



# **CAPACITY ANALYSIS REPORT**

## **Woodlea Road Water Reclamation Facility**

Lake County, Florida

*FDEP Operating Permit: FLA010509*

*Expiration Date: June 25, 2023*



Prepared for:  
City of Tavares

Prepared by:  
Arcadis U.S., Inc.  
37 N. Orange Ave., Suite 900B, Orlando FL - 32801

November 2022



Capacity Analysis Report  
Woodlea Road WRF

**Permittee / Owner's Certification**

As the responsible authority for the City of Tavares Woodlea Road Water Reclamation Facility, the undersigned certifies that he is fully aware of and intends to comply with the recommendations and schedules included herein.

---

Signature

---

Date

**Phillip Clark**

Utilities Director  
City of Tavares  
1000 Captain Haynes Road  
Tavares, FL 32778  
(352) 742-6462

**Treatment Plant Superintendent Certification**

As the superintendent for the City of Tavares Woodlea Road Water Reclamation Facility, the undersigned certifies that he has reviewed and is fully aware and intends to comply with the recommendations and schedules included herein.

---

Signature

---

Date

**Jim Wyker,**

WRF Supervisor  
FL Class A License No. 7877  
City of Tavares  
2770 Woodlea Road  
Tavares, FL 32778  
(352) 742-6301



**City of Tavares  
Woodlea Road WRF**

**Capacity Analysis Report – Update  
2022**

Prepared for:  
City of Tavares

Prepared by:  
ARCADIS U.S., Inc.  
37 N. Orange Ave.,  
Suite 900B  
Orlando  
Florida 32801  
Tel: (407) 660 1133

Date: December 2022

*This document is intended only for the use of the individual or entity for which it was prepared and may contain information that is privileged, confidential and exempt from disclosure under applicable law. Any dissemination, distribution or copying of this document is strictly prohibited.*



Capacity Analysis Report  
Woodlea Road WRF

**Professional Engineer Certification**

I certify that the information contained in this Updated Capacity Analysis Report for the City of Tavares Water Reclamation Facility is true and correct to the best of my knowledge and has been reviewed and discussed with the Permittee's Utilities Director and Wastewater Supervisor. This report was prepared in accordance with sound engineering principles using Florida Department of Environmental Protection's Guidelines for Preparation of Capacity Analysis Reports published in July 1992.

---

Signature

---

Date

Saurabh Srivastava, P.E.  
Florida Professional Engineer No. 72233  
Arcadis U.S., Inc.  
37 N. Orange Ave., Suite 900B, Orlando FL - 32801  
(407) 659-5576



**City of Tavares  
Woodlea Road WRF**

Capacity Analysis Report

Prepared for:  
City of Tavares

Prepared by:  
ARCADIS U.S., Inc.  
37 N. Orange Ave.,  
Suite 900B  
Orlando  
Florida 32801  
Tel: (407) 660 1133

Date:  
December 2022

*This document is intended only for the use of the individual or entity for which it was prepared and may contain information that is privileged, confidential and exempt from disclosure under applicable law. Any dissemination, distribution or copying of this document is strictly prohibited.*



Contents

Acronyms and Abbreviations..... iv

1 INTRODUCTION ..... 1

1.1 Background ..... 1

1.2 Facility Description..... 1

2 EXISTING CONDITIONS ..... 7

2.1 Permitted Capacities ..... 7

2.2 Historical Flows ..... 7

2.3 Seasonal Variations..... 10

2.4 Influent Loading ..... 12

3 FUTURE CONDITIONS..... 12

3.1 Population Projections..... 12

3.2 Flow Projections ..... 13

4 SUMMARY AND CONCLUSIONS..... 16

4.1 Time Required to Reach Plant Capacity..... 16

4.2 Recommendations for Expansion ..... 16



## Tables

|                                                           |    |
|-----------------------------------------------------------|----|
| Table 1-1. Process Unit Descriptions .....                | 3  |
| Table 2-1. Permitted Effluent Disposal Sites .....        | 7  |
| Table 2-2. Historical Flow Data.....                      | 7  |
| Table 2-3. Historical Annual Average Daily Flow .....     | 9  |
| Table 2-4. Woodlea Road WRF Seasonal Flow Variation ..... | 11 |
| Table 2-5. Woodlea Road WRF Current Influent Loading..... | 12 |
| Table 3-1. Population and Flow Projections 2022-2033..... | 15 |

## Figures

|                                                                      |    |
|----------------------------------------------------------------------|----|
| Figure 1-1. Tavares Wastewater Service Area Boundary .....           | 2  |
| Figure 1-2. Woodlea Road WRF Site Plan .....                         | 4  |
| Figure 1-3. Facility Layout - Woodlea Road WRF.....                  | 5  |
| Figure 1-4. Process Flow Diagram - Woodlea Road WRF .....            | 6  |
| Figure 2-1. Historical Flows at Woodlea Road WRF (2013-2022) .....   | 10 |
| Figure 2-2. Historical Precipitation and Woodlea Road WRF Flow ..... | 11 |
| Figure 3-1. Historical and Projected Population .....                | 13 |
| Figure 3-2. Planned Development Map for Future Growth Areas .....    | 14 |
| Figure 3-3. Historical and Projected AADF and TMADF .....            | 15 |

## Appendices

|            |                                |
|------------|--------------------------------|
| Appendix A | Existing FDEP Operating Permit |
|------------|--------------------------------|



Capacity Analysis Report  
Woodlea Road WRF



## Acronyms and Abbreviations

|                   |                                                 |
|-------------------|-------------------------------------------------|
| AADF              | Annual Average Daily Flow                       |
| AUP               | Agricultural Use Plan                           |
| BEBR              | Bureau of Economic and Business Research        |
| BOD               | Biochemical Oxygen Demand                       |
| CAR               | Capacity Analysis Report                        |
| CBOD <sub>5</sub> | Five-day Carbonaceous Biochemical Oxygen Demand |
| DMR               | Discharge Monitoring Reports                    |
| FAC               | Florida Administrative Code                     |
| FDEP              | Florida Department of Environmental Protection  |
| gpd/ft            | Gallons per Day per Foot                        |
| gpd/sf            | Gallons per Day per Square Foot                 |
| gpdpc             | Gallons per Day per Capita                      |
| gpm               | Gallons per Minute                              |
| GST               | Ground Storage Tank                             |
| I/I               | Inflow and Infiltration                         |
| lb/d              | Pounds Per Day                                  |
| MADF              | Monthly Average Daily Flow                      |
| mg/L              | Milligrams per Liter                            |
| MGD               | Million Gallons per Day                         |
| ppd               | Pounds per Day                                  |
| RIB               | Rapid Infiltration Basin                        |
| sf                | Square-foot                                     |
| TMADF             | Three Month Average Daily Flow                  |
| TN                | Total Nitrogen                                  |
| TP                | Total Phosphorus                                |
| TSS               | Total Suspended Solids                          |

# 1 INTRODUCTION

## 1.1 Background

The City of Tavares, Florida owns and operates the Woodlea Road Water Reclamation Facility (WRF). Located at latitude 29°47'29" N and longitude 81°45'22" W in the City of Tavares, Florida in Lake County, the WRF is permitted to treat 3.0 million gallons per day (MGD) of wastewater flow on an annual average daily flow (AADF) basis. The WRF operates under an existing Florida Department of Environmental Protection (FDEP) wastewater permit (No. FLA010509-006-DW1) that expires on June 25, 2023.

The previous capacity analysis report for the Woodlea Road WRF was submitted to the FDEP in February 2013. This Updated CAR was prepared in accordance with FDEP Rule 62-600.405(5)(a) Florida Administrative Code (FAC) and FDEP's Guidelines for Preparation of Capacity Analysis Reports and is being submitted as part of the City of Tavares Domestic Wastewater Facility Permit renewal for the Woodlea Road WRF. Rule 62-600.405, FAC requires CAR to assure timely planning, design and construction for proper treatment and reuse or disposal. The CAR includes an analysis of past flow data, estimation of future growth and flows, and an evaluation of the existing facility to handle the expected growth.

## 1.2 Facility Description

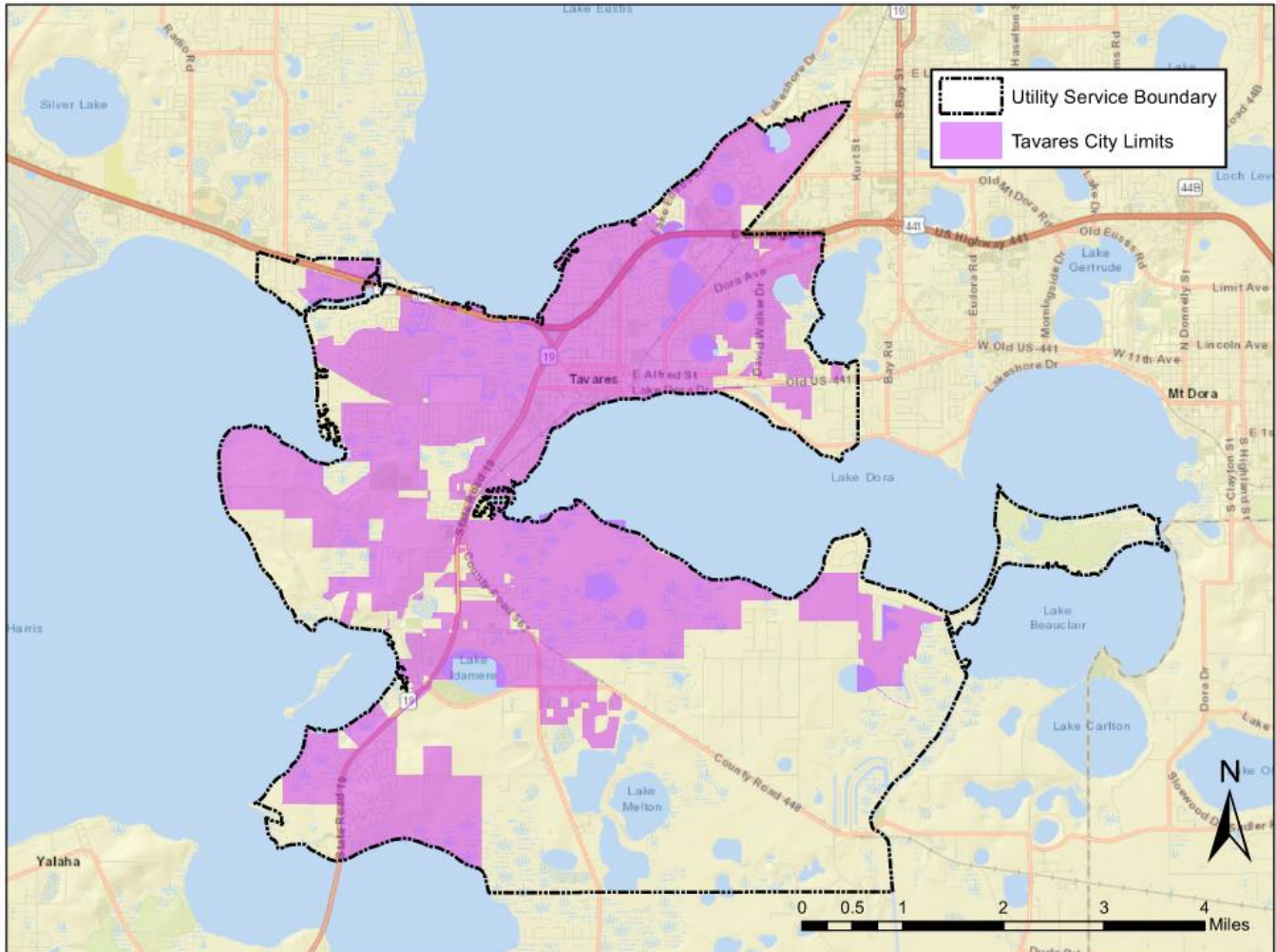
Woodlea Road WRF provides wastewater treatment for customers within the City of Tavares and unincorporated areas within the wastewater service area, shown in Figure 1-1. The WRF has a permitted capacity of 3.0 MGD AADF and provides advanced secondary treatment to influent wastewater by means of screening, extended aeration, secondary clarification, filtration, and disinfection. Treated effluent from the WRF is permitted for 1.08 MGD AADF distribution to a public access reuse system and for 2.0 MGD AADF discharge at City-owned rapid infiltration basins (RIBS). The facility also has a lined effluent storage pond and a 5.0-million-gallon (MG) ground storage tank (GST). The treatment system at the WRF consists of two treatment trains.

Treatment train No. 1 was originally rated at 1.0 MGD AADF. In 2006, treatment train No. 2, permitted at 1.5 MGD AADF, was constructed in addition to improvements to increase the permitted capacity of treatment train No. 1 to 1.5 MGD AADF. In March 2018, the City added a third aerator to train No. 2, which has increased the biological treatment capacity of that train by approximately 0.5 MGD.

The activated sludge domestic wastewater treatment plant consists of the following unit processes:

- Influent screening
- Grit removal
- Two activated sludge treatment trains (biological nutrient removal oxidation ditch)
- Four secondary clarifiers
- Sand Filtration
- Chlorination
- Belt filter press for residuals dewatering
- Aerobic digestion of residuals

- On-site RIBs
- Lined effluent storage pond
- 5.0 MG reclaimed water GST



**Figure 1-1.** Tavares Wastewater Service Area Boundary

Treated effluent from the WRF is permitted for reuse and/or disposal as described below:

- **Rapid Infiltration Basin:** An existing 2.0 MGD AADF permitted capacity on-site RIB system, which consists of three RIBs with a total wetted area of 9.6 acres.
- **Public Access Reuse:** An existing 1.08 MGD AADF permitted capacity slow-rate public access system, which consists of reuse irrigation within the City's Service Area (Figure 1-1).

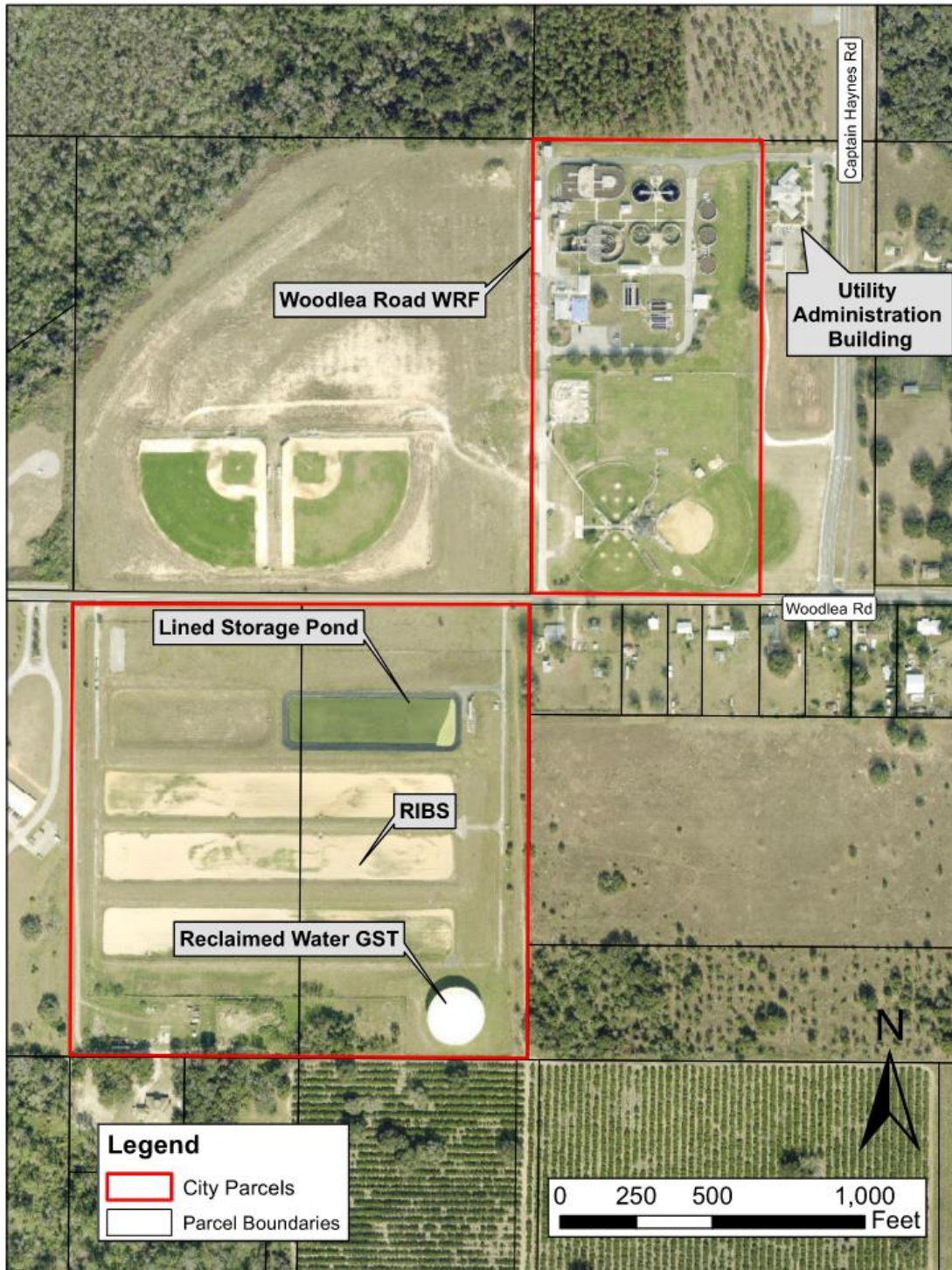
The wastewater residuals are treated to meet Class B requirements via aerobic digestion and are transported by a contracted hauler to a residuals management facility. An agricultural use plan (AUP) is not required.

Table 1-1 lists the major unit processes at the Woodlea Road WRF.

**Table 1-1. Process Unit Descriptions**

| Unit Process                         | Treatment Unit #1<br>1.5 MGD | Treatment Unit #2<br>1.5 MGD      |
|--------------------------------------|------------------------------|-----------------------------------|
| Aeration Basin                       |                              |                                   |
| Number of basins                     | 1                            | 1                                 |
| Effective volume                     | 865,416 gallons              | 993,895 gallons                   |
| Permitted flow (AADF)                | 1.5 MGD                      | 1.5 MGD                           |
| Design influent BOD <sub>5</sub>     | 10 mg/L                      | 10 mg/L                           |
| Design mass BOD <sub>5</sub> loading | 2,752 lb/d                   | 2,752 lb/d                        |
| Hydraulic detention                  | 13.85 hours (AADF)           | 15.90 hours (AADF)                |
| Mechanical Aeration                  | 75 hp (2 units)              | 75 hp (2 units) & 100 hp (1 unit) |
| Secondary Clarifier                  |                              |                                   |
| Number of clarifiers                 | 2                            | 2                                 |
| Diameter                             | 55 feet                      | 55 feet                           |
| Side water depth                     | 14.2 feet                    | 14.4 feet                         |
| Effective volume                     | 251,835 gallons              | 255,389 gallons                   |
| Surface area                         | 4,752 sf                     | 4,752 sf                          |
| Surface Loading at AADF              | 316 gpd/sf                   | 316 gpd/sf                        |
| Surface loading (at PHF)             | 947 gpd/sf                   | 947 gpd/sf                        |
| Weir Loading at AADF                 | 4,341 gpd/ft                 | 4,341 gpd/ft                      |
| Weir loading (at PHF)                | 13,022 gpd/ft                | 13,022 gpd/ft                     |
| Hydraulic detention                  | 8.06 hour (AADF)             | 8.17 hour (AADF)                  |
| Traveling Bridge Sand Filters        |                              |                                   |
| Number of Filters                    | 1                            |                                   |
| Number of Modules                    | 3                            |                                   |
| Surface Area                         | 1,485 sf (495 sf per module) |                                   |
| Surface Loading (at AADF)            | 1.40 gpd/sf                  |                                   |
| Surface Loading (at PHF)             | 4.21 gpd/sf                  |                                   |
| Chlorine Contact Basin               |                              |                                   |
| Number of basins                     | 2                            | 2                                 |
| Effective volume                     | 45,584 gallons               | 69,720 gallons                    |
| Hydraulic detention                  | 14.6 minutes                 | 22.3 minutes                      |
| Aerobic Digester                     |                              |                                   |
| Number of digesters                  | 2                            | 1                                 |
| Effective volume                     | 205,000 gallons (each)       | 205,000 gallons                   |
| Gravity Belt Filter                  |                              |                                   |
| Number of units                      | 1                            |                                   |
| Design influent rate                 | 60-90 gpm                    |                                   |
| Influent percent solids              | 4-5 percent                  |                                   |
| Cake percent solids                  | 15 percent                   |                                   |

An aerial site plan of the WRF is provided in Figure 1-2. A site map with unit processes showing the facility layout is provided in Figure 1-3 and a process flow diagram of the WRF is shown in Figure 1-4.



**Figure 1-2.. Woodlea Road WRF Site Plan**



Capacity Analysis Report  
Woodlea Road WRF



**Figure 1-3. Facility Layout - Woodlea Road WRF**

**>>>>> Replace page with standalone figure in the PDF >>>>>**



Capacity Analysis Report  
Woodlea Road WRF



**Figure 1-4. Process Flow Diagram - Woodlea Road WRF**

>>>> **Replace page with standalone figure in the PDF** >>>>>

## 2 EXISTING CONDITIONS

This section provides a summary of the current WRF capacity, past performance, and treatment capability in order to provide a framework for the assessment of the ability of the facility to handle future conditions (increased flows and loads.) Per the FDEP's Guidelines for Preparation of Capacity Analysis Reports, the following items are discussed in this Section:

- Permitted Capacities
- Historical Flows (Monthly, Three-Month, and Annual Average)
- Seasonal Variations
- Current Flow and Influent Loading

### 2.1 Permitted Capacities

The Woodlea Road WRF currently consists of two treatment units permitted at 1.5 MGD AADF each, for a total facility permitted capacity of 3.0 MGD AADF. The facility's effluent is permitted to a total of 3.08 MGD AADF, as shown in Table 2-1.

Table 2-1 – Permitted Effluent Disposal Sites

| Reuse System | Location                         | Permitted Capacity |
|--------------|----------------------------------|--------------------|
| R001         | Onsite Rapid Infiltration Basins | 2.00 MGD AADF      |
| R002         | Public-Access Reuse System       | 1.08 MGD AADF      |

### 2.2 Historical Flows

Flow to the reclaimed water distribution system is measured by an ultrasonic flow meter at the reuse pump station identified as FLW-3. Flow to RIBs is calculated by subtracting the flow to the reclaimed water distribution system (FLW-3) from the effluent flow measured at ultrasonic flow meter FLW-2. The meters identified as FLW-1 (influent ultrasonic flow meter), FLW-2 and FLW-3 are calibrated yearly. Historical flow information for the existing Woodlea Road WRF from monthly DMRs submitted to FDEP is shown below. The monthly average daily flow (MADF) and three-month average daily flow (TMADF) are shown in Table 2-2. Per discussion with FDEP on September 16, 2022, cutoff date for data analysis for the purpose of this permit renewal is August 30, 2022.

Table 2-2. Historical Flow Data

| Date   | MADF (MGD) | TMADF (MGD) | % Capacity <sup>2</sup> | Date   | MADF (MGD) | TMADF (MGD) | % Capacity <sup>2</sup> |
|--------|------------|-------------|-------------------------|--------|------------|-------------|-------------------------|
| Jan-13 | 1.19       | 1.14        | 38%                     | Jan-18 | 1.49       | 1.50        | 50%                     |
| Feb-13 | 1.23       | 1.18        | 39%                     | Feb-18 | 1.41       | 1.46        | 49%                     |
| Mar-13 | 1.17       | 1.20        | 40%                     | Mar-18 | 1.30       | 1.40        | 47%                     |
| Apr-13 | 1.13       | 1.18        | 39%                     | Apr-18 | 1.36       | 1.36        | 45%                     |
| May-13 | 1.13       | 1.15        | 38%                     | May-18 | 1.45       | 1.37        | 46%                     |



Capacity Analysis Report  
Woodlea Road WRF



| Date   | MADF (MGD) | TMADF (MGD) | % Capacity <sup>2</sup> | Date   | MADF (MGD) | TMADF (MGD) | % Capacity <sup>2</sup> |
|--------|------------|-------------|-------------------------|--------|------------|-------------|-------------------------|
| Jun-13 | 1.22       | 1.16        | 39%                     | Jun-18 | 1.46       | 1.43        | 48%                     |
| Jul-13 | 1.28       | 1.21        | 40%                     | Jul-18 | 1.70       | 1.54        | 51%                     |
| Aug-13 | 1.48       | 1.33        | 44%                     | Aug-18 | 1.60       | 1.59        | 53%                     |
| Sep-13 | 1.27       | 1.34        | 45%                     | Sep-18 | 1.42       | 1.57        | 52%                     |
| Oct-13 | 1.17       | 1.30        | 43%                     | Oct-18 | 1.35       | 1.45        | 48%                     |
| Nov-13 | 1.18       | 1.20        | 40%                     | Nov-18 | 1.33       | 1.36        | 45%                     |
| Dec-13 | 1.16       | 1.17        | 39%                     | Dec-18 | 1.48       | 1.39        | 46%                     |
| Jan-14 | 1.18       | 1.17        | 39%                     | Jan-19 | 1.47       | 1.43        | 48%                     |
| Feb-14 | 1.27       | 1.20        | 40%                     | Feb-19 | 1.52       | 1.49        | 50%                     |
| Mar-14 | 1.28       | 1.24        | 41%                     | Mar-19 | 1.48       | 1.49        | 50%                     |
| Apr-14 | 1.24       | 1.26        | 42%                     | Apr-19 | 1.42       | 1.47        | 49%                     |
| May-14 | 1.25       | 1.25        | 42%                     | May-19 | 1.36       | 1.42        | 47%                     |
| Jun-14 | 1.27       | 1.25        | 42%                     | Jun-19 | 1.40       | 1.39        | 46%                     |
| Jul-14 | 1.27       | 1.26        | 42%                     | Jul-19 | 1.40       | 1.39        | 46%                     |
| Aug-14 | 1.31       | 1.28        | 43%                     | Aug-19 | 1.70       | 1.50        | 50%                     |
| Sep-14 | 1.33       | 1.30        | 43%                     | Sep-19 | 1.49       | 1.53        | 51%                     |
| Oct-14 | 1.36       | 1.33        | 44%                     | Oct-19 | 1.42       | 1.54        | 51%                     |
| Nov-14 | 1.30       | 1.33        | 44%                     | Nov-19 | 1.42       | 1.44        | 48%                     |
| Dec-14 | 1.34       | 1.33        | 44%                     | Dec-19 | 1.45       | 1.43        | 48%                     |
| Jan-15 | 1.30       | 1.31        | 44%                     | Jan-20 | 1.54       | 1.47        | 49%                     |
| Feb-15 | 1.31       | 1.32        | 44%                     | Feb-20 | 1.52       | 1.50        | 50%                     |
| Mar-15 | 1.32       | 1.31        | 44%                     | Mar-20 | 1.48       | 1.51        | 50%                     |
| Apr-15 | 1.31       | 1.31        | 44%                     | Apr-20 | 1.42       | 1.47        | 49%                     |
| May-15 | 1.21       | 1.28        | 43%                     | May-20 | 1.44       | 1.45        | 48%                     |
| Jun-15 | 1.20       | 1.24        | 41%                     | Jun-20 | 1.53       | 1.46        | 49%                     |
| Jul-15 | 1.29       | 1.23        | 41%                     | Jul-20 | 1.51       | 1.49        | 50%                     |
| Aug-15 | 1.40       | 1.30        | 43%                     | Aug-20 | 1.47       | 1.50        | 50%                     |
| Sep-15 | 1.58       | 1.42        | 47%                     | Sep-20 | 1.59       | 1.52        | 51%                     |
| Oct-15 | 1.34       | 1.44        | 48%                     | Oct-20 | 1.61       | 1.56        | 52%                     |
| Nov-15 | 1.26       | 1.40        | 47%                     | Nov-20 | 1.54       | 1.58        | 53%                     |
| Dec-15 | 1.20       | 1.27        | 42%                     | Dec-20 | 1.53       | 1.56        | 52%                     |
| Jan-16 | 1.27       | 1.25        | 42%                     | Jan-21 | 1.53       | 1.54        | 51%                     |
| Feb-16 | 1.35       | 1.27        | 42%                     | Feb-21 | 1.55       | 1.54        | 51%                     |
| Mar-16 | 1.30       | 1.31        | 44%                     | Mar-21 | 1.55       | 1.55        | 52%                     |
| Apr-16 | 1.29       | 1.32        | 44%                     | Apr-21 | 1.61       | 1.57        | 52%                     |
| May-16 | 1.21       | 1.27        | 42%                     | May-21 | 1.55       | 1.57        | 52%                     |
| Jun-16 | 1.22       | 1.24        | 41%                     | Jun-21 | 1.48       | 1.55        | 52%                     |
| Jul-16 | 1.20       | 1.21        | 40%                     | Jul-21 | 1.66       | 1.56        | 52%                     |
| Aug-16 | 1.27       | 1.23        | 41%                     | Aug-21 | 1.61       | 1.59        | 53%                     |
| Sep-16 | 1.39       | 1.29        | 43%                     | Sep-21 | 1.50       | 1.59        | 53%                     |
| Oct-16 | 1.36       | 1.34        | 45%                     | Oct-21 | 1.47       | 1.53        | 51%                     |
| Nov-16 | 1.27       | 1.34        | 45%                     | Nov-21 | 1.52       | 1.50        | 50%                     |

| Date   | MADF (MGD) | TMADF (MGD) | % Capacity <sup>2</sup> | Date   | MADF (MGD)     | TMADF (MGD) | % Capacity <sup>2</sup> |
|--------|------------|-------------|-------------------------|--------|----------------|-------------|-------------------------|
| Dec-16 | 1.25       | 1.29        | 43%                     | Dec-21 | 1.50           | 1.50        | 50%                     |
| Jan-17 | 1.28       | 1.27        | 42%                     | Jan-22 | 1.50           | 1.51        | 50%                     |
| Feb-17 | 1.29       | 1.28        | 43%                     | Feb-22 | 1.51           | 1.50        | 50%                     |
| Mar-17 | 1.26       | 1.28        | 43%                     | Mar-22 | 1.54           | 1.52        | 51%                     |
| Apr-17 | 1.24       | 1.26        | 42%                     | Apr-22 | 1.59           | 1.55        | 52%                     |
| May-17 | 1.18       | 1.22        | 41%                     | May-22 | 1.58           | 1.57        | 52%                     |
| Jun-17 | 1.27       | 1.23        | 41%                     | Jun-22 | 1.53           | 1.57        | 52%                     |
| Jul-17 | 1.34       | 1.26        | 42%                     | Jul-22 | 1.74           | 1.62        | 54%                     |
| Aug-17 | 1.39       | 1.33        | 44%                     | Aug-22 | 1.65           | 1.64        | 55%                     |
| Sep-17 | 1.85       | 1.53        | 51%                     | Sep-22 | - <sup>1</sup> |             |                         |
| Oct-17 | 1.53       | 1.59        | 53%                     | Oct-22 | - <sup>1</sup> |             |                         |
| Nov-17 | 1.53       | 1.64        | 55%                     | Nov-22 | - <sup>1</sup> |             |                         |
| Dec-17 | 1.49       | 1.52        | 51%                     | Dec-22 | - <sup>1</sup> |             |                         |

**NOTES:**

<sup>1</sup> Data not available at the time of preparation of this report

<sup>2</sup> % Capacity = TMADF / Permitted Capacity

Table 2-3 provides a summary of the annual average daily flow at the WRF. A graphical representation of historical AADF, MADF, and TMADF is shown in Figure 2-1.

*Table 2-3. Historical Annual Average Daily Flow*

| Date                                             | Annual Average Flow (in MGD) |
|--------------------------------------------------|------------------------------|
| 2013                                             | 1.22                         |
| 2014                                             | 1.28                         |
| 2015                                             | 1.31                         |
| 2016                                             | 1.28                         |
| 2017                                             | 1.39                         |
| 2018                                             | 1.45                         |
| 2019                                             | 1.46                         |
| 2020                                             | 1.52                         |
| 2021                                             | 1.55                         |
| 2022                                             | 1.58 <sup>1</sup>            |
| NOTE: Average based on data from Jan 1 to Aug 30 |                              |

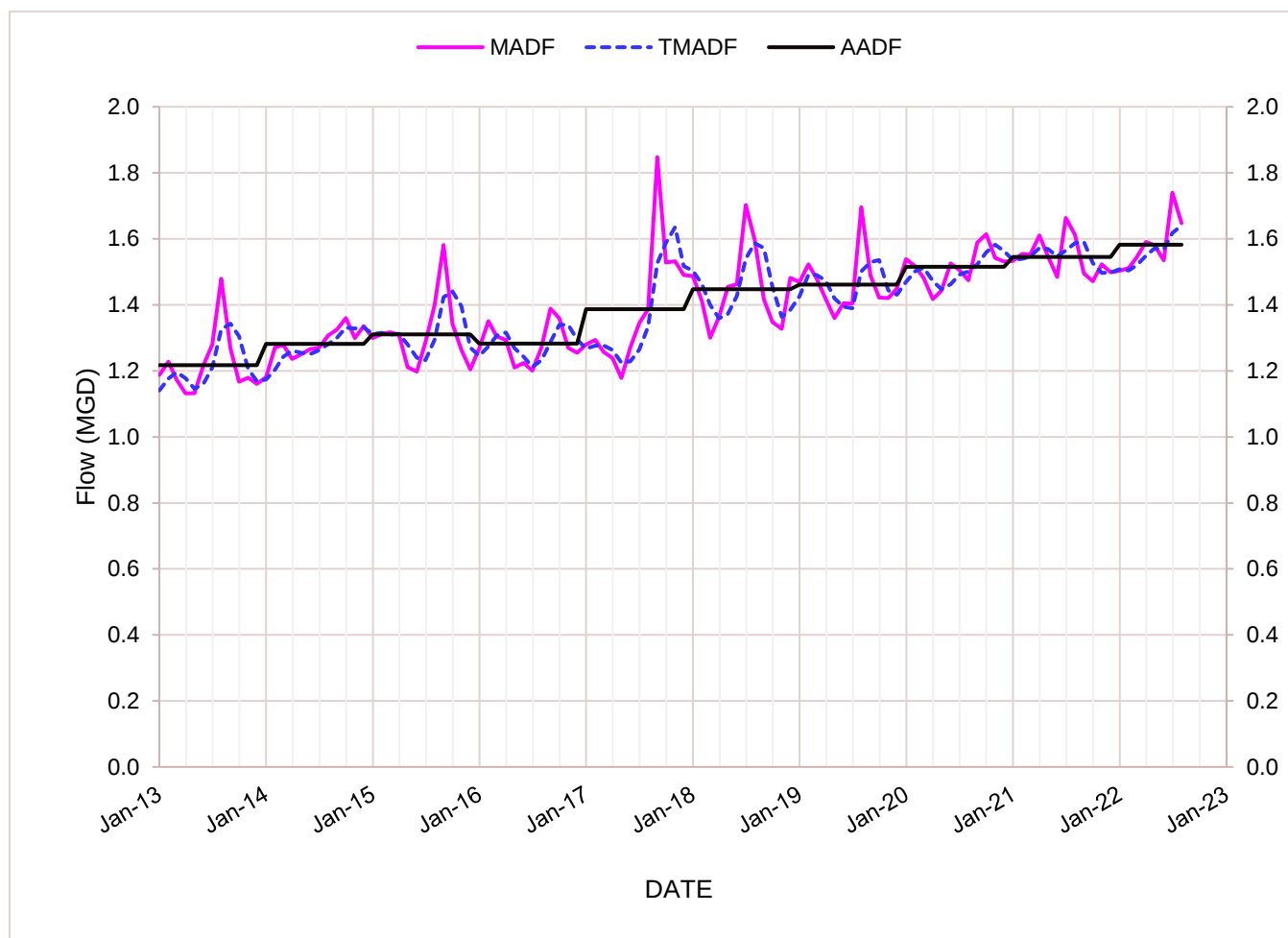


Figure 2-1. Historical Flows at Woodlea Road WRF (2013-2022)

## 2.3 Seasonal Variations

The seasonal variation in rainfall typically affects the inflow to a wastewater treatment facility due to inflow and infiltration (I/I). Stormwater can flow directly into sanitary sewers (inflow), or groundwater can seep into buried gravity collection infrastructure (infiltration). Collection systems react to seasonal variations to varying degrees based upon many factors; such as the age of a system, groundwater conditions etc. Typically, newer systems have less I/I, while older systems are known to have high I/I, due to the pipe cracks and gaps which form as a system ages. Increased infiltration is observed during the rainy months as high groundwater table causes water to enter the gravity system through the cracks and gaps in the system.

The wet season in central Florida generally starts towards the end of May and continues through the early October. As much as 60 percent of the annual rainfall is observed during the wet season. Figure 2-2 shows the historical monthly average flows at Woodlea WRF and the monthly total rainfall for 2013 – 2022 period. As shown in Figure 2-2, the monthly flow tends to increase moderately during the wet season, however, the increase in flow during the wet season is normal and considered typical for the age of the City's system and is not considered excessive.

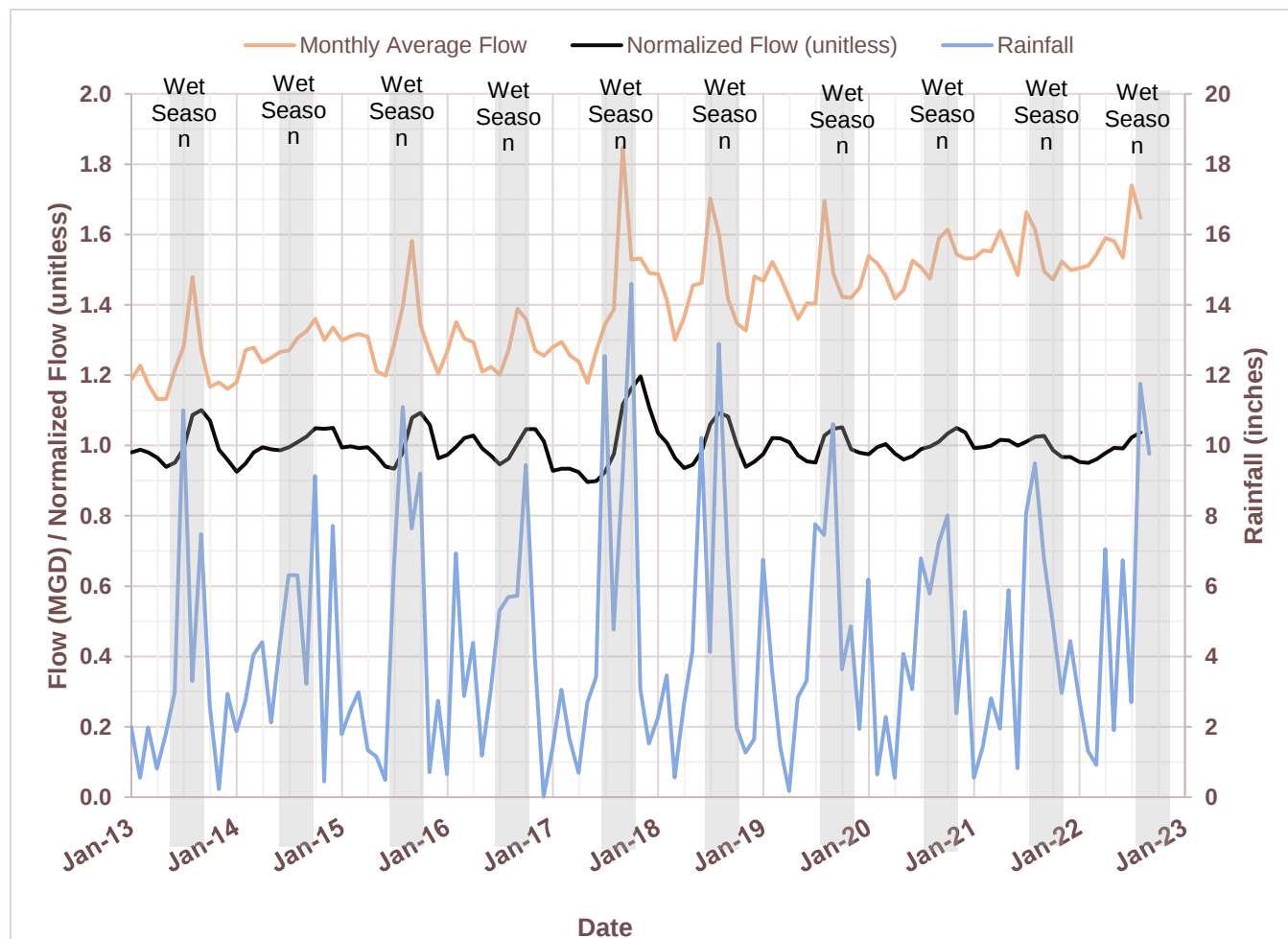


Figure 2-2. Historical Precipitation and Woodlea Road WRF Flow

To further evaluate the seasonal flow variation for the Woodlea Road WRF, the historical maximum TMADF was compared with the AADF as shown in Table 2-4. Ratio of TMADF and AADF is provided for 2013-2022 period.

Table 2-4. Woodlea Road WRF Seasonal Flow Variation

| Year      | Maximum TMADF |            | AADF (MGD) | TMADF:AADF Factor |
|-----------|---------------|------------|------------|-------------------|
|           | Month         | Flow (MGD) |            |                   |
| 2013      | September     | 1.34       | 1.22       | 1.10              |
| 2014      | December      | 1.33       | 1.28       | 1.04              |
| 2015      | October       | 1.44       | 1.31       | 1.10              |
| 2016      | October       | 1.34       | 1.28       | 1.04              |
| 2017      | November      | 1.64       | 1.39       | 1.18              |
| 2018      | August        | 1.59       | 1.45       | 1.10              |
| 2019      | October       | 1.54       | 1.46       | 1.05              |
| 2020      | November      | 1.58       | 1.52       | 1.04              |
| 2021      | September     | 1.59       | 1.55       | 1.03              |
| 2022      | August        | 1.64       | 1.58       | 1.04              |
| Average - |               | 1.50       | 1.50       | 1.07              |

For the 2013 through 2022 period, the TMADF varied from 1.33 MGD to 1.64 MGD, generally peaking during the wet season. The ratio of TMADF and AADF varied between 1.03 and 1.18, with an average of 1.07 for the period of record (2013-2022). The relatively small variation in the ratio of TMADF and AADF indicates a minimal seasonal variation of inflow at the WRF.

## 2.4 Influent Loading

The WRF was designed to treat 3.0 MGD AADF and the process design parameters included 5-day biochemical oxygen demand (BOD<sub>5</sub>) at 5,504 lb/day (220 mg/L) and total suspended solids (TSS) of 5,504 lb/day (220 mg/L), as shown in Table 2-5. To compare the conditions currently experienced at the WRF to those of the design capacity, the existing plant influent loadings were calculated from the most recent 5 full calendar year (2017 to 2021). A summary of that information for the current influent parameters is provided in Table 2-5.

Table 2-5. Woodlea Road WRF Current Influent Loading

| Parameter               | Design Value | 2017  | 2018  | 2019  | 2020  | 2021  |
|-------------------------|--------------|-------|-------|-------|-------|-------|
| Flow (MGD)              | 3.0          | 1.39  | 1.45  | 1.46  | 1.52  | 1.55  |
| BOD <sub>5</sub> (lb/d) | 5,504        | 2,924 | 5,504 | 1,671 | 2,136 | 1,934 |
| TSS (lb/d)              | 5,504        | 1,838 | 2,344 | 2,471 | 2,426 | 2,474 |

## 3 FUTURE CONDITIONS

This section provides an estimate of future conditions that may occur at the Woodlea Road WRF. Future flow projections are developed by applying the historical average per capita flow to the population projections for the City's service area. Population and flow projections are presented on a yearly basis through 2033, as discussed below

### 3.1 Population Projections

The City has experienced accelerated population growth in recent years, as shown in Figure 3-1. The population has increased nearly 45 percent from 2011 to 2022. The trend of accelerated population growth is expected to continue in the future. For this report, population projections were developed by applying the observed historical growth trend to the next 10-year period. Historical population data were obtained from the annual population estimates developed by the University of Florida Bureau of Economic and Business Research (BEBR). Using the historical linear trend, the City's population is projected to increase from 20,296 in 2022 to 26,640 (Figure 3-1), a nearly 31 percent increase from the population in 2022.

The population projections developed for this report were compared to the available BEBR population projections for the City (Figure 3-1). The St. Johns River Water Management District (SJRWMD) typically uses BEBR Medium-High projections, the average of BEBR Medium and BEBR High projections, for consumptive use permitting

purposes. As shown in Figure 3-1, the City's projected population through 2033 is comparable to the BEBR medium projections, indicating that the projected population using historical linear trend is reasonable.

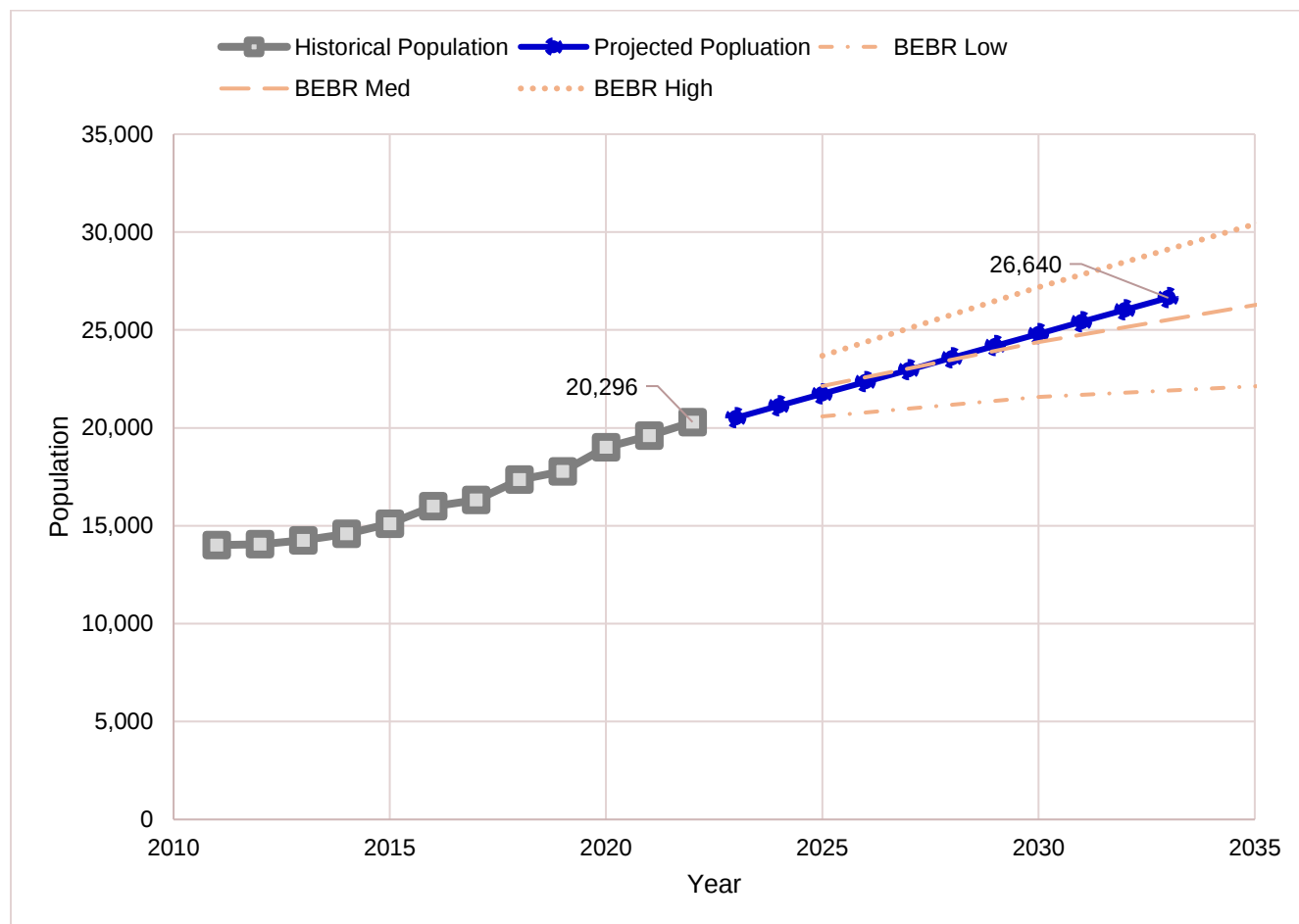


Figure 3-1. Historical and Projected Population

Spatial analysis of future land use was not performed for developing population projections in this report. However, the latest information from the City's Planning Department regarding future Planned Developments (PDs) is provided in Figure 3-2, which shows nearly 2,650 new residential units within the known PDs. The Figure shows several PDs are in design or construction phase; however, the timeline of the development for the different PDs is uncertain. Figure 3-2 provides the spatial distribution of the PDs that are expected to contribute to the future wastewater flow at Woodlea Road WRF.

## 3.2 Flow Projections

Future wastewater flow projections for the City of Tavares were determined using on a historical gross per capita wastewater production rate (most recent 5-year average) and the population projection. Table 3-1 shows the projected population and the corresponding flow projections for 2023 – 2033. To estimate the maximum TMADF expected for the 2023 – 2033 period, the historical AADF to maximum TMADF ratio of 1.07 (Table 2-4) was applied to the projected AADF. The resulting flow projections are shown in Table 3-1.

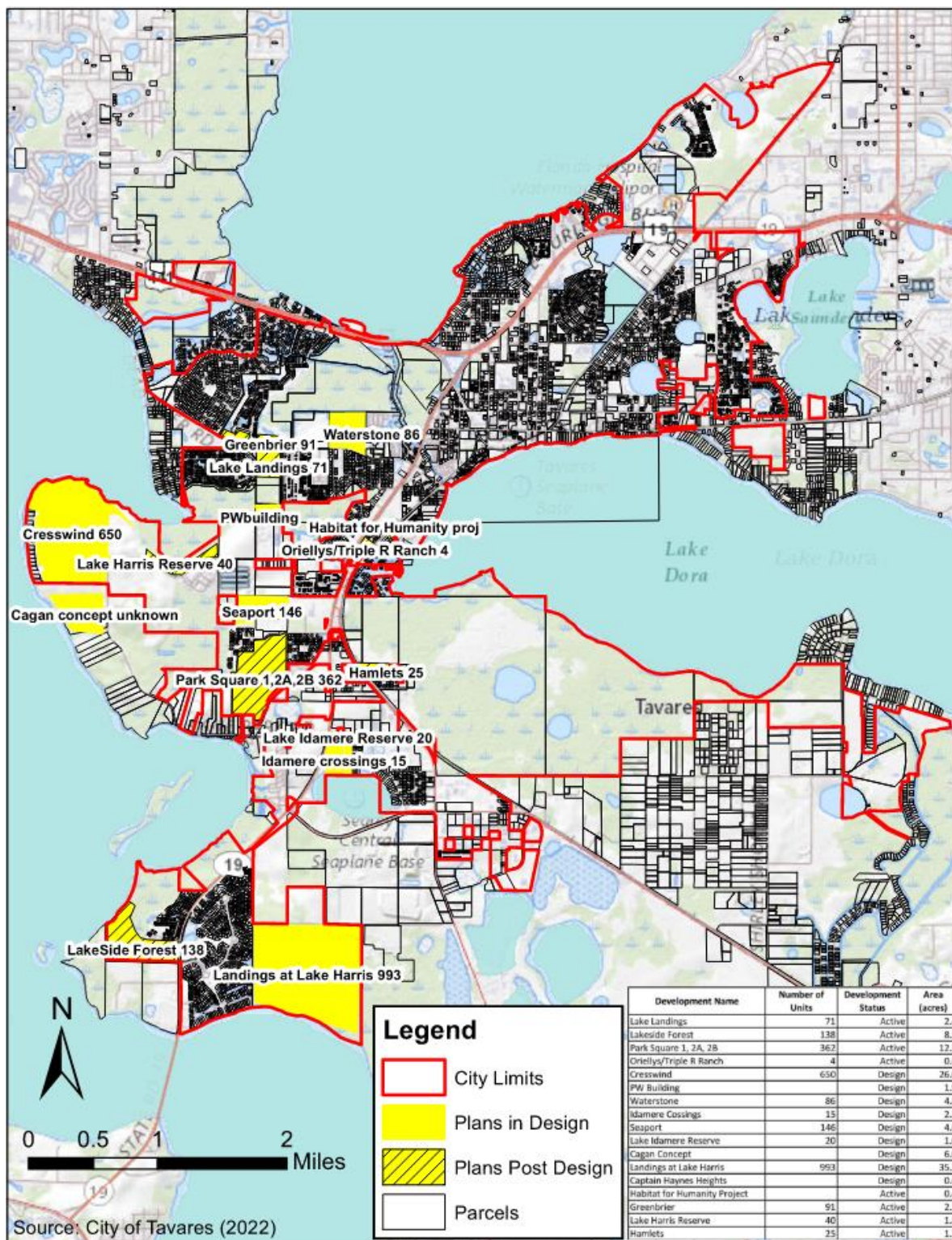


Figure 3-2. Planned Development Map for Future Growth Areas.

Table 3-1. Population and Flow Projections 2022-2033

| Year | Population Projection | Projected AADF (MGD) | Estimated Maximum TMADF (MGD) |
|------|-----------------------|----------------------|-------------------------------|
| 2023 | 20,513                | 1.65                 | 1.77                          |
| 2024 | 21,125                | 1.70                 | 1.82                          |
| 2025 | 21,738                | 1.75                 | 1.87                          |
| 2026 | 22,351                | 1.80                 | 1.93                          |
| 2027 | 22,964                | 1.85                 | 1.98                          |
| 2028 | 23,576                | 1.90                 | 2.03                          |
| 2029 | 24,189                | 1.95                 | 2.09                          |
| 2030 | 24,802                | 1.99                 | 2.14                          |
| 2031 | 25,415                | 2.04                 | 2.19                          |
| 2032 | 26,027                | 2.09                 | 2.24                          |
| 2033 | 26,640                | 2.14                 | 2.30                          |

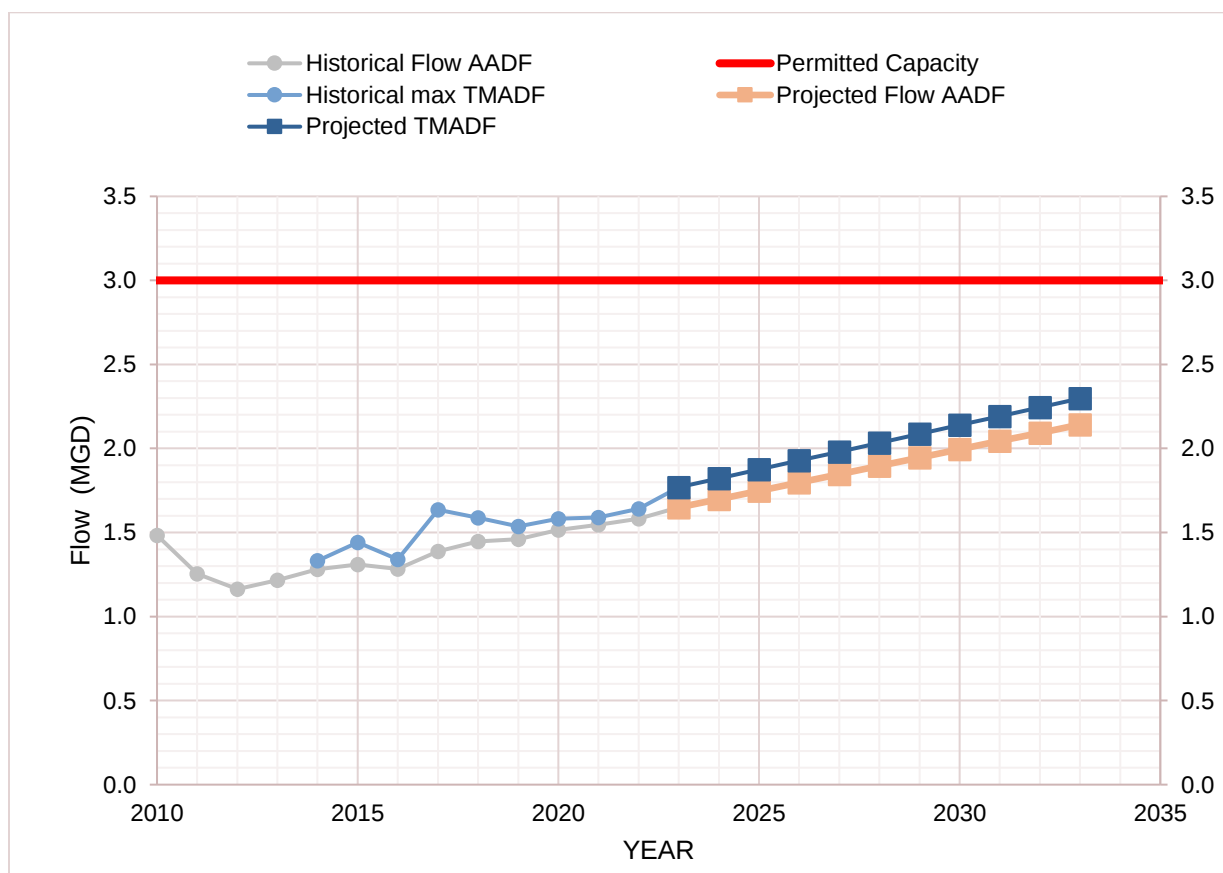


Figure 3-3. Historical and Projected AADF and TMADF

## 4 SUMMARY AND CONCLUSIONS

This section compares the future conditions that were developed in Section 3 with the capacity of the existing facility and the permitted capacity. The FDEP's Guidelines for Preparation of Capacity Analysis Reports states that the permitted capacity should be compared with the maximum TMADF projected flows. If the projected flows exceed the permitted capacity, the approximate exceedance date must be stated and recommendations for specific plant expansion requirements should be included in the report accompanied by an expansion schedule.

### 4.1 Time Required to Reach Plant Capacity

Table 2-2 showed that the flows in 2022 are approximately 55 percent of the permitted capacity. As shown in Figure 3-2, the projected TMADF for Woodlea Road WRF is expected to reach about 2.3 MGD, about 77 percent of the permitted capacity. Therefore, projected flows at the Woodlea Road WRF are not expected to reach the permitting capacity of 3.0 MGD during the next 10-year permitting cycle.

### 4.2 Recommendations for Expansion

Because the current permitting capacity is expected to be sufficient for the projected flow through the next 10-year permitting cycle, no expansions are recommended for the purpose of increasing treatment capacity at the Woodlea Road WRF.