B

Appendix B –Demand Projections Technical Memorandum

Water Master Plan

Population and Flow Projections Technical Memorandum (WMP Section 3)

Englewood Water District

District Contract No. 2022-129

Englewood, FL
August 25, 2023

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1 Introduction

The Englewood Water District (District) has retained HDR Engineering, Inc. (HDR) to provide professional services to develop a Potable Water Master Plan. This Master Plan will assess the District's water service and facility needs for the next 20-year planning period from 2023 through 2043 for treatment and pumping equipment upgrades needed and the next 50-year period from 2023 to 2073 for verifying useful life of new wells, pipelines, and treatment basins with recommended upgrades. The purpose of this Technical Memorandum is to present the assumptions, methodologies, and sources used to develop the District's water supply and distribution demands over the 20-year and 50-year planning periods.

2 Background

The District was created in 1959 and is classified as a political sub-division of the State of Florida under Chapter 2004-439. The District owns and operates a public utility that provides water services within the unincorporated areas of Sarasota and Charlotte Counties generally known as Englewood, Grove City, and Manasota Key. The District's current service area boundary encompasses approximately 44.5 square miles. In addition, the District currently has an interlocal agreements for the delivery of potable water to Bocilla Utilities for the residents of Don Pedro and Knight/Palm Island in Charlotte County.

2.1 Existing Facilities

The District's current Water Use Permit (WUP) issued by the Southwest Florida Water Management District (SWFWMD) (WUP No. 20 004866.012) authorizes total groundwater withdrawals of up to 5,360,000 gallons per day (annual average) and up to 6,860,000 gallons per day (peak month). These quantities were allocated to meet the District's potable water demand through 2050; however, this Master Plan evaluates the needs for applying to adjust the current allocated freshwater wellfield and brackish water supplies in Section 3.3 below. The District's WUP expires on December 9, 2050. The District's water supply, treatment and distribution facilities generally include:

- Five (5) groundwater wellfields
  - Four (4) freshwater well systems with aggregated permitted withdrawal capacities of up to 3.54 MGD (annual average) and up to 4.35 MGD (peak month) within Wellfields 1, 2, 3, and 5 provided the current total WUP allocation is not exceeded.
  - Two (2) brackish water well systems with aggregated permitted withdrawal capacities of up to 4.25 MGD (annual average) and up to 5.44 MGD (peak month) within Wellfields 2 and 4 provided the current total WUP allocation is not exceeded.
- Two (2) water treatment plants
  - One (1) lime softening plant built in 1961 at 3.0 MGD design capacity for treatment of the freshwater wellfield supply; however, the District can only reliably treat 2 MGD of this capacity.
  - One (1) reverse osmosis (RO) Plant built in 1981 at 3.0 MGD design capacity for treatment of the brackish water wellfield supply
- Four (4) finished water storage tanks with a combined capacity of 7.5 million gallons, and one (1) elevated storage tank with 100,000-gallon capacity used to dampen the amplitude of distribution system pressures

- Two (2) deep injection wells
    - One (1) 1.58-MGD deep injection well (DIW-1) onsite for RO concentrate disposal
    - One (1) 2.94-MGD deep injection well (DIW-2) offsite at the Holiday Ventures Lift Station for reclaimed water disposal and backup RO concentrate disposal. Backup capacity is limited due to existing use by the South Water Reclamation Facility (WRF) and future use by the North WRF that is being currently planned.
- Over 3,571 miles of water transmission and distribution pipelines and appurtenances, with emergency interconnections with Sarasota and Charlotte Counties.

3 Historical Population and Flow

3.1 Information Sources

Various information sources were gathered to compile a comprehensive view of the District's historical and future population estimates. The following referenced materials were used in the development of the population projections:

- Englewood Water District – Monthly Operating Reports (2015 - 2022)
- Englewood Water District – Annual Wellfield Report (2022)
- Englewood Water District – Public Supply Annual Reports (2014 – 2021)
- Englewood Water District – Bocilla Supply Meter Reading Reports (2018 – 2023)
- Sarasota County – GIS parcel data
- Charlotte County – GIS parcel data

3.2 Historical Trends

The following subsections describe observed trends in population growth and water demands based on data provided by the District. These trends will be used to inform and adjust population and flow projections developed in later sections.

3.2.1 Historic Population

The District's Public Supply Annual Reports (PSARs) from 2018 to 2021 (see Table 3-1) indicate a population growth rate of 2.8% over the 4-year period. This averages to an annual growth rate of about 0.70%, as illustrated in Figure 3-1.

Table 3-1: Service Area Historical Population from PSARs

Year	Functional Population (PSAR)
2018	37,217
2019	37,540
2020	38,271
2021	38,260

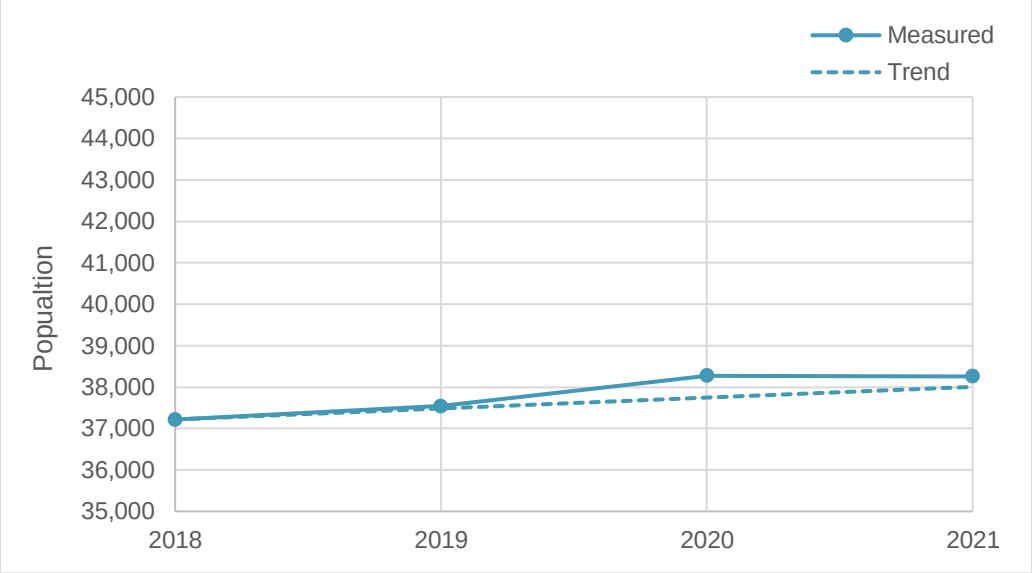


Figure 3-1: Englewood Historical Population from PSARs

3.2.2 Historic Water Demand

Based on the District's last 5 years of monthly operating reports (MORs), and as illustrated in Figure 3-2 below, the annual average rate of increase of metered water service connections from January 2018 through December 2022 is approximately 0.99%. The District saw an increase of approximately 949 new metered services over the last five years. The annual rates of increase in metered services range from a low of 0.57% in 2020 and a high of 1.49% in 2022.

This meter increase corresponds to an increase in average annual demand of 1.03% between 2018 and 2022 based on the values presented in Table 3-2: Annual Average Water Demand and Maximum Month. Demands fluctuate over this time period within a range of 1.1 MGD (October 2022) and 5.3 MGD (July 2019). It should be noted that the District has experienced slight overall reductions in average annual demand over the past three years (-1.49% average).

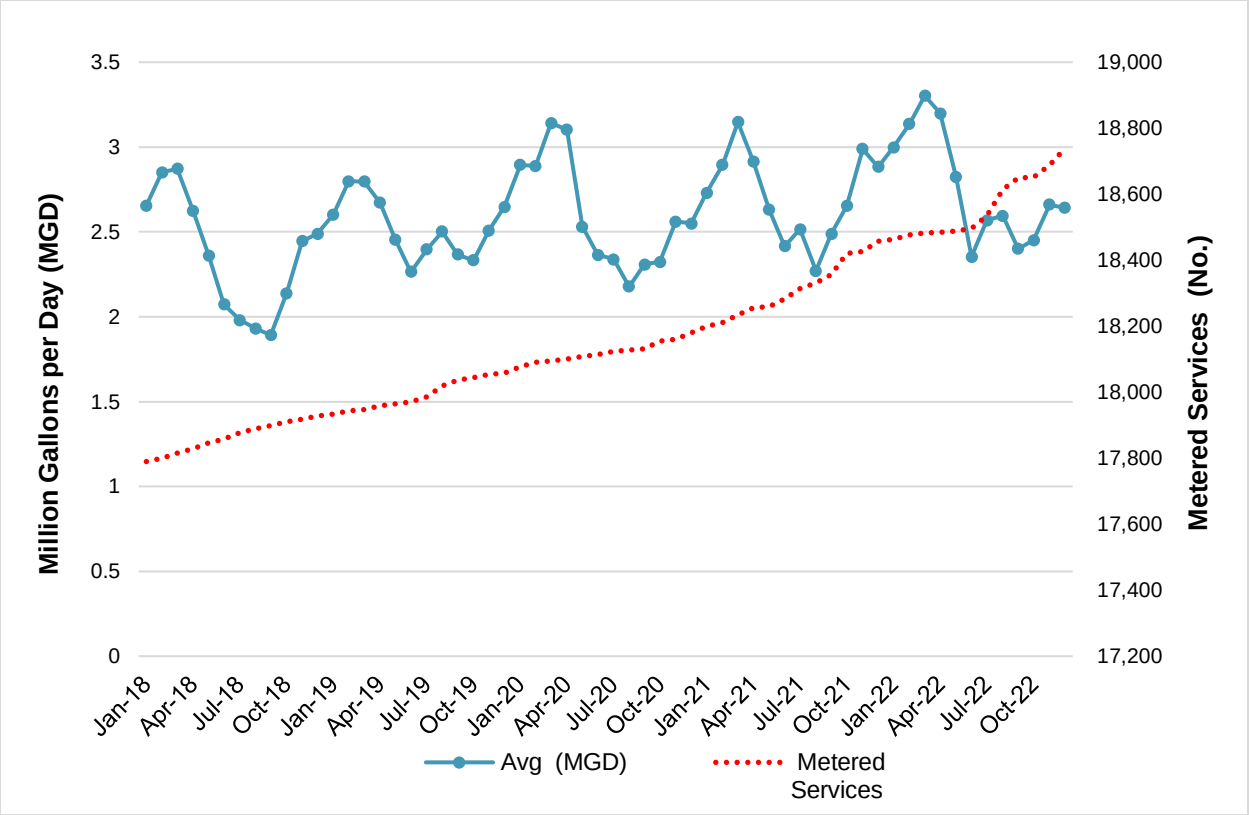


Figure 3-2: Water Consumption and Metered Service Connections

Table 3-2: Annual Average Water Demand and Maximum Month

Year	Annual Average Treated to System (MORs)	Maximum Month	Maximum Month Ratio
2018	2.611	3.825	1.193
2019	3.005	5.295	1.586
2020	2.975	4.500	1.670
2021	2.922	4.403	1.303
2022	2.872	3.854	1.198

Utilizing the District's historical (2018-2022) records of production data as well as the Historical Population Served reported on the District's Public Supply Annual Reports (PSARs) to the SWFWMD, a determination of per capita usage was calculated and is shown in Table 3-3 below.

Table 3-3: Historical Public Supply Annual Reports

Year	Annual Average Treated to System (MOR's)*	Functional Population (PSAR)	District Resident Gallons per capita/day (gpcd)
2018	2.611	37,217	75
2019	3.005	37,540	76
2020	2.975	38,271	79
2021	2.922	38,260	76

*Includes Bocilla Utilities Exported Water

3.2.3 Additional Water Demands

The District currently provides potable water to Bocilla Utilities through a bulk service agreement for the residents of Don Pedro Island (also known as Knight and Palm Island) in Charlotte County. Currently, Bocilla Utilities services approximately 400 residences on the island including private homes, condominiums and a vacation resort. The District's billing records for 2022 indicate that the average daily usage was 120,425 gpd, resulting in a usage rate of about 300 gpd per residence. Aerial photographs of the island suggest that it is approximately 75% built out.

3.2.4 Water Losses

PSARs provided from 2018 to 2021 indicate significant losses between the District's withdrawals and treated water supply. Table 3-5 below shows that the annual average water loss between 2018 and 2021 was about 17%, with a peak loss of 19% in 2020. An annual addition of 17% will be included in total projected water demands to account for these losses within the system.

Table 3-4: Annual Losses Recorded in PSARs

Year	Losses (GPD)	% Loss
2018	432,243	15.58%
2019	478,119	16.80%
2020	582,665	19.24%
2021	464,732	16.04%
Average (2018 – 2021)	489,440	16.92%

3.3 Permitted Withdrawals

Determination of the quantity and timing of projected water supply resources is accomplished by comparing the projected water supply demands to the utility system's existing finished water capacity on an annual basis. The raw water required to produce the estimated potable water demand is also related to the water treatment recovery efficiency. Water treatment recovery efficiency is a function of the treatment method used. Historical water treatment production data received from the District on the RO water treatment plant generally indicates a treatment efficiency of 65%. The combined withdrawals from RO Wellfields 2 and 4 are limited by the WUP to 4.25 MGD average annual and 5.44 MGD peak month. In order to stay below the overall permitted withdrawal limit of 5.36 MGD average and 6.86 MGD peak, well fields 1, 2, 3 and 5 are limited to a permitted average and peak day quantity of 1.11 MGD and 1.42 MGD, respectively. In addition, the WUP

establishes a Chloride Concentration Trigger Level (CCTL) of 250 mg/L for each freshwater well within Wellfields 1, 2, 3, and 5 which may limit withdrawals and raw water production in the future.

Table 3-5: Available Water Supply Resource Analysis

Supply	Permitted Source AAD (MGD)	Permitted Source Peak Day (MGD)	WTP Efficiency %	Finished Water AAD (MGD)	Finished Water Peak Day (MGD)
RO Wellfields 2, 4	4.25	5.44	65%	2.76	3.54
Wellfields 1, 2, 3, and 5	1.11	1.42	100%	1.11	1.42
Total Supply	**5.36**	**6.86**		**3.87**	**4.96**

4 Population Projections

4.1 Information Sources and Methodology

Population projections were developed for the District to facilitate the development of water demand projections. Various information sources were gathered to compile a comprehensive view of the District's historical and future population estimates. The following referenced materials were used in the development of the population projections:

- Bureau of Economic and Business Research – Florida Estimates of Population 2022 (April 1, 2022)
- Bureau of Economic and Business Research – Florida Estimates of Population 2022 (Vol. 55, Bulletin 192, February 2022)
- Englewood Water District – Master Plan Development Table (2023)
- Southwest Florida Water Management District – 2023 Water Supply Demand Projections

Several different population projection methodologies are used across the country for infrastructure planning. These methodologies can be broken down into the following general categories: Trend Based Methods; Ratio Methods; Component Methods; forecasts derived directly from specific estimates of economic projections (employment/labor); comparative or analogy to similar areas; and forecasts derived from assigning an ultimate holding capacity or build out limit and projecting to that limit.

Specific to population projection methodologies used in Florida, the most common data sources referenced by the Metropolitan Planning Organizations (MPOs), Water Management Districts (WMDs), County Planning Departments and Regional Planning Councils (RPCs) include the following:

- **University of Florida's Bureau of Economic and Business Research (BEBR):** Estimates are produced using the housing unit method, in which changes in population are based on changes in occupied housing units (or households).
- **US Census Bureau National Projections:** Estimates of annual projections of resident populations are produced using the Component Method and assumptions about demographic components of change (future trends in births, deaths, and net international migration).
- **Comprehensive Planning Documents:** Florida Statutes require that municipal entities prepare comprehensive plans on a regular basis (every five years), and

that these plans shall be based upon permanent and seasonal population estimates and projections. Projections shall be based on either the University of Florida's BEBR population estimates or generated by the local government based upon a professionally acceptable methodology. If using BEBR, the plan must be based on at least the minimum amount of land required to accommodate the Medium projections of the University of Florida's Bureau of Economic and Business Research for at least a 10-year planning period unless otherwise limited under s. 380.05, including related rules of the Administration Commission.

4.2 Base Year Population

An important part of the population forecasting process is the estimation of the actual population at or near the time the study is undertaken (the base year). If the study is undertaken at the same time as a census, or within one or two years of such a census, it may be acceptable to utilize the census counts with only gross adjustments. Since the United States census is performed only at 10-year intervals, and Florida does not make intermediate census determinations, a base year population estimate for the District was determined without utilizing census data.

The methodology used to determine the District's population projections through 2073 included determination of the base year (2021) population, with a "trend based" percent growth applied at 5-year incremental periods over the 20-year planning horizon.

To determine the District's 2021 Base Year Population, the following two sources of information were compiled and reviewed.

1. *Published population estimates from the Southwest Florida Water Management District.*
2. *District's published 2021 Public Supply Annual Report (PSAR).*

First, as a condition of the District's Water Use Permit (WUP), a Public Supply Annual Report (PSAR) must be submitted to the SWFWMD. This Report contains documentation of the number and type of residential and non-residential water service categories. In 2021, the District's estimated functional population is calculated to be 38,260.

Additionally, in 2023, the SWFWMD provided Adjusted Total Functional Populations from 2021 to 2050 for the Englewood Water District. Table 4-1 illustrates these projections. This population projection utilized the "component based" method, which disaggregates BEBR projections to land parcel levels with a geographic information system (GIS) overlay. These projections estimate a 2021 functional population of 38,260, which agrees with the PSAR's submitted to SWFWMD.

Table 4-1: SWFWMD Population Projections

County	WUP No.	Utility Name	Estimated Total Functional Population 2021	Adjusted Total Functional Population 2025	Adjusted Total Functional Population 2030	Adjusted Total Functional Population 2035	Adjusted Total Functional Population 2040	Adjusted Total Functional Population 2045	Adjusted Total Functional Population 2050
Combined (Charlotte & Sarasota)	4866	Englewood Water District	38,260	40,129	42,162	44,118	45,565	47,010	48,309
Annual % Increase			--	1.22%	1.01%	0.93%	0.66%	0.63%	0.55%

It is noted that this population projection is for the area within the District's service area and does not include populations within the areas currently serviced with bulk water or sewer agreements including Bocilla Utilities, Utilities, Inc. of Sandalhaven or Charlotte County. These additional bulk

water trends are however incorporated into the water demands evaluation as part of Section 5 below.

4.3 Population Projection Sources

Following the determination of the Base Year Population (2021), evaluations and comparisons of three different data sets are completed to determine “percent growth” or “trend based” projections to be applied to the Base Year Population estimate. The following four sources of information are used in the development of the “percent growth” or “trend-based” population projections for the District:

1. *Historical populations from PSARs*
2. *Projections developed by the University of Florida’s Bureau of Economic and Business Research (BEBR) on a County-wide basis*
3. *Projections developed by the Southwest Florida Water Management District (SWFWMD), published April 17, 2023*
4. *Future Planned Residential Developments*

An examination of these data sources predicts that the population within the District’s service area is most likely to experience annual increases between 0.70% and 4.16% over the 20-year planning horizon. This growth rate range covers the District’s historical growth patterns as well as the BEBR and SWFWMD’s projected population growth rates. It is noted that the BEBR and SWFWMD projections have near-term growth rates that are higher and then taper as the planning horizon increases.

4.3.1 Historic Population from PSARs

Historic PSARs show an average annual population increase of 0.70% between 2018 and 2021. For more information, refer to Section 3.2.2 above.

4.3.2 Countywide Population Projections - BEBR

The population projections developed by BEBR are generally accepted as the standard throughout Florida. These projections are made at the County level and can only be used to project future growth trends within the region. BEBR develops three projections for each county: “low”, “medium” and “high”. Table 4-2 and Table 4-3 identify BEBR’s population projections for Sarasota and Charlotte Counties. An annual average growth rate was calculated based on their respective 5-year incremental rates of increase.

Figure 4-1 and Figure 4-2 graphically illustrate Charlotte and Sarasota County’s population projections respectively. It should again be noted that these populations do not represent the EWD’s service area populations; they are only used to better understand growth trends in the region where the EWD is located.

The Annual Average population growth rates presented in Table 4-2 (1.08%) and Table 4-3 (0.93%) represent the total **medium** population increase rate averaged over the 30-year period from 2020 to 2050.

Table 4-2: Countywide Population Estimates – Charlotte County (BEBR 2022)

County	Census Estimates			Projections						Annual Average
	2015	2020		2025	2030	2035	2040	2045	2050	
Charlotte										
			Low	188,800	190,900	190,200	188,000	185,100	181,600	
Total Population	167,141	187,904	**Medium**	203,000	215,700	225,800	234,300	241,900	248,800	
			High	217,200	240,500	261,400	280,600	298,800	315,900	
Medium Projection Increase (%)		12.42%		8.03%	6.26%	4.68%	3.76%	3.24%	2.85%	**1.08%**

Table 4-3: Countywide Population Estimates – Sarasota County (BEBR 2022)

County	Census Estimates			Projections						Annual Average
	2015	2020		2025	2030	2035	2040	2045	2050	
Sarasota										
			Low	439,700	444,000	443,300	440,200	435,600	429,800	
Total Population	392,090	438,816	**Medium**	467,700	493,300	514,000	532,000	547,900	561,800	
			High	495,800	542,700	584,700	623,700	660,200	693,900	
Medium Projection Increase (%)		11.92%		6.58%	5.47%	4.20%	3.50%	2.99%	5.60%	**0.93%**

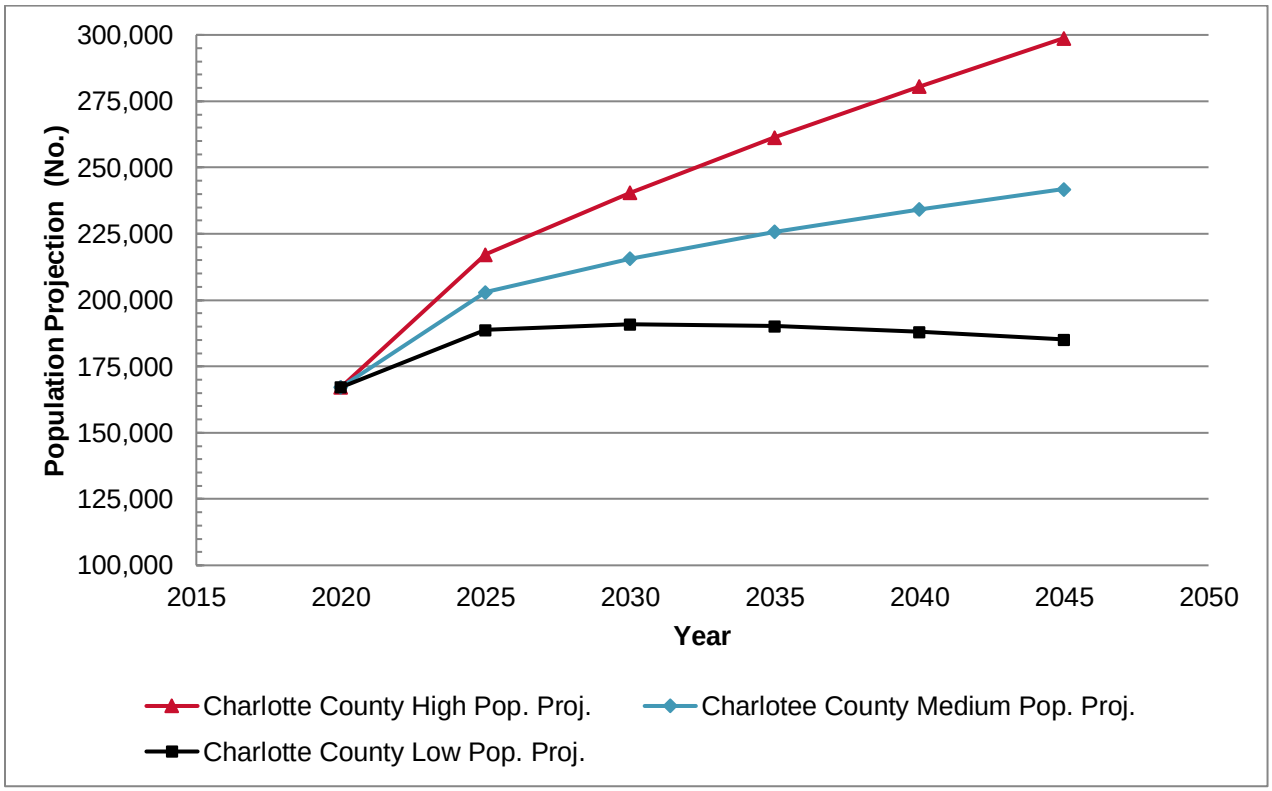


Figure 4-1: BEBR Population Projections: Charlotte County

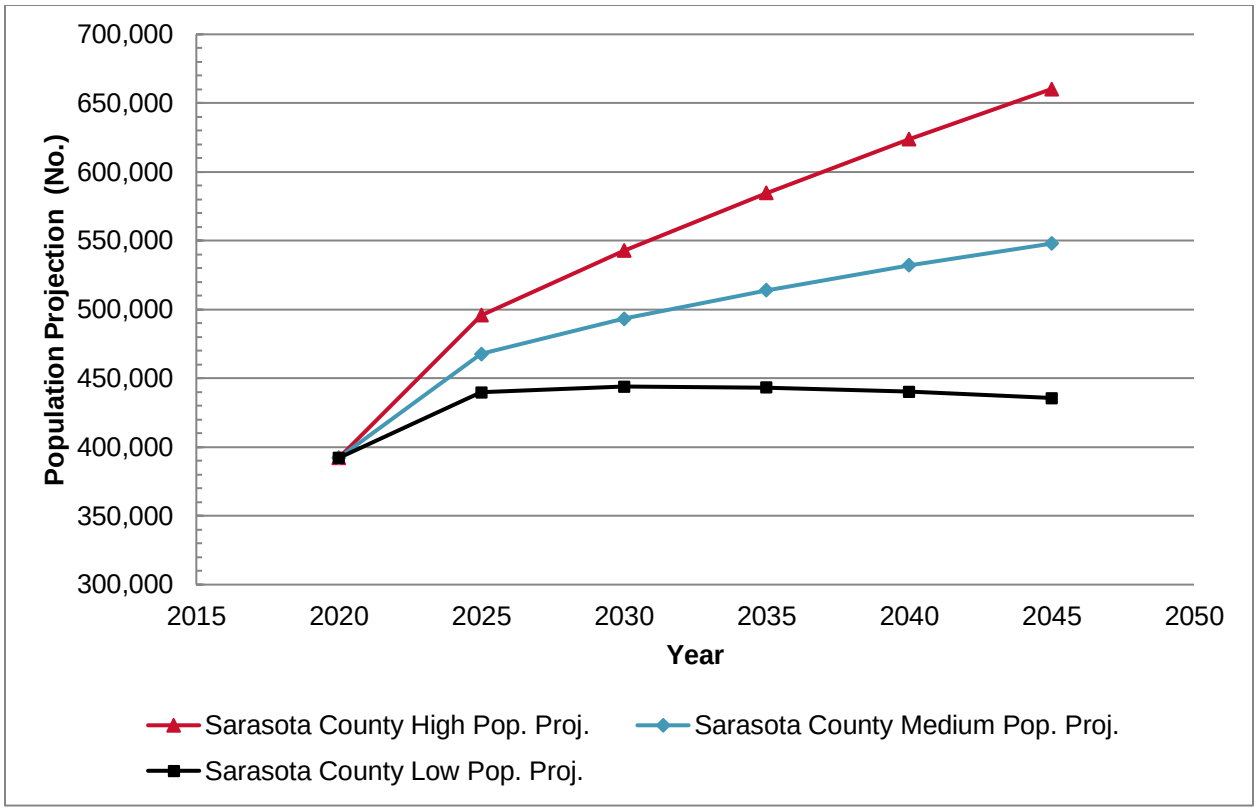


Figure 4-2: BEBR Population Projections: Sarasota County

By taking an average of the medium BEBR projections for Charlotte and Sarasota counties weighted by the populations projected for each, a two-county-wide annual average population growth of 0.98%. This percentage will be carried into population projections presented in Section 4.4 below.

4.3.3 Southwest Florida Water Management District – Population Projections

As discussed in Section 4.2 above, the SWFWMD's population projections for the District through 2050 have an average annual rate of growth of approximately 0.91%.

4.3.4 Future Planned Residential Developments

The District has provided GIS showing significant planned residential development within its service area in upcoming years. Wellen Park and Beachwalk by Manasota Key are two major planned developments, covering a total area of nearly 3,500 acres. These two housing developments, as well as a collection of smaller planned housing developments within Sarasota and Charlotte counties, are shown in Figure 4-3 below. Table 4-4 lists the developments, their sizes, their expected rates of buildout over time, and approximations of their resulting increases in water demand.

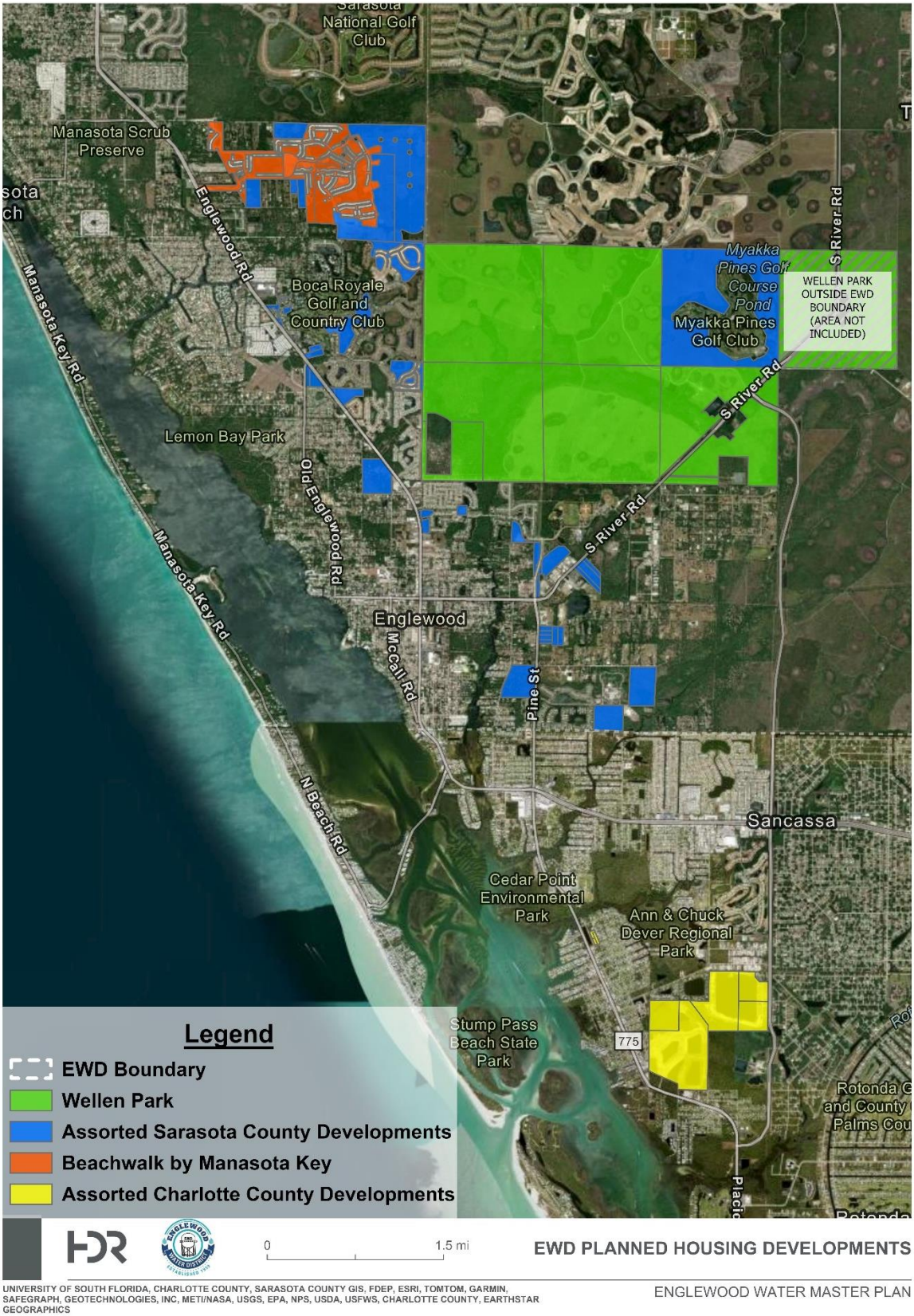


Figure 4-3: Planned Housing Developments

The total expected increase in Equivalent Residential Connections (ERCs) from 2023 to 2043 is 14,851. Using a value of 2.19 persons per household as estimated by the 2020 US Census Bureau for both Charlotte and Sarasota counties, this corresponds to an estimated population increase of 32,524 persons over the 20-year planning horizon. This results in an overall service area population increase of 83.1% over 20 years, or a 4.2% annual service area population increase.

Table 4-4: Developments within the District's Service Area

Development	Proposed Units (ERC)	Expected Buildout % by Year (Year 0 = 2023)				Calculated Population Increase (Year 0 = 2023)			
		0-4	5-10	11-14	15+	0-4	5-10	11-14	15+
Water Available - Not Connected	400	25%	25%	25%	25%	219	219	219	219
Water Not Available	100		50%	50%		0	110	110	0
200 Artists	404	100%				885	0	0	0
Beachwalk by Manasota Key PH1	479	100%				1,050	0	0	0
Beachwalk by Manasota Key PH2	470	100%				1,030	0	0	0
Beachwalk by Manasota Key PH3	253	75%	25%			416	139	0	0
Beachwalk by Manasota Key PH4	363		100%			0	795	0	0
Beachwalk Outparcels	132		100%			0	290	0	0
Boca Royale Unit 13	1	100%				3	0	0	0
Boca Royale Unit 14	80	100%				176	0	0	0
Boca Royale Unit 16	25	100%				55	0	0	0
Boca Royale Unit 17	19	100%				42	0	0	0
Boca Royale Unit 18	18	100%				40	0	0	0
Boca Royale Unit 19	3	100%				7	0	0	0
Boca Royale East (Wellen Park D)	825	50%	50%			904	904	0	0
Englewood Gardens	252	100%				552	0	0	0
Gateway Court	63	100%				138	0	0	0
Generation of Englewood	306	100%				671	0	0	0
Heritage Oaks Multifamily	225		50%	50%		0	247	247	0
Island Lake Estates/Coco Bay	400	100%				876	0	0	0
Lake Emily	171	100%				375	0	0	0

Development	Proposed Units (ERC)	Expected Buildout % by Year (Year 0 = 2023)				Calculated Population Increase (Year 0 = 2023)			
		0-4	5-10	11-14	15+	0-4	5-10	11-14	15+
Manatee Cay	85	50%	50%			94	94	0	0
Medical Twins	298	50%	50%			327	327	0	0
Fairway Vistas at Myakka Pines	877	50%	50%			961	961	0	0
Park Forrest 7	56	50%	50%			62	62	0	0
Paddock Pines	30		100%			0	66	0	0
Prose Apartments	300		100%			0	657	0	0
Sandy Lane Townhomes	41	100%				90	0	0	0
Wellen Park A	266		100%			0	583	0	0
Wellen Park B	1,796		30%	30%	40%	0	1,180	1,180	1,574
Wellen Park C	1,415		40%	40%	20%	0	1,240	1,240	620
Wellen Park D (Remaining)	278			100%		0	0	609	0
Wellen Park E	1,432			33%	67%	0	0	1,035	2,102
Wellen Park F	1,848			25%	75%	0	0	1,012	3,036
Wellen Park G	549		50%	50%		0	602	602	0
Wellen Park H	214				100%	0	0	0	469
Wellen Park I	377				100%	0	0	0	826
Totals	**14,851**	-	-	-	-	**8,963**	**8,468**	**6,252**	**8,843**

4.4 Trend Based Population Projections

As shown in Table 4-5, a comparison of the population projection methodologies and their associated annual average growth rate was used to determine the variability in the methods.

Table 4-5: Annual Average Growth Rate by Methodology

Method	Historical Population Growth	Countywide BEBR Projections	SWFWMD	Future Developments
Reference	*Historical PSARs*	*BEBR*	*SWFWMD 2023*	*EWD-provided ERCs*
Estimated Annual Average Population Growth	0.70%	0.98%	0.91%	4.16%

Examining the data sources listed above, it appears that population within the District's service area could experience annual increases between 0.70% and 4.16% over the 20-year planning horizon. This growth rate range covers the District's historical growth patterns, the SWFWMD and BEBR projected population growth rates, and projected growth rates based on planned housing developments. The higher near-term growth rates are reduced at the later stages of the planning horizon.

Because of the addition of new developments, it is anticipated that the District will see a trend of a higher growth rate in the near term (1-10 years) as service to these new developments is initiated, with a tapering or leveling-off of growth as in-fill and build out of the developments occur in later years. Beyond the 20-year planning horizon, population growth based on planned housing developments is expected to taper off as residentially-zoned areas become saturated. All 20-year projections are shown in Figure 4-4.

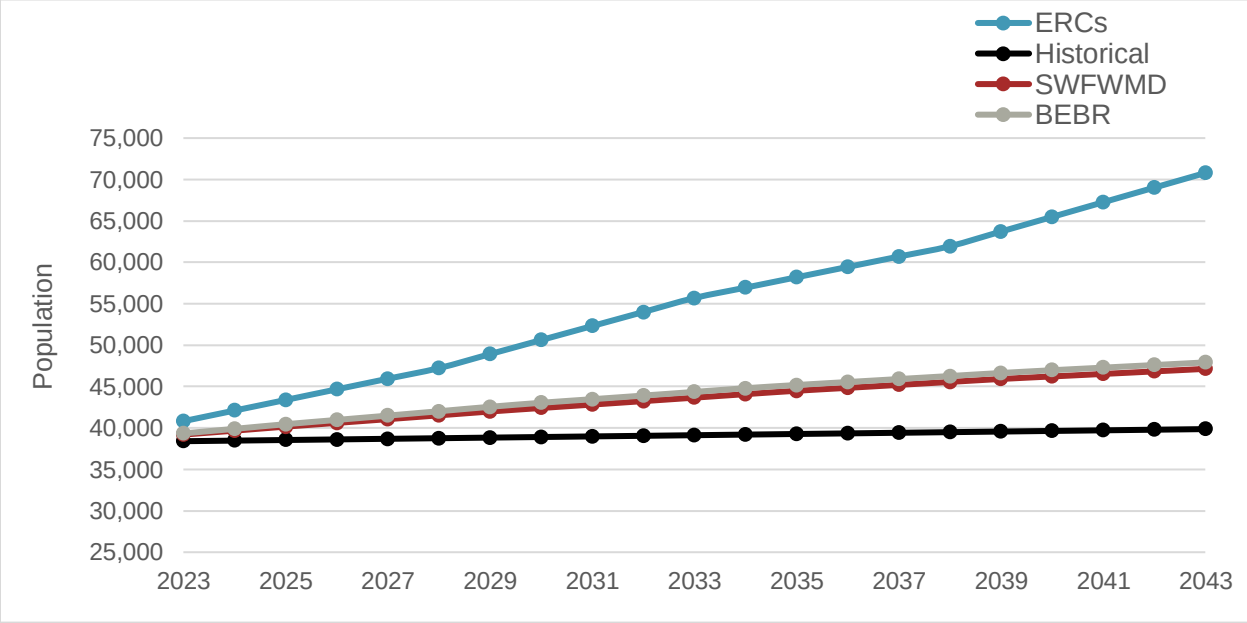


Figure 4-4: Comparison of Population Projections

As shown in Figure 4-4, the expected developments show a high growth rate over the next 20 years, whereas the historical trends from the PSARs indicate a low growth rate. The most reasonable 20-year population projection is developed by taking the year-over-year average of these four projections. Moreover, to project populations between 2043 and 2073, the 20-year average annual population increase of 598 people are added year-over-year. The resulting 50-year population projection is shown in Table 4-6 and Figure 4-5.

Table 4-6: Englewood Water District Most Reasonable Population Projection

20-year projection row	Total Functional Population 2021 (Base Year)	Total Functional Population 2023	Total Functional Population 2028	Total Functional Population 2033	Total Functional Population 2038	Total Functional Population 2043
Annual %		1.54%	1.49%	1.57%	1.14%	1.29%
Population	**38,260**	**39,442**	**42,383**	**45,708**	**48,317**	**51,426**
50-year projection row	**Total Functional Population 2048**	**Total Functional Population 2053**	**Total Functional Population 2058**	**Total Functional Population 2063**	**Total Functional Population 2068**	**Total Functional Population 2073**
Annual %	1.16%	1.10%	1.04%	0.99%	0.94%	0.90%
Population	**54,418**	**57,411**	**60,403**	**63,395**	**66,388**	**69,380**

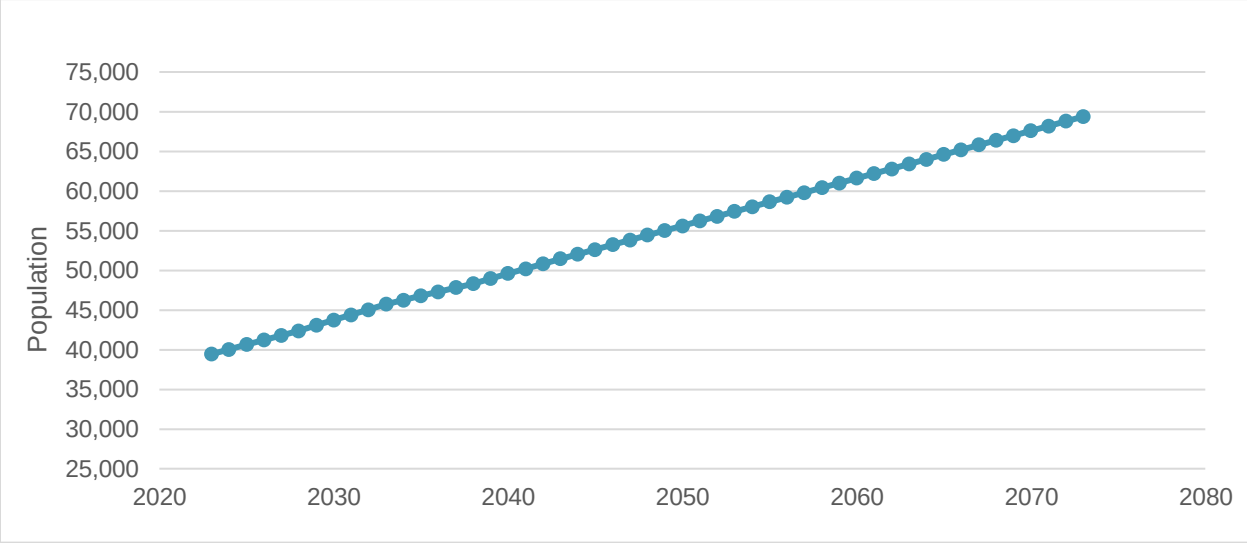


Figure 4-5: Englewood Water District Most Reasonable Population Projection

5 Water Demand Projections

Future water demands are estimated to assess the urgency and degree to which the District will need to expand their existing water treatment and distribution infrastructure over the 20- and 50-year planning horizons in order to accommodate population growth and development. The following subsections explain how future demands are estimated, what these future demands are expected to be, and when the District should respond.

5.1 Water Demand Methodology

For this Water Master Plan, the Per Capita Model for forecasting water supply demands was used. The Per Capita Model calculates the total production or consumption per capita for a historical period and applies the current year per capita consumption to the population projections for future periods. This is the simplest forecasting method and requires only historical production or consumption data, historical population, and forecast of population through the demand forecasting horizon. This approach produces satisfactory results as long as the population forecast is reasonable, and the customer mix does not change substantially.

SWFWMD's 2020 RWSP uses the average per capita demand from 2011 to 2015 to estimate an average per capita demand of 68 gpcd for the District. However, for the purposes of this report, this number is considered outdated and not a conservative basis for per capita demand when compared to the adjusted gross demand per capita in the PSARs from 2018 to 2021. The PSARs show an average per capita demand of 77 gpcd with a maximum of 79 gpcd in 2020. This maximum value will be rounded off to 80 gpcd and used to estimate future water demands for the remainder of this report. This is considered reasonable given low population growth expectations in the region and conservative given the expected developments to be constructed in the area.

U.S. Census Bureau data from 2014 to 2021 indicates an average household size of 2.19 persons for both Charlotte and Sarasota counties. This household size is assumed to be typical of the region and the service area of the District. Table 5-1 illustrates the projected annual average water supply demands for the District within its current service boundary in 5-year increments from 2023 to 2073.

Table 5-1: Annual Average Water Demands within the District

Year	Projected Population	Projected District Resident Demand (gpcd)	Projected Annual Average Water Demands (MGD)*
2023	39,442	80	3.155
2028	42,383	80	3.391
2033	45,708	80	3.657
2038	48,317	80	3.865
2043	51,426	80	4.114
2048	54,418	80	4.353
2053	57,411	80	4.593
2058	60,403	80	4.832
2063	63,395	80	5.072
2068	66,388	80	5.311
2073	69,380	80	5.550

*Not including Bocilla Utilities or system losses

5.1.1 Additional Water Demands

As discussed in Section 3.2.3, the District currently provides potable water to Bocilla Utilities in Charlotte County. Assuming the Island would be 100% built out with 533 residences at the end of the 20-year planning period, the ultimate average annual water demand is estimated to be 160,466 gpd. This final buildout flow was carried forward for all years in the 50-year planning horizon.

5.1.2 Water Losses

As discussed in Section 3.2.4, an annual addition of 17% will be included in total projected water demands to mitigate expected losses within the system based on historical averages.

5.2 Total Demands

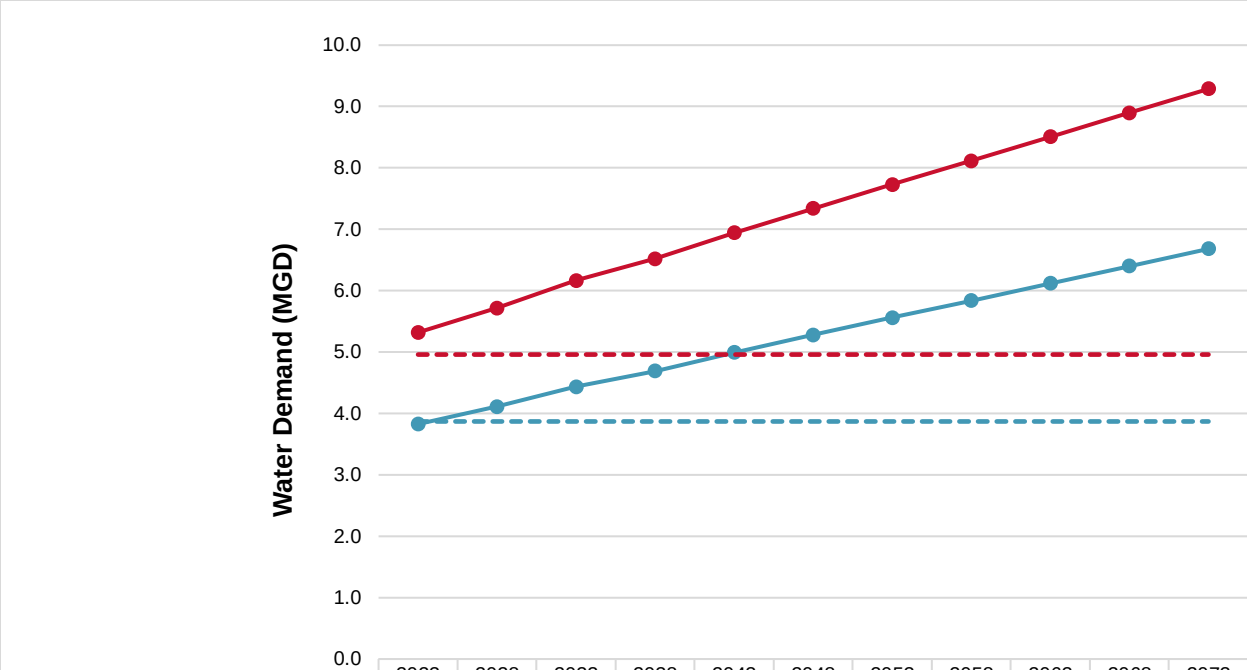
Historical water production data from 2013 through 2022 was used to determine the average monthly peaking factors for peak month demand projections. The peak month demand is defined as the average daily demand during the highest demand month throughout a year. The average maximum month peaking factor from 2013 through 2022 was 1.39. This peaking factor was used for determining peak monthly water demands.

Table 5-2 and Figure 5-1 illustrate the total projected annual average and peak month finished water demands for the District over the 20-year planning period.

Table 5-2: Total Projected Finished Water Demands

Year	Projected Functional Population	Projected District Resident Demand (gpcd)	Projected Annual Average Water Demands (MGD)	Bocilla Utilities Projected Annual Average Water Demands (MGD)	Total Annual Average Water Demands (MGD)*	Projected Peak Month Water Demands (MGD)**
2023	39,442	80	3.155	0.116	3.827	5.320
2028	42,383	80	3.391	0.126	4.114	5.719
2033	45,708	80	3.657	0.136	4.437	6.168
2038	48,317	80	3.865	0.146	4.693	6.524
2043	51,426	80	4.114	0.156	4.996	6.944
2048	54,418	80	4.353	0.160	5.280	7.340
2053	57,411	80	4.593	0.160	5.561	7.729
2058	60,403	80	4.832	0.160	5.841	8.119
2063	63,395	80	5.072	0.160	6.121	8.508
2068	66,388	80	5.311	0.160	6.401	8.897
2073	69,380	80	5.550	0.160	6.681	9.287

*Includes provision to make up for annual 17% water loss.
**Historical Annual Average to Peak Month Ratio of 1.38.

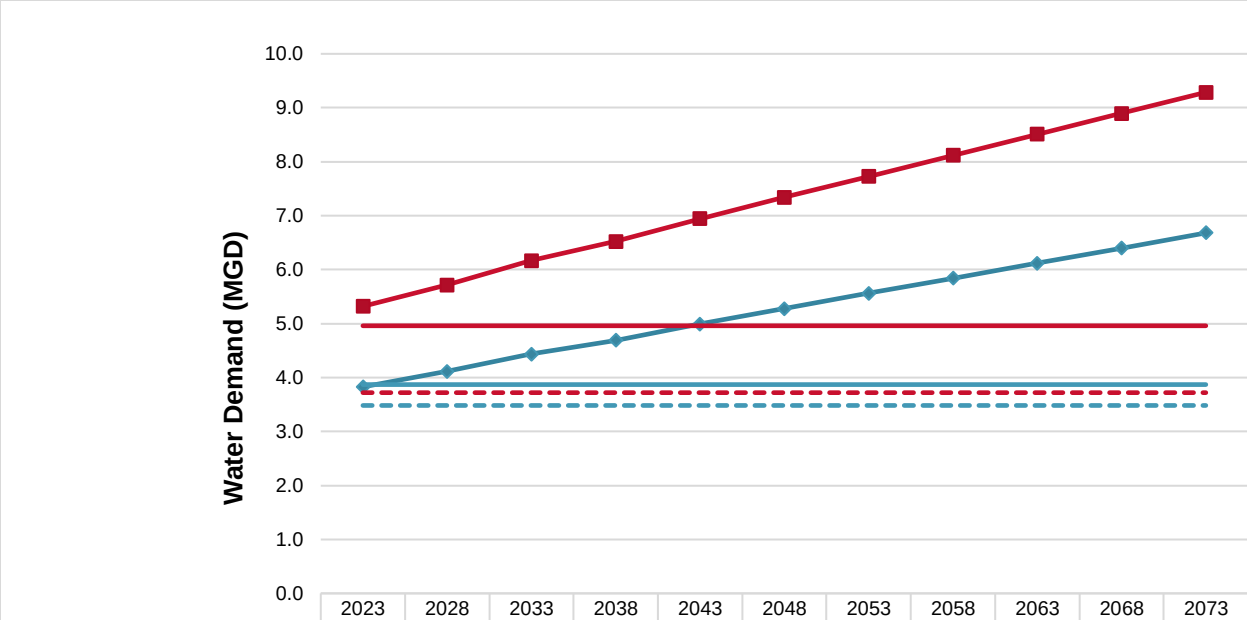


	2023	2028	2033	2038	2043	2048	2053	2058	2063	2068	2073
Projected AADF	3.827	4.114	4.437	4.693	4.996	5.280	5.561	5.841	6.121	6.401	6.681
Projected MMDF	5.320	5.719	6.168	6.524	6.944	7.340	7.729	8.119	8.508	8.897	9.287
Average Treatment Capacity	3.87	3.87	3.87	3.87	3.87	3.87	3.87	3.87	3.87	3.87	3.87
Peak Treatment Capacity	4.96	4.96	4.96	4.96	4.96	4.96	4.96	4.96	4.96	4.96	4.96

Figure 5-1: Englewood Water District Future Finished Water Needs to 2073

5.3 Water Resource and Treatment Analysis

In accordance with paragraph 62-555.348(3) (a), Florida Administrative Code (F.A.C.), an initial capacity analysis report must be submitted to the Department of Environmental Protection (DEP) within six months after the month in which the total maximum-day quantity of finished water produced by the District's water treatment plants exceeds seventy-five percent (75%) of the total permitted maximum-day operating capacity of the plants. Utilizing the combined permitted plant peak day capacity of 4.96 MGD from Table 3-6 above, when the District has a finished water peak day of 3.72 MGD, an initial capacity analysis report will need to be submitted to the DEP within six months. Based on the projected water supply demands shown in Figure 5-2, the District's Peak Month is projected to exceed 75% of the current permitted peak day capacity in 2023.



	2023	2028	2033	2038	2043	2048	2053	2058	2063	2068	2073
Projected AADF	3.827	4.114	4.437	4.693	4.996	5.280	5.561	5.841	6.121	6.401	6.681
AADF Capacity	3.87	3.87	3.87	3.87	3.87	3.87	3.87	3.87	3.87	3.87	3.87
90% AADF Capacity	3.483	3.483	3.483	3.483	3.483	3.483	3.483	3.483	3.483	3.483	3.483
Projected Peak Month	5.320	5.719	6.168	6.524	6.944	7.340	7.729	8.119	8.508	8.897	9.287
Peak Capacity	4.96	4.96	4.96	4.96	4.96	4.96	4.96	4.96	4.96	4.96	4.96
75% Peak Capacity	3.72	3.72	3.72	3.72	3.72	3.72	3.72	3.72	3.72	3.72	3.72

Figure 5-2: Englewood Water District Future Finished Water Needs to 2073

It is a general industry standard that when establishing the need for additional sources of water supply, new sources should be brought on-line when the projected finished water supply demand reaches 90% of the existing AAD treatment capacity.

As shown in Figures 5-1 and 5-2 above, water demand projections for the next 20 years indicate that a new water source and associated treatment capacity will need to be brought on-line as soon as possible. It is noted that new water supply sources and treatment capacities may take up to 10 years to permit, design and construct. It is recommended that the District include in its capital improvement plan the conceptual planning, permitting, design and construction of a new or expansion of the existing water supply source and treatment as soon as possible.

It is recommended that the water supply and treatment both be expanded to accommodate an initial finished water capacity of 7 mgd peak month with phasing to accommodate additional flows beyond 2043 as projected.