includes compilation and review of data collected since the last Master Plan and development of new demand projections through 2040. The Utilities Master Plan Update presents an assessment of the SCUD water, wastewater, and reclaimed water infrastructure, including its ability to deliver service that meets customer demands and regulatory requirements through 2040. Population projections used in the Utilities Master Plan Update were generated by The Balmoral Group who was commissioned by Seminole County to provide population projections for SCUD water, wastewater, and reclaimed water service areas. The population projections for the Yankee Lake WRF service area in the report by the Balmoral Group, *Population Projections by Jurisdiction, Traffic Analysis Zone, and Utility Service Area*, are presented in Table 3-1.

Table 3-1. Yankee Lake WRF Service Area Population Projections

Year	Population
2020	33,410
2021	33,410
2022	34,114
2023	34,114
2024	34,838
2025	35,641
2030	35,822
2035	35,861
2040	36,894
2045	37,690

SCUD completed a Septic Tank Remediation Plan & Wastewater Feasibility Plan (Plan) within the Seminole County Basin Management Action Plans (BMAPs) in late 2021. The study includes a remediation plan for onsite sewage treatment and disposal systems (OSTDS) within the Lake Jesup and Middle St. Johns River BMAPs. The Plan has been documented in the *Seminole County Lake Jesup and Middle St. Johns River Septic Tank Remediation Plan and Wastewater Treatment Feasibility Analysis, December 2021*. From this plan, projects to convert OSTDS were identified which would potentially discharge in the future to the YLWRF. Projects were grouped into phases based on the proximity of the projects to each other. Table 3-2

presents a summary of the phases and estimated schedule for the flows to discharge to the YLWRF. These flows are included in the wastewater projections presented below for the YLWRF.

Table 3-2. OSTDS Conversion Phases

	Annual	Schedule
Phase 1	53,568 gpd	2036-2038
Phase 2	72,288 gpd	2041-2043

Table 3-3 presents the projected annual average daily flows for the YLWRF developed in the Utilities Master Plan Update Draft and includes the OSTDS conversions presented in Table 3-2. The Master Plan projections are based on the mean forecasted value (50th percentile) as described in the Utilities Master Plan Update Draft through 2040. The projected maximum three-month average daily flow is also presented in Table 3-3. The projected maximum three-month average daily flow was determined by using the historical three-month ADF to AADF ratio of 1.02 as developed in Section 2.3.

The historical AADF, historical maximum three-month ADF, projected AADF, and projected maximum three-month ADF is shown in Figure 3-1.

Table 3-3. Yankee Lake WRF Wastewater Projections ⁽¹⁾

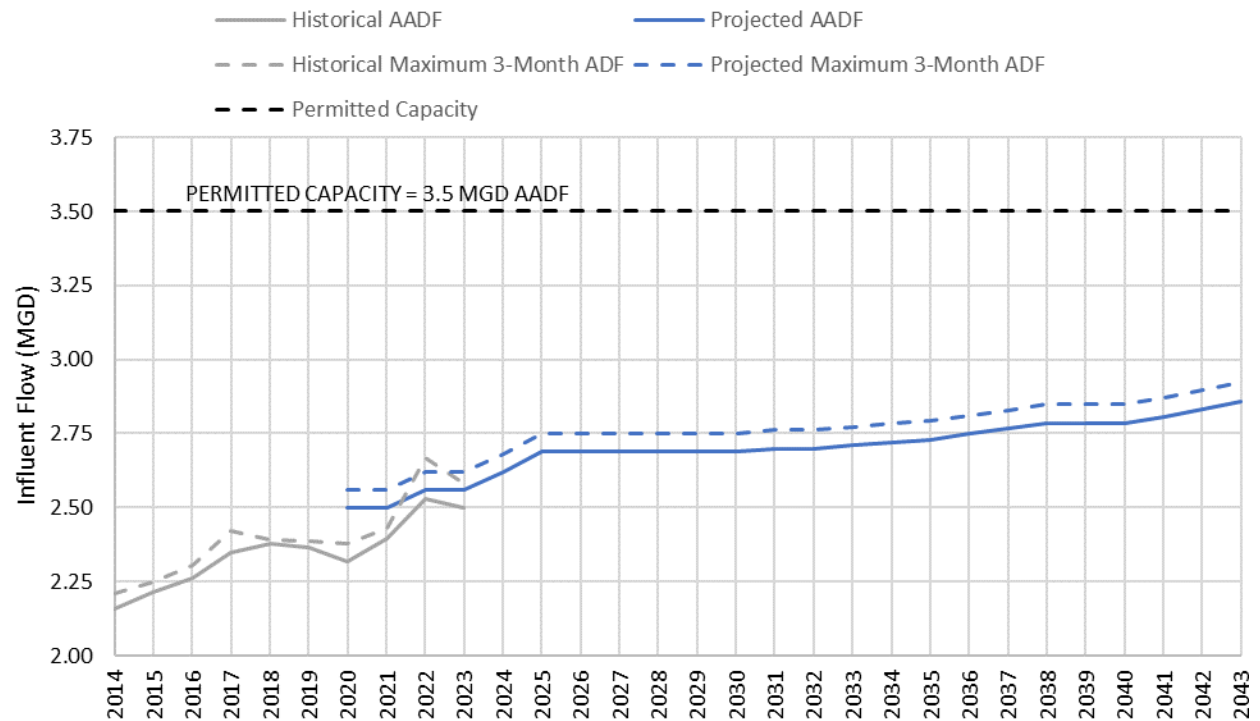
Year	Projected Average Annual Daily Flow	Projected Maximum 3-Month ADF
2020	2.50	2.56
2021	2.50	2.56
2022	2.56	2.62
2023	2.56	2.62
2024 ⁽²⁾	2.62	2.68
2025 ⁽²⁾	2.69	2.75
2026 ⁽²⁾	2.69	2.75
2027 ⁽²⁾	2.69	2.75
2028 ⁽²⁾	2.69	2.75
2029 ⁽²⁾	2.69	2.75
2030 ⁽²⁾	2.69	2.75
2031 ⁽²⁾	2.7	2.76
2032 ⁽²⁾	2.7	2.76
2033 ⁽²⁾	2.71	2.77
2034 ⁽²⁾	2.72	2.78
2035 ⁽²⁾	2.73	2.79
2036 ⁽²⁾	2.75	2.81
2037 ⁽²⁾	2.77	2.83
2038 ⁽²⁾	2.78	2.85
2039 ⁽²⁾	2.78	2.85
2040 ⁽²⁾	2.78	2.85
2041 ⁽²⁾	2.81	2.87
2042 ⁽²⁾	2.83	2.90
2043 ⁽²⁾	2.86	2.92

Notes:

(1) Flows are in units of million gallons per day (MGD)

(2) Indicates projection from 2024 through 2043

Figure 3-1. Yankee Lake WRF Historical and Projected AADF and Maximum 3-Month ADF



4. Summary and Conclusions

SCUD has actively monitored and planned for the need to expand the Yankee Lake WRF through their master planning efforts. The Utilities Master Plan Update Draft represents the latest information with regards to wastewater projections and presents an assessment of the SCUD water, wastewater, and reclaimed water infrastructure, including its ability to deliver service that meets customer demands and regulatory requirements through 2040.

Figure 3-1 shows graphically the existing AADF and projected AADF for the Yankee Lake WRF. The existing AADF and projected AADF appear to be in correspondence with each other during the overlapping period between 2020 and 2023. Flows are projected to increase until 2025 and then level off to 2037. Following 2037, the Master Plan projections are relatively flat except for the addition of flows from the OSTDS conversions.

For the next 10 years, the project 2033 AADF is 2.71 MGD or 77% of the permitted capacity. The projected 2043 AADF is 2.86 MGD which is approximately 82% of the permitted capacity. The permitted capacity is not expected to be equaled or exceeded for at least 20 years, therefore no expansion is needed or recommended at this time. In accordance with Florida Administrative Code 62-600.405 *Planning for Wastewater Facilities Expansion*, an updated capacity analysis report shall be submitted to the FDEP at the next five-year permit interval.

5. Bibliography

Boyle Engineering Corporation (November 2006), *Preliminary Design Report for Yankee Lake Water Reclamation Facility Rerating & Expansion*

CHA (December 2021), *Seminole County Lake Jesup and Middle St. Johns River Septic Tank Remediation Plan and Wastewater Treatment Feasibility Analysis*

Jacobs (December 2021), *Utilities Master Plan Update, Draft Final*

The Balmoral Group (June 2020), *Population Projections by Jurisdiction, Traffic Analysis Zone, and Utility Service Area*