DEPARTMENT OF ENVIRONMENTAL
& ENGINEERING SERVICES

July 30, 2020

Nicholas Vitani, P.G.
Section Leader, Water Use Bureau
Lower East Coast and Central Florida Permitting
South Florida Water Management District
3301 Gun Club Road
West Palm Beach, FL 33406

RE: City of Lauderhill Consumptive Water Use Permit 06-00129W
Letter Modification Request - Limiting Condition 28

Dear Mr. Vitani:

The City of Lauderhill (Lauderhill) recently completed an Alternate Water Supply Update Report including consumptive use projections for Lauderhill thru 2040. The report presented the future flow projections for Lauderhill and compared them to the water use allocations in the City's existing consumptive use permit.

The updated analysis determined that the projected 2030 average day and maximum month demand can be met with the Biscayne allocation of 7.7 MGD and 9.0 MGD, respectively.
The City of Lauderhill continues to evaluate alternative water supply sources including the previously permitted option of constructing a reverse osmosis water treatment plant expansion which will utilize raw water from the Floridan Aquifer. The City will continue to negotiate with Palm Beach Aggregates on a proposed agreement to have the C-51 canal Phase II improvements as an available alternate water source other than the Floridian Aquifer. If necessary, Lauderhill will execute an agreement for bulk purchase of finished water with the City of Sunrise to meet additional water demands through the permit expiration of August 2030.

Based on the updated projections, the City is seeking a modification to Limiting Condition 28 in the Consumptive Water Use Permit that would delay construction completion of the Floridan wells to December 2028 and the reverse osmosis treatment plant to January 2030. The City of Lauderhill is also requesting that the annual progress reports be submitted to the District commencing in September 2025, and they shall contain the status of planning, permitting, construction and implementation of the alternate water supply.

Should you have any questions, please do not hesitate to contact me at jmcala@lauderhill-fl.gov.

Sincerely,

J. Martin Cala, P.E.
DEES Director/City Engineer

c: Ana Solomon
Herb Johnson
Lurleen Evans
Joanne Prince, P.E.

ALTERNATE WATER SUPPLY UPDATE REPORT

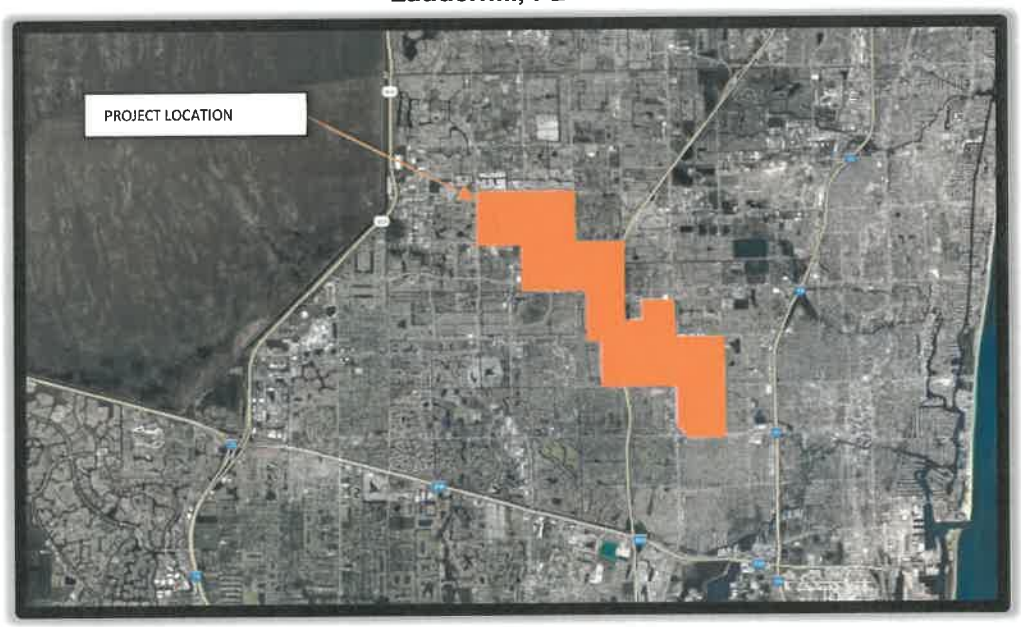
Permit No. 06-00129-W

BCC Project No. 020085.00

Prepared for:

UTILITIES DEPARTMENT

Lauderhill, FL



Prepared by:

Miami, FL 33173

July 2020

PROFESSIONAL ENGINEERING CERTIFICATE

I hereby certify that I am a registered professional engineer in the State of Florida practicing with BCC Engineering, LLC., a corporation, authorized to operate as an engineering business with Certificate of Authorization No. 7184, by the State of Florida, and that I have reviewed or approved the evaluation, findings, opinions, conclusions, or technical advice hereby reported for:

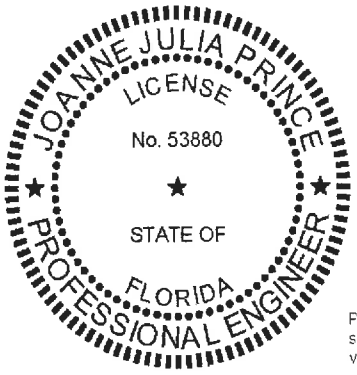
Project Name: Alternate Water Supply Update Report

Location: Lauderhill, Florida

Client: City of Lauderhill, Utilities Department

This Alternate Water Supply Update Report includes a summary of data collection efforts and engineering analysis for the project. I acknowledge that the procedures and references used to develop the results contained in this report are standard to the professional practice of civil engineering and planning as applied through professional judgment and experience.

Name: Joanne J. Prince, P.E., ENV SP



Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

Digital Signature: _____

FL License. No.: 53880

Date: July 9, 2020

TABLE OF CONTENTS

TABLES

FIGURES

1. Introduction

This section presents the statutory overview and objectives including a summary of the contents in this report.

1.1. Objective

BCC Engineering LLC has been retained by the City of Lauderhill, Utilities Department to prepare this Alternate Water Supply (AWS) Update Report. The main objective of the 2020 AWS Update is to comply with Limiting Condition 28, Paragraph 3 and seek a modification to reflect anticipated water use through the end of the permit in August 2030. There may be other compliance reports required by the SFWMD. However, this document is intended to update the water demand projections and present the need for an alternate water supply.

1.2. Statutory Overview

The City of Lauderhill was issued a Consumptive Water Use Permit 06-00129-W by the South Florida Water Management District on December 20, 2010. Limiting Condition No. 28 of the permit required the City of Lauderhill to implement development of alternative sources. The conditions included the following:

1.) Installation of the two proposed Floridan aquifer wells shall commence in December of 2015 and shall be completed by December 2016.
2.) The completion of all water treatment facilities to provide reverse osmosis shall be completed by January 2019.
3.) Annual progress reports shall be submitted to the District commencing in September 2015, and shall contain the status of planning, permitting, construction and implementation of the alternative water supply described in this Staff Report.

This Alternate Water Supply (AWS) Plan update has been prepared to address the limiting condition of the permit and provide an updated projection of water use through the end of the permit. This report will also fulfill paragraph 3 of Limiting Condition 28 for 2018 and 2019. It is the intent of the City to modify the limiting condition to reflect anticipated water use prior to the expiration of the permit.

In addition to this AWS report, it is anticipated that the City of Lauderhill will submit the 10-year compliance report as required by the permit.

1.3. Report Overview

The AWS Report presents information about the City of Lauderhill Utilities Department and the service area. The report includes population and water supply projections through 2040 within the City of Lauderhill's municipal boundary. The population projects are based on data utilized to prepare the City's Comprehensive Development Plan. The water demand projections are based on the total demand less the Annex area which is being served by Broward County and the City of Fort Lauderdale. It is assumed that customer makeup and land use will not change significantly during the remain planning period. This report is organized into the following sections:

Section 2 Water Service Area – presents the geographic service areas within the City of Lauderhill's service area and discusses the Annex area. This section also presents the population projections for the service area.

Section 3 Water Demand Forecast and Water Supply Adequacy – compares water supply capacity to the water demand forecast. Based on the projections, it appears that the City has sufficient water supply and treatment capacity to satisfy demand through the end of the permit in August 2030.

Section 4 Implementation Plan – discusses actions that the City of Lauderhill is undertaking and will initiate in the future to satisfy the permit conditions and plan for future water needs.

2.0 Water Service Area

This section presents an overview of the City of Lauderhill service area including the Annex area as well as the population projections.

2.1 Introduction

The City of Lauderhill (Lauderhill) located in Broward County, Florida has a 2020 estimated population of 74,324 according to the Florida Housing Data Clearinghouse. Lauderhill is bordered by the cities of Tamarac, Lauderdale Lakes, Fort Lauderdale, Plantation, Sunrise, and portions of Unincorporated Broward County. Lauderhill provides potable water service to most of the residents except for those in the Annex area. The Annex area was previously a part of Unincorporated Broward County and part of the City of Fort Lauderdale service area. The Annex area was incorporated in 2005 and 2006 into the City of Lauderhill. Figure 2-1 provides an overview of Lauderhill's municipal boundary and service area. Due to ongoing litigation between Lauderhill and Broward County, it is not clear when the Annex area will be added to the Lauderhill service area. Therefore, this report and analysis presents finding with and without the Annex area included.

2.2 Service Area

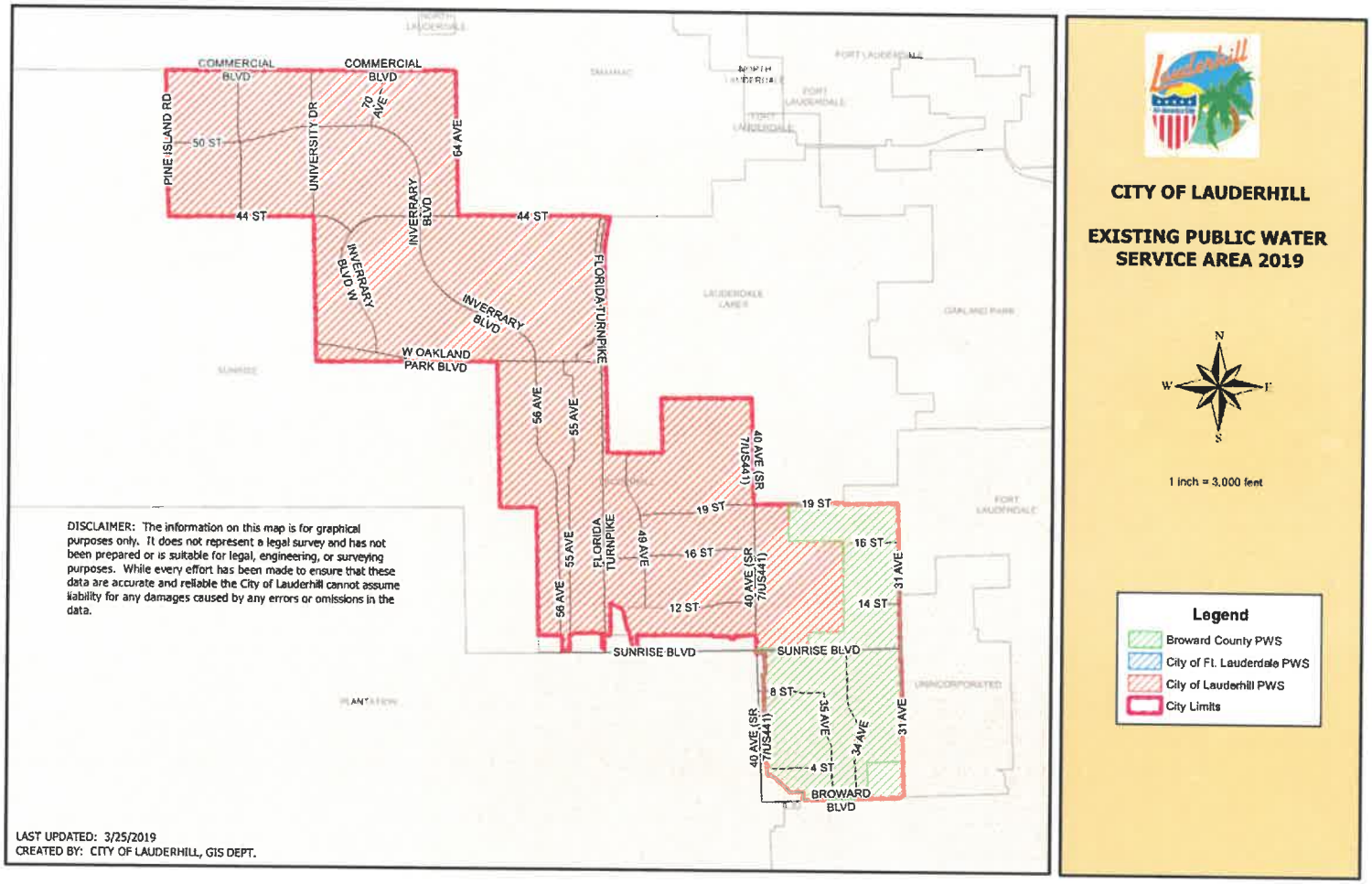
Lauderhill's service area is bound by Commercial Boulevard to the North, a canal between State Road 7 and NW 31st Avenue to the East, Sunrise Boulevard to the South, and Pine Island Road to the West. Lauderhill's water treatment plant (WTP) supplies finished water to the area.

2.3 Raw Water Supply

The Biscayne Aquifer has been the primary source of fresh water used in the Lauderhill service area. During the last permit renewal in August 2010, it was determined that additional sources of water would be needed to satisfy growing demands within the city. To meet the need for additional fresh water, Lauderhill requested additional allocation from the Floridan Aquifer. The Floridan Aquifer is brackish and contains a mixture of salt and fresh water. It also requires a different treatment method that the existing WTP cannot provide. Therefore, as a condition of the permit, Lauderhill agreed to install new wells to extract water from the Floridan Aquifer and construct a Reverse Osmosis (RO) plant to treat this additional source of water.

Due to observed water usage trends and the costs associated with developing the new water sources, Lauderhill retained a consultant in 2016 to evaluate historical water usage and prepare an updated projection of potable water demands for Lauderhill. Based on the analysis conducted in 2016, the City prepared a letter update to utilize surface water from the C-51 canal to meet additional demand for source water beyond the Biscayne Aquifer supply. This report will provide projections through 2040 and covers the remaining permit period.

Figure 2-1 City of Lauderhill Potable Water Service Area



2.4 Population Projections

Population projections were obtained from Broward County Planning Department as well as the Florida Housing Data Clearinghouse and University of Florida Bureau of Economic and Business Research (BEBR). Data obtained from the Florida Clearinghouse was used in combination with TAZ data from Broward County Planning Department to estimate population for the Annex area. The Florida Clearinghouse data was used to be consistent with Lauderhill's Planning Department amendments to the Comprehensive Development Master Plan (CDMP). Table 2-1 presents the population data obtained from the Florida Housing Data Clearinghouse.

Table 2-1
City of Lauderhill Estimated Total Population
2015 - 2040

Year	Population
2015	69,753
2020	74,324
2025	78,148
2030	81,339
2035	83,924
2040	85,897

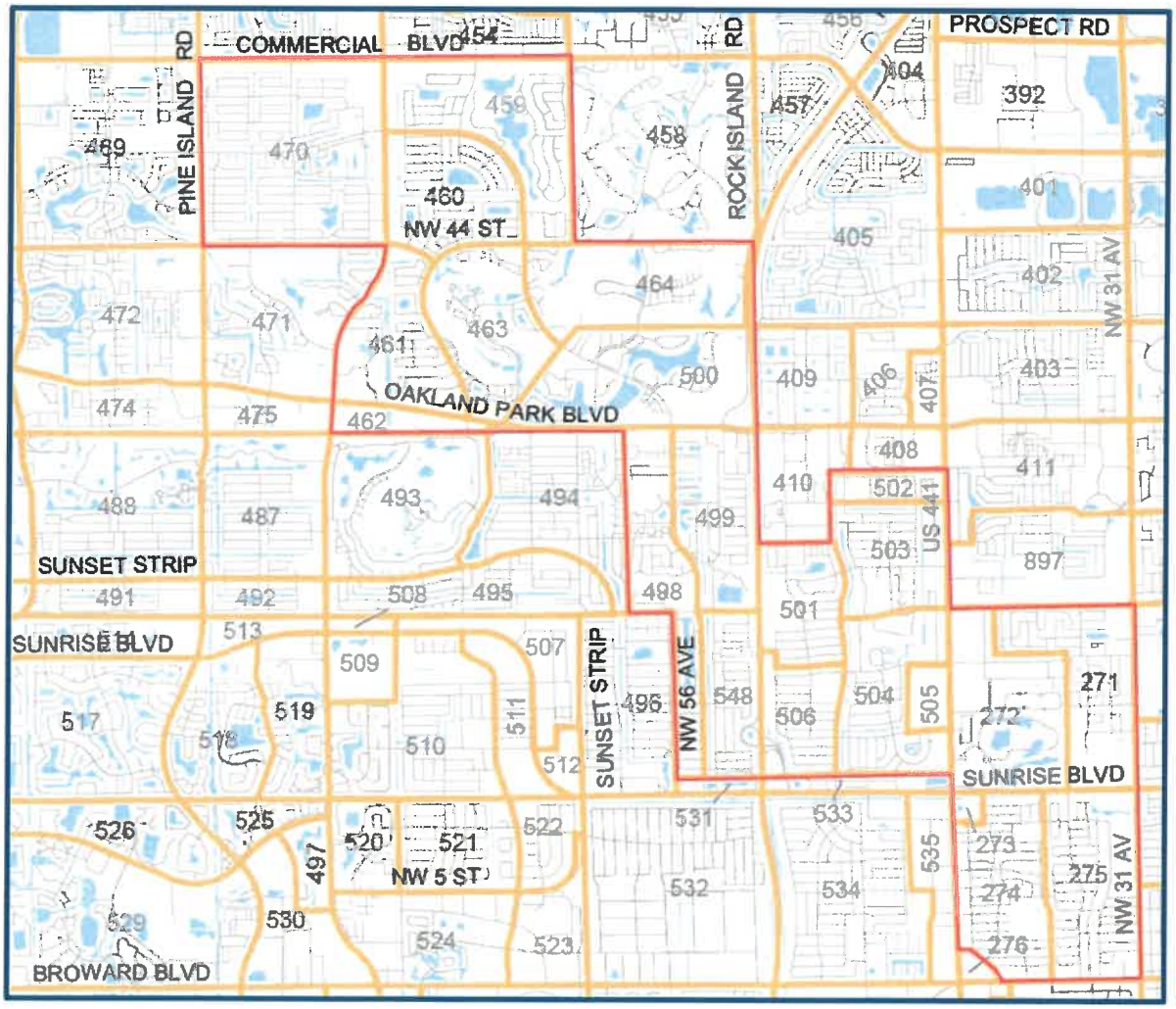
Source: Florida Housing Data Clearinghouse based on 2000 and 2010 US Census data and population projections as of May 2020.

The total population was adjusted to exclude the Annex area population in the following TAZ: 271, 273, 274, and 275. Figure 2-2 presents the TAZ within the Lauderhill municipal boundary. The estimated population within the Annex area TAZ is presented in Table 2-2 below.

Table 2-2
City of Lauderhill
Estimated Annex Area Population by TAZ
2015 - 2040

Year	TAZ 271 Population	TAZ 273 Population	TAZ 274 Population	TAZ 275 Population
2015	3,247	0	2,553	2,917
2020	3,196	0	2,512	2,862
2025	3,439	190	2,762	3,085
2030	3,650	1,204	2,941	3,306
2035	3,803	1,740	3,075	3,450
2040	3,931	2,141	3,187	3,571

Figure 2-2
City of Lauderhill TAZ Breakdown



Lauderhill is largely built out, however the CDMP does anticipate redevelopment along transit corridors that will impact existing commercial properties. Through the existing permitting and approval process, the Utilities Department will have an opportunity to review these projects and anticipate their impact on future water demands.

The following section presents an estimate of the water demand based on these estimated population totals.

3.0 Water Demand Forecast and Water Supply Adequacy

This section presents the water demand forecasted through 2040 which includes the remaining permit term and the source water supply that is available to Lauderhill for the next ten years under this current permit

3.1 Projected Finished Water Demands

The Lauderhill WTP has been in operation for over 50-years. Operating data including Monthly Operating Reports were obtained and used to determine annual average daily, maximum month and maximum day finished water demands for the service area through 2040. These projected water demands are compared to the available allocation in WUP 06-00129-W to evaluate the need for alternate water supplies. Table 3-1 presents historical water consumption. This data was used to develop the average per-capita water consumption.

Annual average day production (ADP) = sum of all the water production in that year divided by the number of days in the year.

Annual maximum – month production (MMP) = average demand in the month with the largest production.

Annual maximum – day production (MDP) = maximum production on any single day in the year.

Table 3-1 presents the annual MDP and Maximum ADP, which are highlighted, for each year. The finished average day water production has averaged 5.89 MGD over this period however it does show an upward trend of increasing production since 2010 with a peak in 2015. Lauderhill has a gradually increasing trend of water production during the period between 2010 through 2019 due to population growth and improving economic conditions. The implementation of a water conservation program decreased per capita water consumption below the levels historically experienced by Lauderhill.

When evaluating future water projections, the South Florida Water Management District (SFWMD) utilizes the average per capita daily water demand from the last five years to forecast future water projections. This number is the average gallons of water per person per day in the service area. In addition, the 10-year average peak factor was calculated as 1.30. This average does not include the highest or lowest maximum day peaking factor. The maximum month peaking factor is determined using a linear regression of the MMP/ADP ratio and MDP/ADP ratio at the maximum day peaking factor of 1.74 as shown in Table 3-1. The results of the linear regression for the maximum day peaking factor of 1.74 yielded a maximum month peaking factor of 1.21.

TABLE 3-1

FINISHED WATER PRODUCTION FROM 2010 THROUGH 2019

Month	Parameter	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
JANUARY	ADP	5.78	5.42	5.62	6.09	5.94	6.14	5.57	6.06	5.84	6.19
	MDP	6.49	6.26	6.82	7.29	6.61	7.14	6.49	6.61	6.71	6.88
FEBRUARY	ADP	5.34	5.62	5.74	6.35	5.95	6.30	6.06	6.34	6.09	6.20
	MDP	6.03	6.62	6.40	7.17	6.39	7.49	6.69	7.25	6.81	7.24
MARCH	ADP	5.51	5.95	5.82	6.05	5.98	6.42	6.36	6.35	6.27	6.23
	MDP	6.18	6.85	7.00	7.63	6.43	7.04	6.81	6.9	7.28	6.97
APRIL	ADP	5.64	6.25	5.52	5.78	6.16	6.71	6.53	6.36	6.26	6.43
	MDP	5.98	9.53	6.23	6.73	6.92	7.39	7.24	6.95	6.85	6.98
MAY	ADP	5.58	5.97	5.27	5.88	6.16	6.50	6.39	6.2	5.99	6.22
	MDP	6.37	6.95	6.30	7.41	7.10	7.04	8.09	6.92	8.81	7.94
JUNE	ADP	5.47	5.76	5.31	5.64	5.78	6.74	6.07	5.83	5.86	5.83
	MDP	6.46	7.20	5.85	6.09	6.42	7.33	6.77	6.34	6.84	6.34
JULY	ADP	5.55	5.15	5.54	5.36	5.75	6.61	6.24	6.01	5.91	6.07
	MDP	6.58	5.89	6.40	5.89	6.30	7.52	7.20	6.61	6.6	6.48
AUGUST	ADP	5.36	5.18	5.46	5.58	5.90	6.29	6.03	5.79	5.96	5.75
	MDP	6.40	6.21	6.08	6.34	6.53	6.91	6.52	6.4	6.86	6.49
SEPTEMBER	ADP	5.43	5.11	5.46	5.46	5.93	6.12	5.88	5.76	5.82	5.89
	MDP	7.10	6.11	6.08	6.58	6.55	6.48	6.45	6.26	6.75	6.87
OCTOBER	ADP	5.48	5.00	5.45	5.69	5.85	6.22	5.80	5.63	6.22	5.89
	MDP	6.19	5.89	5.89	6.51	6.44	7.20	6.32	6.51	7	6.46
NOVEMBER	ADP	5.27	5.06	5.94	5.57	6.09	6.14	6.19	5.73	6.16	5.93
	MDP	6.10	6.13	6.13	6.92	6.73	6.68	6.74	6.55	6.8	6.91
DECEMBER	ADP	5.48	5.34	6.25	5.85	5.96	6.17	6.17	5.93	6.25	5.88
	MDP	6.19	6.17	6.17	6.44	6.40	8.09	8.09	6.9	6.9	6.39
ANNUAL	ADP	5.49	5.48	5.61	5.78	5.95	6.36	6.11	6.00	6.05	6.04
	MDP	7.10	**9.53**	7.00	7.63	7.10	8.09	8.09	7.25	8.81	7.94
	MMP	5.78	6.25	6.25	6.35	6.16	6.74	6.53	6.36	6.27	6.43
	MMP /ADP Peaking Factor	1.05	1.14	1.11	1.10	1.03	1.06	1.07	1.06	1.04	1.06
	MDP/ ADP Peaking Factor	1.29	1.74	1.25	1.32	1.19	1.27	1.32	1.21	1.46	1.31

Gray shaded cells in the table indicate when the maximum-day production occured for each year

Yellow shaded cells in the table indicate when the maximum-month ADP production occurred for each year.

Maximum-Month Peaking Factor	1.05	Estimated as the average of the max month peaking factors over the past three years(2017-2019)
Maximum Day Peaking Factor	**1.74**	Estimated as the maximum of the max day peaking factors over past 10 yrs.
Ten Year Average Peak Factor	**1.30**	Estimated as the average of the max day peaking factors over past 10 yrs. Less the highest and lowest numbers

ADP:	Average Day Production	**5.89**	
MDP:	Maximum-Day Production	**9.53**	yr 2011
MMP:	Maximum -Month Production	**6.74**	yr 2015

3.2 Per Capita Consumption

The per capita water consumption together with the estimated population projection was used to estimate projected finished water demands. Table 3-2 presents the average per capita consumption for Lauderhill using Monthly Operating Report data for the last 5 years with estimated population data for 2015 through 2020. Population for the period between 2015 and 2020 was estimated by assuming the same annual increase for each year. The TAZ population was obtained from Broward County (County) Planning and Development Division. The County population and forecast model (PFAM) distributes county-wide population estimates prepared by the University of Florida Bureau of Economic and Business Research (BEBR) to each municipality and traffic analysis zone (TAZ). The Annex area TAZ population was subtracted from the total Lauderhill population to arrive at the estimated service area population.

Table 3-2
City of Lauderhill
Average Per Capita Consumption

Year	Total Lauderhill Pop. (FHDC)	Annex Area Pop. (TAZ)	Service Area Pop.	ADP	Per-Capita Consumption
2015	69,753	8,717	61,036	6.36	104
2016	70,667	8,831	61,836	6.15	99
2017	71,581	8,947	62,634	6	96
2018	72,496	9,064	63,431	6.05	95
2019	73,410	9,183	64,227	6.04	94
2020	74,324	9,303	65,021		
Annual Change	914	117		5-yr avg	98

3.3 Water Demand and Supply Adequacy

Finished water demand was calculated as the product of the service area population and average per capita water consumed. The estimated average day finished water demand, for the city, the service area, and the Annex area are presented in Table 3-3. Based on the average finished water demand the Maximum-Month Peaking Factor, and the Maximum-Day Peaking Factor were used to project the Maximum-Month demand and Maximum-Day demand. Table 3-4 presents data for the base year of 2015 through 2040 without the Annex area. Table 3-5 presents data for the base year of 2015 through 2040 with the Annex area added in 2030. The raw water demand was calculated using a factor of 1.03 which assumes a 3% loss during processing and treatment of raw water from the Biscayne Aquifer using a lime softening process.

Figure 3-1 graphically present the average daily raw water demand, finished water demand, max month demand based on the max day peaking factor and compares them to the Daily Biscayne Withdrawal limit as well as the monthly withdrawal limit.

The Water Availability Rule, established in 2007, has limited the raw water withdrawals from the Biscayne Aquifer to a base condition water use defined as the maximum running average withdrawal of any 12-month period in the five years preceding April 1, 2006. Five years of monthly operating data were analyzed and yielded the base condition water use of 7.70 MGD which occurred between April 2002 and 2003.

The SFWMD consumptive use permits limiting conditions stipulates that the annual withdrawals from the Biscayne Aquifer are 2,811 MG or 7.70 MGD. The permit also allows annual withdrawals from the Upper Floridan Aquifer at 372 MG per year or 1.05 MGD. The maximum monthly withdrawal from the Biscayne Aquifer is 270 MG or 9.0 MGD. The maximum monthly withdrawal limit for the Florida Aquifer is 24.25 MG or 0.80 MGD.

Based on the updated projections in Figure 3-1, the Biscayne Aquifer can meet the Lauderhill service area's average raw water needs, finished average daily water flow, average daily flow plus fire flow, max-month flows through the year 2030. However, the allocation is not sufficient to meet the estimated maximum day demand. The maximum day peaking factor of 1.74 experienced in 2011 was due to a fire within the service area. The next highest maximum day peaking factor of 1.46 was experienced in 2018. Barring any out of the ordinary events which result in an even greater Maximum-Day peaking factor, the 1.74 Maximum-Day peaking factor will be excluded from consideration after 2021, as it will fall outside of the most recent 10 years of data. A future AWS report will assess the impact of this change on the maximum-day demand and the capacity to be supplied by alternate water sources. Lauderhill is proposing to meet the maximum day demand using existing interconnects with neighboring utilities through the year 2030.

Figure 3-2 presents the average raw water needs, finished average daily water flow, max month, and max day flows through the year 2040 with the Annex area added in 2030. Based on the updated projections, the Biscayne Aquifer cannot meet Lauderhill's service area raw water needs, average daily flow, average daily flow plus fire flow or max month flow once the Annex area is added in 2030. Therefore, before the Annex area can be added to the Lauderhill service area, alternate water sources must be developed and brought online. Source, and treatment capacity to address the Annex area, future population growth, together with estimated maximum day flows could be added at the simultaneously. This approach would allow Lauderhill to implement a capacity increase in a more cost-effective manner.

TABLE 3-3
City of Lauderhill
Average Day Finished Water Demand Projections by TAZ Including Annexed TAZ Areas # 271, 273, 274, & 275

TAZ Location Number	TAZ Per Capita In gal/day/person	Pop. In 2015	Flows ADF -2015 Flows	Pop. In 2020	Flows ADF -2020 Flows	Pop. In 2025	Flows ADF- 2025 Flows	Pop. In 2030	Flows ADF- 2030 Flows	Pop. In 2035	Flows ADF- 2035 Flows	Pop. In 2040	Flows ADF- 2040 Flows
271	98	3,247	317,474	3,196	312,487	3,439	336,246	3650	356,877	3803	371,836	3,931	384,351
272	98	1,690	165,239	2,238	218,819	2,442	238,765	2595	253,725	2706	264,578	2,802	273,964
273	98	0	0	0	0	190	18,577	1204	117,720	1740	170,128	2,141	209,335
274	98	2,553	249,618	2,512	245,609	2,762	270,053	2941	287,555	3075	300,657	3,187	311,607
275	98	2,917	285,208	2,862	279,831	3,085	301,634	3306	323,242	3450	337,322	3,571	349,153
459	98	2,098	205,131	2,086	203,958	2,046	200,047	2012	196,722	2189	214,028	2,317	226,543
460	98	2,874	281,004	2,834	277,093	2,789	272,693	2755	269,369	2733	267,218	2,710	264,969
461	98	2,188	213,931	2,148	210,020	2,107	206,011	2085	203,860	2186	213,735	2,254	220,384
462	98	0	0	0	0	0	0	0	0	19	1,858	33	3,227
463	98	3,408	333,215	3,341	326,665	3,471	339,375	3414	333,802	3426	334,975	3,389	331,358
464	98	5,836	570,612	5,768	563,963	5,876	574,523	5782	565,332	5734	560,639	5,661	553,501
470	98	6,675	652,645	6,576	642,965	6,473	632,894	6392	624,974	6336	619,499	6,280	614,024
498	98	4,947	483,690	4,872	476,357	4,741	463,549	4654	455,042	4640	453,674	4,582	448,003
499	98	6,078	594,273	5,940	580,780	5,788	565,919	5674	554,772	5634	550,861	5,566	544,213
500	98	4,259	416,421	4,172	407,915	4,290	419,453	4241	414,662	4378	428,057	4,458	435,879
501	98	1,115	109,019	1,089	106,476	1,071	104,716	1069	104,521	1060	103,641	1,051	102,761
502	98	965	94,352	1,014	99,143	1,230	120,263	1368	133,755	1481	144,804	1,583	154,777
503	98	5,498	537,564	5,634	550,861	5,787	565,821	5979	584,594	6101	596,522	6,198	606,006
504	98	1,895	185,283	2,235	218,526	2,427	237,299	2575	251,769	2679	261,938	2,774	271,226
505	98	342	33,439	3,033	296,550	3,160	308,967	3665	358,343	3924	383,667	4,184	409,088
506	98	1,366	133,560	1,346	131,604	1,327	129,747	1357	132,680	1342	131,213	1,327	129,747
548	98	2,875	281,102	2,809	274,649	2,732	267,120	2689	262,916	2645	258,613	2,604	254,605
Annexed TAZ	98	8,717	854,266	9,303	911,694	9,782	958,601	10,181	997,743	10,505	1,029,452	10,752	1,053,654
City	98	69,753	**6,835,794**	74,324	**7,283,752**	78,148	**7,658,504**	81,339	**7,971,222**	83,924	**8,224,552**	85,897	**8,417,906**
SERVICE AREA	98	61,036	5,981,528	65,021	6,372,058	68,366	6,699,903	71,158	6,973,479	73,419	7,195,100	75,145	7,364,252

TABLE 3-4

Forecasted ADP, MD & MM Finished Water (Based on TAZ)

Demand Projections *Without Annexed Areas* (271, 273, 274 & 275)

Year	Raw Water Q MGD	Finished ADF MGD	Finished ADF with Fire Flow MGD*$_1$	Max day MGD*$_2$	Max Month MGD*$_3$
2015	6.37	5.98	7.06	11.08	7.71
2020	6.56	6.37	7.45	11.42	7.94
2025	6.90	6.70	7.78	12.01	8.35
2030	7.18	6.97	8.05	12.50	8.69
2035	7.41	7.20	8.28	12.90	8.97
2040	7.59	7.36	8.44	13.20	9.18

TABLE 3-5

Forecasted ADP, MD & MM Finished Water (Based on TAZ)

Demand Projections Including Annex *Areas* (271, 273, 274 & 275) by 2030

Year	Raw Water Q MGD	Finished ADF MGD	Finished ADF with Fire Flow MGD*$_1$	Max day MGD*$_2$	Max Month MGD*$_3$
2015	6.37	5.98	7.06	11.08	7.71
2020	6.56	6.37	7.45	11.42	7.94
2025	6.90	6.70	7.78	12.01	8.35
2030	8.21	7.97	9.05	15.37	9.93
2035	8.47	8.22	9.30	15.82	10.25
2040	8.67	8.42	9.50	16.17	10.49

*1 Fire flow protection of 1.08MGD per 4-hour @ 4500GPM for Industrial Land Use.

*2 Max day obtained from raw water x 1.74

*3 Max month obtained from raw water x 1.21 peaking factor from linear regression.

Figure 3-1
Projected Water Demand for Lauderhill Service Area Without Annexation (Biscayne Supply)

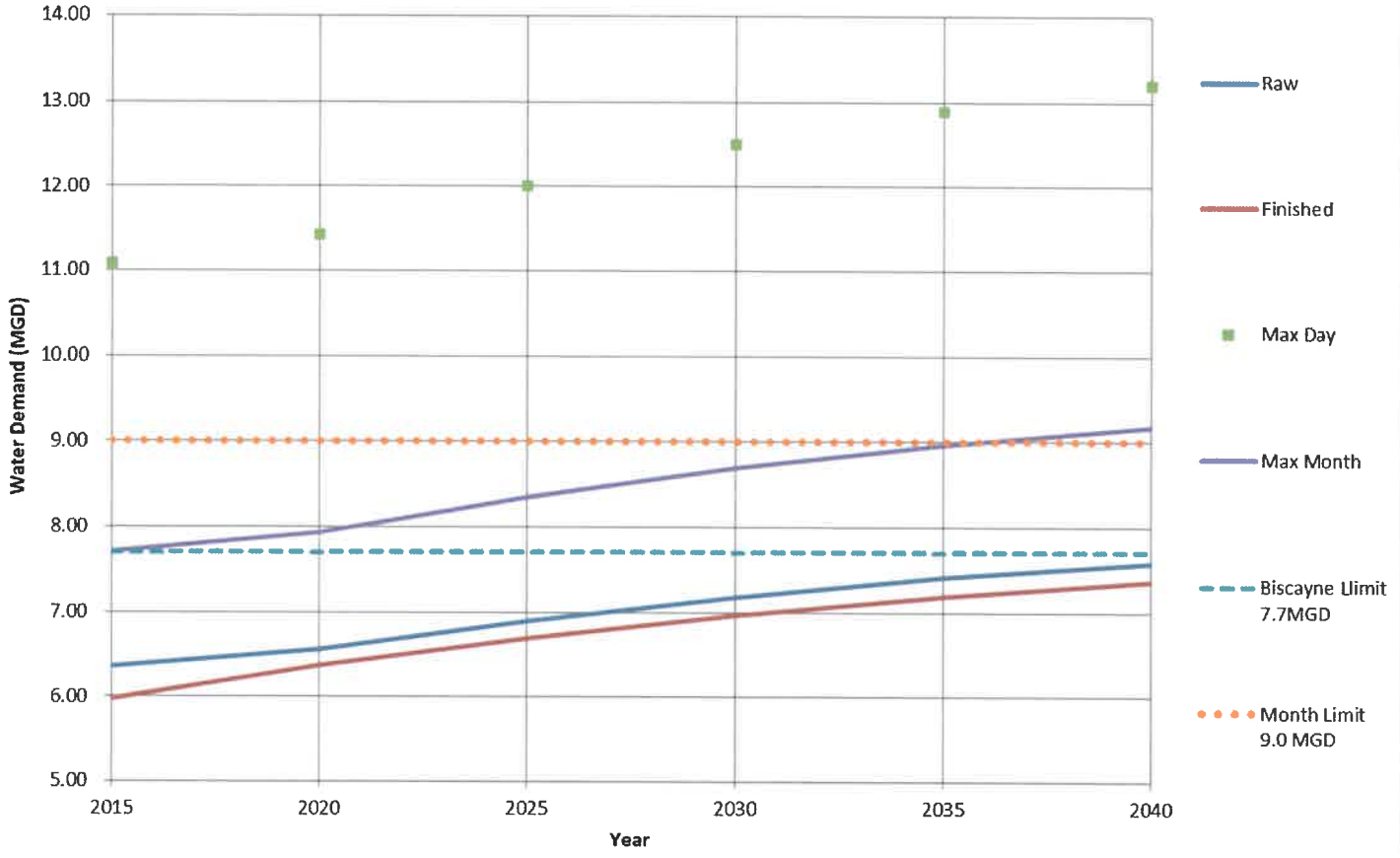
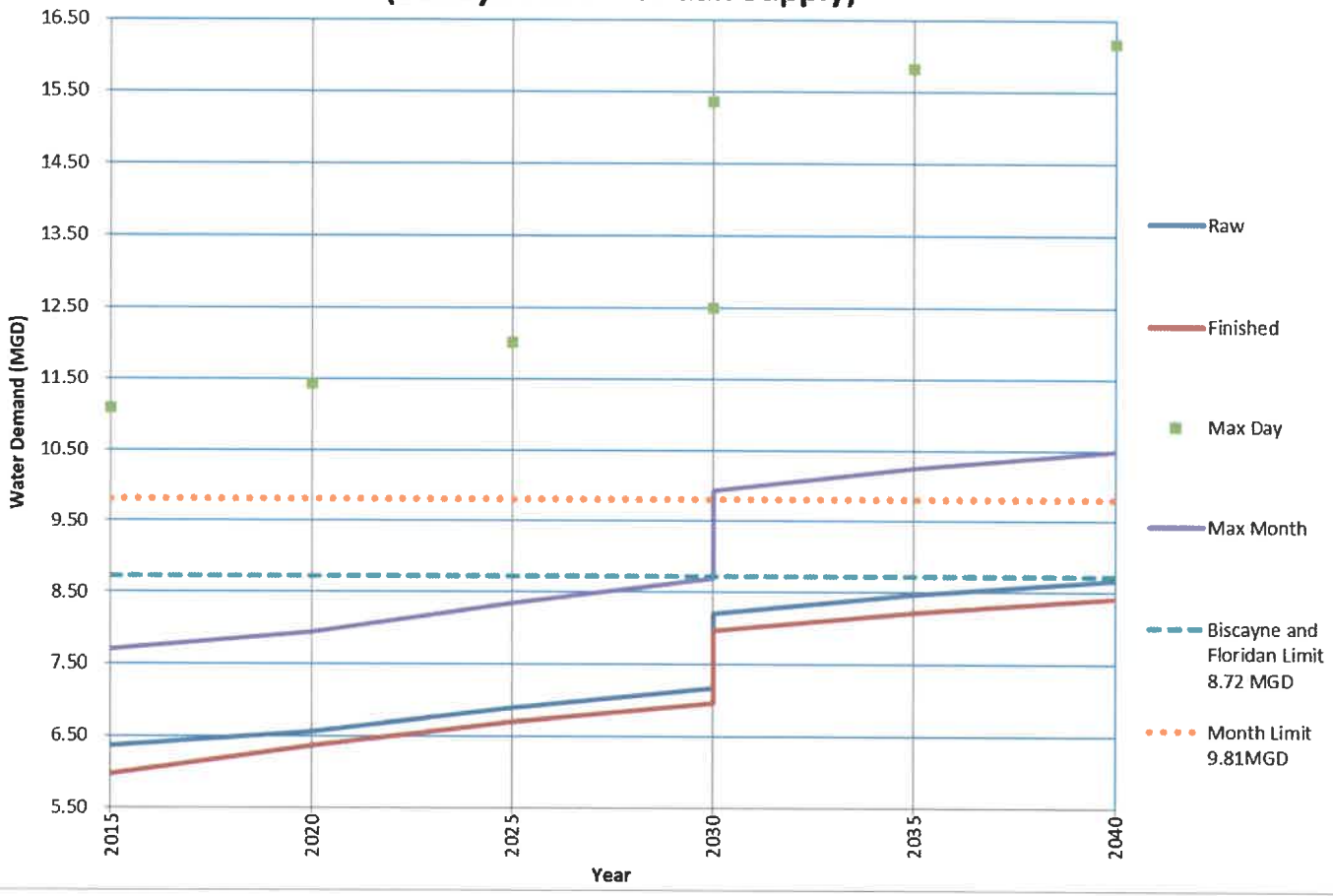


Figure 3-2
Projected Water Demand for Lauderhill Service Area With Annexation (Biscayne and Floridan Supply)



4.0 Implementation Plan

This section discusses steps that the City of Lauderhill Utilities Department will undertake to comply with the conditions of their water use permit as well as plan for future source and capacity needs.

4.1 Future Actions

The Utilities Department is in discussion with the City of Sunrise regarding the availability of water for bulk purchase to meet future water needs. This would also facilitate the return of the Annex area prior to 2030 by providing needed additional potable water. If the need arises, entrance into a bulk purchase agreement may also be more cost effective for Lauderhill than construction of Floridan wells and the necessary reverse osmosis treatment plant. Lauderhill will provide an update to SFWMD staff if a bulk purchase agreement is executed.

The City of Lauderhill will submit the 10-year compliance report to the South Florida Water Management District by the July 31, 2020 deadline. The report together with the AWS Update will be used as the basis for a permit modification delaying the AWS compliance date to 2030. Based on these updated projections the City will require an alternate water supply to serve the Annex area and meet future growth within the service area after 2030.

The City of Lauderhill will retain consultants to evaluate future water demands and the timing for necessary upgrades.

Due to uncertainty around the status of the Annex area, Lauderhill intends to retain the Floridan Aquifer allocation. The construction of the necessary treatment capacity is being planned for an in-service date of 2030.

The City of Lauderhill will continue discussions with Palm Beach Aggregates to secure an allocation in the Phase II improvements to meet alternate water supply needs.

As the timing and the need for future improvements is refined, the City intends to utilize bulk purchase agreement if additional water supply is needed before 2030.

4.2 Proposed Modifications to Limiting Condition 28

Based on the updated projections, Lauderhill is proposing the following modifications to Limiting Condition 28 of water use permit 06-00129-W.

1.) Installation of the two proposed Floridan wells shall commence in December 2027 and shall be completed by December 2028.
2.) The completion of all water treatment facilities to provide reverse osmosis shall be completed by January 2030.
3.) Annual progress reports shall be submitted to the District commencing in September 2025, and shall contain the status of planning, permitting, construction and implementation of the alternate water supply described in this Staff Report.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

WATER USE
LETTER MODIFICATION

APPLICATION NUMBER: 200731-2 **PERMIT NUMBER:** 06-00129-W

DATE ISSUED: August 6, 2020 **EXPIRATION DATE:** August 24, 2030

PERMITTEE: CITY OF LAUDERHILL
2101 NW 49TH AVE
LAUDERHILL, FL 33313

PROJECT NAME: CITY OF LAUDERHILL

PROJECT LOCATION: BROWARD COUNTY, S31/T49S/R42E
S15, 16, 22, 23, 25, 26, 35, 36/T49S/R41E

District staff has reviewed the information submitted in support of the referenced application for permit modification(s) and determined that the proposed activities are in compliance with the previous permit and the appropriate provisions of Rule 40E-2.331 (4)(a), Florida Administrative Code. The permit modification(s) include the following:

To update Limiting Condition #28 to reflect a revised alternative water supply schedule. The implementation date of the saline water intrusion monitoring program in Limiting Condition #27 is also updated based on the revised completion date for the Floridan aquifer wells.

1) Installation of the two proposed Floridan aquifer wells shall commence in December 2027 and shall be completed by December 2028.

2) The completion of all water treatment facilities to provide reverse osmosis shall be completed by January 2030.

3) Annual progress reports shall be submitted to the District commencing in September 2025 and shall contain the status of planning, permitting, construction and implementation of the alternative water supply described in the Staff Report (Application #090804-4).

Within one month of completion of Floridan aquifer well F1, the Permittee shall implement the following saline water intrusion monitoring program:

The monthly sampling and testing for chloride concentration in milligrams per liter of Floridan aquifer well F1 and quarterly submittal of the results to District Compliance Staff.

Please understand that your permit remains subject to the 28 Limiting Conditions and all other terms of the permit authorization as previously issued.

Nicholas M. Vitani, P.G.
Section Leader
Water Use Bureau

LIMITING CONDITIONS

1. This permit shall expire on August 24, 2030.

2. Application for a permit modification may be made at any time.

3. Water use classification:

   Public Water Supply

4. Source classification is:

   Groundwater from:
   Biscayne Aquifer
   Upper Floridan Aquifer

5. Annual allocation shall not exceed 3,182.84 million gallons (MG). (8.72 MGD)

   Maximum monthly allocation shall not exceed 294.25 million gallons (MG).

   The following limitations to annual withdrawals from specific sources are stipulated:
   Biscayne Aquifer-: 2,811 MG.
   Upper Floridan Aquifer-: 372 MG.

   The following limitations to maximum monthly withdrawals from specific sources are stipulated:
   Biscayne Aquifer-: 270.00 MG.
   Upper Floridan Aquifer-: 24.25 MG.

6. Pursuant to Rule 40E-1.6105, F.A.C., Notification of Transfer of Interest in Real Property, within 30 days of any transfer of interest or control of the real property at which any permitted facility, system, consumptive use, or activity is located, the permittee must notify the District, in writing, of the transfer giving the name and address of the new owner or person in control and providing a copy of the instrument effectuating the transfer, as set forth in Rule 40E-1.6107, F.A.C.

   Pursuant to Rule 40E-1.6107 (4), until transfer is approved by the District, the permittee shall be liable for compliance with the permit. The permittee transferring the permit shall remain liable for all actions that are required as well as all violations of the permit which occurred prior to the transfer of the permit.

   Failure to comply with this or any other condition of this permit constitutes a violation and pursuant to Rule 40E-1.609, Suspension, Revocation and Modification of Permits,

the District may suspend or revoke the permit.

This Permit is issued to:

CITY OF LAUDERHILL
2101 N.W. 49TH AVENUE
LAUDERHILL, FL - 33313

7. Withdrawal facilities:

Groundwater - Proposed:

2 - 20" X 1250' X 910 GPM Wells Cased To 950 Feet

Groundwater - Existing:

1 - 12" X 154' X 1000 GPM Well Cased To 80 Feet
1 - 24" X 121' X 2800 GPM Well Cased To 80 Feet
1 - 24" X 142' X 2800 GPM Well Cased To 80 Feet
1 - 24" X 115' X 2800 GPM Well Cased To 80 Feet
1 - 24" X 120' X 2400 GPM Well Cased To 80 Feet
1 - 12" X 154' X 1500 GPM Well Cased To 80 Feet

8. Permittee shall mitigate interference with existing legal uses that was caused in whole or in part by the permittee's withdrawals, consistent with the approved mitigation plan. As necessary to offset the interference, mitigation will include pumpage reduction, replacement of the impacted individual's equipment, relocation of wells, change in withdrawal source, or other means.

Interference to an existing legal use is defined as an impact that occurs under hydrologic conditions equal to or less severe than a 1 in 10 year drought event that results in the:

(A) Inability to withdraw water consistent with provisions of the permit, such as when remedial structural or operational actions not materially authorized by existing permits must be taken to address the interference; or

(B) Change in the quality of water pursuant to primary State Drinking Water Standards to the extent that the water can no longer be used for its authorized purpose, or such change is imminent.

9. Permittee shall mitigate harm to existing off-site land uses caused by the permittee's withdrawals, as determined through reference to the conditions for permit issuance. When harm occurs, or is imminent, the District will require the permittee to modify withdrawal rates or mitigate the harm. Harm caused by withdrawals, as determined through reference to the conditions for permit issuance, includes:

(A) Significant reduction in water levels on the property to the extent that the designed function of the water body and related surface water management improvements are damaged, not including aesthetic values. The designed function of a water body is identified in the original permit or other governmental authorization issued for the construction of the water body. In cases where a permit was not required, the designed function shall be determined based on the purpose for the original construction of the water body (e.g. fill for construction, mining, drainage canal, etc.)

(B) Damage to agriculture, including damage resulting from reduction in soil moisture resulting from consumptive use; or

(C) Land collapse or subsidence caused by reduction in water levels associated with consumptive use.

10. Permittee shall mitigate harm to the natural resources caused by the permittee's withdrawals, as determined through reference to the conditions for permit issuance. When harm occurs, or is imminent, the District will require the permittee to modify withdrawal rates or mitigate the harm. Harm, as determined through reference to the conditions for permit issuance includes:

(A) Reduction in ground or surface water levels that results in harmful lateral movement of the fresh water/salt water interface,

(B) Reduction in water levels that harm the hydroperiod of wetlands,

(C) Significant reduction in water levels or hydroperiod in a naturally occurring water body such as a lake or pond,

(D) Harmful movement of contaminants in violation of state water quality standards, or

(E) Harm to the natural system including damage to habitat for rare or endangered species.

11. If any condition of the permit is violated, the permit shall be subject to review and

possible modification, enforcement action, or revocation.

12. Authorized representatives of the District, with advance notice to the permittee, shall be permitted to enter, inspect, and observe the permitted system to determine compliance with permit conditions.

13. The Permittee is advised that this permit does not relieve any person from the requirement to obtain all necessary federal, state, local and special district authorizations.

14. The permit does not convey any property right to the Permittee, nor any rights and privileges other than those specified in the Permit and Chapter 40E-2, Florida Administrative Code.

15. Permittee shall submit all data as required by the implementation schedule for each of the limiting conditions to: SFWMD at www.sfwmd.gov/ePermitting, or Regulatory Support, 3301 Gun Club Road, West Palm Beach, FL 33406.

16. In the event of a declared water shortage, water withdrawal reductions will be ordered by the District in accordance with the Water Shortage Plan, Chapter 40E-21, F.A.C. The Permittee is advised that during a water shortage, pumpage reports shall be submitted as required by Chapter 40E-21, F.A.C.

17. Prior to the use of any proposed water withdrawal facility authorized under this permit, unless otherwise specified, the Permittee shall equip each facility with a District-approved operating water use accounting system and submit a report of calibration to the District, pursuant to Section 4.1, Basis of Review for Water Use Permit Applications.

    In addition, the Permittee shall submit a report of recalibration for the water use accounting system for each water withdrawal facility (existing and proposed) authorized under this permit every five years from each previous calibration, continuing at five-year increments.

18. Monthly withdrawals for each withdrawal facility shall be submitted to the District quarterly. The water accounting method and means of calibration shall be stated on each report.

19. The Permittee shall notify the District within 30 days of any change in service area

boundary. If the Permittee will not serve a new demand within the service area for which the annual allocation was calculated, the annual allocation may then be subject to modification and reduction.

20. Permittee shall determine unaccounted-for distribution system losses. Losses shall be determined for the entire distribution system on a monthly basis. Permittee shall define the manner in which unaccounted-for losses are calculated. Data collection shall begin within six months of Permit issuance. Loss reporting shall be submitted to the District on a yearly basis from the date of Permit issuance.

21. Permittee shall maintain an accurate flow meter at the intake of the water treatment plant for the purpose of measuring daily inflow of water.

22. Every ten years from the date of permit issuance, the permittee shall submit a water use compliance report for review and approval by District Staff, which addresses the following:

    (A) The results of a water conservation audit that documents the efficiency of water use on the project site using data produced from an onsite evaluation conducted. In the event that the audit indicates additional water conservation is appropriate or the per capita use rate authorized in the permit is exceeded, the permittee shall propose and implement specific actions to reduce the water use to acceptable levels within timeframes proposed by the permittee and approved by the District.

    (B) A comparison of the permitted allocation and the allocation that would apply to the project based on current District allocation rules and updated population and per capita use rates. In the event the permit allocation is greater than the allocation provided for under District rule, the permittee shall apply for a letter modification to reduce the allocation consistent with District rules and the updated population and per capita use rates to the extent they are considered by the District to be indicative of long term trends in the population and per capita use rates over the permit duration. In the event that the permit allocation is less than allowable under District rule, the permittee shall apply for a modification of the permit to increase the allocation if the permittee intends to utilize an additional allocation, or modify its operation to comply with the existing conditions of the permit.

23. The Water Conservation Plan required by Section 2.6.1 of the Basis of Review for Water Use Permit Applications within the South Florida Water Management District, must be implemented in accordance with the approved implementation schedule.

24. If a proposed well location is different from a location specified in the application, the Permittee shall submit to the District an evaluation of the impact of pumpage from the proposed well location on adjacent existing legal uses, pollution sources, environmental features, the saline water interface, and water bodies one month prior to all new well construction. The Permittee is advised that the proposal must be in compliance with all permitting criteria and performance standards in effect at the time of submittal, and that a formal modification of the permit shall be required if the withdrawals from the well location will result in an environmental or resource impact significantly greater than that anticipated in the permit review process.

25. If at any time there is an indication that the well casing, valves, or controls leak or have become inoperative, repairs or replacement shall be made to restore the system to an operating condition. Failure to make such repairs shall be cause for filling and abandoning the well, in accordance with procedures outlined in Chapter 40E-3, Florida Administrative Code.

26. The Permittee shall submit to the District an updated Well Description Table (Table A) within one month of completion of the proposed wells identifying the actual total and cased depths, pump manufacturer and model numbers, pump types, intake depths and type of meters.

27. Within one month of completion of Floridan aquifer well F1, the Permittee shall implement the following saline water intrusion monitoring program:

    The monthly sampling and testing for chloride concentration in milligrams per liter of Floridan aquifer well F1 and quarterly submittal of the results to District Compliance Staff.

28. The Permittee shall implement the following schedule for the development of alternative sources:

    1) Installation of the two proposed Floridan aquifer wells shall commence in December 2027 and shall be completed by December 2028.
    2) The completion of all water treatment facilities to provide reverse osmosis shall be completed by January 2030.
    3) Annual progress reports shall be submitted to the District commencing in September 2025 and shall contain the status of planning, permitting, construction and implementation of the alternative water supply described in the Staff Report (Application #090804-4).

NOTICE OF RIGHTS

As required by Chapter 120, Florida Statutes, the following provides notice of the opportunities which may be available for administrative hearing pursuant to Sections 120.569 and 120.57, Florida Statutes, or judicial review pursuant to Section 120.68, Florida Statutes, when the substantial interests of a party are determined by an agency. Please note that this Notice of Rights is not intended to provide legal advice. Some of the legal proceedings detailed below may not be applicable or appropriate for your situation. You may wish to consult an attorney regarding your legal rights.

RIGHT TO REQUEST ADMINISTRATIVE HEARING

A person whose substantial interests are or may be affected by the South Florida Water Management District's (District) action has the right to request an administrative hearing on that action pursuant to Sections 120.569 and 120.57, Florida Statutes. Persons seeking a hearing on a District decision which affects or may affect their substantial interests shall file a petition for hearing in accordance with the filing instructions set forth herein within 21 days of receipt of written notice of the decision unless one of the following shorter time periods apply: (1) within 14 days of the notice of consolidated intent to grant or deny concurrently reviewed applications for environmental resource permits and use of sovereign submerged lands pursuant to Section 373.427, Florida Statutes; or (2) within 14 days of service of an Administrative Order pursuant to Section 373.119(1), Florida Statutes. "Receipt of written notice of agency decision" means receipt of written notice through mail, electronic mail, posting, or publication that the District has taken or intends to take final agency action. Any person who receives written notice of a District decision and fails to file a written request for hearing within the timeframe described above waives the right to request a hearing on that decision.

If the District takes final agency action that materially differs from the noticed intended agency decision, persons who may be substantially affected shall, unless otherwise provided by law, have an additional point of entry pursuant to Rule 28-106.111, Florida Administrative Code.

Any person to whom an emergency order is directed pursuant to Section 373.119(2), Florida Statutes, shall comply therewith immediately, but on petition to the board shall be afforded a hearing as soon as possible.

A person may file a request for an extension of time for filing a petition. The District may grant the request for good cause. Requests for extension of time must be filed with the District prior to the deadline for filing a petition for hearing. Such requests for extension shall contain a certificate that the moving party has consulted with all other parties concerning the extension and whether the District and any other parties agree to or oppose the extension. A timely request for an extension of time shall toll the running of the time period for filing a petition until the request is acted upon.

FILING INSTRUCTIONS

A petition for administrative hearing must be filed with the Office of the District Clerk. Filings with the Office of the District Clerk may be made by mail, hand-delivery, or e-mail. Filings by facsimile will not be accepted. A petition for administrative hearing or other document is deemed filed upon receipt during normal business hours by the Office of the District Clerk at the District's headquarters in West Palm Beach, Florida. The District's normal business hours are 8:00 a.m. – 5:00 p.m., excluding weekends and District holidays. Any document received by the Office of the District Clerk after 5:00 p.m. shall be deemed filed as of 8:00 a.m. on the next regular business day. Additional filing instructions are as follows:

- Filings by mail must be addressed to the Office of the District Clerk, 3301 Gun Club Road, West Palm Beach, Florida 33406.

- Filings by hand-delivery must be delivered to the Office of the District Clerk. Delivery of a petition to the District's security desk does not constitute filing. It will be necessary to request that the District's security officer contact the Office of the District Clerk. An employee of the District's Clerk's office will receive and process the petition.
- Filings by e-mail must be transmitted to the Office of the District Clerk at clerk@sfwmd.gov. The filing date for a document transmitted by electronic mail shall be the date the Office of the District Clerk receives the complete document.

INITIATION OF AN ADMINISTRATIVE HEARING

Pursuant to Sections 120.54(5)(b)4. and 120.569(2)(c), Florida Statutes, and Rules 28-106.201 and 28-106.301, Florida Administrative Code, initiation of an administrative hearing shall be made by written petition to the District in legible form and on 8 1/2 by 11 inch white paper. All petitions shall contain:

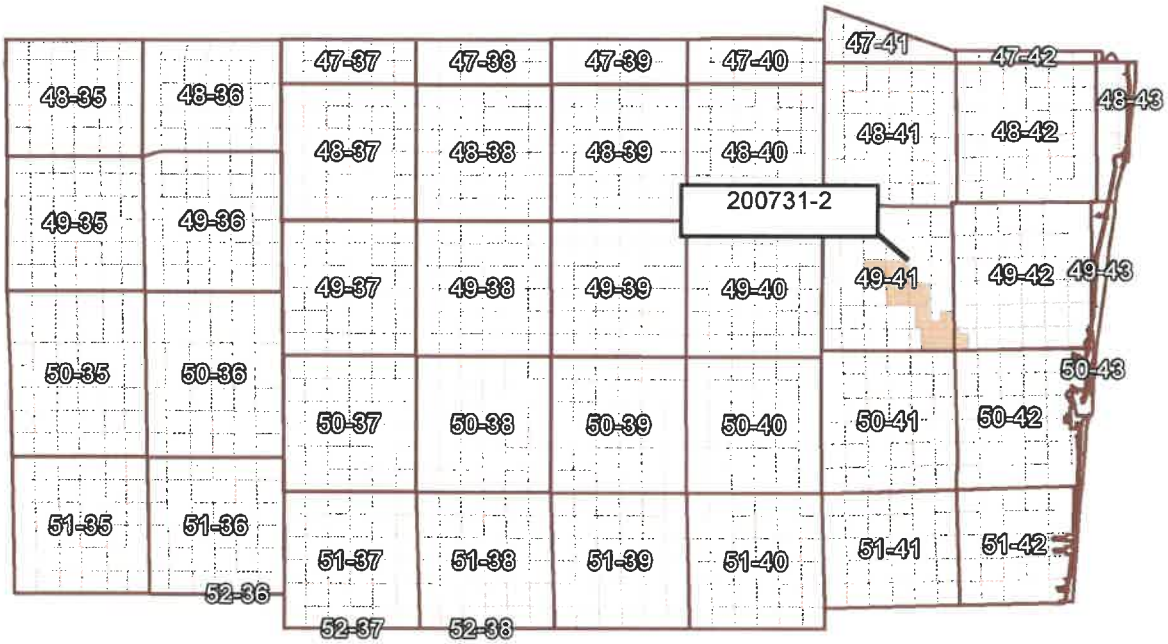
1. Identification of the action being contested, including the permit number, application number, District file number or any other District identification number, if known.
2. The name, address, any email address, any facsimile number, and telephone number of the petitioner, petitioner's attorney or qualified representative, if any.
3. An explanation of how the petitioner's substantial interests will be affected by the agency determination.
4. A statement of when and how the petitioner received notice of the District's decision.
5. A statement of all disputed issues of material fact. If there are none, the petition must so indicate.
6. A concise statement of the ultimate facts alleged, including the specific facts the petitioner contends warrant reversal or modification of the District's proposed action.
7. A statement of the specific rules or statutes the petitioner contends require reversal or modification of the District's proposed action.
8. If disputed issues of material fact exist, the statement must also include an explanation of how the alleged facts relate to the specific rules or statutes.
9. A statement of the relief sought by the petitioner, stating precisely the action the petitioner wishes the District to take with respect to the District's proposed action.

MEDIATION

The procedures for pursuing mediation are set forth in Section 120.573, Florida Statutes, and Rules 28-106.111 and 28-106.401–.405, Florida Administrative Code. The District is not proposing mediation for this agency action under Section 120.573, Florida Statutes, at this time.

RIGHT TO SEEK JUDICIAL REVIEW

Pursuant to Section 120.68, Florida Statutes, and in accordance with Florida Rule of Appellate Procedure 9.110, a party who is adversely affected by final District action may seek judicial review of the District's final decision by filing a notice of appeal with the Office of the District Clerk in accordance with the filing instructions set forth herein within 30 days of rendition of the order to be reviewed, and by filing a copy of the notice with the appropriate district court of appeals via the Florida Courts E-Filing Portal.



BROWARD COUNTY, FLORIDA

N

Map Date: 2020-08-04

Application No: 200731-2

Permit No: 06-00129-W

Sec 15, 16, 22, 23, 25, 26, 35, 36 / Twp 49 / Rge 41

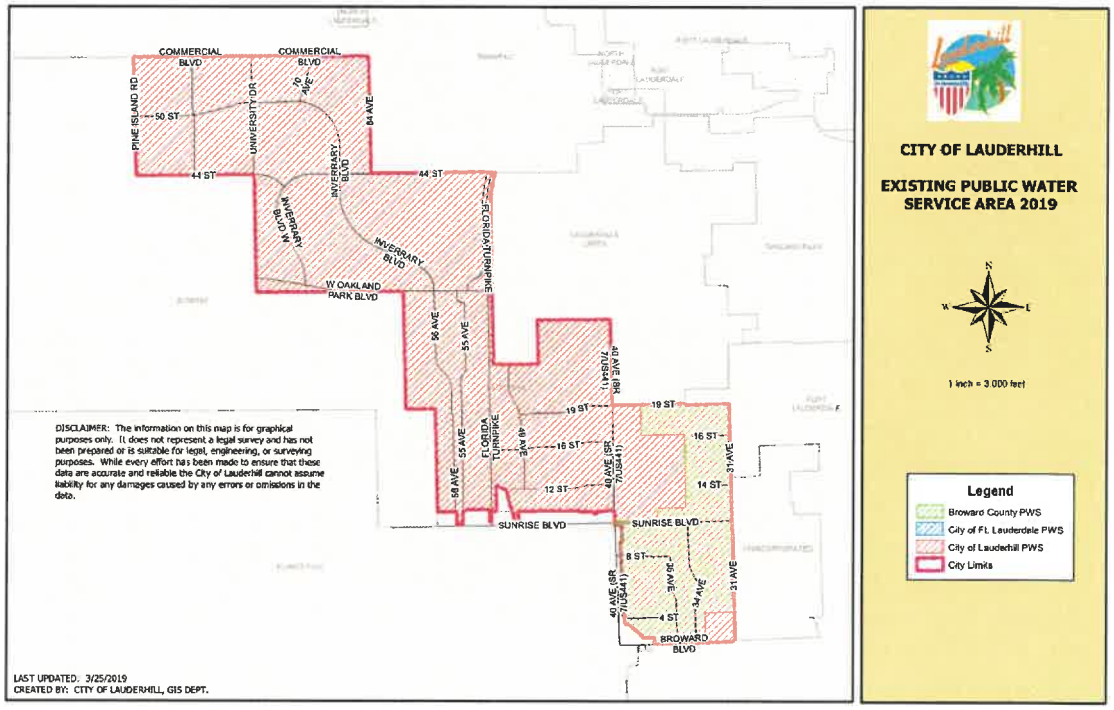
Sec 31 / Twp 49 / Rge 42

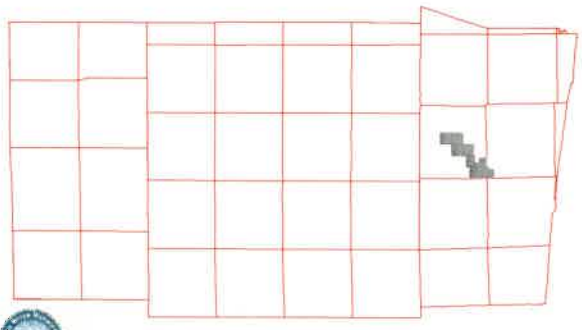
Project Name: CITY OF LAUDERHILL

0 10 20 Miles

Exhibit No: 1

City of Lauderhill Potable Water Service Area





BROWARD COUNTY, FLORIDA

◆ Well

N

Map Date: 2020-08-05

Application No: 200731-2

Permit No: 06-00129-W

Sec 15, 16, 22, 23, 25, 26, 35, 36 / Twp 49 / Rge 41

Sec 31 / Twp 49 / Rge 42

Project Name: CITY OF LAUDERHILL

0 0.075 0.15 Miles

Exhibit No: 3

TABLE - A
Description Of Wells.

Application Number: 200731-2

Well ID	28203	28204	28205	28206	28207	152686
Name	3	4	5	6	7	8
Map Designator	3	4	5	6	7	8
FLUWID Number						
Well Field						
Existing/Proposed	E	E	E	E	E	E
Well Diameter(Inches)	12	12	24	24	24	24
Total Depth(feet)	154	154	115	121	142	120
Cased Depth(feet)	80	80	80	80	80	80
Facility Elev. (ft. NGVD)						
Screened Interval						
From	0	0	0	0	0	0
To	0	0	0	0	0	0
Pumped Or Flowing	P	P	P	P	P	P
Pump Type	Turbine	Turbine	Turbine	Turbine	Turbine	Turbine
Pump Int. Elev. Feet (NGVD)						
Feet (BLS)	0	0	0	0	0	45
Pump Capacity(GPM)	1500	1000	2800	2800	2800	2400
Year Drilled						
Planar Location						
Source	DIGITIZED	DIGITIZED	DIGITIZED	DIGITIZED	DIGITIZED	DIGITIZED
Feet East	912765	912880	912908	912651	913218	912511
Feet North	661902	661641	661909	661698	662030	661893
Accounting Method	Flow Meter	Flow Meter	Flow Meter	Flow Meter	Flow Meter	Flow Meter
Use Status	Primary	Primary	Primary	Primary	Primary	Primary
Water Use Type	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply	Public Water Supply
Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer	Biscayne Aquifer

Exhibit No: 4

TABLE - A
Description Of Wells.

Application Number: 200731-2

Well ID	253405	253406
Name	F1	F2
Map Designator	F1	F2
FLUWID Number		
Well Field		
Existing/Proposed	P	P
Well Diameter(Inches)	20	20
Total Depth(feet)	1250	1250
Cased Depth(feet)	950	950
Facility Elev. (ft. NGVD)		
Screened Interval From		
To		
Pumped Or Flowing	P	P
Pump Type	Submersible	Submersible
Pump Int. Elev. Feet (NGVD)		
Feet (BLS)	200	200
Pump Capacity(GPM)	910	910
Year Drilled		
Planar Location Source	DIGITIZED	DIGITIZED
Feet East	912352	912359
Feet North	662151	660900
Accounting Method	Flow Meter	Flow Meter
Use Status	Primary	Secondary
Water Use Type	Public Water Supply Monitor	Public Water Supply
Aquifer	Upper Floridan Aquifer	Upper Floridan Aquifer

Exhibit No: 4

Requirement by Permit Condition Report

App No: 200731-2
Permit No: 06-00129-W
Project Name: CITY OF LAUDERHILL

Permit Condition No: 17 **Permit Condition Code:** WUSTD021-8

Facility Name	Requirement Name	Col Freq	Sub Freq	Due Date
WELL - 3	Calibration report for WELL 3	Every Five Years	Every Five Years	31-DEC-2022
WELL - 4	Calibration report for WELL 4	Every Five Years	Every Five Years	31-DEC-2022
WELL - 5	Calibration report for WELL 5	Every Five Years	Every Five Years	31-DEC-2022
WELL - 6	Calibration report for WELL 6	Every Five Years	Every Five Years	31-DEC-2022
WELL - 7	Calibration report for WELL 7	Every Five Years	Every Five Years	31-DEC-2022
WELL - 8	Calibration report for WELL 8	Every Five Years	Every Five Years	31-DEC-2022
WELL - F1	Calibration report for WELL F1	Every Five Years	Every Five Years	31-JAN-2029
WELL - F2	Calibration report for WELL F2	Every Five Years	Every Five Years	31-JAN-2029

Permit Condition No: 18 **Permit Condition Code:** WUSTD022-1

Facility Name	Requirement Name	Col Freq	Sub Freq	Due Date
WELL - 3	Monthly withdrawal for WELL 3	Monthly	Quarterly	31-OCT-2020
WELL - 4	Monthly withdrawal for WELL 4	Monthly	Quarterly	31-OCT-2020
WELL - 5	Monthly withdrawal for WELL 5	Monthly	Quarterly	31-OCT-2020
WELL - 6	Monthly withdrawal for WELL 6	Monthly	Quarterly	31-OCT-2020
WELL - 7	Monthly withdrawal for WELL 7	Monthly	Quarterly	31-OCT-2020
WELL - 8	Monthly withdrawal for WELL 8	Monthly	Quarterly	31-OCT-2020
WELL - F1	Monthly withdrawal for WELL F1	Monthly	Quarterly	31-OCT-2020
WELL - F2	Monthly withdrawal for WELL F2	Monthly	Quarterly	31-OCT-2020

Permit Condition No: 20 **Permit Condition Code:** WUPWS003-1

Facility Name	Requirement Name	Col Freq	Sub Freq	Due Date
PERMIT	Unaccounted for Distribution Losses for PERMIT	Monthly	Yearly	31-AUG-2020

Permit Condition No: 22 **Permit Condition Code:** WUPWS008-2

Facility Name	Requirement Name	Col Freq	Sub Freq	Due Date
PERMIT	Ten-Year Compliance Report for PERMIT	Every Ten Years	Every Ten Years	31-JUL-2030

Permit Condition No: 26 **Permit Condition Code:** WUWC004-1

Facility Name	Requirement Name	Col Freq	Sub Freq	Due Date
WELL - F1	Updated Table A for WELL F1	One time Only	One time Only	31-JAN-2029
WELL - F2	Updated Table A for WELL F2	One time Only	One time Only	31-JAN-2029

Permit Condition No: 27 **Permit Condition Code:** WUZZUD004-3

Facility Name	Requirement Name	Col Freq	Sub Freq	Due Date
WELL - F1	Chloride for Well F1	Monthly	Quarterly	31-JAN-2029

Permit Condition No: 28 **Permit Condition Code:** WUZZUD001-1

Facility Name	Requirement Name	Col Freq	Sub Freq	Due Date
PERMIT	AWS Projects Status Report	Yearly	Yearly	30-SEP-2025

Exhibit No: 5

STAFF REPORT DISTRIBUTION LIST

CITY OF LAUDERHILL

Application No: 200731-2

Permit No: 06-00129-W

INTERNAL DISTRIBUTION

X Stephanie Lancaster, P.G.

EXTERNAL DISTRIBUTION

X Permittee - City Of Lauderhill
X Agent - Bcc Engineering L L C

GOVERNMENT AGENCIES

X Broward County - Director, Water Mgmt Div
X Dept of Environmental Protection - West Palm Beach
X Engineer, City of Lauderhill
X FDEP Div of Recreation and Park - District 5

OTHER INTERESTED PARTIES

X Natural Resources Defense Council

Exhibit No:6

City of Lauderhill

Planning and Zoning Department
3800 Inverrary Boulevard • Suite 207 • Lauderhill FL 33319

10-Year Water Supply Facilities Work Plan

April 2008 (Revised January 2009)

Report Prepared By:

Malcolm Pirnie, Inc.

8201 Peters Rd.
Suite 3400
Plantation, FL 33324
(954) 761-3460

4900008

MALCOLM PIRNIE

Contents

Tables

Figures

Appendices

List of Acronyms

ADP	Average daily production
AWWA	American Water Works Association
BCUPRD	Broward County Urban Planning and Redevelopment Department
BCWWS	Broward County Water and Wastewater Services
BEBR	Bureau of Economics and Business Research (University of Florida)
CIP	Capital Improvement Plan
DEES	Department of Environmental and Engineering Services (City of Lauderhill)
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FLUE	Future Land Use Element
FY	Fiscal year
gal	Gallons
GOPs	Goals, Objectives, and Policies
gpcd	Gallons per capita per day
gpd	Gallons per day
IWA	International Water Association
LUZ	Land use zone
MDP	Maximum-day production
MG	Million gallons
mgd	Million gallons per day
MGM	Million gallons per month
MMP	Maximum monthly production
MOR	Monthly Operating Report
PHD	Peak hour demand
ppl	People
ppl/du	People per dwelling unit
PSD	Broward County Planning Services Division
RO	Reverse osmosis
SFWMD	South Florida Water Management District
TAZ	Traffic Analysis Zone
TOC	Transit Oriented Corridor
TPC	Treatment plant capacity
WTP	Water Treatment Plant
WUP	Water Use Permit

1. Introduction

This section presents the statutory overview and the project objective, including a brief description of the content of this report.

1.1. Statutory Overview

As the urban population of Broward County continues to expand and available water resources diminish, local governments are tasked with taking a proactive role in meeting future water demands. To address increasing water demands, the 2005 Florida Legislature strengthened the coordination of water supply and land use planning in Senate Bills 360 and 444. These Senate Bills created a direct statutory linkage between the State's five water management districts' regional water supply plans and local government comprehensive plans throughout the state. Given this statutory linkage, municipalities are required to prepare a minimum 10-year work plan for building public, private, or regional water supply facilities to serve existing and new development within each City's jurisdiction and adopt the work plan into the comprehensive plan by August 15, 2008.

1.2. Objective

As the main water consultant for the City of Lauderhill (City), Malcolm Pirnie, Inc. (Malcolm Pirnie) was contracted to prepare the City's 10-year Water Supply Facilities Work Plan. Malcolm Pirnie prepared a scope that addressed the future water needs of the City. The main objective of the 10-Year Work Plan is to ensure that potable water service is available to concurrently support development in the City through the 20-year planning horizon.

1.3. Project Overview

This 10-Year Work Plan provides the characterization of water utilities that serve the City of Lauderhill's jurisdiction and presents the development of traditional and alternative water supplies and conservation and reuse programs that are necessary to serve existing and new development for a 20-year planning period while complying with regulatory requirements. Note that the term "water supply facilities" includes raw water supply infrastructure, treatment facilities, distribution system, and associated storage.

Generally, this 10-Year Work Plan includes the following:

- Population and water supply projections for the next 20 years within the City of Lauderhill's jurisdiction;

- Assessment of current water supply sources and facilities for each water utility serving the City's jurisdiction and their adequacy for meeting projected demands;
- Identification of alternative water supply projects for implementation including cost and schedule for each water utility;
- Identification of capital improvement projects including demonstration of financial feasibility for the first five years of the plan;
- Demonstration that the City of Lauderhill has coordinated with other service providers supplying within the City's jurisdiction (i.e. BCWWS and the City of Fort Lauderdale) to ensure that short- and long-term water supply needs will be met; and
- Identification of goals, objectives, and policies required to implement the Work Plan and water supply concurrency requirements.

Accordingly, this report is organized in the following seven sections:

Section 1 – *Introduction* – presents the statutory overview and project objective, including a brief description of the content in this report.

Section 2 – *Characterization of the City of Lauderhill* – introduces the geographic service area for potable and reuse water service providers of the City of Lauderhill jurisdiction, including water use permit information, raw water sources, existing treatment facilities, distribution and interconnects, and conservation practices in place.

Section 3 – *City of Lauderhill Water Utility Past Water Demand Characterization* – characterizes various components of the water demand and the basis for demand projections used to determine future treatment capacity and infrastructure needs.

Section 4 – *Projected Water Demands* – presents the projected annual average daily, maximum-month, and maximum-day finished water demands of the City's service area over the 20-year planning horizon. These projections are based on the demographic projections of the City's retail service area. Projected water demands are compared against the existing capacities of the City's Public Water System in order to assess requirements for new or expanded facilities in Section 5.

Section 5 – *Capacity Adequacy Assessment* – evaluates the water supply facilities adequacy relative to the water demand forecast and introduces the water treatment facilities expansion schedules. The discussions in this section aid in the development of the 5-year Capital Improvement Plan (CIP) presented in Section 6.

Section 6 – *Capital Improvement Plan* – identifies the capital improvements required to build all public water supply facilities to serve the existing and new development within

the City of Lauderhill jurisdiction. Additionally, anticipated non-capital projects and associated expenditures are identified. The five-year schedule of Capital Improvements for the City of Lauderhill Water System is supported by an overview of financial feasibility.

Section 7 – *Goals, Objectives, and Policies* – includes a discussion of the Goals, Objectives, and Policies (GOPs) that address water supply sources and facilities, as well as conservation and reuse programs.

This page intentionally left blank.

2. Characterization of the City of Lauderhill

This section introduces the geographic service area for potable water service providers of the City of Lauderhill jurisdiction, including water use permit information, raw water sources, existing treatment facilities, distribution and interconnects, and conservation practices in place.

2.1. Introduction

The City of Lauderhill (City), located in southeast Florida, is bordered by the cities of Tamarac, Lauderdale Lakes, Fort Lauderdale, Plantation and Sunrise, as well as a portion of Unincorporated Broward County. With a current population of approximately 70,000 residents, the City provides potable water service to the majority of the population. The remaining residents receive potable water service from the Broward County Water and Wastewater Services (BCWWS) and the City of Fort Lauderdale. The annexed portion of the City was previously part of Unincorporated Broward County. In 2005 and 2006, these sections became incorporated into the City; however, these portions of the City have not been integrated into the City's water system. The characterization of the City as presented in subsequent sections will present details related to all water systems that service the City.

2.2. Service Area

The City's service area covers 7.2 square miles that are generally bound by Commercial Boulevard to the north, a canal between State Road 7 and NW 31st Avenue to the east, Sunrise Boulevard to the south, and Pine Island Road to the west. This area is supplied by finished water produced at the City's water treatment plant (WTP). Figure 2-1 shows both the City's service area and distribution system and the portion of the City served by BCWWS and the City of Fort Lauderdale. In 2007, the average daily finished water production of the City of Lauderhill WTP was 6.67 million gallons per day (mgd). Approximately 10% of this production was sold to large users, which are customers using more than 10,000 gallons per day (gpd).

The BCWWS District 1 retail service area is located in the central portion of Broward County and covers approximately 12 square miles. As shown in Figure 2-2, the service area includes portions of the cities of Fort Lauderdale, Lauderdale Lakes, Lauderhill, North Lauderdale, Oakland Park, Plantation, Pompano Beach and Tamarac, as well as certain unincorporated areas in the central region of Broward County. The portion of the City served by BCWWS covers approximately 1.5 square miles in the southeast corner of the City.

The City of Fort Lauderdale's utility service area encompasses a total area of 43 square miles and provides retail water service to about 187,200 residents and 6,300 commercial and wholesale customers in the City and surrounding areas. Wholesale customers include: City of Oakland Park, City of Wilton Manors, Port Everglades, Oakland Forest subdivision within the City of Oakland Park, City of Tamarac, Broward County Office of Environmental Services and the State of Florida Department of Transportation – Toll Booth. Figure 2-1 outlines the portion of the City of Lauderhill that is serviced by the City of Fort Lauderdale, which covers approximately 35 acres (0.06 sq mi).

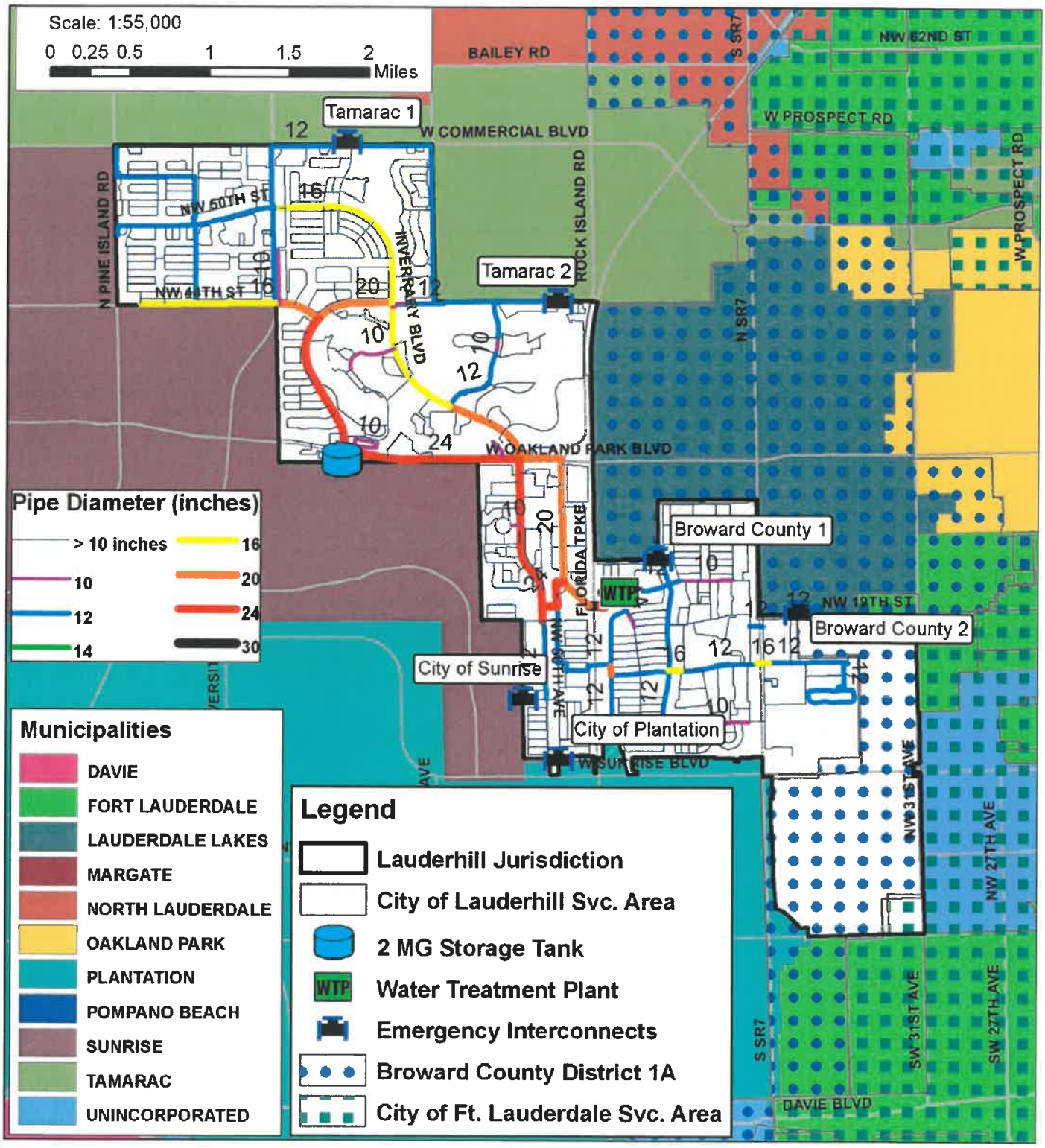
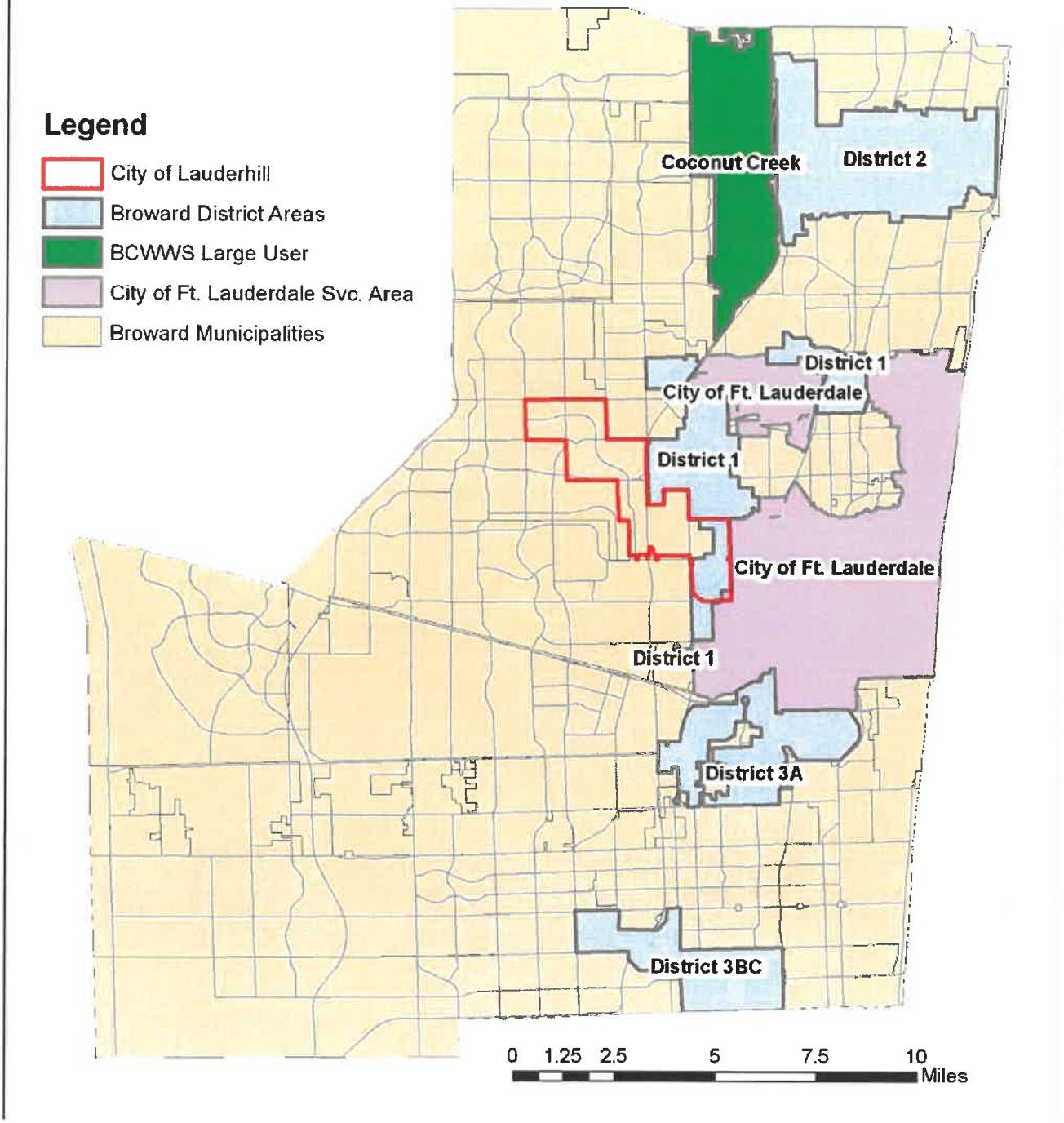


Figure 2-1: Service Areas Covering the City of Lauderhill's Jurisdiction



Source: 2004 Broward County 10-Year Water Supply Facilities Work Plan and City of Fort Lauderdale GIS Directory

Figure 2-2: BCWWS District Service Areas and the City of Fort Lauderdale Service Area

2.3. Self-Supplied Properties

Some of the homes, businesses, and recreational open spaces in the City are self-supplied for landscape irrigation. Those with large irrigation demand such as golf courses, schools, private developments, and parks can potentially be the most cost-effective to serve with reclaimed water, which is wastewater that has been treated to high enough standards such that it is safe to use for irrigation. On the other hand, scattered single and multi-family residential homes with lawns requiring irrigation may be the least cost effective to serve depending on their proximity to a reclaimed water system. Commercial establishments using potable water for cooling and other applications can also be potentially served with a cost-effective reclaimed water system.

Properties with water use permits issued by the South Florida Water Management District (SFWMD) for landscape irrigation within the City of Lauderhill include golf courses, parks, schools, and apartment or multi-family complexes. Figure 2-3 shows the locations of these properties, with those covering more than 20 acres labeled by project name. These users are important to consider when doing utility planning because of the potential for the use of reclaimed water for irrigation.

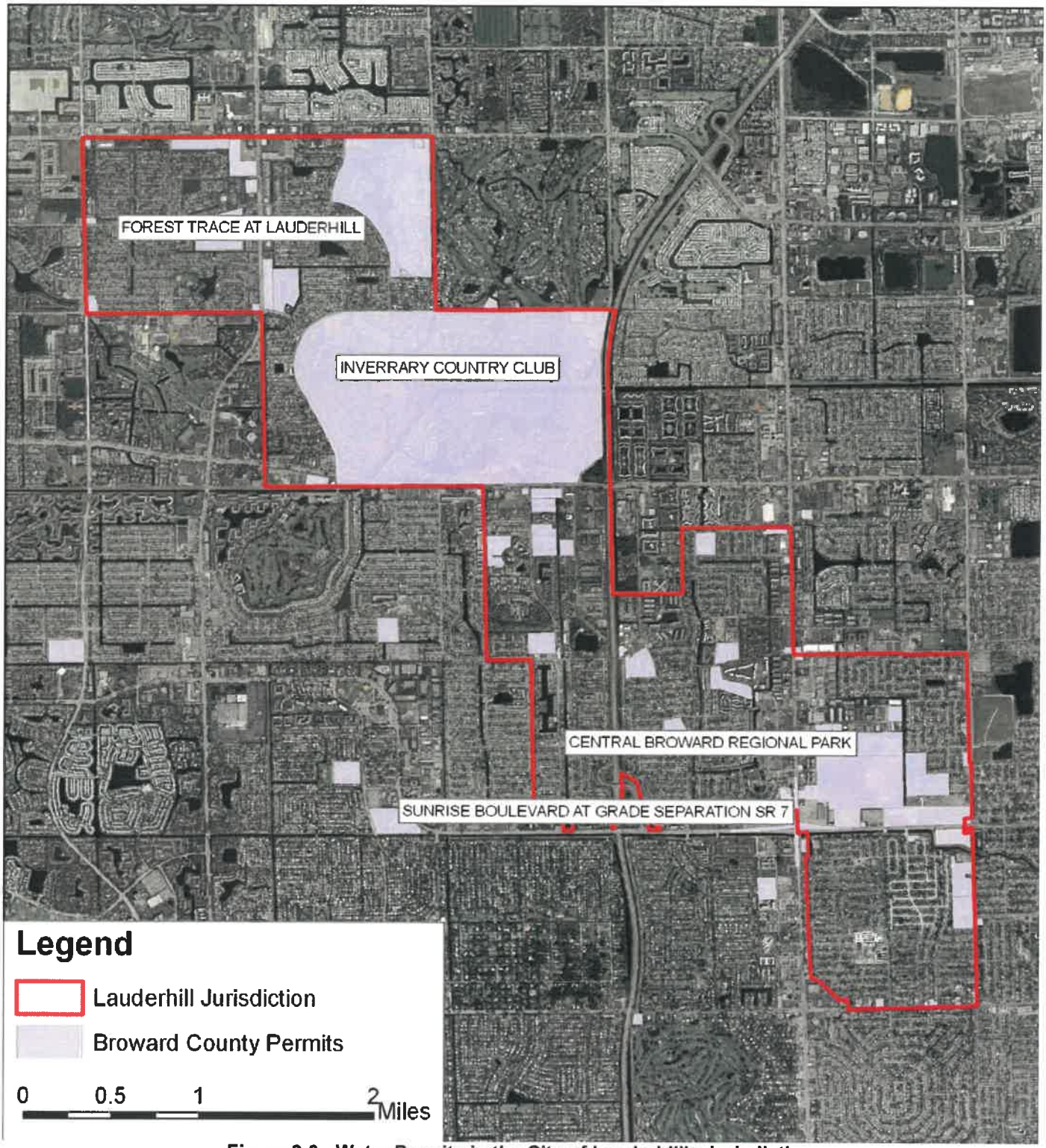


Figure 2-3: Water Permits in the City of Lauderhill's Jurisdiction

2.4. Raw Water Supply

The Biscayne Aquifer is the primary traditional source of fresh water to residents of the City and Broward County overall. In 1979, it was designated as a Sole Source Aquifer by the U.S. Environmental Protection Agency. Recently, the SFWMD determined that this traditional water supply source will not be sufficient to meet the demands of the growing population and the needs of the environment, agriculture and industry over the next 20 years. Efficient management of existing water resources will need to be optimized in order to delay and reduce the need for the development of alternative resources such as the Floridan Aquifer.

The Biscayne Aquifer is a water supply of high quality, while the Floridan Aquifer, a much deeper source of water, is brackish (mixture of salt and freshwater) and requires a higher level of treatment. Groundwater from the Floridan Aquifer is not currently being utilized to service any area of the City. Figure 2-4 illustrates the typical geologic formations crossing the Biscayne and Floridan Aquifers.

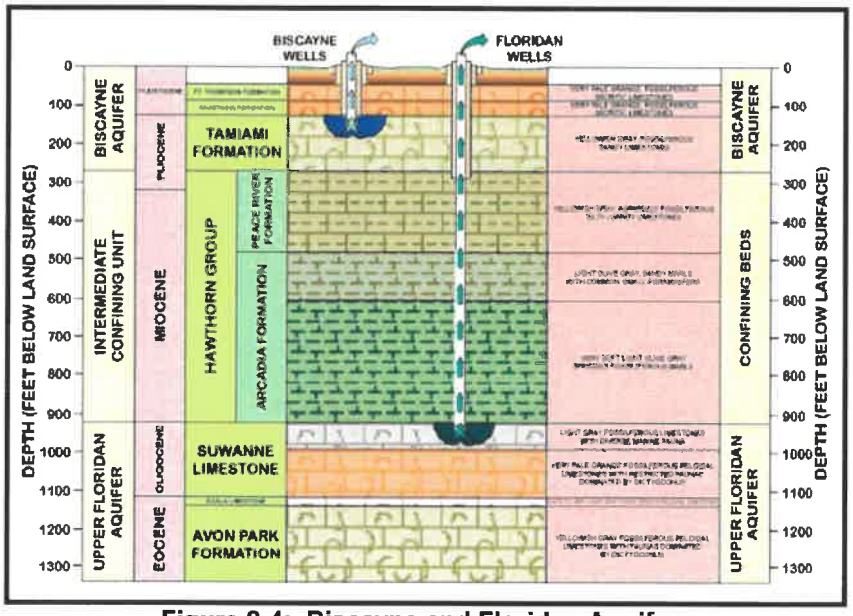


Figure 2-4: Biscayne and Floridan Aquifers

Biscayne and Floridan Aquifer withdrawal wells for the City of Lauderhill, BCWWS District 1 and the City of Fort Lauderdale are listed in Table 2-1. Figures 2-5, 2-6 and 2-7 represent maps of these wellfield locations.

Table 2-1. Biscayne Aquifer and Floridan Aquifer Withdrawal Wells

Groundwater Source	Well ID	Number of Wells	Casing Diameter (inches)	Depth of Well (ft)	Pumping Capacity (gpm)	Casing Depth (ft)
Existing Biscayne Wells						
City of Lauderhill Wellfield		**6**				
Biscayne	3	1	12	154	1000	80
Biscayne	4	1	12	154	1500	80
Biscayne	5	1	24	115	2800	80
Biscayne	6	1	24	121	2800	80
Biscayne	7	1	24	142	2800	80
Biscayne	8	1	24	110	2400	82
BCWWS District 1 Wellfield		**9**				
Biscayne	1	1	12	100	1100	89
Biscayne	2	1	12	100	1150	70
Biscayne	3	1	12	100	1150	76
Biscayne	4	1	12	100	1200	72
Biscayne	5	1	20	94	2100	84
Biscayne	6	1	20	100	2100	69
Biscayne	7	1	20	100	2100	69
Biscayne	8	1	12	135	2700	75
Biscayne	9	1	12	147	2700	82
City of Fort Lauderdale						
Prospect Wellfield		**29**				
Biscayne	25-28, 30-49, 50-54	29	N/A	N/A	2100	N/A
Dixie Wellfield		**8**				
Biscayne	1-8	8	N/A	N/A	N/A	N/A
TOTAL Biscayne Existing		**52**				
Proposed Floridan Wells						
City of Lauderhill Wellfield		**4**				
Floridan	F-1	1	TBD	TBD	TBD	TBD
Floridan	F-2	1	TBD	TBD	TBD	TBD
Floridan	F-3	1	TBD	TBD	TBD	TBD
Floridan	F-4	1	TBD	TBD	TBD	TBD
BCWWS District 1 Wellfield		**4**				
Floridan	F-1	1	16	1200	1389	1000
Floridan	F-2	1	16	1200	1389	1000
Floridan	F-3	1	16	1200	1389	1000
Floridan	F-4	1	16	1200	1389	1000
TOTAL Floridan Proposed		**8**				

Sources: City of Lauderhill Water Use Permit issued by the SFWMD on August 11, 2004
BCWWS District 1 Water Use Permit application issued by the SFWMD on December 13, 2001
Draft City of Fort Lauderdale 10-year Water Supply Facilities Work Plan (March 2008)

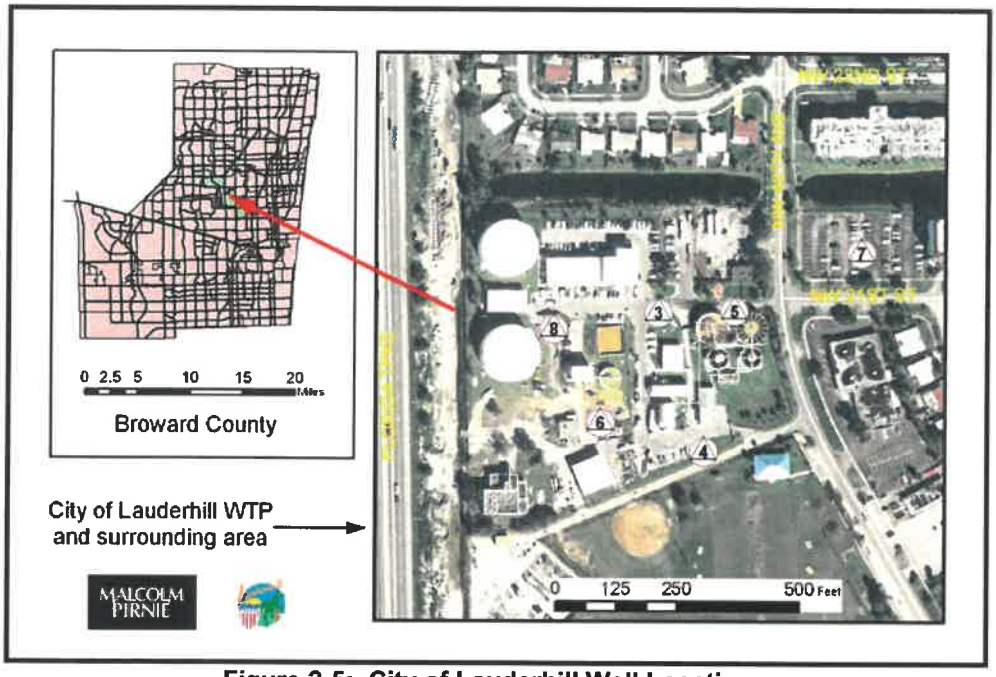
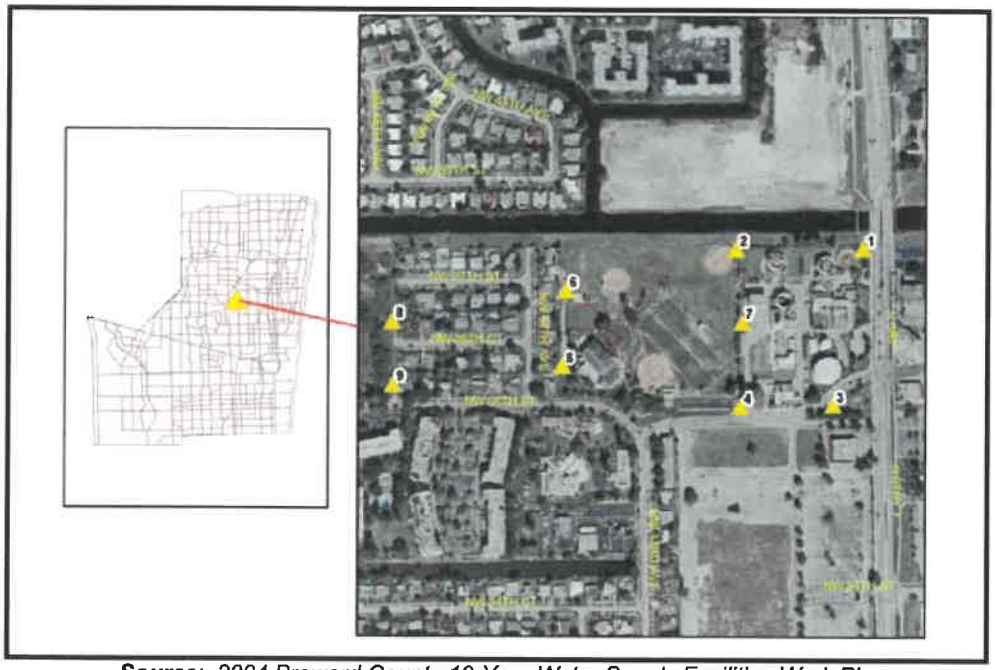
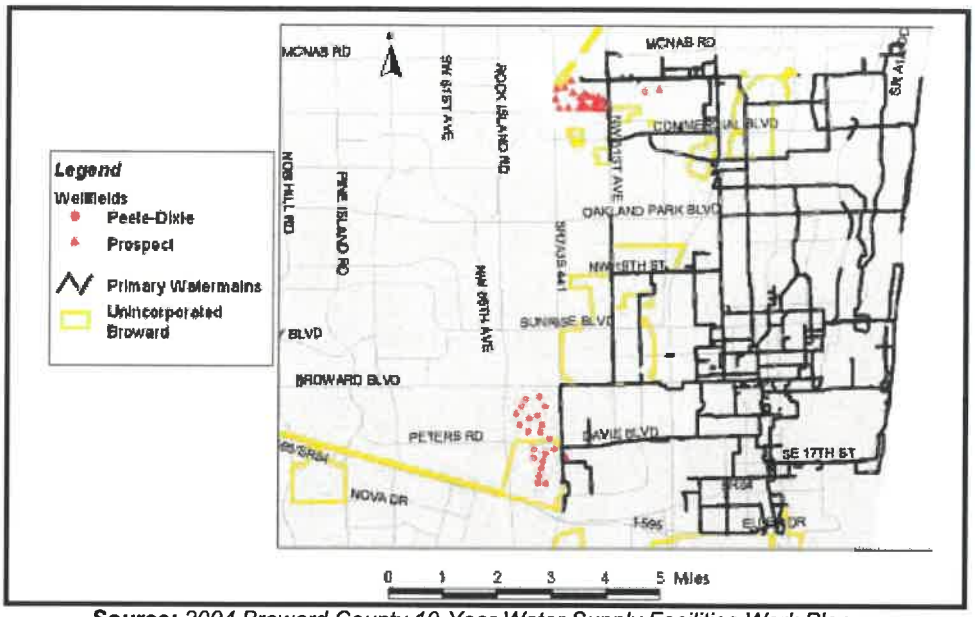


Figure 2-5: City of Lauderhill Well Locations



***Source**: 2004 Broward County 10-Year Water Supply Facilities Work Plan*

Figure 2-6: BCWWS District 1A Well Locations



Source: *2004 Broward County 10-Year Water Supply Facilities Work Plan*

Figure 2-7: City of Fort Lauderdale Wellfield Locations

2.4.1. Water Availability Rule

The current Biscayne annual average raw water allocation for the City of Lauderhill is 8.14 mgd under Water Use Permit (WUP) No. 06-00129-W. Due to changing weather patterns and increased demand on water resources in South Florida, the SFWMD has taken action to protect the region's water supply. The Water Availability Rule, promulgated in 2007, will limit the raw water withdrawals from the Biscayne Aquifer to a base condition water use defined as the maximum running average withdrawal of any 12-month period in the five years preceding April 1, 2006. Based on the City's raw water pumping reports for 2001 through 2006, the base condition water use is 7.70 mgd occurring between April 2002 and March 2003. Therefore, it is anticipated that the annual allocation in the City's new WUP will be no less than approximately 7.70 mgd. Please see Appendix A for a brief characterization of the City's historic raw water consumption.

2.5. Treatment Facilities

The jurisdiction of the City of Lauderhill is served by three water utilities: the City's own Utility, BCWWS District 1, and the City of Fort Lauderdale. Below are descriptions of these three utilities as they pertain to the City of Lauderhill, with a summary of the WTP characteristics in Table 2-3.

2.5.1. City of Lauderhill WTP

The City owns and operates a WTP located at 2101 NW 49th Avenue which serves approximately 55,000 users and in 2007 provided 6.67 mgd of water service within the City limits. While the rated capacity of the WTP is 16 mgd, the City's current WUP limits its raw water withdrawals to an annual average of 8.14 mgd (as mentioned above) with a maximum monthly withdrawal of 282 million gallons per month (MGM). The water drawn from the six active Biscayne Aquifer wells is treated using a lime softening process which consists of pre-chlorination, softening in two Accelator units, pre-filtration chlorination, gravity filtration in two Greenleaf filtration units (with four sections each), fluoridation in an approximately 53,000 gallon clearwell, storage in two 3-million gallon (MG) tanks, and additional chlorination just prior to pumping to the distribution system.

The distribution system consists of approximately 125 miles of pipe along with one 2-MG ground storage tank and booster station located on Oakland Park Boulevard. Including the two storage tanks at the WTP and the clearwell, the City has a total of just over 8 MG of storage capacity.

2.5.2. BCWWS District 1 WTP

BCWWS District 1 water is treated at the District 1 WTP prior to distribution to retail customers. The District 1 WTP is located at 3701 North State Road 7, Lauderdale Lakes, FL and was established in 1960 with a treatment capacity of 3.0 mgd, expanded to 10.5 mgd in 1979, and brought to its current design capacity of 16.0 mgd in 1994. The plant uses upflow clarifiers and multimedia filtration to provide lime softening of the raw water inflows from the District 1 wellfield.

The existing District 1 wellfield is comprised of nine wells, all of which are currently in service. The total design capacity of the wellfield is approximately 23.5 mgd with a firm capacity of 19.6 mgd with the largest unit out of service.

The County's current WUP is currently being renewed. Based on the historically derived "base condition water use" the anticipated maximum monthly and average annual daily withdrawals from the Biscayne Aquifer are 317.9 MGM and 9.5 mgd, respectively. A temporary permit for an allocation of 357 MGM maximum month and 10.9 mgd average annual day has been requested for this source for the next five years (until 2013).

District 1 has two finished water storage facilities at the WTP site and four at remote locations. The total storage capacity is 5.6 MG, plus an additional clearwell volume of 0.65 million gallons. The District 1 water distribution system contains approximately 212 miles of pipe, and is illustrated in Figure 2-8. Currently, there are no reclaimed water facilities in the District 1 service area. BCWWS entered into a sales agreement with the City of Plantation under which the City provides potable water for resale to County customers in the Broadview Park portion of District 1 on a continuing basis.

Based on the population projections provided by the Broward County Urban Planning and Redevelopment Department (BCUPRD), the City of Lauderhill population served by BCWWS District 1 will increase from 9,952 in 2006 to 12,455 in 2030. The 2007 Broward County 10-Year Water Work Plan provides per capita consumptions for District 1 during the planning horizon. Based on the population growth and estimated per capita demand, the associated flow will increase from 1.10 mgd in 2006 to 1.43 mgd in 2030. Table 2-2 tabulates these projections in five-year intervals. Please see Section 4.3.3 for a discussion of these projections as they relate to the City.

Table 2-2.
City of Lauderhill Population Served by BCWWS District 1 and Associated Flow Projections

Year	Population[1]	Annual Average Daily Flow Forecast (mgd)[2]
2006	9,252	1.10
2010	9,712	1.13
2015	10,063	1.18
2020	10,853	1.26
2025	11,809	1.36
2030	12,455	1.43

1. *Population estimates by Malcolm Pirnie based on the BCURPD TAZ projections.*
2. *Flow calculated by multiplying the population by the per capita consumption implied in the BCWWS 10-Year Water Work Plan.*

The adequacy of the BCWWS District 1 to supply the area including the City of Lauderhill is implicitly ensured in the 2007 BCWWS 10-Year Water Supply Facilities Work Plan, where the appropriate capital expansions are identified to meet the overall BCWWS District 1 water demand of 14.1 mgd annual average daily flow and 19.2 mgd maximum-day flow.

BCWWS has elected to use the Floridan Aquifer as its alternative source of supply to provide the additional water supply required to meet demands over the planning horizon. BCWWS District 1 will need 1.6-mgd and 4.6-mgd Floridan raw water flows by 2013 and 2030, correspondingly. BCWWS District 1 capacity expansion projects and efforts are summarized as follows:

- BCWWS plans to construct a treatment plant that uses Floridan raw water at the existing District 1 treatment site. The first phase of the treatment plant and source system will be designed to produce a minimum 4.5-mgd maximum-day flow – expandable to a minimum of 5.5 mgd. Floridan wells with an annual average daily withdrawal of 4.1 mgd will be required for the first phase. The plant expansion will require an additional 0.9 mgd of annual average daily withdrawal. BCWWS has a

$46.3 million project in its five-year capital improvement program to provide the required first phase of the Floridan Aquifer production capacity.

- BCWWS will continue to pursue demand reduction practices. Such practices will not impact the sizing of the initial Floridan Aquifer project but may delay the need for the subsequent expansion.
- BCWWS is a member of a regional water supply working group investigating other possible alternative water sources. Currently, a feasibility study is being undertaken on a project that could have significant multi-jurisdictional benefits as a future alternative water source. The project known as the "Sub-Regional Lower East Coast Water Supply Solution" would utilize a reservoir created from a rock mining operation in northern Palm Beach County. This reservoir is known as the "Western L-8 Reservoir". BCWWS would consider other alternatives that become available in the future that are more feasible environmentally and economically.
- Using a level of service standard for finished water storage equal to 40 percent of the maximum day demand plus fire flow storage of 0.63 MG, BCWWS determined a minimum finished water storage need of 8.3 MG by 2030. BCWWS anticipates expanding storage capacity by 2010 at two different locations. The first project received its initial funding in FY 2008 and is scheduled for completion in FY 2010. The second project will receive its initial funding in FY 2009 and is scheduled for completion in FY 2012.
- To correct identified distribution inefficiencies, BCWWS is implementing a major water system rebuilding effort in District 1, which includes rebuilding substantial portions of the water and wastewater systems and providing wastewater service to those on septic tanks. These projects are anticipated to be completed by the year 2011 at an estimated cost of $320 million.

2.5.3. City of Fort Lauderdale WTPs

According to its Draft 10-Year Water Supply Facilities Work Plan, the City of Fort Lauderdale provides potable water services, among other utility services, to approximately 187,200 residents and 6,300 commercial and wholesale customers in the City of Fort Lauderdale and surrounding areas in central Broward County.

The City of Fort Lauderdale treats raw water from the Prospect wellfield at the Fiveash WTP and from the Peele-Dixie wellfield at the Peele-Dixie WTP to supply its retail and wholesale service areas. The Fiveash system supplies the City of Lauderhill's southeast corner.

Both the Prospect and Peele-Dixie wellfields are permitted by the SFWMD under WUP No. 06-00123-W. Both wellfields withdraw raw water from the Biscayne Aquifer, and the Prospect Wellfield has 29 active production wells. The wells have pumping capacities of approximately 2,100 gpm each, which equates to a total wellfield capacity of approximately 87 mgd. Based on the Water Availability Rule, the City of Fort

Lauderdale anticipates an annual average daily allocation of no less than 53.6 mgd for both wellfields. This anticipated allocation is 3 mgd greater than the existing allocation. Figure 2-9 illustrates the City limit and treatment facilities for the City of Fort Lauderdale. The potable water service area for this system is shown in Figure 2-2 above.

The City of Fort Lauderdale's largest plant is the Fiveash WTP. The plant was originally constructed in 1950 and has undergone various expansions in subsequent years. The facility's treatment capacity is technically permitted at 70 mgd, and the plant uses conventional lime softening at a target pH of 9.0 – 9.5 followed by filtration.

The City of Fort Lauderdale's water distribution system consists of over 750 miles of 2-inch to 54-inch diameter water mains that convey the finished water from the treatment facilities to the individual customers. In general, the larger diameter transmission mains radiate from the treatment facilities and decrease in size as they extend throughout the service area. The major transmission mains travel east from the WTPs to the populated portions of the service area and the two systems are interconnected along major north-south avenues. The Fiveash water service area, which serves the City of Lauderhill's southeast corner, has a remote elevated 1-MG storage tank known as the Northwest Second Avenue Water Tank. The City of Fort Lauderdale is considering rehabilitating this storage tank.

The City of Lauderhill's southeast corner served by the City of Fort Lauderdale is approximately 35 acres out of the 24,400-acre (or 38-sq. mi.) City of Fort Lauderdale water service area. Thus, the City of Lauderhill's southeast corner in reference is less than 0.1 percent of the entire City of Fort Lauderdale water service area. Based on the Broward County Forecasting Model, this portion of the City of Lauderhill will increase in population from 315 in 2006 to 474 in 2030. Due to the proximity of this area to the BCWWS District 1 service area, the per capita demands implied by the BCWWS projections have been applied to the City of Lauderhill area served by the City of Fort Lauderdale. Using these per capita values, the annual average water demand of the population of this area is not expected to exceed 0.05 mgd over the 20-year planning horizon.

The adequacy of the City of Fort Lauderdale water system to supply this small area is implicitly ensured in the City of Fort Lauderdale 10-Year Water Supply Facilities Work Plan, where the appropriate capital expansions are identified to meet the overall City of Fort Lauderdale service area water demand of 62.3 mgd annual average daily flow. The City of Fort Lauderdale capacity expansion efforts are summarized as follows:

- In 2007, the City of Fort Lauderdale completed the construction of two Floridan Aquifer test wells at the Peele-Dixie wellfield site. The purpose of these wells is to collect data for the design of Floridan Aquifer wells to supply sufficient brackish water for the addition of 6.0-mgd of RO treatment at the Peele-Dixie WTP. It should

be noted that the expansion of the Peele-Dixie system will benefit the Fiveash system as well, as the two systems are interconnected.

- A study entitled "Floridan Aquifer Reverse Osmosis Conceptual Plan and Assessment of the Peele Dixie WTP" is currently underway to address technical and constructability issues for the addition of the 6.0-mgd RO treatment capacity. This expansion would supplement the existing 12-mgd nanofiltration facility and increase the Peele-Dixie water treatment capacity to 18 mgd. The 6.0-mgd RO expansion will partially meet the forecasted potable water production shortfall in the City of Fort Lauderdale's service area. The remaining shortfall is anticipated to be offset with water conservation programs, which are expected to reduce the overall water demand by ten percent, reclaimed water use, and the previously mentioned multijurisdictional implementation evaluated under the L-8 Reservoir Study.

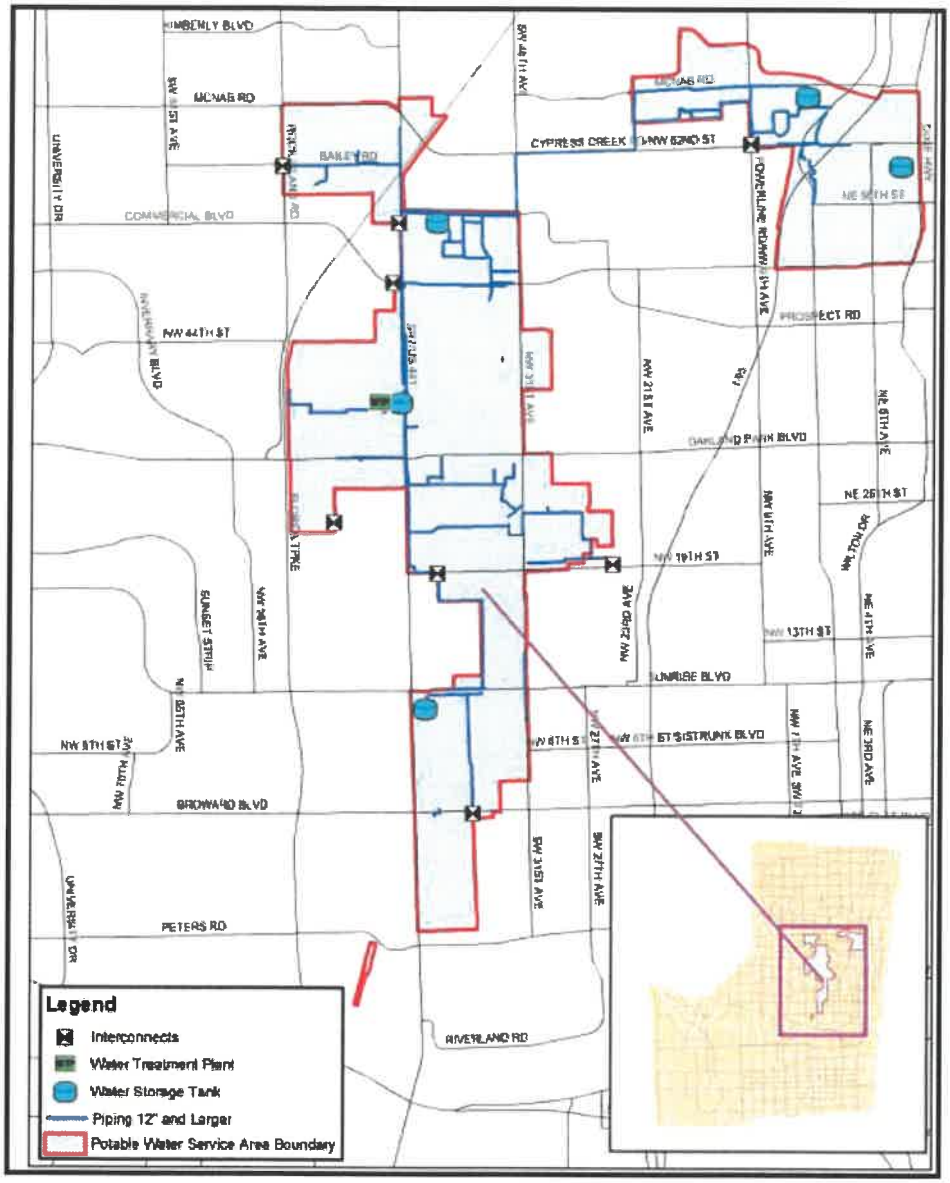
As the water supply adequacy for the areas of the City of Lauderhill served by Broward County District 1 and the City of Fort Lauderdale have been addressed in this section, the following sections will focus on the adequacy of the water service provided by the City of Lauderhill.

Table 2-3.
Water System Characteristics

Water System	WTP Rated Capacity (mgd)	Current WUP Allocation (mgd)	Average Finished Water Demand (mgd)	Total Storage (MG)	Miles of Pipe
City of Lauderhill WTP	16	8.14	6.67	8.05	125
BCWWS District 1A WTP	16	10.9[1]	9.5[2]	6.3	212
City of Fort Lauderdale – Peele-Dixie WTP[3]	12	15	N/A[4]	7.3	780
City of Fort Lauderdale – Fiveash WTP	70	52.3	43	22.9	

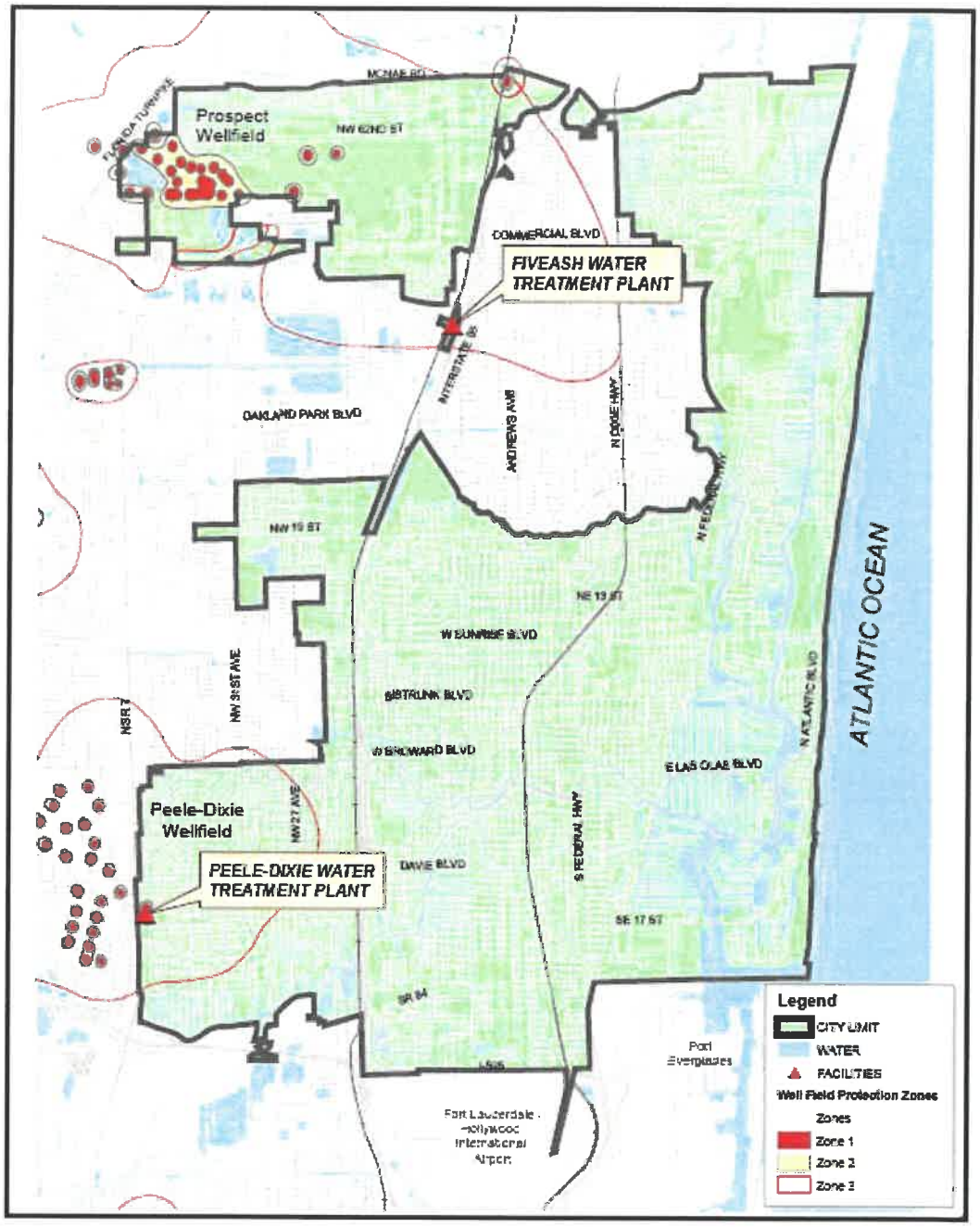
Notes:

1. The SFWMD WUP is currently being renewed, a temporary permit for an allocation of 10.9 mgd average annual day has been requested for this source for the next five years (until 2013).
2. Anticipated value based on the historically derived "base condition use".
3. This WTP is part of the City of Fort Lauderdale system but does not serve the City of Lauderhill.
4. The average finished water demand cannot be determined until the proposed nanofiltration treatment plant is in operation.



***Source**: 2004 Broward County 10-Year Water Supply Facilities Work Plan*

Figure 2-8: BCWWS District 1 Potable Water Service Area



***Source**: Draft 2008 City of Fort Lauderhill 10-Year Water Supply Facilities Work Plan*

Figure 2-9: City of Fort Lauderdale City Limit and Treatment Facilities

2.6. Emergency and Service Agreements

The City does not currently provide water to other utilities on a wholesale basis. However, there are two interconnects with Broward County (6 inches and 12 inches), two with the City of Tamarac (12 inches), one with the City of Plantation (6 inches) and one with the City of Sunrise (8 inches). These interconnects are shown in Figure 2-1. The existing agreements between the City and these other entities stipulate that each of these six interconnects is operated for emergency purposes only.

The BCWWS District 1 maintains water system interconnections with the systems of the City of Fort Lauderdale, the City of Tamarac, and the City of Lauderhill. These interconnects are used for emergency purposes only to maintain adequate supply. Additionally, as previously mentioned, BCWWS purchases potable water from the City of Plantation to serve the customers in the Broadview Park neighborhood of BCWWS District 1.

The City of Fort Lauderdale maintains wholesale agreements for potable water supply with the City of Oakland Park, the City of Wilton Manors, the City of Tamarac (east of 34th Avenue), and Port Everglades. Emergency potable water interconnections are maintained with the City of Dania Beach, the City of Pompano Beach, and the City of Plantation.

2.7. Planning, Financing, Construction & Operation

The City of Lauderhill is currently not involved with planning, financing, construction and operation of other facilities supplying potable water in its service area. Areas of the City served by BCWWS and the City of Fort Lauderdale bill these customers directly and are therefore being served wholly by their respective suppliers. However, it should be noted that the City is participating in on-going discussions to incorporate the annexed portions of the City into their service area. If successful, the City will need to be involved in all aspects of the planning, financing, construction and operation of those facilities.

2.8. Conservation and Reuse Practices

In order to achieve long-term sustainability of water supplies, water conservation and responsible water use must be at the forefront of each municipality's agenda. The City of Lauderhill is playing an interactive role in water supply sustainability by contributing to efforts put forth by the County as a whole. In 1991, BCWWS implemented a conservation program which includes the components listed below:

- County-wide ordinance limiting hours of irrigation from 5:00 pm to 9:00 am (Chapter 36, Broward County Code of Ordinances, Article II).

- County-wide ordinance adopting the principles of Xeriscape (Chapter 39, Broward County Code of Ordinances, Article III).
- County-wide ordinance adopting the South Florida Building Code which requires water conservation fixtures and low volume irrigation (Chapters 5 and 39, Broward County Code or Ordinances, Article III).
- County-wide ordinance requiring the installation of rain sensor devices on all irrigation systems installed after May 1, 1991 (Chapter 39, Broward County Code of Ordinances, Article VII).
- Broward County has adopted a progressive rate structure which includes a three-tier structure for residential users and a two-tier structure for commercial and irrigation users. Automatic tier adjustments are imposed for formally declared water restrictions (Chapter 34, Broward County Code of Ordinances, Article III).
- BCWWS maintains a leak detection program utilizing surveillance techniques, certification and calibration of water meters to reduce water losses.
- BCWWS provides water conservation flyers and brochures to the public and hosts conservation contests throughout the Broward County elementary school system.

Broward County is continuing to increase conservation efforts by pursuing the following components:

- **Customer base data** – A Water Use Profile study is being conducted to identify water loss throughout the distribution system. The information resulting from this study will allow the County to focus on elements with the greatest savings potential.
- **Rebate Programs** – As part of the Water Use Profile study, a rebate program will also be considered. The rebate program could potentially provide qualified customers with rebates who implement certain water conservation techniques at home, such as installing low volume toilets, using specific irrigation equipment, and planting Xeriscape-type trees.
- **Educational Programs** – Public information and education may include such aspects as developing a water conservation curriculum and presentation program that could be presented at schools, for communities, homeowners and offices.
- **Demand Management** – BCWWS offers a Mobile Irrigation Lab that offers useful advice on how to attain significant water savings based upon landscape and irrigation system evaluations.

This page intentionally left blank.

3. Lauderhill Water Utility Past Water Demand Characterization

This section characterizes various components of the water demand and the basis for demand projections used to determine future treatment capacity and infrastructure needs.

The following topics are covered for the City's retail service area:

- Water metering in the system
- Characterization of the City's retail service area water demand using geocoded billing records and the past ten years of Florida Department of Environmental Protection (FDEP) required monthly operation reports (MORs)
- Water production supplied to the City's service area over the past ten years expressed as annual average daily production (ADP), annual maximum daily production (MDP), and annual maximum monthly production (MMP)
- Maximum-day peaking factors and average-day per capita demand based on past water production
- Non-revenue water

3.1. Water Metering

There are approximately 11,000 retail customer accounts in the City's service area. These customers are classified by meter type, which determines the use, and to a lesser degree, the size, of the meter. Billing cycles were bi-monthly until October 2006, when the City transitioned to monthly billing. To support the monthly billing, meter readings are collected in cycles of 20 business days. In 2007, an average of 530 readings were collected on each of the 247 reading days. Table 3-1 shows the number of accounts by customer class, meter type, and meter size. In addition to the information in the table, the descriptions of the customer classes other than Single Family homes are as follows:

- Irrigation meters are those that strictly supply sprinkler service. The 5/8-inch meters typically belong to single family customers, and the larger meters are typically apartment/condo complexes, City properties, and large commercial properties.
- Non-Residential meters cover all commercial, government, and school use.
- Multi-Family meters serve townhomes, homeowner associations, and some apartment/condominium complexes as well as assisted living and retirement facilities.
- Multi-Unit meters more strictly serve apartment and condominium complexes.

Table 3-1.
Number of Accounts by Customer Class and Meter Type

Description	Meter Type	Meter Size (in)	Number of Accounts in 2007
Irrigation Meters (IR)	701	5/8	811
	702	1	34
	703	1.5	25
	704	2	65
	706	3	2
Single Family (SF)	901	5/8	8,154
Multi-Family (MF)	902	5/8 to 6	953
Non-Residential (NR)	903	5/8 to 1.5	472
	904	5/8 to 2	133
	905	5/8	72
	906	1.5 to 4	131
	907	2	11
	908	3	5
	909	4 and 6	2
Multi-Unit (MU)	910	5/8 to 6	157
		Total Accounts	**11,027**

The above table shows that of the 11,027 retail accounts, approximately 84% are residential accounts. The water consumption in the City agrees with this percentage; the 2007 residential water consumption was approximately 80% of the average of 5.38 mgd billed that year.

3.2. Retail Customer Characterization

To characterize the retail water demand throughout the service area, Malcolm Pirnie evaluated the available 2006 and 2007 monthly billing records of 10,318 and 11,027 customer accounts, respectively. Traffic Analysis Zones (TAZs) were used as the geographical base for these analyses. Figure 3-1 shows the TAZs covering the City's retail service area. Based on the 2006 and 2007 billing records, the retail water demand was characterized by customer location, size, and class as indicated below.

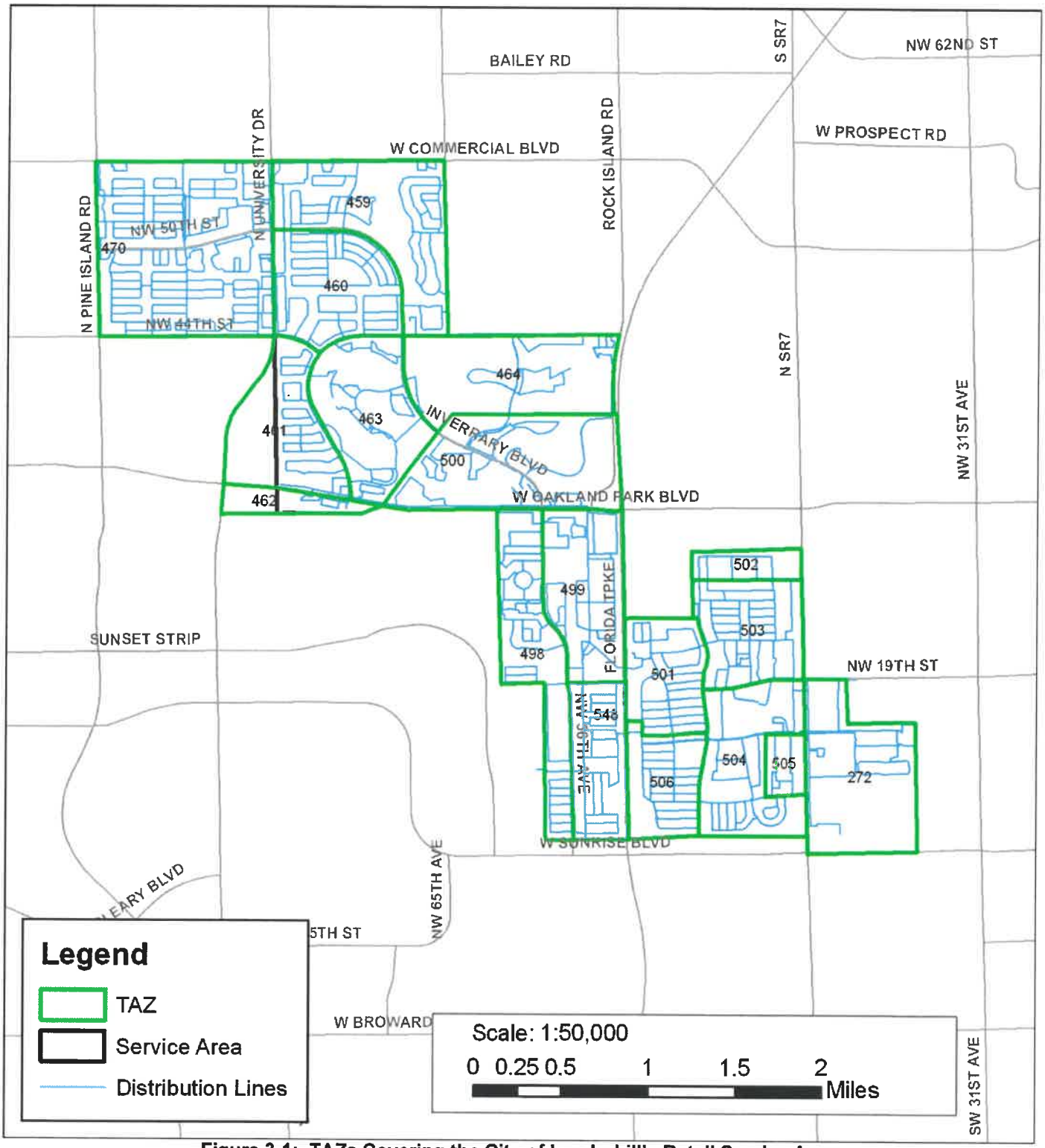


Figure 3-1: TAZs Covering the City of Lauderhill's Retail Service Area

3.2.1. Retail Customer Location

Geocoded customers were related to 18 TAZs covering the retail service area. The most recent and readily available records for these geocoded customers included 2006 monthly billing records. Figure 3-2 shows the 2006 metered water consumption density by TAZ expressed in gallons per day per acre (gpd/acre). As a whole, the City's consumption is approximately 1,400 gpd/acre. The highest consumption density is in the City's central region, where the population density is higher due to more multi-family residences and commercial users such as the Lauderhill Mall. In this area, consumption averages 1,700 gpd/acre. Consumption is lower in the northern region of the City, which generally contains more single family homes and open spaces. In this region, the consumption averages 1,300 gpd/acre.

3.2.2. Retail Customer Size

Figure 3-3 is a characterization of the retail customer size in the City. Specifically, it shows the percentile of metered water consumption against the number of customer accounts. To estimate the percentile of metered water consumption, the 2006 billing records were sorted from large to small annual consumption. Once sorted, the cumulative water consumption was estimated by adding the individual consumption of the included customers. The ratio between the cumulative water consumption and the total consumption is the percentile value assigned for each number of customer accounts. Therefore, 100% of the consumption is reached by the total number of customer accounts.

Figure 3-3 shows a logarithmic progression of the water consumption attributed to large customers down to small customers, excluding accounts with zero consumption in 2006. In other words, demand from larger customer accounts adds up to a significant portion of the total water consumption, whereas the demand from small customer accounts is only significant in large groups. The water demand by customer size generally conforms to the following: 5.5% of the customers (546 out of 9,855 in 2006) account for 50% of the retail water demand (3.2 mgd) and 34% of customers account for 80% of the demand. Table 3-2 accompanies Figure 3-3 by showing the number of customers that make up 1 mgd increments of the City's finished water demand. The table shows that the larger users add 1 mgd to the demand by the tens or hundreds, and the smallest users add 1 mgd to the demand by the thousands.

The majority of the largest users are apartment/condo complexes with meters at least 2 inches in size. A list of the 2006 top 100 retail customers, each of which consumed more than 8,500 gallons per day, is included with this report as Appendix B. Considering this fact can have positive impacts on how to target conservation programs.

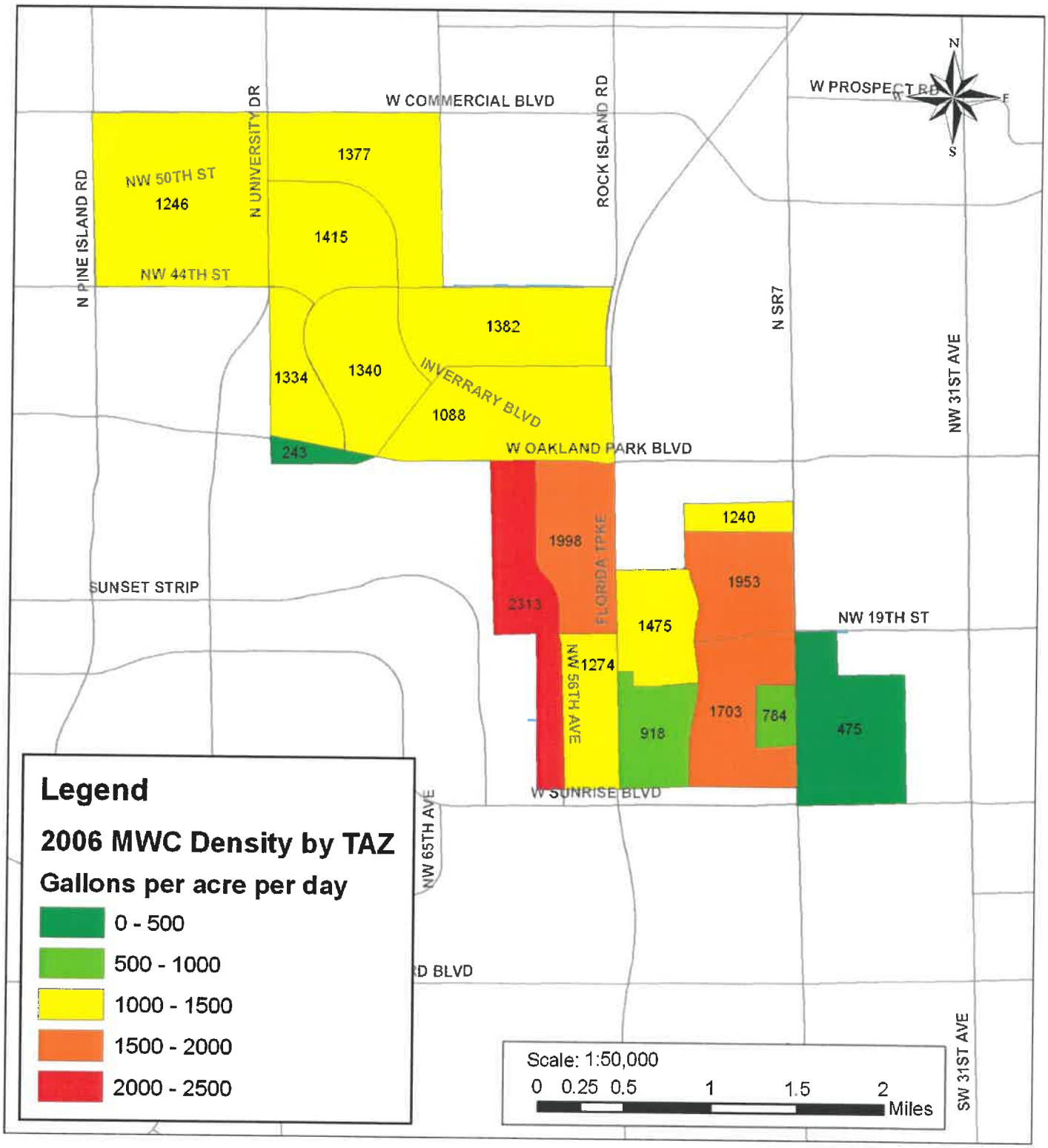


Figure 3-2: 2006 Metered Water Consumption Density by TAZ

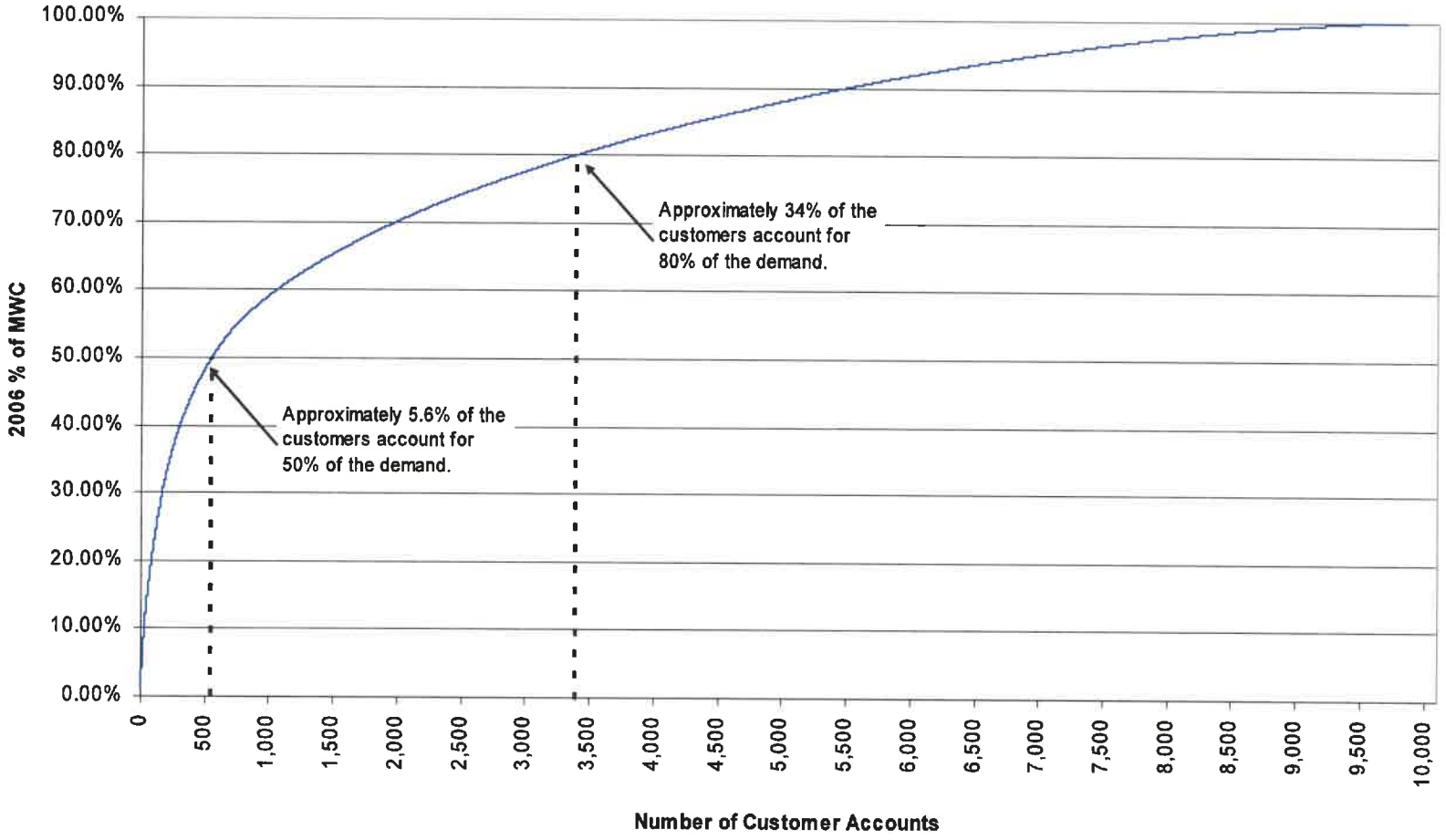


Figure 3-3: Metered Water Consumption Percentile

Table 3-2.
Customer Contribution to 2006 Metered Water Consumption

Metered Water Consumption Increment (mgd)	# of Customers in 1 mgd Increment	Total # of Customers
1	53	53
2	123	176
3	273	449
4	785	1,234
5	1,818	3,052
6	3,448	6,500

3.2.3. Retail Customer Class

Figure 3-4 shows the billed water consumption from 2000 to 2007 for the City of Lauderhill. Generally, the consumed water has declined slightly over this time period, with a significant drop observed from 2006 to 2007. The City's population did not decrease from 2000 to 2007, so the decrease in consumption is likely due to activities such as water main improvement, conservation, and prevention of unauthorized use. The significant drop in 2007 is likely due to the water restrictions put in place by the SFWMD.

Figure 3-4 also shows that the majority of the water consumption is residential. Indeed, billing records indicate that 80% of the 5.38 mgd consumption in 2007 went to residential use (32% single family, 24% multi-family, and 24% multi-unit), while 12% went to non-residential use (commercial, government, etc.) and 8% was consumed by irrigation meters.

One of the larger retail customers is the City itself. There are 39 accounts in the City's name that in 2007 consumed approximately 0.12 mgd. Of this consumption, 92,000 gpd was for irrigation and the remaining 32,000 gpd was for non-residential use. Therefore, the City accounted for approximately 21% of the Utility's irrigation demand, 5% of the non-residential demand, and 2% of the overall Utility demand.

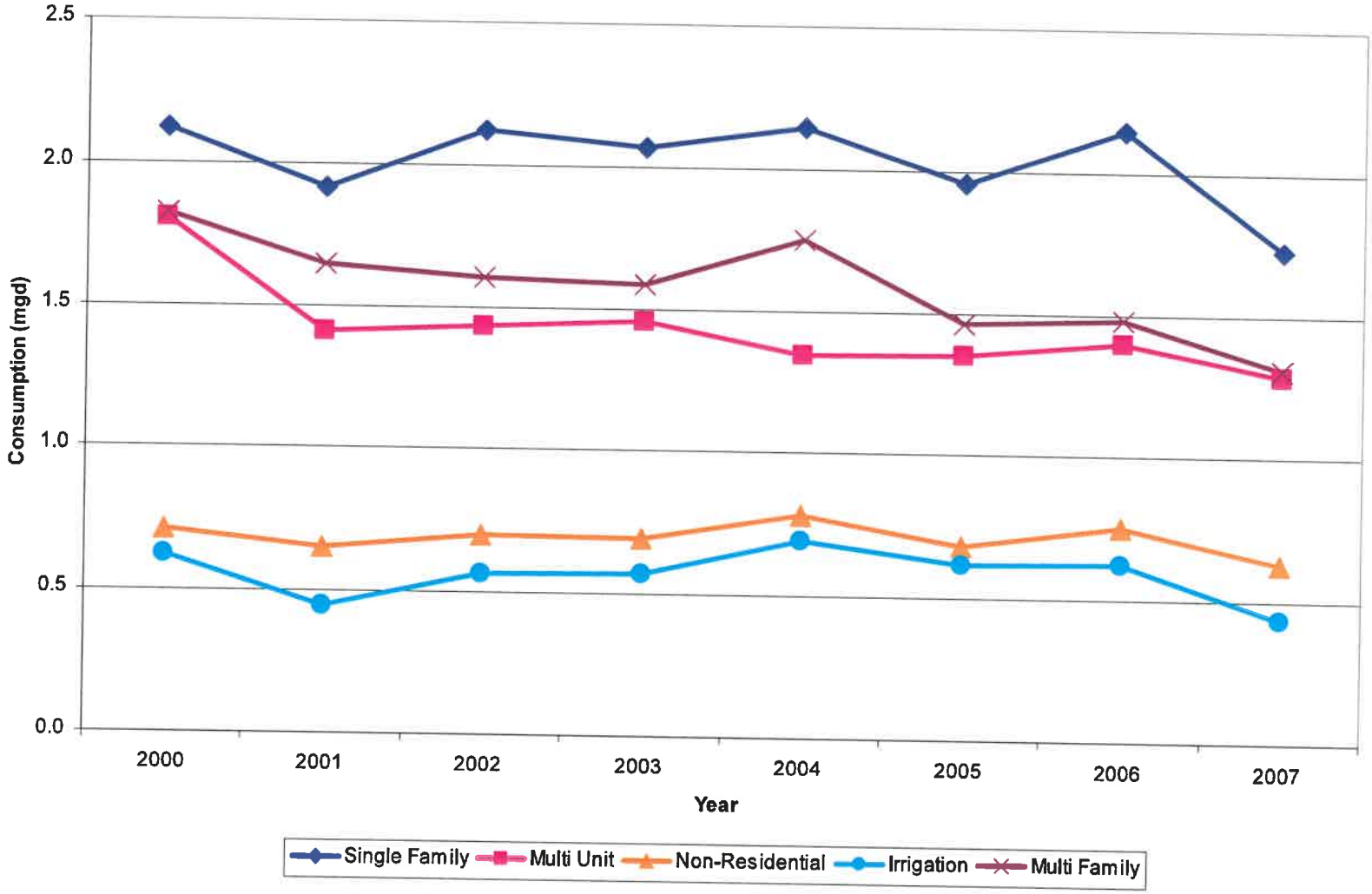


Figure 3-4: Historical Water Consumption by Customer Class

3.3. Past Water Production

The City's service area is supplied entirely by finished water produced at the City's WTP. Table 3-3 presents the historical annual maximum-day (MDP), annual maximum-month (MMP), and annual average (ADP) finished water production of the City's treatment facility from 1998 through 2007. This information was obtained from FDEP-required monthly operating reports (MORs). These values are defined as follows:

- The annual ADP is the sum of all of the water produced in that year divided by the number of days in that year.
- The annual MMP is the average demand in the month with the largest production.
- The annual MDP is the maximum production on any single day in that year.

The annual MDPs and annual MMPs are highlighted in Table 3-3. Generally, the average daily production at the City's WTP from 2003 through 2007 (past five years) was approximately 6.42 mgd.

Figure 3-5 illustrates the historical annual ADP, MDP, and MMP of the City's WTP. According to WTP operators, the larger demands in 1999 and 2000 were due to the plant upgrades occurring at that time. During these upgrades, the storage at the WTP was increased from 1.5 MG to 6 MG. It should also be noted that 2001 was a drought year with a 12% below average daily production relative to the previous year and following year. Hence, 2001 is deemed non-representative of the historical water production of the City's system and is not included in the characterization of the water demand. Additionally, 2007 was also a drought year. The decrease in the ADP is consistent with the downward trend observed in the past five years, but the decreases in MMP and MDP are more significant. While it follows to eliminate 2007 from the demand characterization as well, it will be included due to the strong possibility that water restrictions will not be lifted in the next year.

3.4. Average Per Capita Daily Demand

The per capita daily water demand is a guideline used to measure the reasonable population-related water use associated with residential, commercial, and unaccounted-for uses. According to the guidelines given by the SFWMD, the average per capita daily use rate can be calculated for the last five years of record by dividing the average daily water use by the population served by the utility in each year. The per capita daily demand is expressed in gallons per capita per day (gpcd).

Table 3-4 shows a summary of the finished water production and the population growth of the water system over the past five years (2003 through 2007). The populations in the City are based on the historical demographics provided by TAZ by the BCUPRD. The population in column 3 is the sum of populations in all of the TAZs in the City's

jurisdiction. The population in column 4 is the sum of the population in the TAZs that fall in the City's service area. The BCUPRD populations were only given for 2000 and 2006, so the remaining values in the chart have been interpolated from the given populations. The City's retail service area per capita demand in each row of column 5 is the quotient of the finished water production in that year and the retail service area population. This method divides the entire City demand evenly among all residents within the service area.

As indicated in Table 3-4, the City's retail average per capita daily demand is 106 gpcd. This per capita daily demand was estimated as the average of the per capita demands for each of the past five years. Note that these per capita demands are based on finished water production and therefore they implicitly include unaccounted-for water losses, assuming the production meters are properly calibrated.

Table 3-3.
Finished Water Production from 1998 through 2007

Month/Parameter (mgd)		YEAR									
		1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
January	ADP	6.78	7.08	8.89	6.93	7.48	7.50	6.41	7.09	6.61	6.10
	MDP	7.19	7.59	9.98	9.14	8.33	8.11	6.88	7.66	9.42	6.64
February	ADP	6.99	7.28	8.87	7.29	7.15	7.68	6.30	7.09	6.52	6.05
	MDP	7.57	7.87	9.61	9.08	7.92	8.58	6.91	7.66	7.04	6.73
March	ADP	7.01	8.23	7.29	5.13	7.36	7.99	6.60	6.78	6.97	6.34
	MDP	8.80	10.46	8.58	7.58	8.28	8.54	7.18	7.19	7.66	7.31
April	ADP	7.06	9.77	7.18	5.48	7.76	7.20	6.62	6.92	7.15	6.29
	MDP	8.54	11.28	7.80	7.15	8.86	7.91	7.27	7.88	7.91	7.27
May	ADP	7.11	8.11	7.70	6.45	8.30	6.97	7.28	6.62	6.70	5.85
	MDP	7.85	10.25	9.30	7.19	9.68	8.06	8.63	7.39	7.88	6.69
June	ADP	7.73	6.30	7.03	6.85	7.20	6.37	7.15	5.79	5.96	5.40
	MDP	8.09	7.69	7.81	8.18	8.21	7.07	7.88	8.24	6.42	6.14
July	ADP	7.58	6.93	7.34	6.76	7.04	6.67	6.90	6.22	5.64	5.40
	MDP	8.31	8.02	8.90	8.07	7.82	7.82	7.97	7.27	5.93	5.87
August	ADP	7.56	7.39	7.88	6.83	7.58	6.27	6.27	6.26	5.74	5.85
	MDP	8.10	7.83	9.51	7.77	8.49	7.06	6.71	7.52	6.35	7.43
September	ADP	7.03	6.10	7.86	7.26	7.83	6.05	6.11	6.08	5.49	5.89
	MDP	8.19	7.44	8.76	7.86	8.26	6.57	7.30	6.81	5.88	6.64
October	ADP	7.07	6.39	8.26	7.58	7.57	6.59	6.29	6.26	6.44	5.67
	MDP	7.68	8.64	9.41	8.08	8.35	7.82	6.84	9.20	6.98	6.12
November	ADP	7.04	8.68	9.50	7.26	7.60	6.56	6.71	6.13	6.22	5.92
	MDP	7.58	9.25	10.54	7.86	8.45	7.36	7.22	6.78	6.71	6.40
December	ADP	6.89	8.38	6.85	7.58	7.40	6.47	6.64	6.27	6.12	6.07
	MDP	7.44	9.49	8.47	8.08	7.87	7.08	7.55	7.50	6.62	6.84
Annual	ADP	7.15	7.55	7.89	6.78	7.52	6.86	6.61	6.46	6.30	5.90
	MDP	8.80	11.28	10.54	9.14	9.68	8.58	8.63	9.20	9.42	7.43
	MMP	7.73	9.77	9.50	7.58	8.30	7.99	7.28	7.09	7.15	6.34
	MMP/ADP Peaking Factor	1.08	1.29	1.20	1.12	1.10	1.16	1.10	1.10	1.14	1.07
	MDP*/ADP Peaking Factor	1.13	1.49	1.34	1.19	1.29	1.25	1.31	1.19	1.26	1.24
	MDP/ADP Peaking Factor	1.23	1.49	1.34	1.35	1.29	1.25	1.31	1.42	**1.50**	1.26

Gray shaded cells in the table indicate when the maximum-day productions occurred for each year.
Yellow shaded cells in the table indicate when the masimum-month productions occurred for each year.

Maximum-Month Peaking Factor estimated as the average of the maximum-month peaking factors over the past three years (2005 through 2007): 1.10

Maximum-Day Peaking Factor estimated as the maximum of the max-day peaking factors over the past ten years: 1.50

ADP: Average daily production.
MDP: Maximum-day production.
MDP*: Maximum-day production during max month.
MMP: Maximum-month production.

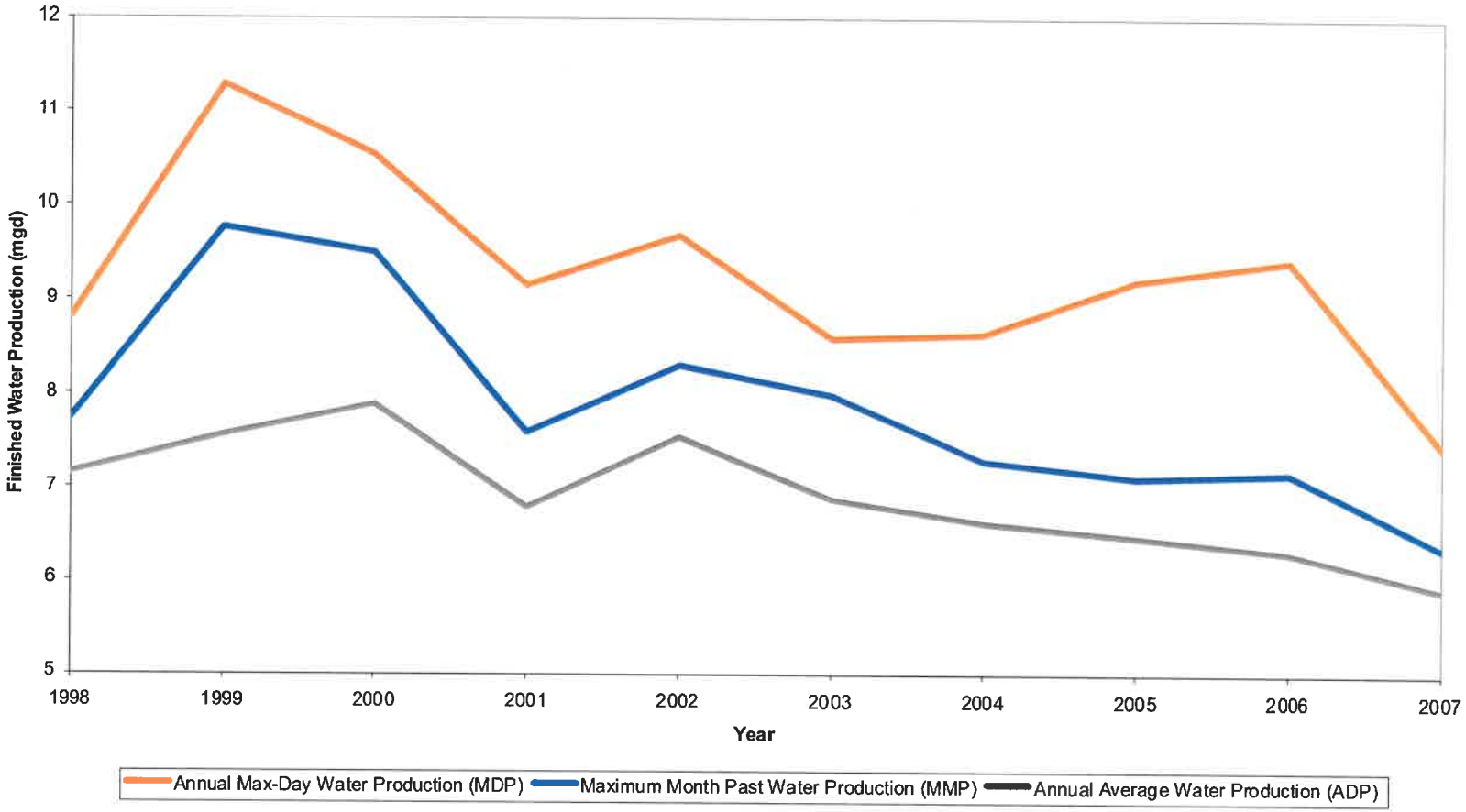


Figure 3-5: Finished Water Production from 1998 through 2007

Table 3-4.
City of Lauderhill Estimate of Per Capita Demand Using the SFWMD Methodology

(1)	(2)	(3)	(4)	(5)=(2)/(4)
Year	**Total Finished Water Production (mgd)**	**City of Lauderhill Population**	**City's Retail Service Population**	**City's Retail Service Area Per capita**
2003	6.859	68,844	59,421	115.4
2004	6.606	69,504	60,033	110.0
2005	6.460	70,165	60,645	106.5
2006	6.296	70,825	61,257	102.8
2007	5.902	71,485	61,869	95.4
			5-year Average	**106** gpcd

Base of Interpolation for the City's population

Year	Population	Source
2000	66,863	Broward County Population Forecast Model, Allocated by TAZ
2006	70,825	Broward County Population Forecast Model, Allocated by TAZ

Base of Interpolation for the City's retail service area population

Year	Population	Source
2000	57,585	Broward County Population Forecast Model, Allocated by TAZ
2006	61,257	Broward County Population Forecast Model, Allocated by TAZ

Notes:
The 2000 service area population is the population that the Census Bureau has listed for the entire City of Lauderhill because the City was limited to its service area in 2000. The "City" population for 2000 is therefore the actual City plus the area that is now annexed. The 2006 City population includes the annexed areas, and the 2006 Service Area population is the City population without the annexed TAZs: 271 and 273-275.

3.5. Maximum-Day and Maximum-Month Peaking Factors

Table 3-3 tabulates the maximum-day and maximum-month peaking factors from 1998 through 2007. The maximum-day peaking factor is estimated for each year as the ratio of annual MDP over annual ADP. The maximum-month peaking factor is estimated as the ratio of annual MMP over annual ADP. The maximum historical maximum-day peaking factor over the period from 1998 through 2007 occurred in January 2006 with a value of 1.50. This maximum-day peaking factor is used to estimate the projected maximum-day finished water demands presented in Section 4.

According to the SFWMD, the maximum-month peaking factor is estimated as the average of the peaking ratios of the last three years of record, which for the City is 1.10, as noted on the bottom of Table 3-3. It is anticipated that the recommended maximum monthly allocation for the City's water supply will be tied to this maximum-month peaking factor in the next WUP. The City's current permit expires on August 12, 2009. The maximum-month water supply allocation from the existing Biscayne Aquifer sources will be equal to the annual average water use established as the base condition (based on actual raw water pumped in the five years previous to April 1, 2006, see Appendix A) times the maximum-month peaking factor. This maximum-month permitted water supply allocation is required to be expressed as an equivalent maximum-day raw water demand in order to properly plan for infrastructure designed on a maximum-day basis, such as treatment facilities and wellfield daily production capacity. To get a maximum-day peaking factor corresponding to the maximum-month peaking factor, the peaking factors calculated in Table 3-3 were plotted with the maximum-month peaking factor on the x-axis and the maximum-day peaking factor on the y-axis. Then, a linear regression (best-fit line) between the two factors was run, illustrated in Figure 3-6.

The regression results show a 72% linear correlation between the two factors.[1] Note that the maximum-day peaking factor in the y-axis of Figure 3-6 represents the maximum-day occurring during the maximum-month as opposed to the maximum-day occurrence during the year, even though the two can often be the same. The linear regression of the historical data shows that the maximum-month peaking factor of 1.10 will support a maximum-day peaking factor of 1.22. These peaking factors are used to determine peaks in the annual average water supply permitted allocation. On the other hand, the maximum-day peaking factor of 1.5 calculated in Table 3-3 will support a maximum-month peaking factor of 1.32. These factors are used to determine peaks in average water demand and used by utilities to size treatment, distribution, and storage facilities.

[1] A correlation factor of 1 represents a perfect linear fit and a factor of zero represents data that is not linearly correlated.

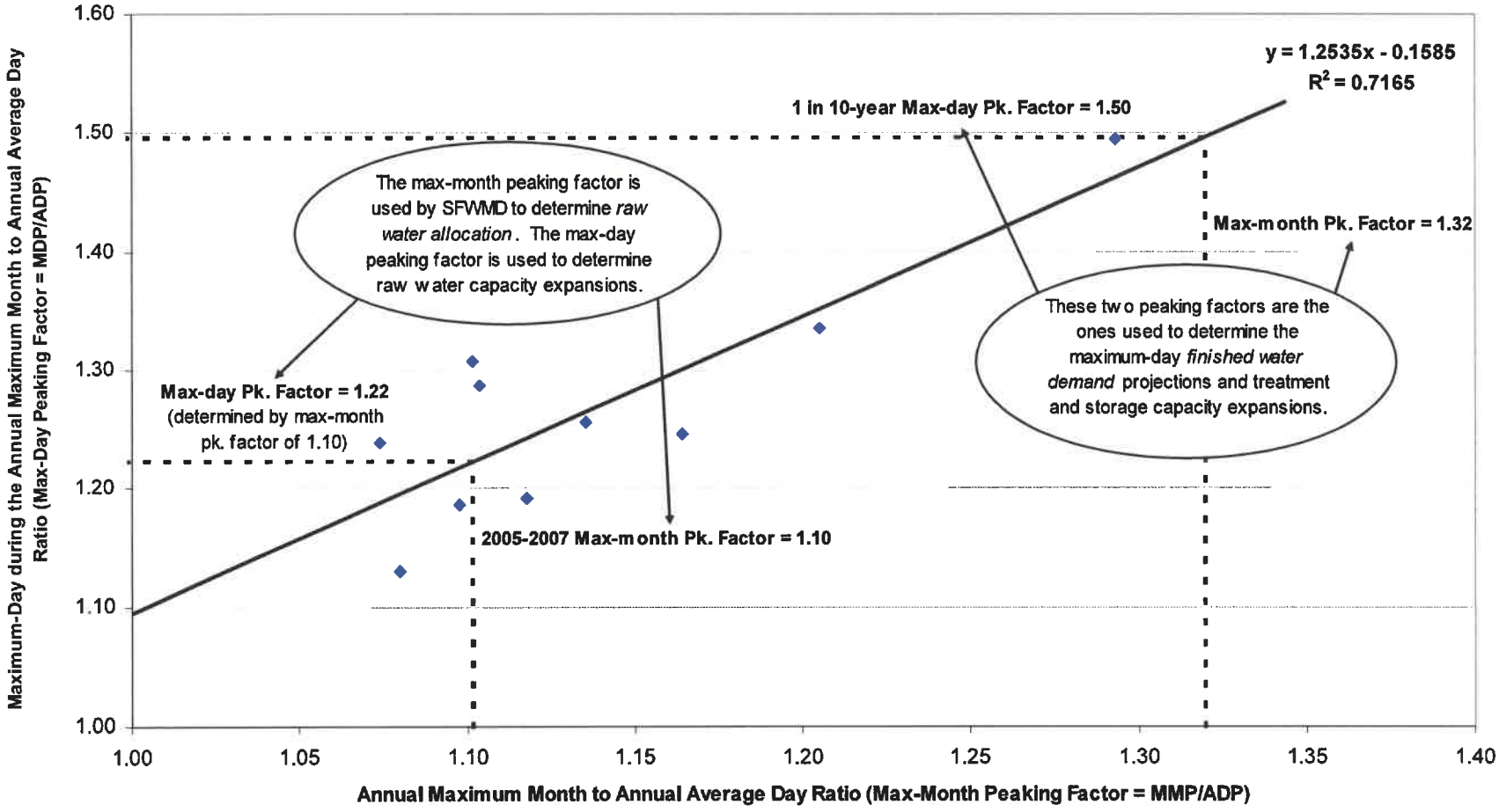


Figure 3-6: Linear Regression of Max-Day Peaking Factors and Max-Month Peaking Factors

3.6. Non-Revenue Water

Many utilities experience a variety of water losses. Most operators recognize distribution system leakage as the primary type of loss. However, water suppliers also register losses from poor (deficient) accounting, meter inaccuracy, systematic data handling errors, and unauthorized consumption. These real and apparent losses are collectively labeled as non-revenue water as they can have a negative impact on utility revenue and consumption data accuracy. It should be noted that the new water accounting methodology approved by the International Water Association (IWA) and the American Water Works Association (AWWA) promotes the concept of "non-revenue" water over the previous concept of "unaccounted-for" water loss.

Utilizing a top-down approach, non-revenue water is preliminarily estimated in this section as the difference between the volume of water pumped from the WTP and the volume of water billed to customers. As indicated before, sources of non-revenue water can include, but are not limited to, the following:

- Meter inaccuracies (apparent losses)
- Unauthorized uses such as water theft, illegal connections, etc. (real losses)
- Systematic data handling errors (apparent losses)
- Leakage (real losses)

Figure 3-7 shows the volumes of finished and metered water for the years 2000 through 2007. The flows are presented in a three-month running average basis, in mgd, in order to help reduce some of the asynchrony between the finished water production recording and the metered water consumption collection.

One trend in the data is an apparent reduction in non-revenue water since the period of 2001 to 2003. This may be due to the City's aggressive replacement of several hundred older, larger meters in each of the past few years. The data also show that the non-revenue water averages 0.46 mgd, which is approximately seven percent of the ten-year average production. This estimate is below the ten percent threshold observed by the SFWMD. Nonetheless, this preliminary estimate requires further review to eliminate the uncertainty of meter inaccuracies as some periods show significant losses (as high as 2.16 mgd) while others show metered water being greater than the pumped water (as much as 1.26 mgd). Unless the City receives water through an emergency interconnect, metered water should be less than the water produced.

Additionally, a report provided to the City by the SFWMD shows system losses between August 2004 and July 2005 of approximately 15 percent. This figure is significantly higher than the seven percent calculated by Malcolm Pirnie. Upon further investigation, the difference in the two calculations appears to come from the difference in the amount

of billed water. On average, the monthly billed water in the SFWMD report is approximately 15 percent lower than the billed water in the monthly billing reports provided to Malcolm Pirnie by the City. Therefore, due to the uncertainty in the preliminary estimates and because of the upcoming renewal of the City's WUP, it is recommended that the City conduct a formal non-revenue water review. Since the SFWMD has 15 percent losses on record, it is likely that the non-revenue water review will be required as part of the WUP application package.

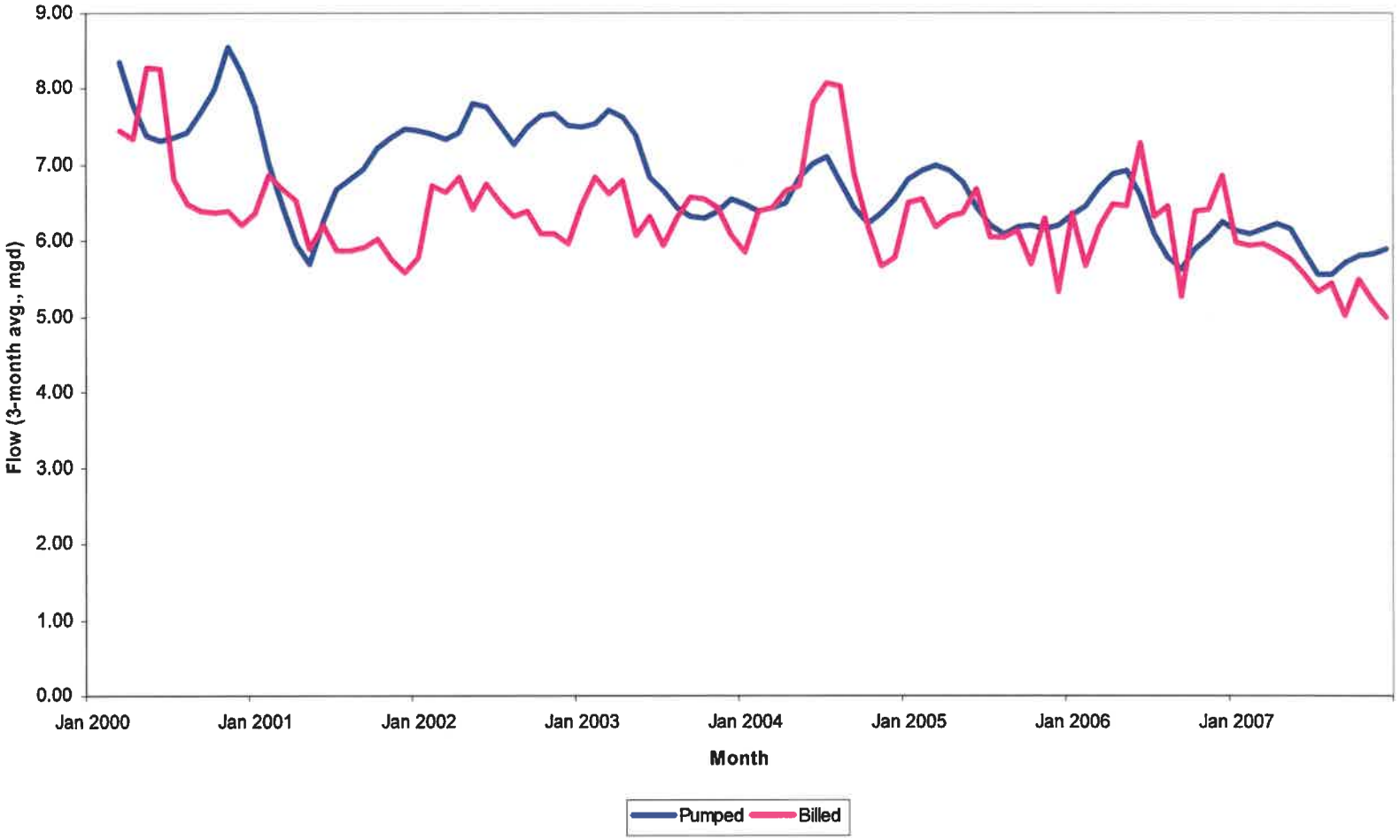


Figure 3-7: City of Lauderhill Pumped vs. Billed Water

4. Projected Water Demands

This section presents the projected annual average daily, maximum-month, and maximum-day finished water demands of the City's service area over the 20-year planning horizon. These projections are based on the demographic projections of the City's retail service area. Projected water demands are compared against the existing capacities of the City's Public Water System in order to assess requirements for new or expanded facilities in Section 5.

4.1. Retail Service Area Demographics

This study uses the year 2006 as a baseline for population and water consumption. It is important to note that the City is mostly built-out, and with the exception of the Transit Oriented Corridor (See Section 4.1.4), the land uses throughout the City are not expected to change dramatically during the planning horizon. The demographic projections were provided by the Broward County Urban Planning and Redevelopment Department (BCUPRD). The water demand projections were estimated based on the 2006 Traffic Analysis Zones (TAZ) allocated population projections for the City over a 20-year planning horizon.

4.1.1. Land Use Zone Data

The Future Land Use Element (FLUE) of the City's 2000 Comprehensive Plan provides details on the existing and future land use in the City. For planning purposes, the Broward County Planning Council has divided the County into planning zones. The City's service area is covered by five of these zones. The Broward County Planning Zone and the associated Land Use Zone (LUZ) name chosen by the City are shown in Table 4-1 and illustrated in Figure 4-1.

Table 4-1.
City of Lauderhill Land Use Zones

Broward County Planning Zone Number	City of Lauderhill Land Use Zone Name
63	Northwest
65	Inverrary
71	West Central
72	East Central
52	Industrial

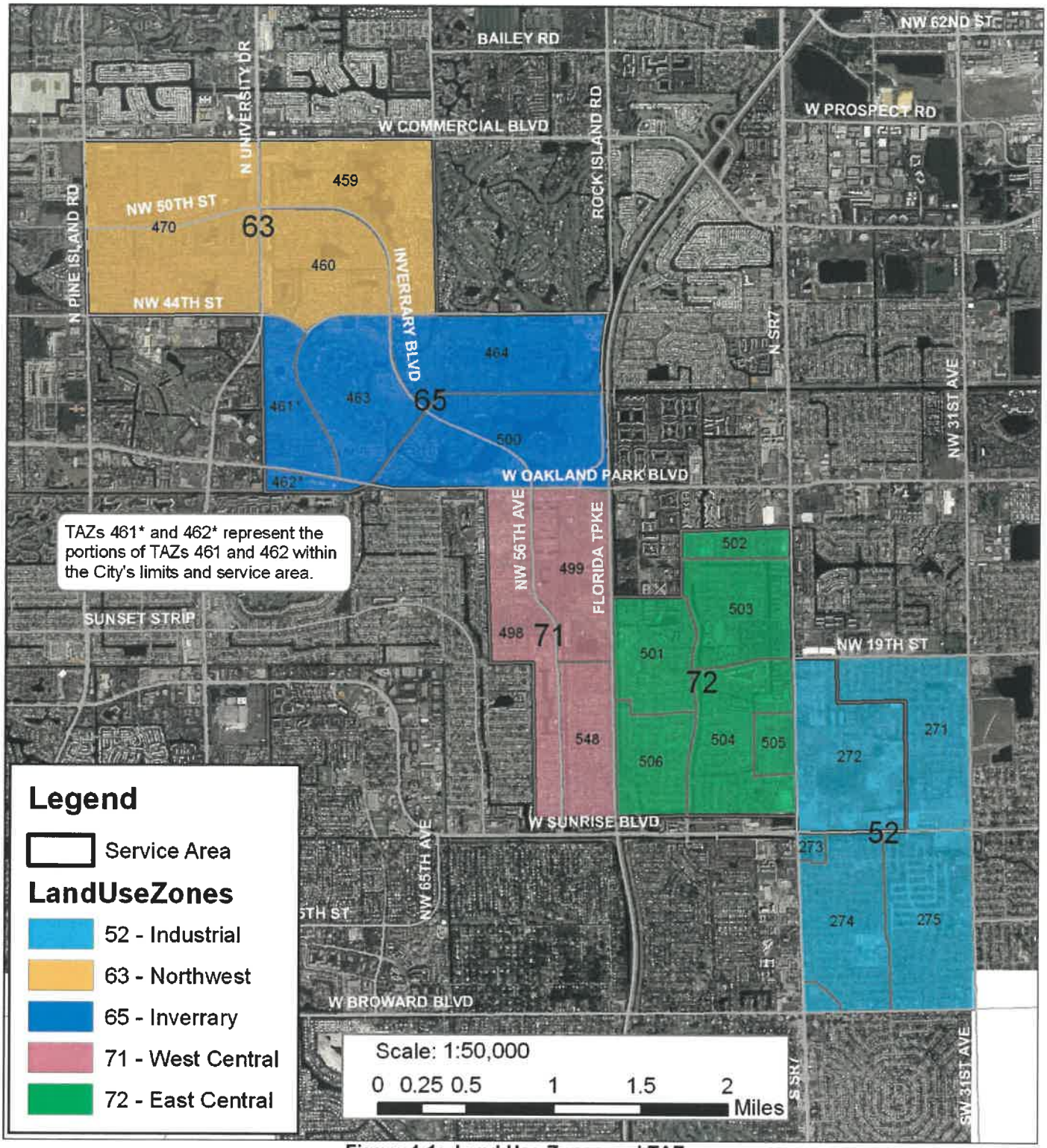


Figure 4-1: Land Use Zones and TAZs

The City recognizes in the FLUE that with the City being 95% built-out (as of 2000), the expected population increase will be accommodated by redevelopment and urban infill. According to the land use designations and acreage in the FLUE, the City's residential areas can accommodate approximately 100,000 people[1]. However, the BCUPRD population projections do not predict this much of an increase in population due to redevelopment and urban infill during the 20-year planning horizon.

4.1.2. Traffic Analysis Zone Data

Demographic projections were provided by TAZ by the BCUPRD. TAZs are useful in projecting the distribution of the population because each covers small population areas, which are also integrated into the County's transportation planning process. BCUPRD completed the most recent County-wide demographic projections in May 2005 and the most recent municipal distribution in April 2007. BCUPRD provided its most recent population forecast by TAZ to Malcolm Pirnie in March 2008. The TAZ data produced by the BCUPRD included population, households (occupied units), and dwelling units (total units) by TAZ for 2000, 2006, 2007, 2008, 2010, 2015, 2020, 2025, and 2030.

Generally, BCUPRD follows three steps to develop the population forecasts:

- Step 1. Develop a County-wide population forecast
- Step 2. Allocate population to TAZs
- Step 3. Allocate the TAZ projections to the municipalities

Based on the 2000 Census data, BCUPRD forecasted the County-wide future population using a cohort-survival model. The Broward County Population Forecasting Model, developed by the Planning Services Division (PSD), was approved by the State of Florida's Department of Community Affairs as part of the adoption of the Broward County Comprehensive Plan in 1989. A complete description of the Broward County Population Forecasting Model can be found at http://www.broward.org/planningservices/upi00108.htm.

Table 4-2 shows the County-wide projections produced by BCUPRD using the cohort-survival model and those produced by the Bureau of Economics and Business Research (BEBR). BEBR is an applied research center at the University of Florida. BEBR produces population projections under three scenarios: low, medium, and high. Note from Table 4-2 that the County-wide projections by BCUPRD are just slightly (2% to 3%) above the medium projections by BEBR. BEBR produces County-wide projections, but not municipality projections.

[1] Please see the City's Future Land Use Element Support Documents, Section III.C.3, page 49.

Table 4-2.
Broward County Population Projections

Year	BCUPRD Projections	BEBR Projections *Low*	*Medium*	*High*
2005	1,765,855	1,686,000	1,755,900	1,826,500
2010	1,905,271	1,755,900	1,919,300	2,076,000
2015	2,038,381	1,826,500	2,068,100	2,330,300
2020	2,159,926	1,880,300	2,215,600	2,596,600
2025	2,264,855	1,914,600	2,357,000	2,871,900
2030	2,348,552	1,932,400	2,488,300	3,152,900

Table 4-3.
City of Lauderhill Population Projections by TAZ

TAZ	2006	2010	2015	2020	2025	2030	Growth
272	848	1,065	2,090	2,827	3,339	3,821	2,973
459	2,119	2,245	2,349	2,439	2,511	2,541	422
460	3,026	3,115	3,172	3,216	3,240	3,253	227
461[1]	1,604	1,663	1,881	2,140	2,506	2,834	1,230
462[1]	0	1	21	50	96	142	142
463	3,249	3,332	3,429	3,513	3,581	3,633	384
464	5,946	6,123	6,287	6,424	6,529	6,599	653
470	6,737	6,954	7,089	7,226	7,372	7,456	719
498	6,574	6,746	6,942	7,135	7,321	7,444	870
499	6,947	7,126	7,315	7,500	7,703	7,827	880
500	4,451	4,858	5,147	5,377	5,489	5,552	1,101
501	2,501	2,606	2,702	2,783	2,842	2,887	386
502	922	934	974	1,089	1,174	1,205	283
503	5,605	5,853	6,071	6,667	7,150	7,313	1,708
504	5,378	5,644	5,865	6,513	7,127	7,297	1,919
505	0	12	689	1,281	1,488	1,688	1,688
506	1,595	1,618	1,651	1,672	1,686	1,706	111
548	3,755	4,049	4,182	4,269	4,322	4,356	601
271[2]	*3,518*	*3,705*	*3,785*	*3,887*	*4,055*	*4,154*	*636*
273[2]	*20*	*20*	*20*	*20*	*20*	*20*	*0*
274[2]	*2,877*	*3,003*	*3,057*	*3,469*	*3,833*	*4,019*	*1,142*
275[2]	*3,152*	*3,315*	*3,557*	*3,863*	*4,334*	*4,736*	*1,584*
City	***70,824***	***73,987***	***78,275***	***83,360***	***87,718***	***90,483***	*19,659*
Service Area	**61,257**	**63,944**	**67,856**	**72,121**	**75,476**	**77,554**	*16,297*

1. Population projections for TAZs 461 and 462 have been allocated to the portion covered by the City's boundary and service area.
2. TAZs 271, 273, 274, and 275 (shaded) cover the recently annexed Unincorporated Broward County territory and are not currently served by the City's water system.

Table 4-3 shows the BCUPRD population projections by TAZ for the City. The rows shaded in gray represent the four annexed TAZs which are not currently part of the City's service area. The service area population will grow by approximately 16,000 over the planning horizon from 2006 to 2030. If the annexed portions of the City are added to the service area, the service population may grow by as much as 29,000 people. For analysis of the population and water demand, 2006 is used as the base year rather than 2007 due to the water shortage and therefore unusually low water consumption in 2007.

4.1.3. Joint TAZ and LUZ Analysis

In order to gain a reasonable idea of the expected future water demand, the SFWMD recommends the use of a per capita coefficient approach to estimate water use. This approach involves first calculating the average per capita finished water demand, as done in Section 3.4. Then, this demand is applied to the entire population in a given service area; specifically, the population is multiplied by the per capita demand to determine the demand projections for the entire service area.

In order to justify the use of population and per capita water use to project the future water demand for the City, the Existing and Future Land Use Map Series associated with the FLUE (Appendix C) were analyzed in conjunction with the TAZ population and consumption data. The goal of this analysis was to reveal for which TAZs, if any, an approach other than the per capita coefficient approach should be used to estimate the water demand.

Figure 4-2 on the following page describes the 2007 water use in the City by TAZ and customer class. Each bar in the figure represents one TAZ, with the TAZs grouped by sector. Within each bar, the colored sections show the use associated with Residential, Non-Residential, and Irrigation meters. The descriptions below justify the use of population for the demand projection for each TAZ, grouped by sector.

One assumption present throughout these discussions is that if the large majority of the use in any one TAZ or sector is residential and the land use is not expected to change significantly from now until 2030, then population will serve as a sufficient driver of the increase in water demand in that area. The initial assumption is that population can be used for the City as a whole because the past water consumption has consistently been approximately 80% residential. If the past use in a TAZ or LUZ has not been largely residential, then the next step is to look at the percent of water use in that area compared with the entire City's consumption, expected population growth in that area, and any changes in land use. Significant projected increases in population or land zoned for residential use often indicate that population will overcome non-residential use and become the driving factor in water demand projections. In the discussions below, the 2007 consumption was evaluated because it was the most easily analyzed by both TAZ and customer class.

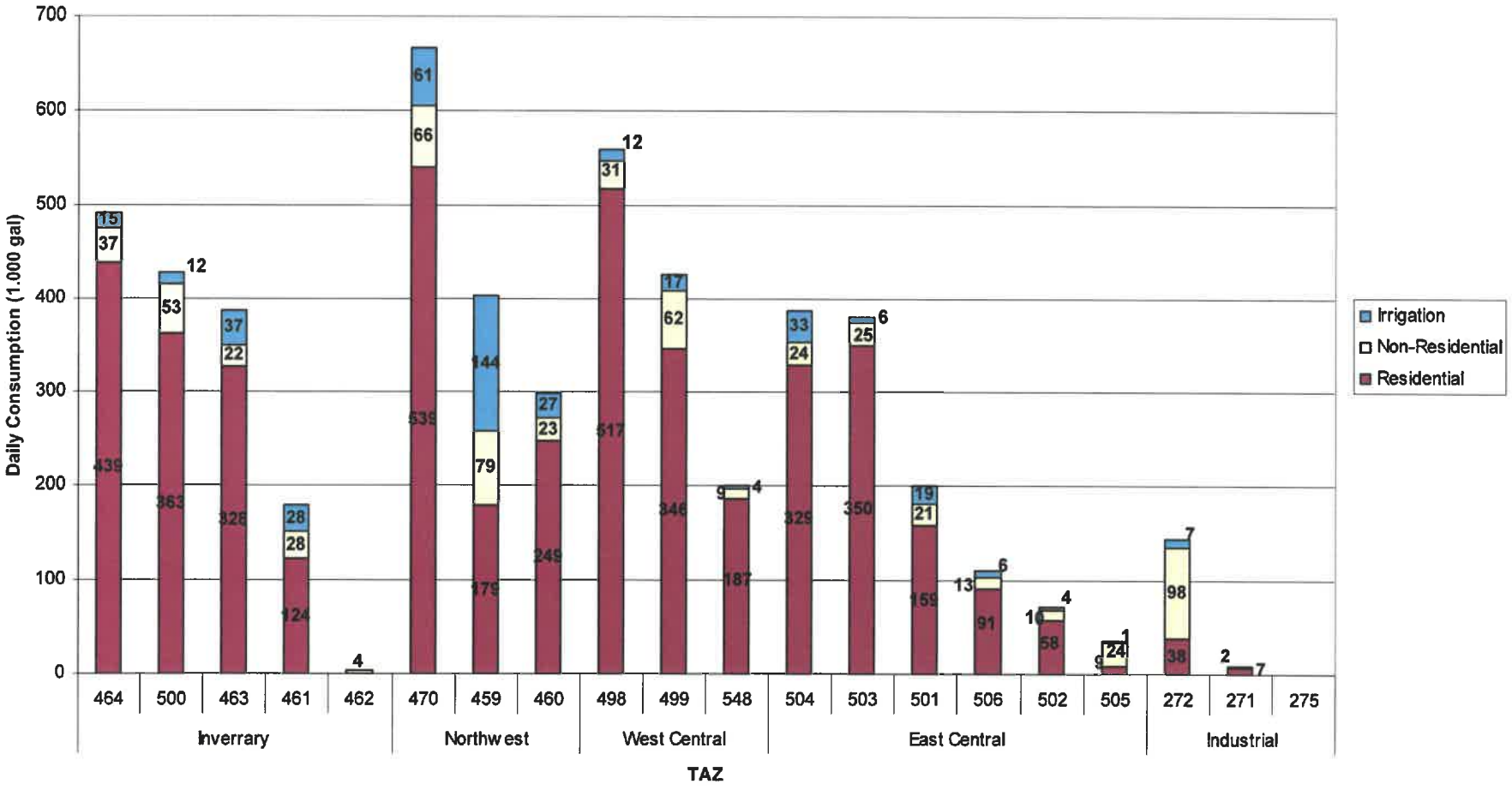


Figure 4-2: City of Lauderhill 2007 Water Consumption by TAZ and Customer Class

4.1.3.1. Northwest Zone

The Northwest Zone of the City (Broward County Planning Zone 63) is bound by Commercial Boulevard, NW 64th Avenue, NW 44th Street, and Pine Island Road to the north, east, south, and west, respectively. It is comprised of TAZs 459, 460, and 470, with residential land use being approximately 81% of this sector's area. TAZs 460 and 470 both have water use that is over 80% residential, but the 2007 consumption in TAZ 459 was 45% residential, 20% non-residential, and 35% irrigation. Aerial images of this TAZ show the commercial areas along University Drive and Commercial Boulevard and the significant irrigable area in the central area of the TAZ, which support the consumption percentages. The method of projecting demand uses the current consumption as a base and adds demand per the population increase. Since the land use pattern in this sector is not expected to change significantly, the population can still be used as a driver of demand because the non-residential and irrigation use will be incorporated into the base consumption.

4.1.3.2. Inverrary Zone

The Inverrary Zone of the City (Broward County Planning Zone 65) is generally bound by NW 44th Street to the north, Florida's Turnpike to the east, Oakland Park Boulevard to the south, and University Drive to the west. It is comprised of TAZs 463, 464, 500, and the portions of 461 and 462 within the City's limits. Together, this sector made up 28% of the 2007 metered water consumption, with 84% of the sector's consumption being residential use.

The only TAZ in this sector that does not have predominantly residential water consumption is TAZ 462, which is a small 35-acre area that accounted for only 0.07% of the City's total metered consumption. Approximately half of this TAZ is the Lauderhill Sports Park, and the other half is commercial land use. The consumption for the recreation and commercial land use in this TAZ is not significant. The population increase can still drive the demand increase for this sector, as the land uses are generally expected not to change.

4.1.3.3. West-Central Zone

The West-Central Planning Zone of the City (Broward County Planning Zone 71) is generally bound by Oakland Park Boulevard to the north, Florida's Turnpike to the east, Sunrise Boulevard to the south, and NW 58th Avenue to the west. The TAZs in this sector are 498, 499, and 548. Respectively, the 2007 water consumption in these TAZs was 92% 81%, and 93% residential. This sector is one of the two most densely populated in the City, and will only become more populous with an expected growth of over 2,300 people in 710 acres by 2030. Changes in land use as shown on the maps are not expected; rather, the population will grow due to increases in household size. Overall, the population growth is expected to far outweigh any other changes in the West-Central

sector, making population the most appropriate driver of water demand in this region of the City.

4.1.3.4. East-Central Zone

The East-Central Zone of the City (Broward County Planning Zone 72) is generally bound by NW 27th Street to the north, State Road 7/US 441 to the east, Sunrise Boulevard to the south, and Florida's Turnpike to the west. Additionally, it contains TAZs 501 through 506. This area contains the City's WTP and is also the most densely populated area of the City.

The only major changes to the land use in this sector will be that the parcels along State Road 7 have been designated as part of the Transit Oriented Corridor (TOC, see Section 4.1.4). This designation means that the area is targeted for increased development such that the use of public transportation is encouraged. TAZ 505, the only TAZ in this sector that does not have at least 80% residential water use, is a 53-acre area completely contained in the TOC. Currently, TAZ 505 has 70% commercial water use and represents 0.64% of the City's 2007 total metered consumption. According to the BCUPRD population projections, this TAZ is expected to experience growth from zero people in 2006 to nearly 1,700 in 2030. However, this projection does not include all of the growth expected due to the TOC (see Section 4.2.2). Since the details of development within each TAZ of the TOC are uncertain, the per capita coefficient approach is used as a best-estimate for the demand projection of the BCURPD-expected population growth.

4.1.3.5. Industrial Zone

The southern-most sector in the City is the Industrial Zone (Broward County Planning Zone 52). It is bound by NW 19th Street to the north, NW 31st Avenue to the east, Broward Boulevard to the south, and State Road 7 to the west. Additionally, it contains TAZs 271 through 275. This planning zone is unique because currently, only TAZ 272 is part of the City's service area. TAZs 271, 273, and 274 are served by BCWWS, and TAZ 275 is served by BCWWS and the City of Fort Lauderdale. When the FLUE was written, the City had not yet annexed the remaining TAZs; however, the land use map series have since been updated to include the annexed parts of the City. With the exception of TAZ 272, the majority of this sector is single family homes with some commercial development along the major roads. These residential designations are not expected to change in the future, so if the City does add these areas to its service area, the population approach to determining water demand will be appropriate.

TAZ 273 is the only TAZ in the City not expected to experience population growth during the planning horizon. This TAZ is a 17-acre area bordered to the north and west by Sunrise Blvd. and State Road 7. According to the Broward County population projections, this TAZ will continue to have a population of 20 from the present until

2030. Orthoimagery and the land use maps for this TAZ reveal that it contains approximately 10 homes and utility property. Since growth is not expected in this TAZ, the demand is expected to remain constant through the planning horizon.

TAZ 272 currently has consumption that is approximately 70% non-residential and 25% residential. This non-residential water use includes the areas on the land use map designated as industrial. At the same time, the consumption in this TAZ only made up 2.7% of the 2007 metered water consumption for the entire City. The majority of this TAZ is part of the TOC, which is addressed in Section 4.1.4. Accordingly, the land use along State Road 7 and Sunrise Boulevard may change significantly. The BCUPRD population projections, which again do not encompass all of the growth expected in the TOC, predict that the population in TAZ 272 will increase from 848 in 2006 to 3,821 people in 2030. This change represents a population density increase of nearly 9 persons/acre, which is significant enough to justify using population as a driver for the demand increase in this portion of expected growth.

4.1.4. Transit Oriented Corridor

The most significant development that will occur in the City in the next 20 years will be the redevelopment of the Transit Oriented Corridor (TOC). The TOC is the area of the City along State Road 7, and including a portion of Sunrise Boulevard, that the City has identified as an area that can stimulate significant economic growth. Specifically, the FLUE indicates that an additional 2.7 million square feet of commercial land use, 1.2 million square feet of industrial land use, and 5,200 dwelling units are planned for this area. The Comprehensive Plan amendment that includes the TOC was not submitted before the publication of the Broward County population projections. Therefore, the projections used to estimate the demands for the rest of the City do not incorporate all of the expected growth in the TOC.

The TOC is shown in Figure 4-3, along with the surrounding TAZs and existing land use. The figure shows that most of the land covered by the TOC is currently commercial, with some recreational space, multi-family residential land use, and a small amount of public building and industrial land use. Overall, the typical use of this area has been suburban in nature. The TOC, as proposed, will alter the land use so it will attract visitors and contain buildings such as a stadium and hotels. Given this pattern of growth is so different from the current growth patterns in the City, a different approach is necessary to estimate the future water demands. This method will be discussed in Section 4.2.2.

The Planning and Zoning Department has indicated that the redevelopment of the TOC is expected to be complete by 2033. However, for the purposes of planning water supply facilities, the projections estimate the growth in the TOC occurring by 2030.

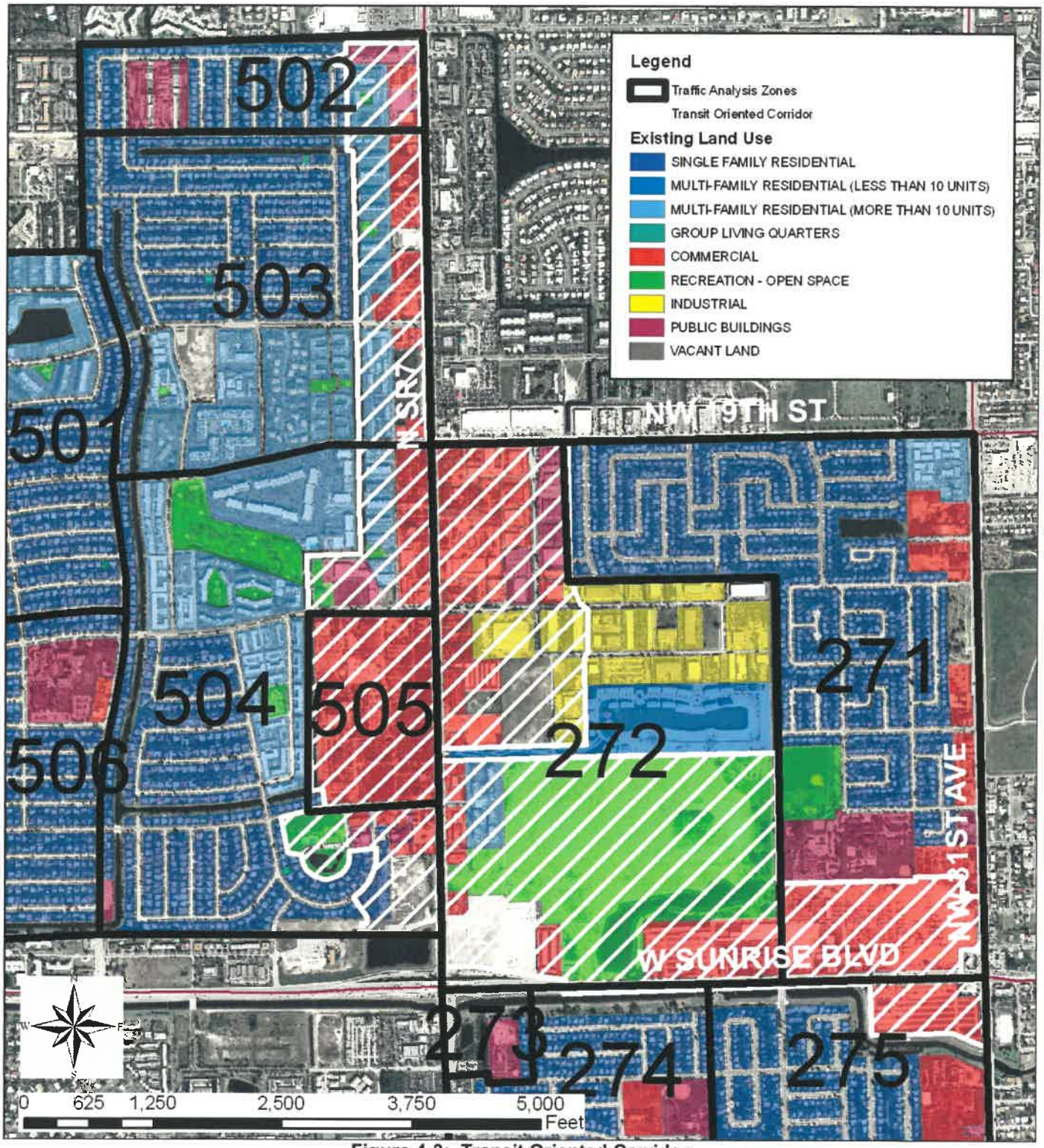


Figure 4-3: Transit Oriented Corridor

4.2. Projected Average Daily Finished Water Demands

4.2.1. Current Population Projections

Projected water demands were estimated based on a per capita coefficient approach for the City's service area. As discussed in Section 4.1, it has been determined that this approach is appropriate for all areas of the City except the TOC. The finished-water demand projections for the City were estimated for each TAZ by using the 2006 metered water consumption, 2006 average daily per capita demand rate, and BCUPRD population projections. The projections were estimated from 2007 through 2030 as follows:

$$WD_{n,i} = MWC_{2006,i} + \left[\Delta Pop_{n,i} \times PC_i\right], \text{ where}$$

$WD_{n,i}$: Finished water demand in year n for TAZ i
$MWC_{2006,i}$: Metered water consumption in 2006 for TAZ i
$\Delta Pop_{n,i}$: Change in service area population from 2006 to year n for TAZ i
PC_i: Per capita water demand for TAZ i

For TAZs 462 and 505, which had zero population in 2006, the demand added to the 2006 consumption was estimated as the population in that year multiplied by the overall average City per capita demand rate, 106 gpcd. See Section 4.2.3 for the demand projections of the TAZs which are not currently served by the City.

4.2.2. TOC Projections

As previously mentioned, the TOC requires a different method for estimating the finished water demand due to the change in growth pattern and the lack of full representation in the Broward County population projections. However, the BCUPRD projections are still useful to help determine the expected demand. The steps taken to calculate the finished water demand to be exerted by the TOC were as follows:

- Estimate the percentage of each TAZ's population currently in the TOC
- Estimate the percentage of each TAZ's population growth that will occur in the TOC
- Use the estimations to project the population in the entire TOC
- Calculate population growth not accounted for in the BCUPRD projections
- Use the current consumption in the TOC to determine a baseline for non-residential demand
- Apply this demand to the proposed commercial and industrial growth

Seven TAZs make up the TOC: 271, 272, 275, 502, 503, 504, and 505. Of these TAZs, 505 is the only one to be completely contained within the TOC. Additionally, the only portions of TAZs 271 and 275 in the TOC are part of the Swap Shop property. The population currently within the area designated as the TOC was estimated by looking at

the orthoimagery of the City and determining an approximate percentage of homes in each TAZ that intersect the TAZ. The resulting current TOC populations are shown in Table 4-4.

Table 4-4.
Current Population Characterization in TOC

TAZ	2006 TAZ Population	Estimated Percent in TOC	Estimated TOC Population	2006 TAZ Dwelling Units[1]	2006 ppl/du[2]
271	3,518	0%	0	N/A	--
272	848	35%	297	322	2.63
275	3,152	0%	0	N/A	--
502	922	20%	184	353	2.61
503	5,605	15%	841	2,202	2.55
504	5,378	10%	538	2,273	1.94
505	0	100%	0	0	--
Total	19,423		**1,860**		**2.4 (avg)**

1. Given in the BCURPD population projections. N/A used for TAZs with no expected population within the TOC.
2. 2006 TAZ Population divided by 2006 TAZ Dwelling Units.

Table 4-4 also shows the number of people per dwelling unit (ppl/du) in each TAZ that has a portion of its population in the TOC. The average ppl/du in 2006 for the TOC was calculated by dividing the population in each TAZ by the number of dwelling units. The average living density is therefore approximately 2.4 ppl/du.

The population growth expected to occur in the TOC can be estimated using the BCUPRD population projections, orthoimagery of the City, and existing land use. In particular, observing the land use can lead to an estimate of that TAZ's growth to occur within the TOC. Based on the amount, type, and location of housing and commercial properties, the following TOC growth percentages presented in Table 4-5 were assigned to each TAZ:

Table 4-5.
Percent of TOC Population Growth and Justification

TAZ	Percent	Justification
271	0%	The only portion of this TAZ in the TOC is the Swap Shop
272	75%	The only part of the TAZ not in the TOC is largely industrial
275	0%	Same as TAZ 271
502	20%	The TOC seems to contain approximately 20% of the expandable land in the TAZ
503	20%	The TOC seems to contain approximately 20% of the expandable land in the TAZ
504	10%	The TOC seems to contain approximately 10% of the expandable land in the TAZ
505	100%	TAZ is completely contained within the TOC

These percentages were applied to the population growth in each TAZ predicted in the BCUPRD projections (see Table 4-3). This calculation yielded a total population growth in the TOC that is already accounted for in the future demand, which is 4,508 people between 2006 and 2030, as shown in Table 4-6.

Table 4-6.
TOC Population Growth Projections

TAZ	TAZ Population Growth[1]	TOC Population Growth[2]
272	2,973	2,230
502	283	57
503	1,708	342
504	1,919	192
505	1,688	1,688
Total	10,155	**4,508**

1. Per BCUPRD projections in Table 4-3.
2. TAZ Population Growth times percentages in Table 4-5.

The total growth expected in the TOC, as previously mentioned, is 5,200 dwelling units. To translate this to population, it is multiplied by 2.4 ppl/du, as calculated above. Accordingly, the expected population growth in the TOC is 12,480 people, meaning that the growth not accounted for in the BCUPRD projections is 7,971 people. Using the 106 gpcd estimate for the City, this growth will produce a need for 0.85 mgd. Pleas see Table 4-7 for these calculations.

Table 4-7.
TOC Demand Estimates

	Description	Calculation	Result	Unit
	TOC Finished Water Demand			
(A)	Total growth expected in TOC:	5,200 du x 2.4 ppl/du=	12,480	ppl
(B)	Growth accounted for in projection:	See Table 4-6	4,508	ppl
(C)	Growth not accounted for in projection:	(A)-(B)=	7,972	ppl
(D)	Demand increase due to TOC:	(C) x 106 gpcd=	**0.85**	**mgd**
	Estimated Non-Residential Demand			
(E)	TOC current consumption=	Per Billing Records	0.42	mgd
(F)	Consumption by current population=	1,860 ppl x 106 gpcd=	0.20	mgd
(G)	Base water consumption=	(E)-(F)=	**0.22**	**mgd**

Table 4-7 also shows the estimate for the base water consumption of non-residential (commercial and industrial) demand in the TOC. Based on the 2006 geocoded billing

records, the current consumption in the TOC is approximately 0.42 mgd. The portion of this demand associated with the population is approximately 0.20 mgd. The per capita approach is used to determine this demand based on the mix of current land use throughout the City. The 0.22 mgd difference between these two demands represents a base non-residential consumption that is incurred beyond typical per capita use.

According to the City's Planning and Zoning Department, the TOC currently contains approximately 2.1 million square feet of commercial land use and 300,000 square feet of industrial land use. Assuming similar consumption per square foot for these two land uses,[2] the non-residential water consumption in the TOC is currently 0.093 gallons per day per square foot, or approximately 4,050 gpd/acre. Therefore, the additional 2.7 million square feet of commercial area and 1.2 million square feet of industrial land use will create an additional 0.36 mgd demand in the TOC. See Table 4-8 for the related calculations.

Table 4-8.
TOC Commercial and Industrial Demand Estimate

	Description	Calculation	Result	Unit
(A)	Current Comm. and Indust. in TOC:	2.1 Comm.+ 0.3 Indust. =	2.4	million sq ft
(B)	Base consumption Comm. and Indust.:	0.22 mgd/(A) =	0.093	mgd/million sq ft
(C)	Add'l Comm. and Indust. In TOC:	2.7 mil sq ft + 1.2 mil sq ft =	3.9	million sq ft
(D)	Add'l Comm. & Indust. demand in TOC:	(C) x (B) =	**0.36**	mgd

The final portion of the TOC consumption is the Swap Shop, which is in an area on Sunrise Boulevard that covers portions of TAZs 271, 272, and 275. This area is existing commercial property not currently served by the City. The Swap Shop is known to consume approximately 30,000 gpd, and it is the first property that the City plans to incorporate into its service area among the annexed portion of the City. Therefore, this 30,000 gpd (0.03 mgd) has also been incorporated into the expected TOC demand. With these three demand sources, the total demand expected from the TOC by 2030 is

$$0.85\ mgd + 0.36\ mgd + 0.03\ mgd = \mathbf{1.24\ mgd}.$$

4.2.3. BCWWS and City of Fort Lauderdale Population and Finished Water Demand Projections

As previously mentioned, the Industrial Zone of the City (except for TAZ 272) is currently served by other water utilities. Specifically, all of TAZs 271, 273, and 274 are served by BCWWS, and TAZ 275 is served approximately 90% by BCWWS and 10% by

[2] Two recent studies, the *Water & Sewer Study of a Portion of Southeast Jasper County* (1995 & 2002) and the *Buckwalter Tract Sewer and Water Master Plan*, both estimate general commercial and light industrial water demand to be the same.

the City of Fort Lauderdale. The 2007 Broward County 10-Year Water Work Plan provides projections for the 2030 planning horizon based on 2000 water consumption, production, and census data. As mentioned in Section 2.5.2, the per capita estimates in that Plan and the BCURPD population projections were used to estimate the future demand in the portion of the City served by BCWWS. Per capita consumption is not available for the portion of the City served by the City of Fort Lauderdale. However, due the proximity of this area to the BCWWS service area and its small size, the per capita estimates have been applied to all of TAZ 275.

Based on a total population increase from 9,567 people in 2006 to 12,929 people in 2030 and a per capita demand that ranges from 119 gpcd in 2006 to 115 gpcd in 2030, the increase in demand in this area is expected to be 0.35 mgd. However, since the City does not currently serve this annexed area, if it is incorporated into the service area the increase in demand on the City's utility will be:

$$12{,}929\ ppl \times 115\ gpcd = \mathbf{1.49\ mgd}.$$

4.2.4. Combined Finished Water Demand

The total finished water demand for the City is comprised of the sum of the projections for each TAZ and the expected growth in the TOC. Accordingly, the following two figures and two tables show the demand projections carried out for the City. The first set of projections represents the estimated water demand should the City's service area remain the same. The second set represents the estimated demand should the City expand the service area to include the annexed portions of the City. This projection assumes that the expansion occurs between 2015 and 2030, so the populations and projections for the two scenarios are the same through 2015. Both sets of projections include the 1.24 mgd demand increase due to the TOC, which has been added to the demand linearly throughout the planning horizon.

Table 4-9 shows the demand projections by TAZ and for the TOC, including the base consumption, per capita demand, population change, and demand increase. The increases in the final column of this table are shown in Figure 4-4. It is important to note that the projections for TAZs 271, 273, 274, and 275 (per Section 4.2.3) will only apply to the overall City demand if the City adds the annexed portion to its distribution system.

Table 4-10 displays the demand projections for each year in the planning horizon, which is the sum of the projections for each TAZ and the TOC. The populations in this table are the sum of the populations of the appropriate TAZs and the projected increase in population in the TOC that is not already included in the BCUPRD projections. The average-day demand projections are illustrated in Figure 4-5, along with the maximum-day and maximum-month projections that are discussed in the next subsection.

Table 4-9.
Average-Day Finished Water Demand Projections by TAZ and TOC

Sector	TAZ	MWC 1,000 gpd 2006	TAZ Per Capita gal/day/person 2006	Population 2006	Population 2030	Demand Increase mgd 2006-2030[1]
Industrial[2]	271	0	119	3,518	4,154	0.48
	272	160	189	848	3,821	0.56
	273	0	119	20	20	0.00
	274	0	119	2,877	4,019	0.46
	275	0	119	3,152	4,736	0.54
Northwest	459	518	244	2,119	2,541	0.10
	460	392	130	3,026	3,253	0.03
	470	804	119	6,737	7,456	0.09
Inverrary	461	213	133	1,604	2,834	0.16
	462	9	0	0	142	0.02
	463	391	120	3,249	3,633	0.05
	464	482	81	5,946	6,599	0.05
	500	443	99	4,451	5,552	0.11
West Central	498	641	97	6,574	7,444	0.08
	499	531	76	6,947	7,827	0.07
	548	233	62	3,755	4,356	0.04
East Central	501	279	111	2,501	2,887	0.04
	502	84	91	922	1,205	0.03
	503	445	79	5,605	7,313	0.14
	504	475	88	5,378	7,297	0.17
	505	42	0	0	1,688	0.18
	506	151	94	1,595	1,706	0.01
TOC		0.42	--	--	7,972[3]	1.24
Current Service Area		6.29 mgd	106	61,257	77,554	3.16[4]
City of Lauderhill		n/a	n/a	70,824	90,483	4.65[5]

1. MWC is zero for TAZs 271, 273, 274, and 275 because billing records were not available for the portions of the City served by BCWWS or City of Fort Lauderdale
2. The demand increase for TAZs 271, 273, 274, and 275 are the entire demand for those TAZs, which is the population multiplied by the BCWWS-estimated 2030 per capita demand of 115 gpcd.
3. This population is the population growth in the TOC that is not already incorporated into the BCUPRD population projections (see Table 4-7).
4. The "Current Service Area" demand increase represents the increase in demand that will occur due to the population increase and TOC development if the City does not incorporate the annexed portion of the City into the service area.
5. The "City of Lauderhill" service area demand increase represents the increase in demand that will occur due to the population increase, TOC development, and incorporation of the annexed portion of the City into the service area.

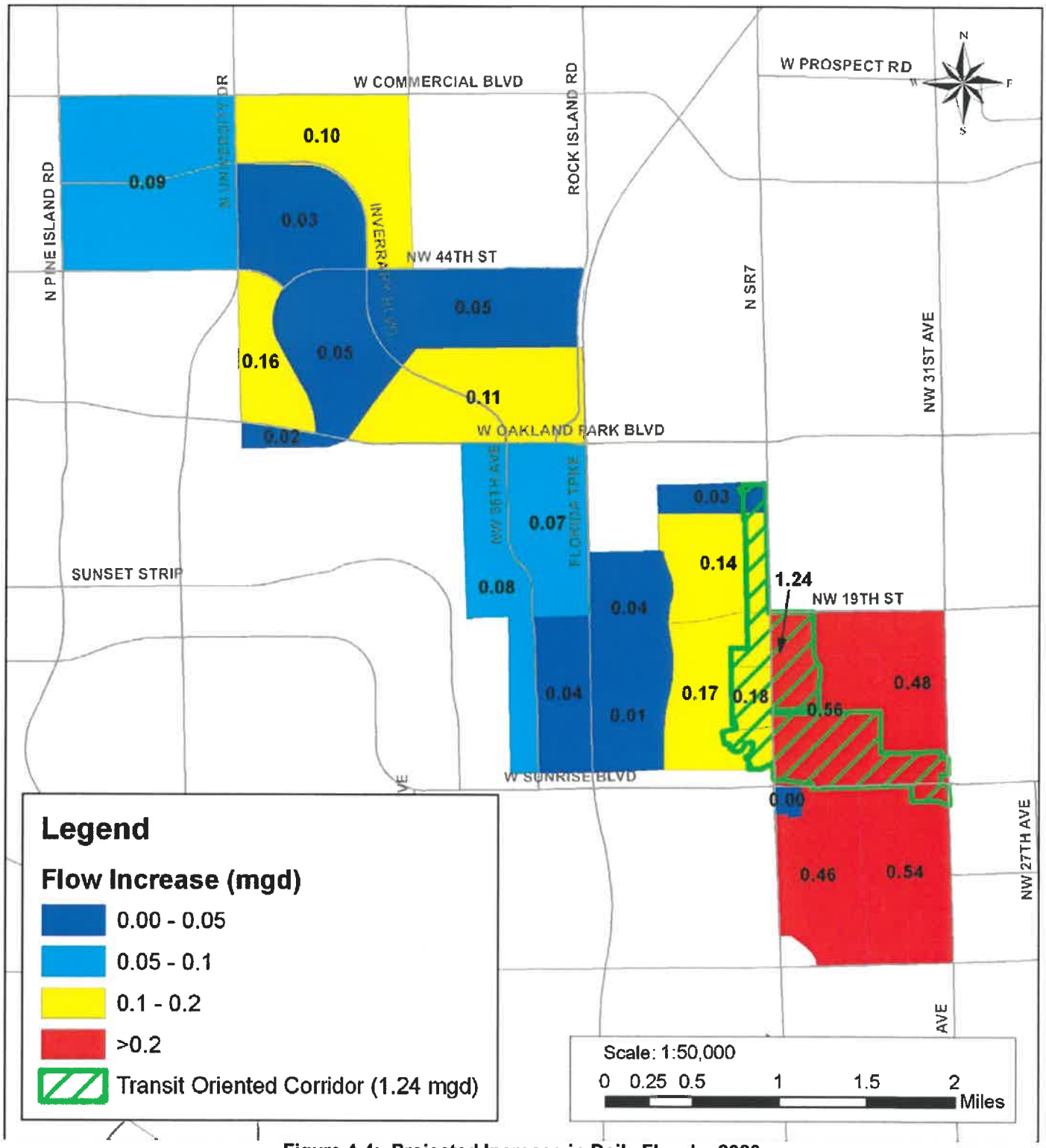


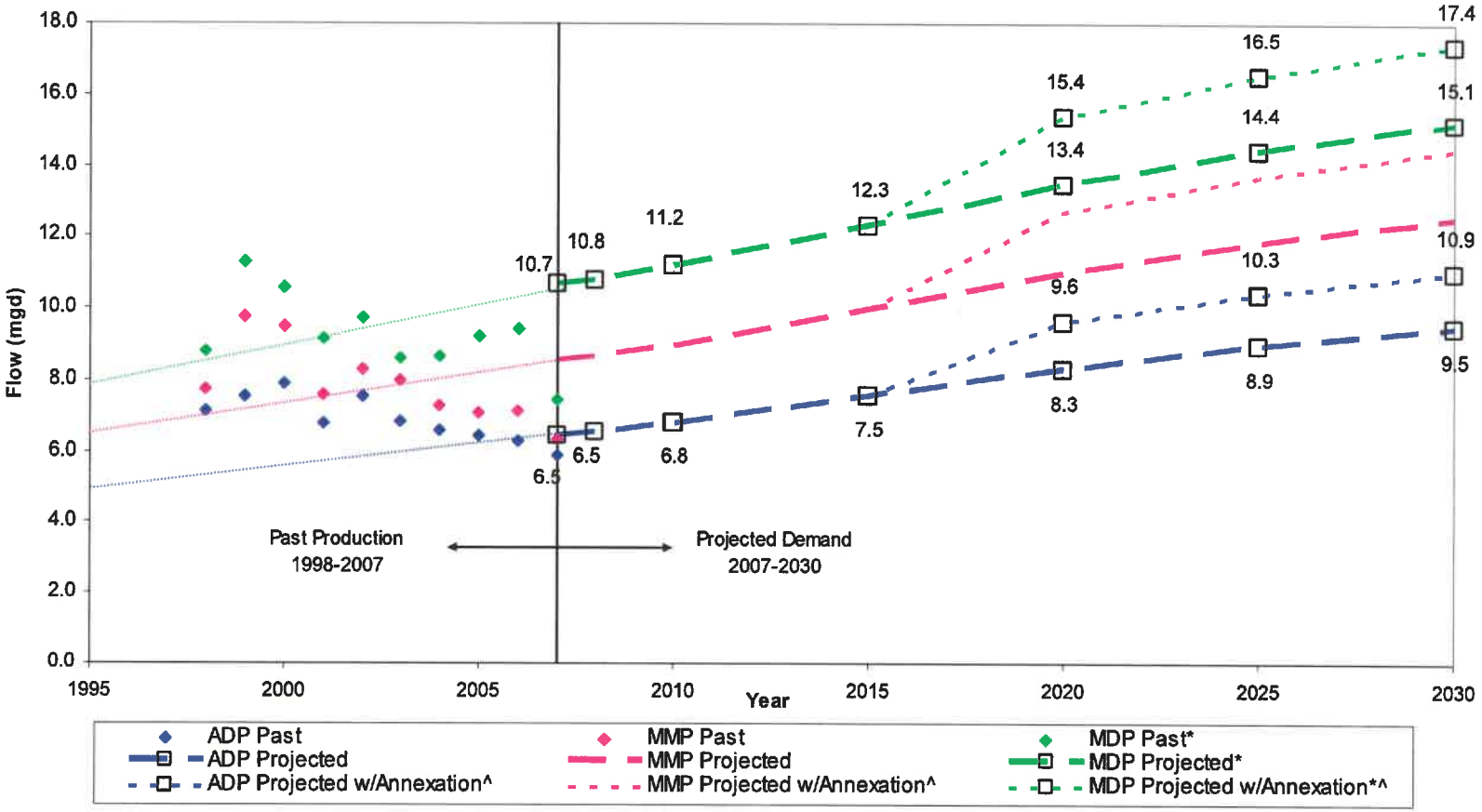
Figure 4-4: Projected Increase in Daily Flow by 2030

Table 4-10.
Average-Day Finished Water Demand Projections

Year	City's Service Area Population Projections	Average-Day Finished Water Demand Projections (mgd)		City's Service Area Population Projections with Annexed Areas[1]	Average-Day Finished Water Demand Projections with Annexed Areas (mgd)
2006[2]	61,257	6.29		61,257	6.29
2007	62,487	6.46		62,487	6.46
2008	62,929	6.54		62,929	6.54
2010	65,273	6.79		65,273	6.79
2015	70,846	7.54		70,846	7.54
2020	76,771	8.29		88,010	9.60
2025	81,787	8.94		94,029	10.35
2030	85,526	9.45		98,455	10.94

1. This service area population assumes that the annexed portions of the City are incorporated into the service area between 2015 and 2020.

2. The demand for 2006 is the actual metered water consumption based on the City's billing records.



*All Maximum-day demands assume a max-day peaking factor of 1.50 and a fire flow of 1 MGD.
^All Annexation demands assume inclusion of the entire City of Lauderhill into the service area by 2020.

Figure 4-5: Past and Projected Finished Water Demands

4.3. Projected Maximum-Day and Maximum-Month Water Demands

A maximum-day peaking factor of 1.5 and a maximum-month peaking factor of 1.3 were used to estimate the maximum-day and maximum-month daily water demands of the City's service area. Both peaking factors were introduced in Section 3.5 (see Figure 3-6). The City's maximum-day demand was estimated as the sum of the City's service area maximum-day demand (1.5 times retail annual average) and a 1.0 mgd fire flow. The City's maximum-month demand was estimated as the product of 1.3 (maximum-month peaking factor corresponding to the 1.5 maximum-day peaking factor) and the average-day demand. The average-day, maximum-day, and maximum-month finished water demand projections for the City thus estimated are presented in Table 4-11 and Table 4-12, and also illustrated in Figure 4-5.

The projections show that the maximum-day water demand is expected to increase by approximately 4.7 mgd between 2006 and 2030. If the service area is expanded, the maximum-day requirements may increase by 7 mgd in the same period. Based on the City's current WUP and the Water Availability Rule, this amount of water is not available to the City. The specific capacity expansions required to meet these needs will be addressed in Section 5.

Table 4-11.
Forecasted Average-Day, Maximum-Month and Maximum-Day Finished Water Demand Projections

	Finished Water Forecasted Demand (mgd)		
Year	Average-Day	Maximum-Month	Maximum-Day (includes 1 mgd fire flow)
2006[1]	6.29	8.31	10.41
2007	6.46	8.53	10.66
2008	6.54	8.63	10.78
2010	6.79	8.96	11.16
2015	7.54	9.96	12.28
2020	8.29	10.95	13.41
2025	8.94	11.79	14.37
2030	9.45	12.48	15.14

1. The demand for 2006 is the actual metered water consumption based on the City's billing records.

Table 4-12.
Forecasted Average-Day, Maximum-Month and Maximum-Day Finished Water Demand Projections with Annexed Portion of City

	Finished Water Forecasted Demand (mgd)		
Year	Average-Day	Maximum-Month	Maximum-Day (includes 1 mgd fire flow)
2006[1]	6.29	8.31	10.41
2007	6.46	8.53	10.66
2008	6.54	8.63	10.78
2010	6.79	8.96	11.16
2015	7.54	9.96	12.28
2020	9.60	12.67	15.35
2025	10.35	13.66	16.48
2030	10.94	14.44	17.37

1. The demand for 2006 is the actual metered water consumption based on the City's billing records.

This page intentionally left blank

5. Capacity Adequacy Assessment

Based on the projected finished water demands and the characterization of the City's water utility facilities presented in the previous three sections, this section evaluates the adequacy of the water supply facilities and introduces the water treatment facilities expansion schedules. The discussions in this section aid in the development of the 5-year Capital Improvement Plan (CIP) presented in Section 6.

5.1. Water Treatment Capacity Evaluation

To ensure continuous delivery of water during peak demands, the expansion of the WTP treatment capacities are based on the maximum-day water demand projections presented in Section 4.

The treatment capacity of the City's WTP is limited by the raw water available for withdrawal. As previously mentioned, the SFWMD is limiting the amount of water that can be withdrawn from the Biscayne Aquifer wells to the maximum 12-month running average during the five-year period preceding April 1, 2006. For the City, this base condition water use is 7.70 mgd (See Appendix A). This withdrawal limits the treatment capacity of the City's lime softening plant. In order to translate this annual average raw water withdrawal to maximum-day finished water capacity, two calculations are performed.

1. 7.70 mgd is multiplied by the maximum-day peaking factor associated with the three-year maximum-month peaking factor established in Section 3:

$$7.70\ mgd \times 1.22 = 9.39\ mgd$$

2. The City experiences an average treatment loss of approximately 5%, so only 95% of the raw water withdrawn will be available as finished water:

$$9.39\ mgd \times 0.95 = 8.92\ mgd$$

Therefore, the 7.70 mgd raw water allocation limits the existing WTP treatment capacity to approximately 8.9 mgd. Since no more Biscayne Aquifer water will be allocated to the City, the deficit of the 8.9 mgd treatment capacity to the projected maximum-day demand will be made up by alternative sources, mainly Floridan Aquifer water treated using reverse osmosis (RO). Each new RO train adds approximately 2 mgd of finished water treatment capacity. Using the 8.9 mgd calculated above as a base, the treatment capacity will increase at 2 mgd increments. The timing of these expansions is driven by the maximum-day projections. Accordingly, the list below shows the expected treatment

capacities for the City, including the current capacity and expansions. These values are illustrated in Figure 5-1:

- 9.9 mgd existing treatment capacity as the finished water equivalent of the raw water allocation in the current WUP, based on the max-day peaking factor that correlates to the max-month peaking factor implied in the WUP
- 8.9 mgd base treatment capacity in 2009 due to the Water Availability Rule
- 12.9 mgd, after 4.0 mgd RO expansion (Trains A and B) by 2010
- 14.9 mgd, after 2.0 mgd RO expansion (Train C) by 2018

The historic maximum-day productions and projections show that the City is currently at a treatment capacity deficit relative to the one-in-ten year maximum-day demand. Therefore, the 4.0 mgd expansion by 2010 is critical to ensure adequate performance of the City's water utility. Furthermore, the capacities depicted above do not include the incorporation of the annexed portion of the City into the distribution area. Should this incorporation occur, the capacity expansions needed after 2010 are expected to be as follows, depicted by dashed lines in Figure 5-1:

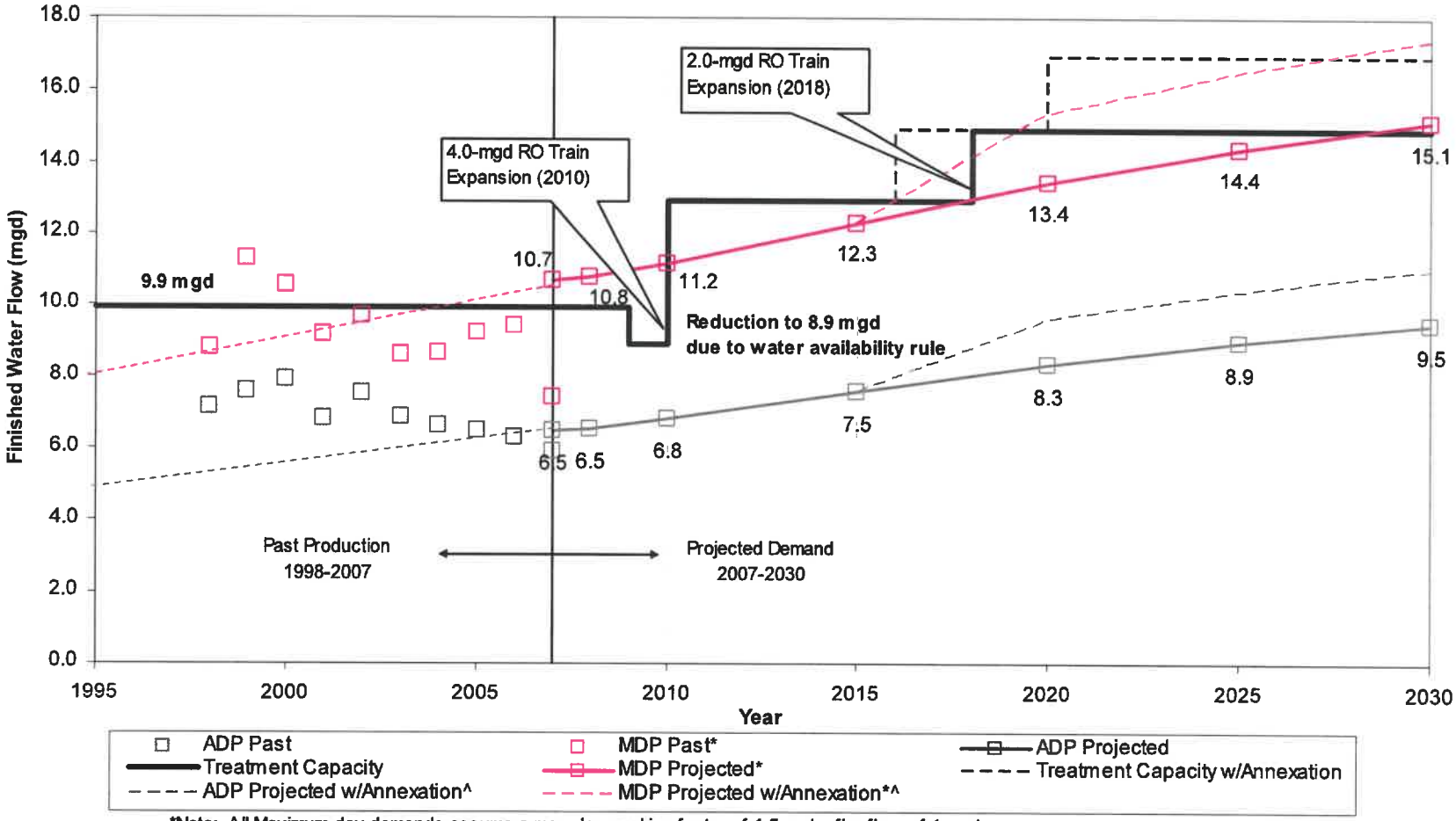
- 14.9 mgd, after 2.0 mgd RO expansion (Train C) by 2016
- 16.9 mgd, after 2.0 mgd RO expansion (Train D) by 2020

It is important to note that the expansions to occur after 2012 are not included in the 5-year CIP. Further evaluations must be done in the future to determine the need for these and any additional necessary expansions.

5.2. Raw Water Capacity Evaluation

As previously mentioned, any capacity needed by the City beyond the 7.70 mgd annual average withdrawal will likely be made up by water from future wells in the Floridan Aquifer. The maximum-day Biscayne finished water production capacity (8.9 mgd) and the City's projected maximum-day demand are used to estimate the total Floridan raw water flow rate and the total number of Floridan wells needed to supplement the finished water production.

Table 5-1 shows the estimates for raw water needed from the Floridan Aquifer. The finished water production needed from the Floridan Aquifer is the difference between the total maximum-day projected demand and the Biscayne finished water production. This finished water demand is converted to raw water needed by accounting for treatment losses. For RO, treatment efficiency is typically 80%, so the finished water demand is divided by 0.80 to estimate raw water. Without the incorporation of the annexed portion of the City into the service area, the City will need the capacity for 7.78 mgd of raw water



*Note: All Maximum-day demands assume a max-day peaking factor of 1.5 and a fire flow of 1 mgd.
All Annexation demands assume inclusion of the entire City of Lauderhill into the service area by 2020.

Figure 5-1: Maximum-Day Water Demand Forecast and Treatment Capacity Expansions

Table 5-1.
Estimate of Needed Raw Water from the Floridan Aquifer

Part A: Requirements without Annex incorporation into service area

ID/Computation	Description of Flow Rate (mgd)	2008	2009	2010	2015	2020	2025	2030
(1)	Maximum-day finished water demand	10.78	11.04	11.16	12.28	13.41	14.37	15.14
(2)	Maximum-day Biscayne finished water production	9.90	8.92	8.92	8.92	8.92	8.92	8.92
(3)=(1)-(2)	Max-day finished water required from Floridan Aquifer	0.88	2.12	2.24	3.36	4.49	5.45	6.22
(4)=(3)/0.80	**Max-day Floridan Raw Water required**	**1.10**	**2.65**	**2.80**	**4.21**	**5.61**	**6.81**	**7.78**

Part B: Requirements with Annex incorporation into service area

ID/Computation	Description of Flow Rate (mgd)	2008	2009	2010	2015	2020	2025	2030
(1)	Maximum-day finished water demand	10.78	11.04	11.16	12.28	15.35	16.48	17.37
(2)	Maximum-day Biscayne finished water production	9.90	8.92	8.92	8.92	8.92	8.92	8.92
(3)=(1)-(2)	Max-day finished water required from Floridan Aquifer	0.88	2.12	2.24	3.36	6.43	7.56	8.45
(4)=(3)/0.80	**Max-day Floridan Raw Water required**	**1.10**	**2.65**	**2.80**	**4.21**	***8.04***	***9.45***	***10.56***

Notes for rows above:

(1) The maximum-day forecast is based on the per capita demand in each TAZ, population growth by TAZ, and the additions of the Swap Shop, TOC, and annexed portion of the City to the service area. The maximum-day peaking factor used for the demand is 1.5. This approach is described fully in Section 4.

(2) The maximum-day finished water production capacity of the Biscayne Aquifer is determined by the expected average allocation, max-day peaking factor of 1.2, and treatment efficiency of 95%. These calculations can be found on page 5-1. The 2008 values are based on the existing WUP.

(3) This value is the difference between the maximum-day finished water demand and the Biscayne finished water production.

(4) Raw water required from the Floridan Aquifer as it relates to the finished water required. The RO treatment process for Floridan Aquifer water has an assumed efficiency of 80%.

from the Floridan Aquifer by 2030. Should the City incorporate the annexed area into the service area, the needed withdrawal capacity will be 10.56 mgd. It is important to note that these estimates do not include reduction in demand due to factors such as conservation and non-revenue water reduction, which will reduce the raw water needed. As the City develops and implements such policies, the raw water projections may be revisited.

These capacity requirements will be fulfilled by the installation of Floridan Aquifer wells. A typical production capacity of Floridan wells is approximately 1,000 gpm, or 1.44 mgd. Since the treatment efficiency of RO is approximately 80%, the equivalent finished water capacity of each well is approximately

$$1.44\ mgd * 0.80 = 1.15\ mgd\ .$$

The Floridan well expansions will occur to coincide with the completion of the treatment facility expansions described in Section 5.1. The first expansion, to be completed by 2010, will include five total Floridan wells. Two wells will supply each of the 2.0 mgd RO trains, and the fifth well will be a redundant well. Due to the number of wells needed in this expansion, it is anticipated that the expansion will occur over two years, 2009 and 2010. The expansion in 2018 will include two additional wells; the 8.6 mgd of raw water expected to be supplied by the six production wells will be sufficient for the three 2.0 mgd RO trains and will meet finished water needs until after 2025. Therefore, the maximum-day raw water capacities of the City will be as described below and as shown in Figure 5-2. Please note that the total raw water capacity will be the sum of the Biscayne and Floridan raw water capacities.

Assuming no incorporation of annexed area:

- 10.4 mgd existing Biscayne raw water withdrawal as limited by the existing WUP
- 9.4 mgd estimated base Biscayne raw water withdrawal in 2009 due to Water Availability Rule
- 5.8 mgd firm/7.2 mgd total Floridan raw water capacity by 2010, 4 new Floridan wells for RO Trains A and B, plus 1 new redundant well (5 total Floridan wells)
- 8.6 mgd firm/10.1 mgd total Floridan raw water capacity by 2018, 2 new Floridan wells for RO Train C (7 total Floridan wells)

Assuming incorporation of annexed area (expansions beyond 2010/RO Trains A and B):

- 8.6 mgd firm/10.1 mgd total Floridan raw water capacity by 2016, 2 new Floridan wells for RO Train C (7 total Floridan wells)
- 11.5 mgd firm/13.0 mgd total Floridan raw water capacity by 2020, 2 new Floridan wells for RO Train D (9 total Floridan wells)

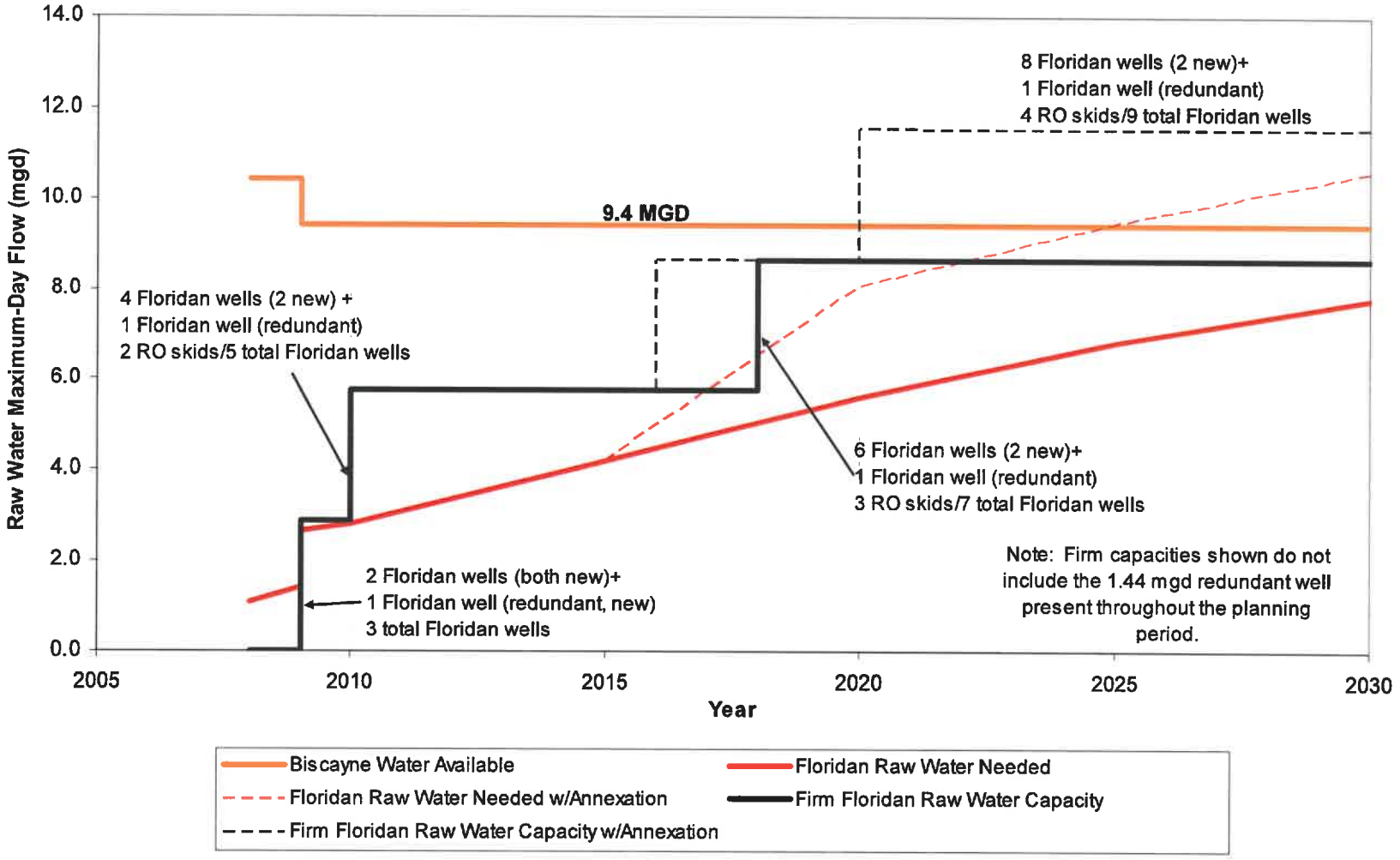


Figure 5-2: Maximum-Day Raw Water Firm Capacity and Expansions

As with the treatment capacity expansions, the Floridan wells to be complete by 2010 are crucial in maintaining the City's ability to provide water under maximum-day conditions. Additionally, the raw water provided by the wells is typically higher than what is needed to supply to RO trains to account for the decreased production of the wells over time. Finally, it is also important to note that a deep injection well must be installed for concentrate disposal. This should be done in concert with either the installation of the first Floridan wells or the construction of the new RO facility.

5.3. Alternative Water Sources

One concern of the City is the ability to complete the raw water and treatment capacity stages in the initial years of the planning period before the current permitted capacity is exceeded. While every effort will be made by the City to meet the projected demands by adhering to the schedule of expansions presented above, alternative sources must be considered as a contingency.

In particular, the City will likely request a temporary allocation of additional Biscayne Aquifer water in the upcoming WUP renewal application. The SFWMD will request a particular set of information from the City and, based on their analysis, an amount of water above what will be permitted based on the Water Availability Rule may be granted to the City for a period not exceeding five years. This temporary allocation would allow the City to meet demands by using the existing raw water capacity and treatment capacity at the City's WTP while the necessary expansions for withdrawing and treating Floridan Aquifer water are put into place.

Another option the City will consider is entering into one or more agreements with neighboring utilities for the purchase of finished water. As described in Section 2, the City currently has interconnects with the Cities of Sunrise, Tamarac and Plantation, as well as BCWWS. With the infrastructure already in place, these utilities are the best candidates for finished water purchase negotiations. Similar to a temporary Biscayne allocation, an agreement to purchase water from another utility will likely have a set time frame due to increasing demands throughout Broward County. Additionally, the City will consider the financial implications of this option; as purchased water is typically more expensive than water a utility treats itself.

5.4. Storage Capacity Evaluation

According to the Florida Administrative Code (FAC) 62-555, finished water storage needs are determined by storage required for operational equalization to meet peak-hour water demand and storage to meet fire flow requirements. For utilities such as the City's, fire flow storage is estimated to be approximately 1 MG in order to supply 3,500 gpm sustained for three hours. The equalization storage is estimated using the following two methodologies provided by the FDEP:

- FDEP Criterion 1: Multiply the projected maximum-day water demand by 25%.
- FDEP Criterion 2: Demonstrate sufficient storage available to sustain peak-hour flows beyond treatment plant capacity for 4 hours.

Table 5-2 shows these criteria as they relate to the treatment capacities and projected demands throughout the planning horizon. The storage needs based on Criterion 1 are the sum of 25% of the maximum-day demand and 1 MG fire flow storage. Since the maximum-day projections constantly increase, the storage needs under Criterion 1 constantly increase as well. For Criterion 2, the storage needs are calculated as follows:

$$(PHD - TPC) \times 4 \frac{hours}{day} + 1MG\,fire\,flow, \text{ where}$$

PHD = Peak-hour demand in mgd, which is estimated as 2.5 times the average demand[1]
TPC = Planned treatment plant capacity in mgd (see Section 5.1)

These storage needs fluctuate because the difference between the peak-hour flow and treatment capacity decreases when planned treatment capacity expansions occur.

To determine the finished-water storage capacity expansions, the projected storage needs are compared with the existing useful storage capacity. Currently, the City has two 3-MG ground storage tanks at the WTP and one 2-MG ground storage tank in the distribution system, for a total of 8 MG. However, a portion of the storage capacity at the WTP is typically reserved for disinfection contact time.[2] It is expected that the planned disinfection system upgrades at the WTP will eliminate the need to reserve ground storage tank capacity for disinfection. However, since the disinfection upgrades have not yet occurred, 50% of the plant's ground storage capacity (3 MG) has been removed from the operational value for the purpose of this evaluation. Therefore, the storage capacity available to the City to meet the FDEP criteria is 5 MG (3 MG at the WTP + 2 MG in the distribution system ground storage tank).

[1] 2.5 is the AWWA standard peak-hour to average-day peaking factor.
[2] FAC 62-555.320 requires 4-log virus reduction on account of the utilization of uncovered tanks in the treatment process, which could render the water supply vulnerable to contamination. Out of the 4-log virus reduction requirement, the City receives 2-log removal credit for its use of filtration. Consequently, the remaining 2-log virus reduction must be achieved via disinfection. The capacity that must be reserved for disinfection is dynamic and varies with flow, disinfectant type, and residual level, as well as water temperature and pH.

Table 5-2.
Peak-Hour Demands and Finished Water Storage Needs

Part A: Requirements without Annex incorporation into service area

Year[1]	Peak Hour Demand (PHD, mgd)[2]	Planned Treatment Plant Capacity (TPC, mgd)	Storage Needs (MG)	
			FDEP Criterion 1[3]	FDEP Criterion 2[4]
2008	16.44	9.9	3.4	2.1
2009	16.78	8.9	3.5	2.3
2010	16.97	12.9	3.5	1.7
2015	18.86	12.9	3.8	2.0
2018	19.82	14.9	4.0	1.8
2020	20.73	14.9	4.1	2.0
2025	22.34	14.9	4.3	2.2
2030	23.63	14.9	4.5	2.5

Part B: Requirements with Annex incorporation into service area (after 2015)

Year[1]	Peak Hour Demand (PHD, mgd)[2]	Planned Treatment Plant Capacity (TPC, mgd)	Storage Needs (MG)	
			FDEP Criterion 1[3]	FDEP Criterion 2[4]
2016	19.88	14.9	4.0	1.8
2020	23.99	16.9	4.6	2.2
2025	25.87	16.9	4.9	2.5
2030	27.35	16.9	5.1	2.7

1. Years shown are 5-year intervals and those years with capacity expansions. For Part B, only the years after 2015 are shown because the values for 2008-10 are the same for Parts A and B.
2. PHD is estimated as 2.5 x average-day production.
3. This storage criterion is calculated as 25% of the maximum-day production plus 1 MG fire flow.
4. This storage criterion is calculated as (PHD-TPC) x 4 hours + 1 MG fire flow.

Figure 5-3 shows the comparison of the storage needs and existing storage. The storage requirements under FDEP Criterion 1 are compared to the overall useful storage capacity of the utility, which is 5 MG. In the situation that the City's service area remains the same, the storage requirements will increase from approximately 3.4 MG to 4.5 MG by 2030, meaning that the storage is sufficient. If the annexed portion of the City is added to the service area, the storage requirements will increase to 5.1 MG, which is 0.1 MG above the current useful storage capacity. In this case, an expansion of storage will only be necessary if demand reductions are not realized and the full 3 MG of the storage at the WTP must be reserved for disinfection.

The storage requirements under FDEP Criterion 2 are comparable to the storage available in the distribution system, which for the City is 2 MG. If the City's service area is not expanded, the storage needs will vary between 1.7 MG and 2.5 MG throughout the planning horizon. If the City's service area is expanded to include the annexed area, the maximum storage requirement under this Criterion may be as high as 2.7 MG. These requirements are approximately half of the overall useful storage capacity, which is equivalent to the remote storage capacity alone. Therefore, according to the two FDEP criteria, a capacity expansion is not required over the anticipated 20-year planning horizon because of the ample storage available at the WTP. Nonetheless, it is recommended that the operation of these storage facilities along with their associated pump stations be hydraulically evaluated, using a distribution system model, under different water demand conditions and fire flow scenarios to confirm that storage is operationally adequate.

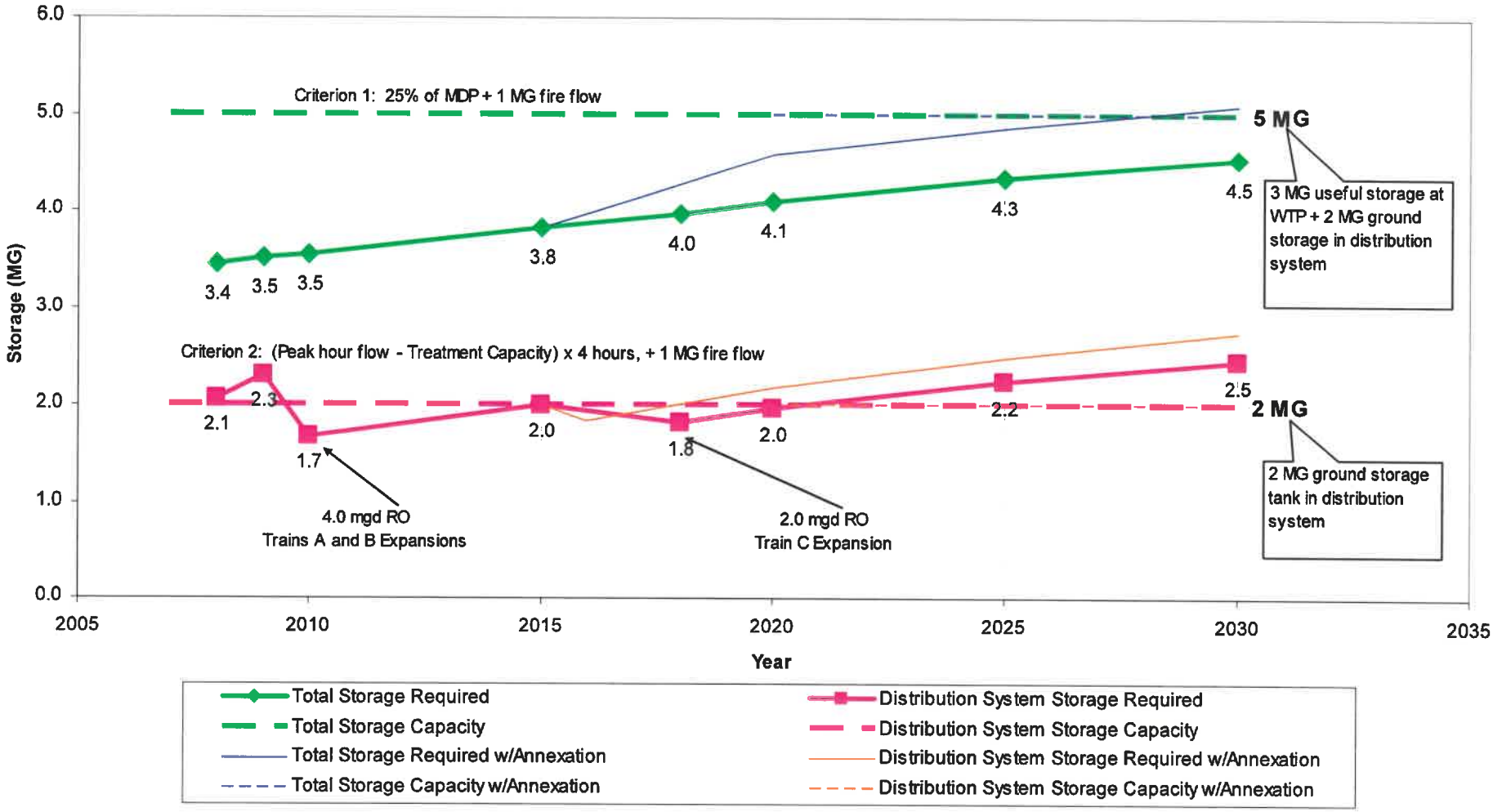


Figure 5-3: Storage Capacity Requirements and Expansions

This page intentionally left blank.

7. Goals, Objectives, and Policies

This section includes an assessment of current Goals, Objectives, Policies (GOPs) and identifies any new or revised GOPs needed to implement the work plan. For ease of identification, edits are provided in track changes.

Goals, Objectives, and Policies (GOPs) which address water supply sources and facilities, as well as conservation and reuse programs, are discussed in this section. The GOPs presented in this section were derived from the City's comprehensive plan including the following plan elements: Future Land Use, Infrastructure, Conservation, Capital Improvements, and Intergovernmental Coordination. An assessment of current GOPs found in the plan and identification of new or revised GOPs will be presented in this section as well.

7.1. Future Land Use

Goal: The City Commission shall provide for a distribution of land use by type, density, and intensity to meet the needs of the current and future resident and seasonal population in a manner that; promotes a land use pattern that supports a multimodal transportation system; with an emphasis on pedestrianways and walkability; protects and improves the natural and physical characteristics of the City and ensures the timely and cost-effective provision of public facilities and services.

Objective 2.3: **Public Facilities, Phase Growth, & Concurrency.** Phase growth and coordinate future land uses, consistent with the provision of adequate community and regional services and facilities~~, through at least December 31, 2005~~2013~~~~.

- *Policy 2.3.1* – **Concurrency.** The City of Lauderhill shall ensure that regional and municipal facilities and services are available concurrent with the impacts of development and that facilities that provide utility service to various land uses are authorized at the same time land uses are authorized, through the implementation of a concurrency management system, that conditions the approval of plats, site plans, and building permits, upon the availability of facilities and services, which meet the adopted level-of-service standards for local roadways, wastewater, potable water supply, drainage/aquifer recharge, solid waste, fire, and parks.

    - *Subpolicy 2.3.1.3* – ~~Future Land Use Element~~ **Potable Water Supply.** The level-of-service standard for potable water supply shall be the South Florida Water Management District's consumptive use permit allocation. Prior to approval of a building permit or its functional equivalent, the City will consult

with the water supplier to determine whether adequate water supplies to serve the new development will be available no later than the anticipated date of issuance of a certificate of occupancy or its functional equivalent.

- *Subpolicy 2.3.1.4* – **Ten-Water Supply Facilities Plan.** The City shall implement the recommendations of the Ten-year Water Supply Facilities Plan for 2008. The City shall update the plan every five years consistent with the update of the South Florida Water Management District's Lower East Cost Regional Water Supply Plan and may update the plan periodically to respond to changes in local conditions.

- *Subpolicy 2.3.1.45* – **Drainage & Aquifer Recharge.** The level-of-service standard for drainage and aquifer recharge shall be as follows:

1. **Road Protection.** Residential streets not greater than fifty feet wide rights-of-way to have crown elevations no lower than the elevation for the respective area depicted on the Broward County ten-year "Flood Criteria Map".

2. **Building.** To have the lowest floor elevation no lower than the elevation for the respective area depicted on the Broward County "100 Year Flood Elevation Map," or the Federal Emergency Management Agency Base Flood Elevation, whichever is higher.

3. **Off Site Discharge.** Not to exceed the inflow limit of South Florida Water Management District primary receiving canal or the City's conveyance system, whichever is less.

4. **Storm Sewers.** Design frequency minimum to be three-year rainfall intensity of the State Department of Transportation Zone 10 rainfall curves.

5. **Flood Plain Routing.** Calculated flood elevations based on the ten-year and one hundred-year return frequency rainfall of three-day duration shall not exceed the corresponding elevations of the Broward County ten-year "Flood Criteria Map" and the "100-Year Flood Elevation Map."

6. **Antecedent Water.** The higher elevation of either the control level elevation or the elevation depicted on the Broward County "Average Wet Season Water Levels Map."

7. **On-Site Storage.** Minimum capacity above antecedent water level and below flood plain routing elevations to be design rainfall volume minus off site discharge occurring during design rainfall.

8. **Best Management.** Prior to discharge to surface or ground water, the Best Management Practices of the South Florida Water Management District, shall be used to reduce pollutant loading from stormwater runoff.

- *Subpolicy 2.3.1.~~6~~7* – **Fire Protection.** The fire protection level-of-service standard shall be as follows:

1. **Low (5) Residential, Recreation & Open Space, and Conservation.** In the Low (5) Residential, Recreation and Open Space, and Conservation future land use designations, the maximum fire hydrant spacing shall be 650 feet, with all portions of each structure located within a maximum of 325 feet from the nearest hydrant; the minimum water flow shall be 1,000 gallons per minute; and, the minimum pipe size shall be six (6) inches. If permanent structures greater than 500 square feet are constructed in the Recreation and Open Space and Conservation future land use designations, the fire hydrant spacing and flow requirements shall be determined by the Director of the Department of Environmental and Engineering Services.

2. **Low-Medium (10) Residential.** In the Low-Medium (10) Residential future land use designation, the maximum fire hydrant spacing shall be 500 feet, with all portions of each structure located within a maximum of 150 feet from the nearest hydrant; the minimum water flow shall be 1,500 gallons per minute; and, the minimum pipe size shall be eight (8) inches.

3. **Medium (20) Residential, Medium-High (25) Residential, High (50) Residential, Commercial, Community Facilities, Commercial Recreation, Employment Center – High, Employment Center – Low, Office Park, & Regional Activity Center.** In the Medium (20) Residential, Medium-High (25) Residential, High (50) Residential, Commercial, Community Facilities, Commercial Recreation, Employment Center – High, and Employment Center – Low, Office Park, and Regional Activity Center future land use designations, the maximum fire hydrant spacing shall be 300 feet, with all portions of each structure located within a maximum of 150 feet from the nearest hydrant; the minimum water flow shall be 3,000 gallons per minute; and, the minimum pipe size shall be eight (8) inches.

4. **Industrial and Utility.** In the Industrial and Utility future land use designations, the maximum fire hydrant spacing shall be 300 feet, with all portions of each structure located within a maximum of 150 feet from the nearest hydrant; the minimum water flow shall be 2,500 gallons per minute; and, the minimum pipe size shall be eight (8) inches.

5. **Transportation.** In the Transportation future land use designation, uses shall not be subject to fire protection concurrency, with the exception of permanent structures greater than 500 square feet, which shall be subject to fire hydrant spacing and flow requirements, as determined by the Director of the Department of Environmental and Engineering Services.

- *Subpolicy 2.3.1.~~7~~8 – Parks.* The community parks level-of-service standard shall be three (3) acres per every 1,000 existing and projected permanent and seasonal residents, with the acreage used to meet this requirement as set forth in Subpolicy 2.1.4.3.

- *Subpolicy 2.3.1.~~8~~9 – Regional Services & Facilities.* Prior to the approval of a site plan, plat, or building permit, the adopted level of service standards for regional roadways, public transit, parks, and solid waste, shall have been met, in accordance with the provisions of the Broward County Comprehensive Plan.

- *Subpolicy 2.3.1.~~9~~10 – Development Permits.* Development permits granted by the City of Lauderhill shall be consistent with the criteria in the Broward County Land Use Plan's, Plan Implementation section's, Development Review Requirements subsection, as contained within Objective 2.26 and associated policies of the Lauderhill Comprehensive Plan.

- *Subpolicy 2.3.1.~~10~~11 Public Transit, Bikeways, & Pedestrianways.* The Planning and Zoning Department shall provide recommendations regarding the adoption of level-of-service standards for public transit, bikeways, and pedestrianways through the Evaluation and Appraisal Report-based amendments to the Transportation Element.

7.2. Infrastructure

Goal: To assure that public facilities are provided which will protect the investments and rights of the City property owners and establish standards which will promote orderly growth.

Objective 1.1: ~~By November 30, 1989,~~ The City shall continue ~~through the year 2013~~ to implement procedures that will ensure adequate facility capacity is available prior to the issuance of a development order.

- *Policy 1.1.5* – The City shall reduce the per capita potable water demand from 110 gallons per day to 100 gallons per day by the year 2010 through the following:

    1. Developing and implementing a water conservation strategy, in accordance with the recommendations of the 2008 Ten-year Water Supply

Facilities Work Plan, by December 31, 2007~~9~~ that may include, but is not limited to, requiring irrigation systems to have rain sensors, increased use of native plants, tiered water rates that deter excessive water use, water restrictions, irrigation system maintenance, replacing leaky pipes, and public education campaigns.

2. The Planning and Zoning Department, in coordination with the Department of Environmental and Engineering Services, shall submit a report to the City Manager by January 31st of each year documenting the status of water supply, water use, and water conservation measures.

Goal: The City of Lauderhill will regulate or provide the services of: Sanitary Sewer, Potable Water, Solid Waste, and Drainage-Natural groundwater aquifer recharge, to meet existing and projected needs.

Objective 2.1: Existing deficiencies shall be corrected by the year ~~1991~~ 2013, by completing the following projects:

Sanitary Sewer:

A continuous sanitary pipe sealing and monitoring program shall be maintained to reduce the Inflow/Infiltration of surface and non-sewage product.

Potable Water

~~No deficiencies exist.~~ Existing and projected deficiencies shall be addressed by implementing the 2008 Ten-year Water Supply Facilities Plan.

Solid Waste

No deficiencies exist.

Drainage-Natural Groundwater Recharge

No deficiencies exist.

Objective 2.2: The City will coordinate its water supply planning activities with the South Florida Water Management District ~~through at least 2013~~.

- *Policy 2.2.1* – The City shall coordinate its 2008 Ten-year Water Supply Plan with the South Florida Water Management District's Lower East Coast Regional Water Supply Plan 2005-2006 Update.

- *Policy 2.2.2* – The City shall update the 2008 Ten-year Water Supply Facilities Work Plan in five years consistent with the update of the South Florida Water Management

District's Lower East Coast Regional Water Supply Plan 2005-2006 Update and may update the plan periodically to respond to changes in local conditions.

- *Policy 2.2.3* – The 2008 Ten-year Water Supply Facilities Work Plan and the City of Fort Lauderdale's 2008 Ten-Year Water Supply Facilities Work Plan are incorporated into the Infrastructure Element by reference.

- *Policy 2.2.4* – As required by the City's 2008 Ten-year Water Supply Facilities Work Plan, develop and implement a water conservation plan taking into consideration the Conserve Florida Guide recommendations, by December 31, 2009. The Water Conservation Plan shall identify the water conservation programs and activities that can be implemented immediately and include policies outlining the specific programs and activities the City will undertake to implement conservation measures that will take more time to implement.

7.3. Conservation

Goal: To conserve and protect the air, water and natural resources within the City of Lauderhill, while reducing the utilization of potable water through the implementation of conservation measures and best management practices.

Objective 2: The City will ~~prepare standards~~ continue to conserve and protect the surface and groundwaters ~~through December 31, 2013~~.

- *Policy 2.1* – ~~The City shall by the year 1991, conduct a study of all the surface waters as to environmental condition and water quality.~~ The City shall continue to cooperate with the South Florida Water Management District to enforce emergency water conservation measures during droughts.

- *Policy 2.2* – The City shall maintain an annual update of the State and County agencies that regulate the surface and groundwater within the City.

- *Policy 2.3* – As required by the City's 2008 Ten-year Water Supply Facilities Work Plan, develop and implement a water conservation plan, ~~in accordance with the 2008 Ten-year Water Supply Facilities Work Plan and~~ taking into consideration the Conserve Florida Guide recommendations, by December 31, 2009. The Water Conservation Plan shall identify the water conservation programs and activities that can be implemented immediately and include policies outlining the specific programs and activities the City will undertake to implement conservation measures that will take more time to implement.

7.4. Capital Improvements

Goal: The City of Lauderhill shall establish methods to adequately supply public facilities

for the existing and future population while protecting investments in existing facilities by practicing sound fiscal policies.

Objective 1.1: The City of Lauderhill shall provide capital improvements which meet the needs of correct deficiencies, supply requirements for future growth, and to replace worn-out or obsolete facilities.

- *Policy 1.1.6* – The City shall incorporate the recommendations of the 2008 Ten-year Water Supply Facilities Work Plan into the five-year schedule of capital improvements.

7.5. Intergovernmental Coordination

Goal: To ensure that the City of Lauderhill initiates and participates in the most comprehensive manner in support of the processes and procedures necessary for the efficient and effective inter-jurisdictional coordination of development activities and in the production and provision of public services.

Objective 1.1: The City of Lauderhill shall coordinate the Comprehensive Plan and its implementation with adjacent cities, adjacent areas of Broward County and with governments and agencies/jurisdictions in the South Florida region, Broward County, the State and with the Federal government.

- *Policy 1.1.10* – The City shall coordinate its water supply planning activities with the South Florida Water Management District ~~through at least 2013~~.
- *Policy 1.1.11* – Ensure continuous and ongoing planning and intergovernmental coordination on water supply issues between the City and its water supply providers, which include Broward County and the City of Fort Lauderdale, through the following processes:
    - The City shall submit Future Land Use Map amendments to the appropriate water supplier for review.
    - The City shall coordinate with Broward County and the City of Fort Lauderdale on updates to each respective jurisdiction's Ten-year Water Supply Facilities Work Plans.

This page intentionally left blank

Appendix A

City of Lauderhill Historic Raw Water Consumption

Table A-1.
City of Lauderhill Historic Raw Water Withdrawal from 2001 through 2007

Month/Parameter (mgd)		YEAR						
		2001	2002	2003	2004	2005	2006	2007
January	ADW	9.33	8.41	8.19	7.55	7.78	7.15	7.18
	MDW	7.07	7.56	7.58	7.02	6.88	6.67	6.25
February	ADW	7.99	8.00	8.67	7.22	8.42	7.20	7.05
	MDW	7.34	7.23	7.76	6.88	7.31	6.54	6.15
March	ADW	7.91	8.36	8.63	8.02	7.90	7.53	7.67
	MDW	7.13	7.43	8.07	7.10	7.12	7.18	6.46
April[1]	ADW		8.95	7.99	8.34	7.81	8.12	7.11
	MDW		7.84	7.28	7.16	7.41	7.50	6.31
May	ADW	6.59	9.78	8.26	8.93	7.87	7.27	6.57
	MDW	5.17	8.39	6.92	7.62	7.15	8.81	5.93
June	ADW	7.91	8.29	6.98	8.60	6.88	7.20	7.08
	MDW	5.69	7.27	6.55	7.73	6.04	6.27	5.52
July	ADW	6.72	7.90	7.89	8.49	7.58	6.90	6.18
	MDW	6.18	7.11	7.20	7.46	6.61	5.98	5.59
August	ADW	7.67	8.58	6.88	7.59	7.78	6.93	7.43
	MDW	6.54	7.66	6.52	6.67	6.68	6.07	5.97
September	ADW	8.00	8.34	7.76	7.07	7.46	6.90	6.94
	MDW	6.77	7.90	6.56	5.92	6.21	5.78	6.01
October	ADW	7.92	8.44	7.70	7.63	11.04	7.48	7.21
	MDW	6.82	7.65	7.09	6.36	6.23	6.79	5.81
November	ADW	8.00	8.54	7.60	7.65	7.40	6.37	7.10
	MDW	7.32	7.68	6.81	6.94	6.13	6.90	5.96
December	ADW	8.16	7.95	7.37	7.54	7.12	7.14	7.21
	MDW	7.66	7.47	6.85	7.12	6.24	6.27	6.16
Annual	ADW	7.84	8.46	7.83	7.88	7.92	7.18	7.06
	MDW	7.66	8.39	8.07	7.73	7.41	8.81	6.46
	MMW	9.33	9.78	8.67	8.93	11.04	8.12	7.67

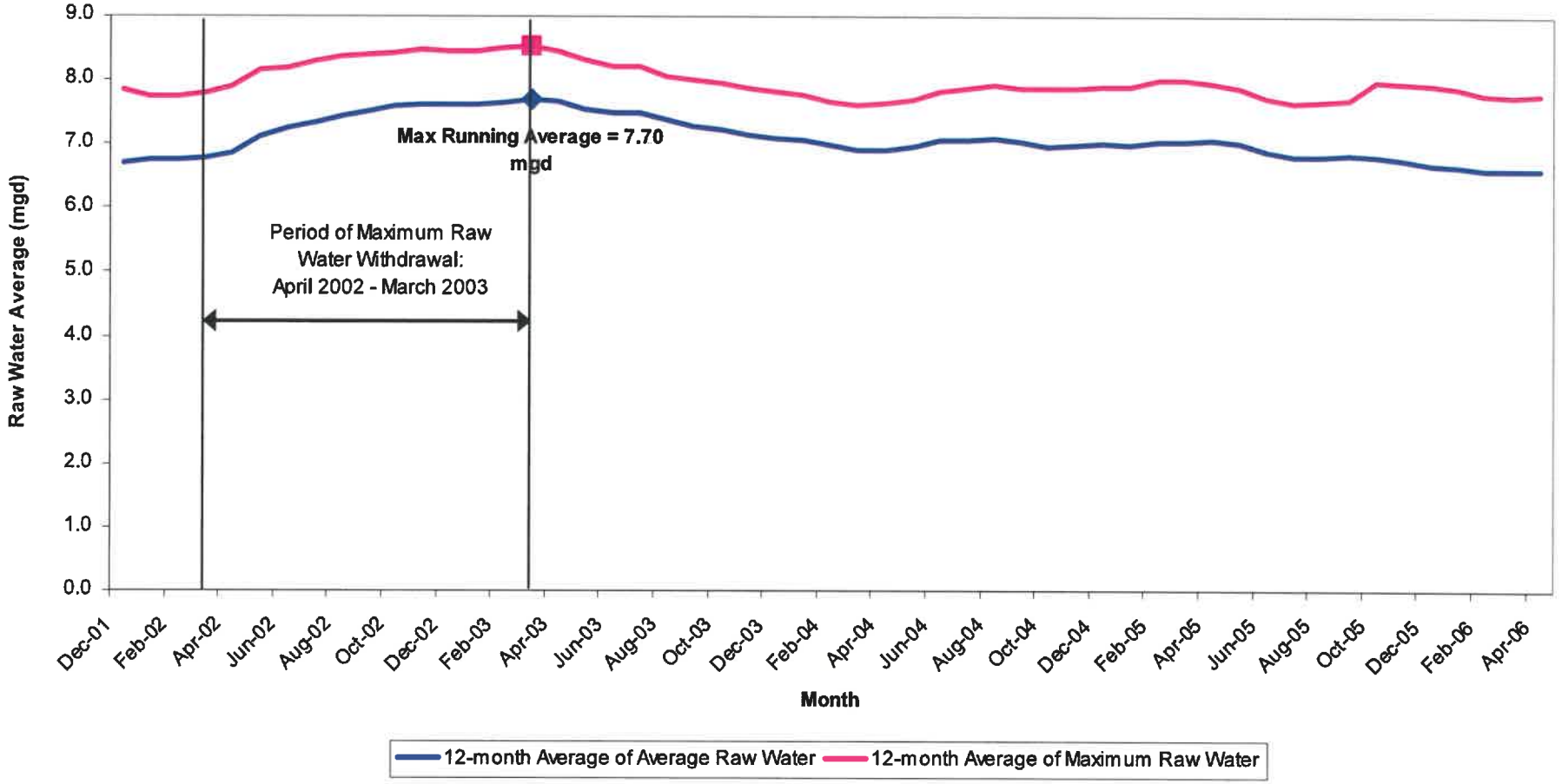
Gray shaded cells in the table indicate when the maximum-day withdrawals occurred for each year.
Yellow shaded cells in the table indicate when the maximum-month withdrawals occurred for each year.
Dashed outlined cells in the table indicate the 12-month period of maximum raw water withdrawal (April 2002 to March 2003).

ADW: Average daily withdrawal.
MDW: Maximum-day withdrawal.
MMW: Maximum-month withdrawal.

1. Data not available for April 2001 due to changes in the City's record keeping methods.

Figure A-1.

City of Lauderhill 12-month Averages of Raw Water Withdrawal from 2001 through 2007



Appendix B

City of Lauderhill 2006 Top 100 Retail Water Customers

Appendix B
City of Lauderhill 2006 Top 100 Retail Water Customers

Rank	Customer Number	Daily Use (gallons)	Annual Use (1000 gallons)
1	1136700	66,748	24,363
2	4101810	42,753	15,605
3	4300025	36,710	13,399
4	4261110	32,312	11,794
5	3720001	30,666	11,193
6	4240800	24,847	9,069
7	4202101	24,797	9,051
8	4240512	22,890	8,355
9	3888500	22,085	8,061
10	4202201	21,997	8,029
11	4261120	21,814	7,962
12	5360590	21,532	7,859
13	4210400	21,326	7,784
14	706900	21,323	7,783
15	4211000	21,022	7,673
16	330900	20,252	7,392
17	1120867	20,044	7,316
18	3880500	20,027	7,310
19	714650	19,899	7,263
20	4900003	18,855	6,882
21	728660	18,219	6,650
22	4103100	18,170	6,632
23	2130180	18,110	6,610
24	3630500	17,912	6,538
25	714580	17,874	6,524
26	728810	16,405	5,988
27	4001130	16,279	5,942
28	2130170	15,770	5,756
29	4101900	15,556	5,678
30	3629500	15,244	5,564
31	4240720	15,071	5,501
32	1120865	14,937	5,452
33	700600	14,707	5,368
34	5126700	14,690	5,362
35	5249200	14,219	5,190
36	3730400	14,132	5,158
37	4101710	14,123	5,155
38	706730	14,003	5,111
39	4240740	13,285	4,849
40	1200800	13,077	4,773
41	3710401	12,981	4,738
42	5023300	12,973	4,735
43	5023000	12,841	4,687
44	4030700	12,134	4,429
45	4103200	12,093	4,414
46	4240511	12,071	4,406
47	417900	12,060	4,402
48	3730320	11,926	4,353
49	4210500	11,570	4,223
50	4240730	11,342	4,140

Appendix B
City of Lauderhill 2006 Top 100 Retail Water Customers

Rank	Customer Number	Daily Use (gallons)	Annual Use (1000 gallons)
51	1008335	11,134	4,064
52	1002700	11,030	4,026
53	1200010	10,970	4,004
54	3710001	10,945	3,995
55	4101300	10,868	3,967
56	3629510	10,803	3,943
57	4114900	10,803	3,943
58	4103000	10,800	3,942
59	4031400	10,573	3,859
60	4030600	10,444	3,812
61	5023400	10,405	3,798
62	1200026	10,373	3,786
63	4289943	10,373	3,786
64	4114700	10,367	3,784
65	5023100	10,315	3,765
66	4114000	10,156	3,707
67	4114800	10,121	3,694
68	4030100	10,036	3,663
69	1034590	9,959	3,635
70	3630400	9,959	3,635
71	4560809	9,885	3,608
72	3629200	9,866	3,601
73	2130730	9,847	3,594
74	4030300	9,595	3,502
75	3401510	9,551	3,486
76	5149710	9,490	3,464
77	5013490	9,441	3,446
78	4115100	9,436	3,444
79	4001120	9,392	3,428
80	700640	9,373	3,421
81	4030900	9,260	3,380
82	4114200	9,260	3,380
83	4114600	9,208	3,361
84	4202401	9,090	3,318
85	3710301	9,088	3,317
86	3890010	9,071	3,311
87	706700	9,003	3,286
88	4202701	8,992	3,282
89	5128400	8,984	3,279
90	4101700	8,808	3,215
91	222620	8,792	3,209
92	4100700	8,742	3,191
93	4031301	8,704	3,177
94	4214000	8,696	3,174
95	516100	8,655	3,159
96	3814100	8,655	3,159
97	4213000	8,636	3,152
98	4113000	8,608	3,142
99	417800	8,559	3,124
100	3629600	8,501	3,103

Appendix C

Existing and Future Land Use Map Series

CITY OF LAUDERHILL
EXISTING LAND USE MAP SERIES
JUNE 2007
Zone 63

1 inch equals 777.44731

LEGEND

- CITY LIMITS

LAND USE DESIGNATIONS

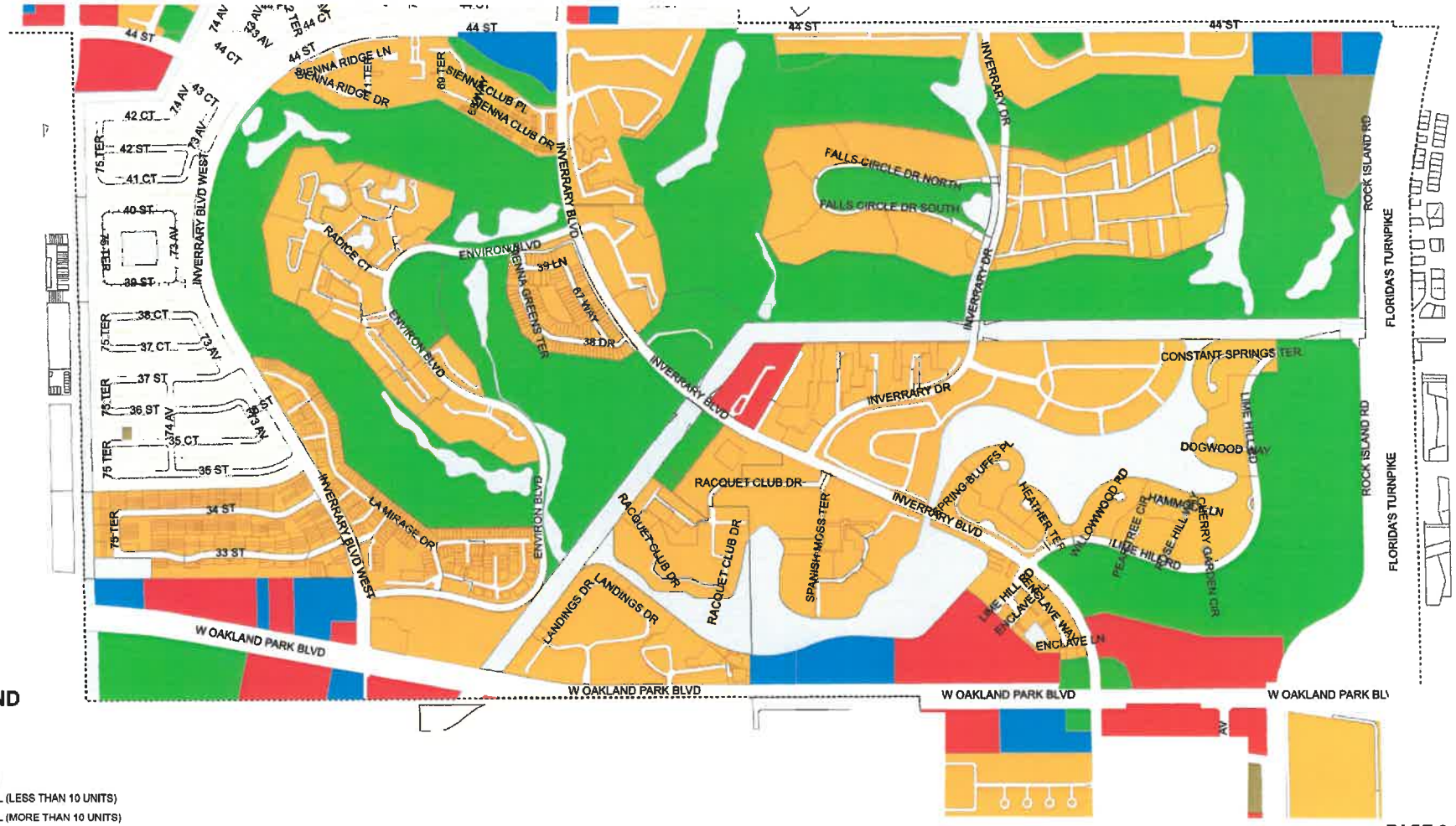
- COMMERCIAL
- GROUP LIVING QUARTERS
- MULTI-FAMILY RESIDENTIAL (LESS THAN 10 UNITS)
- MULTI-FAMILY RESIDENTIAL (MORE THAN 10 UNITS)
- COMMUNITY FACILITIES
- RECREATION - OPEN SPACE
- SINGLE FAMILY RESIDENTIAL
- VACANT LAND
- WATER BODIES

SOURCE: BROWARD COUNTY PROPERTY APPRAISER'S OFFICE
CITY OF LAUDERHILL PLANNING & ZONING DEPARTMENT

p:/LandUseMaps/ExistingLandUse/ZONE63_SHEET1_6_1_07.mxd

CITY OF LAUDERHILL
EXISTING LAND USE MAP SERIES
JUNE 2007
Zone 65

1 inch equals 800 feet



LEGEND

- CITY LIMITS

LAND USE DESIGNATION

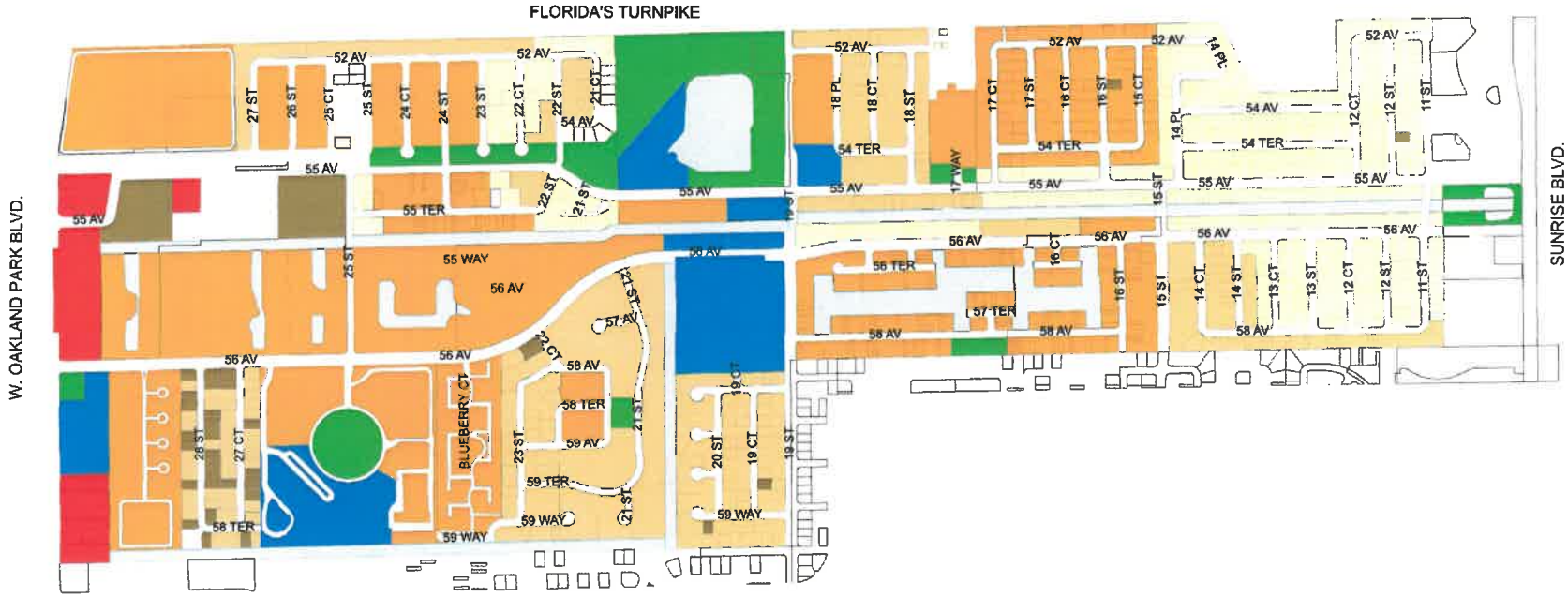
- COMMERCIAL
- GROUP LIVING QUARTERS
- MULTI-FAMILY RESIDENTIAL (LESS THAN 10 UNITS)
- MULTI-FAMILY RESIDENTIAL (MORE THAN 10 UNITS)
- COMMUNITY FACILITIES
- RECREATION - OPEN SPACE
- SINGLE FAMILY RESIDENTIAL
- VACANT LAND

SOURCE: BROWARD COUNTY PROPERTY APPRAISER'S OFFICE
CITY OF LAUDERHILL PLANNING & ZONING DEPARTMENT

p:/LandUseMaps/ExistingLandUse/ZONE65_SHEET2_6_1_07.mxd

CITY OF LAUDERHILL
EXISTING LAND USE MAP SERIES
JUNE 2007
Zone 71

1 inch equals 800 feet



LEGEND

LAND USE DESIGNATION

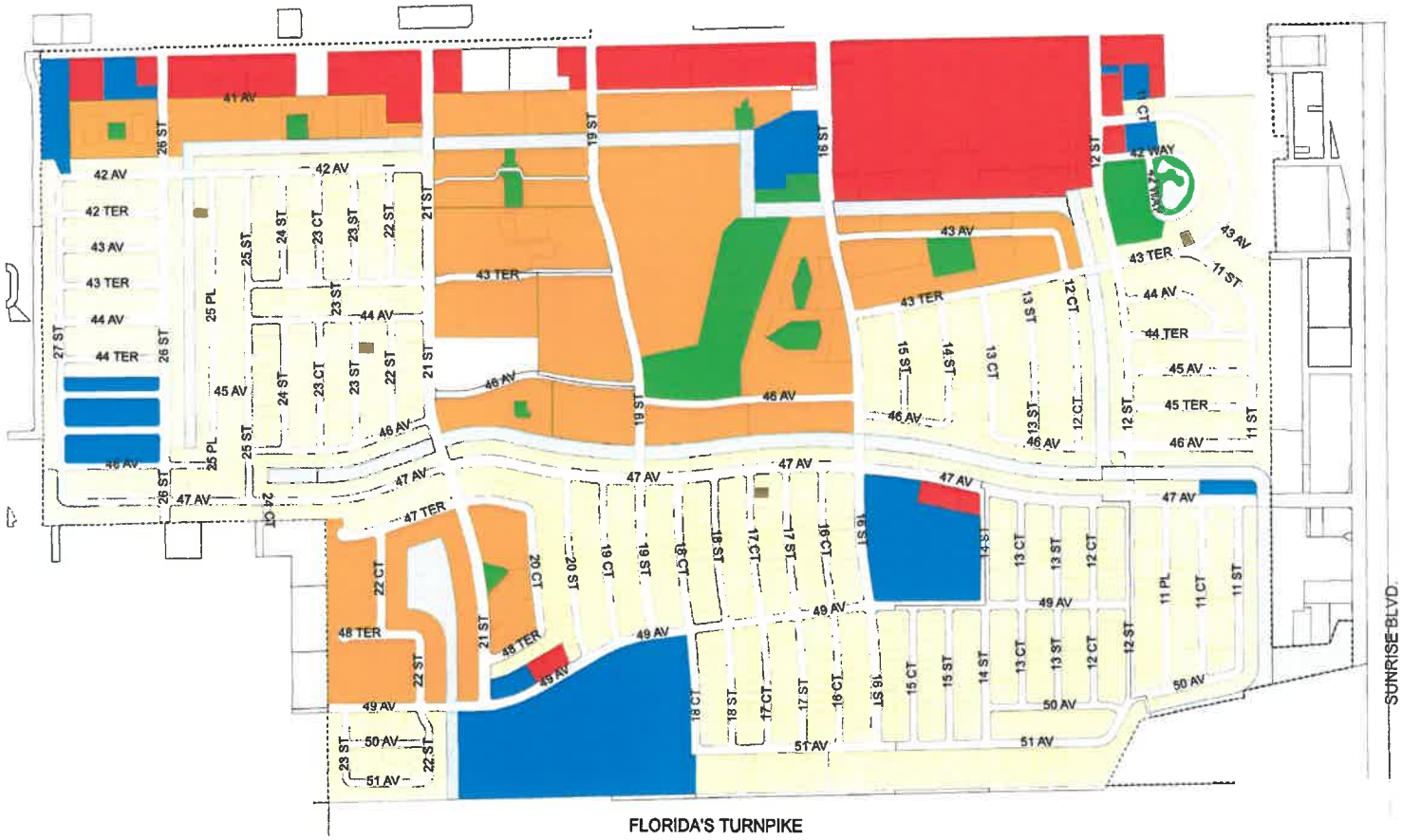
- COMMERCIAL
- GROUP LIVING QUARTERS
- MULTI-FAMILY RESIDENTIAL (LESS THAN 10 UNITS)
- MULTI-FAMILY RESIDENTIAL (MORE THAN 10 UNITS)
- COMMUNITY FACILITIES
- RECREATION - OPEN SPACE
- SINGLE FAMILY RESIDENTIAL
- VACANT LAND

SOURCE: BROWARD COUNTY PROPERTY APPRAISER'S OFFICE
CITY OF LAUDERHILL PLANNING & ZONING DEPARTMENT

p:/LandUseMaps/ExistingLandUse/ZONE71_SHEET3_6_1_07.mxd

CITY OF LAUDERHILL
EXISTING LAND USE MAP SERIES
JUNE 2007
Zone 72

1 inch equals 800 feet



LEGEND

- CITY LIMITS

LAND USE DESIGNATION

- COMMERCIAL
- GROUP LIVING QUARTERS
- MULTI-FAMILY RESIDENTIAL (LESS THAN 10 UNITS)
- MULTI-FAMILY RESIDENTIAL (MORE THAN 10 UNITS)
- COMMUNITY FACILITIES
- RECREATION - OPEN SPACE
- SINGLE FAMILY RESIDENTIAL
- VACANT LAND
- WATER BODIES

SOURCE: BROWARD COUNTY PROPERTY APPRAISER'S OFFICE
CITY OF LAUDERHILL PLANNING & ZONING DEPARTMENT

p:/LandUseMaps/ExistingLandUse/ZONE72_SHEET4_6_1_07.mxd

CITY OF LAUDERHILL
EXISTING LAND USE MAP SERIES
JUNE 2007
Zone 52

1 inch equals 800 feet

LEGEND

- WATER BODIES

LAND USE DESIGNATION

- COMMERCIAL
- GROUP LIVING QUARTERS
- INDUSTRIAL
- MULTI-FAMILY RESIDENTIAL (LESS THAN 10 UNITS)
- MULTI-FAMILY RESIDENTIAL (MORE THAN 10 UNITS)
- COMMUNITY FACILITIES
- RECREATION - OPEN SPACE
- SINGLE FAMILY RESIDENTIAL
- VACANT LAND

SOURCE: BROWARD COUNTY PROPERTY APPRAISER'S OFFICE
CITY OF LAUDERHILL PLANNING & ZONING DEPARTMENT

p:/LandUseMaps/ExistingLandUse/ZONE52_SHEET5_6_1_07.mxd

CITY OF LAUDERHILL
FUTURE LAND USE MAP SERIES
OCTOBER 2006
Flex Zone 63

CITY LIMITS

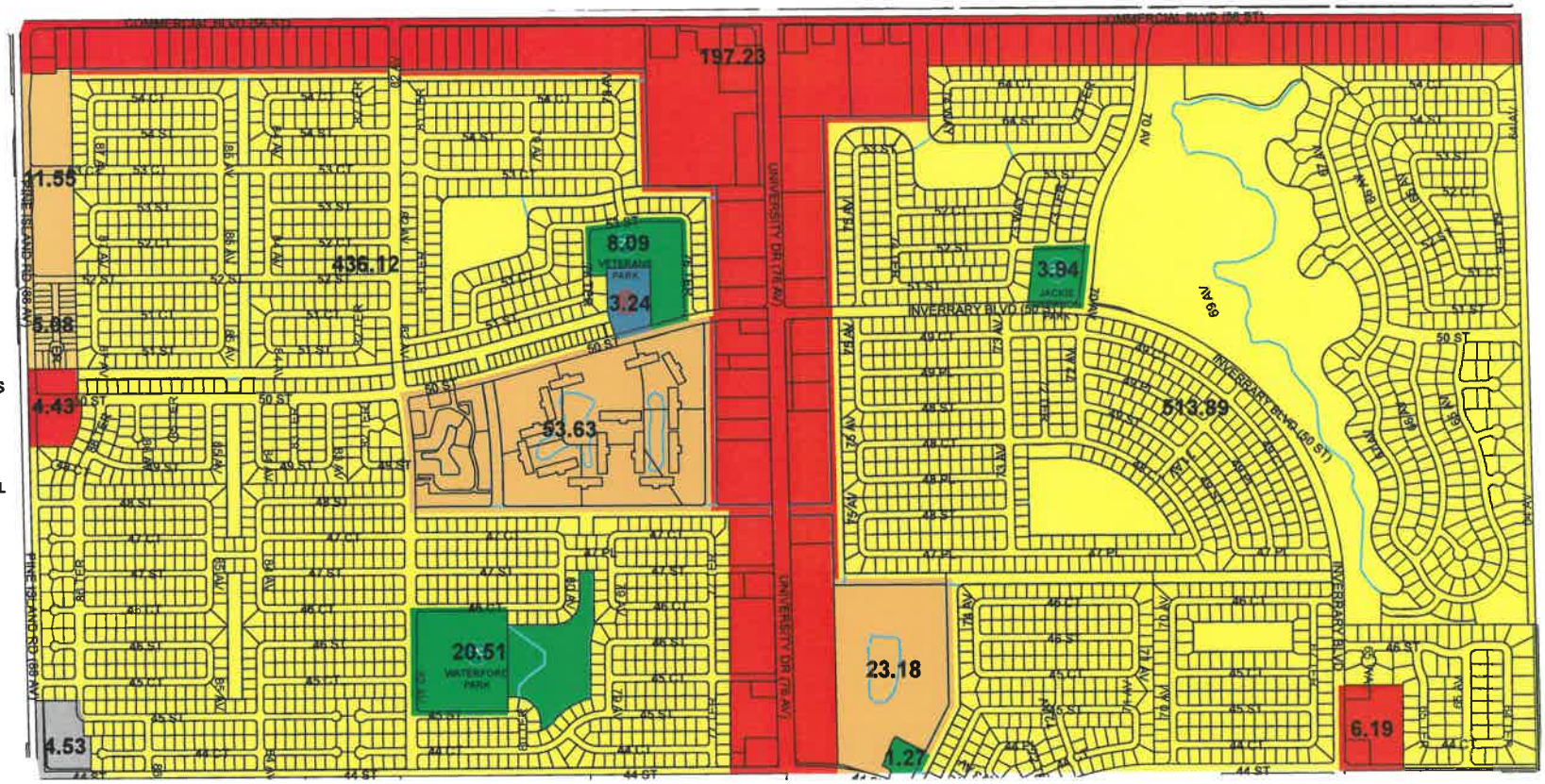
POINTS OF INTEREST
- Jackie Gleason Park
- Veterans Park
- Waterford Park
- FIRE STATION
- BODIES OF WATER

FLU

FUTURE LAND USE CATEGORIES
- COMMERCIAL
- COMMUNITY FACILITY
- LOW (5) RESIDENTIAL
- LOW MEDIUM (10) RESIDENTIAL
- MEDIUM (16) RESIDENTIAL
- RECREATION - OPEN SPACE
- UTILITIES

N W E S

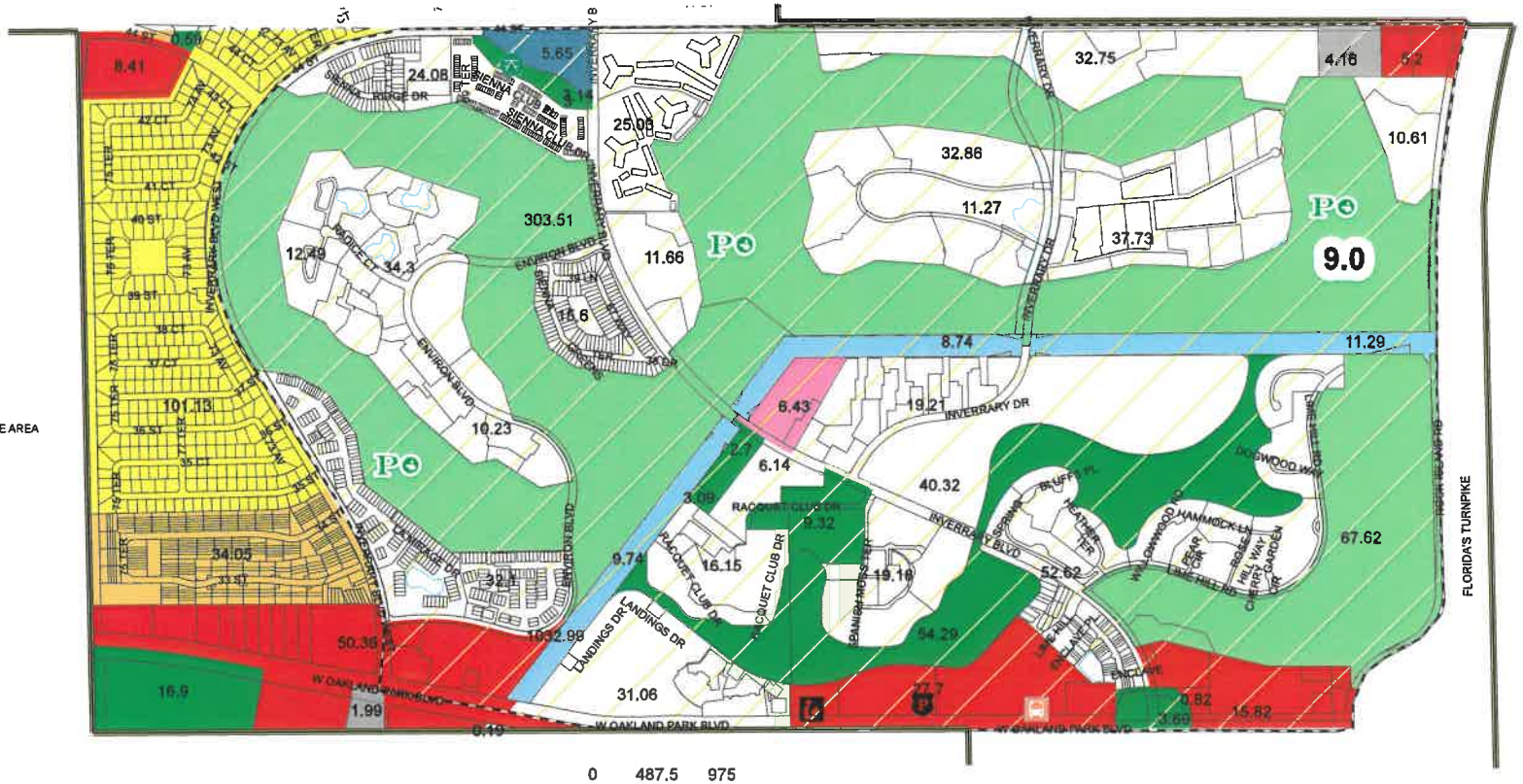
0 500 1,000
Feet



Amended by: ORDINANCE NO. 05O-04-135, 05O-04-136, 05O-04-137, 05O-04-138, MAY 9, 2005.
Amended by: ORDINANCE NO. 06O-09-169, OCTOBER 30, 2006.

p:/CompPlanMapsAdopted/2006-1/flu63_SHEET1Rev12_7_06.mxd

CITY OF LAUDERHILL
FUTURE LAND USE MAP SERIES
OCTOBER 2006
Flex Zone 65



- CITY LIMITS
- PRIVATE GOLF COURSE
- BUS TRANSFER STATION
- LIBRARY
- POLICE
- BODIES OF WATER
- C-13 CANAL

LAND USE CATEGORIES

- COMMERCIAL
- COMMERCIAL RECREATION
- COMMUNITY FACILITY
- IRREGULAR 9.0 RESIDENTIAL DASHED LINE AREA
- LOW (5) RESIDENTIAL
- LOW MEDIUM (10) RESIDENTIAL
- MEDIUM (16) RESIDENTIAL
- OFFICE PARK
- RECREATION & OPEN SPACE
- TRANSPORTATION
- UTILITIES

NOTES:
Residential development in parts of Inverrary is restricted by a Stipulated Settlement Agreement.
Refer to Map 2-8-1: Settlement Agreement Units and Map 2-8-2: Platted and Existing Units for further information.

Amended by: ORDINANCE NO. 05O-04-139, 05O-04-142, 05O-04-143, MAY 9, 2005.
Amended by: ORDINANCE NO. 06O-09-170, OCTOBER 30, 2006.

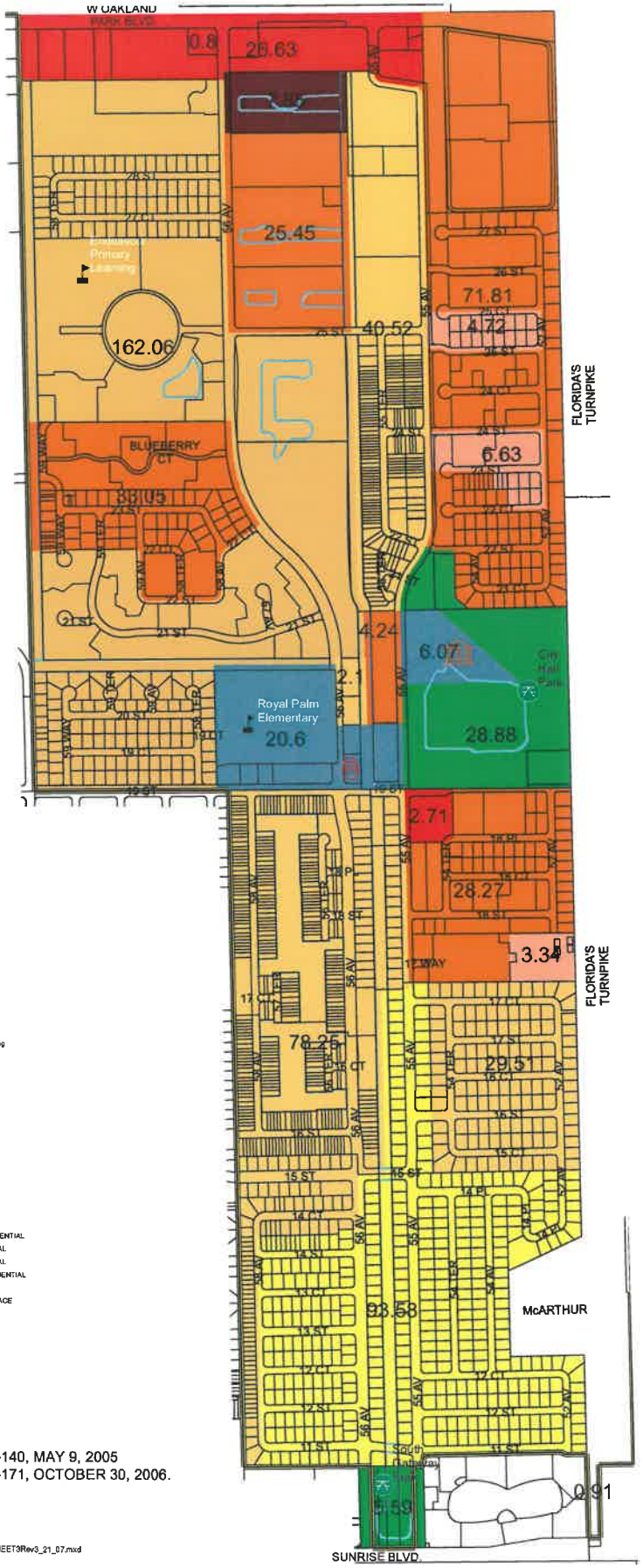
p:/landusemaps/futurelanduse/flu65_sheet2Rev3_21_07.mxd

CITY OF LAUDERHILL

FUTURE LAND USE MAP SERIES

OCTOBER 2006

Flex Zone 71



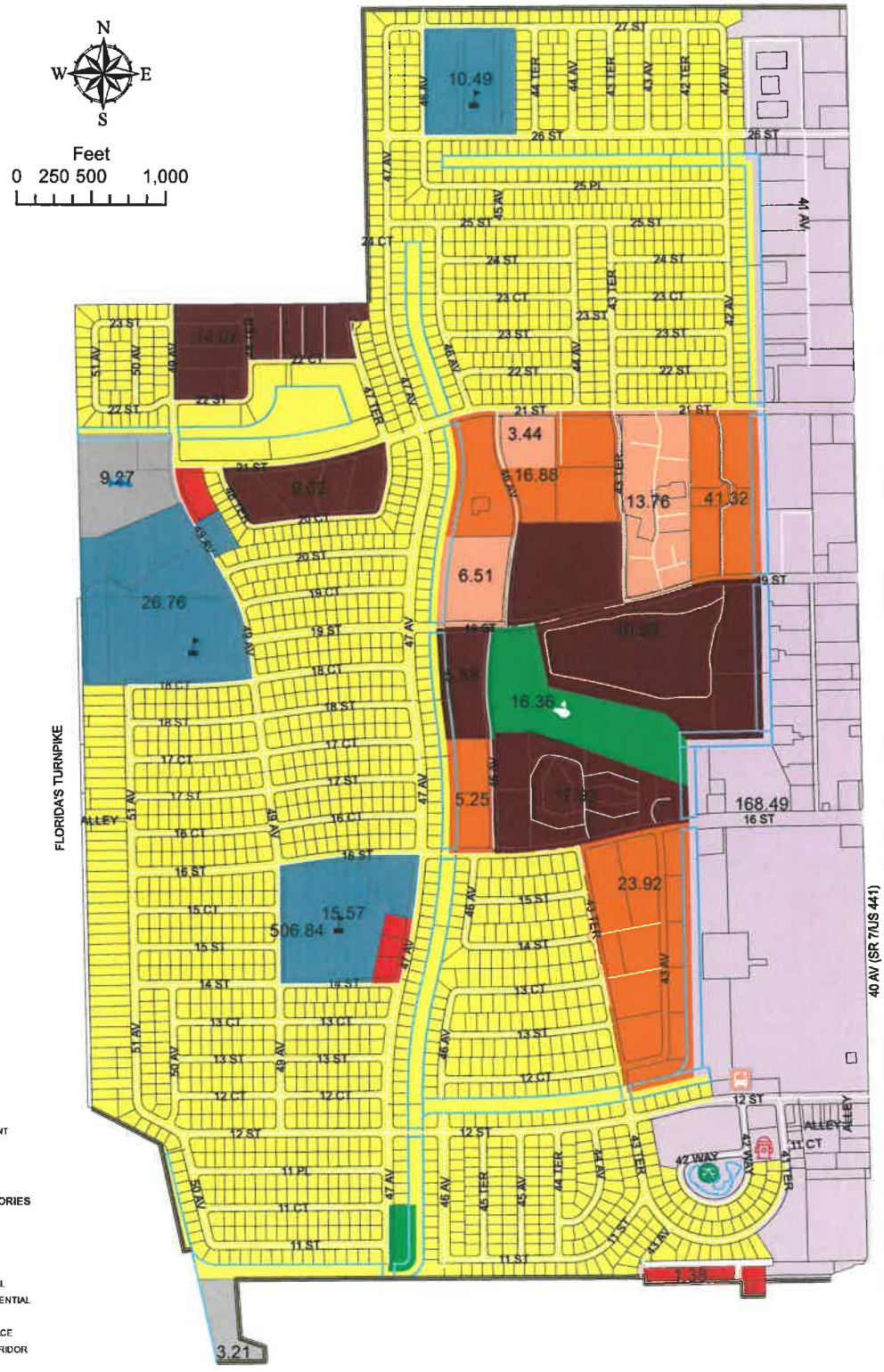
Amended by: ORDINANCE NO. 05O-04-140, MAY 9, 2005
Amended by: ORDINANCE NO. 06O-09-171, OCTOBER 30, 2006.

Sheet 3

p:\LandUseMaps\Future Land Use\flu71_SHEET3Rev3_21_07.mxd

CITY OF LAUDERHILL

FUTURE LAND USE MAP SERIES
OCTOBER 2006
Flex Zone 72

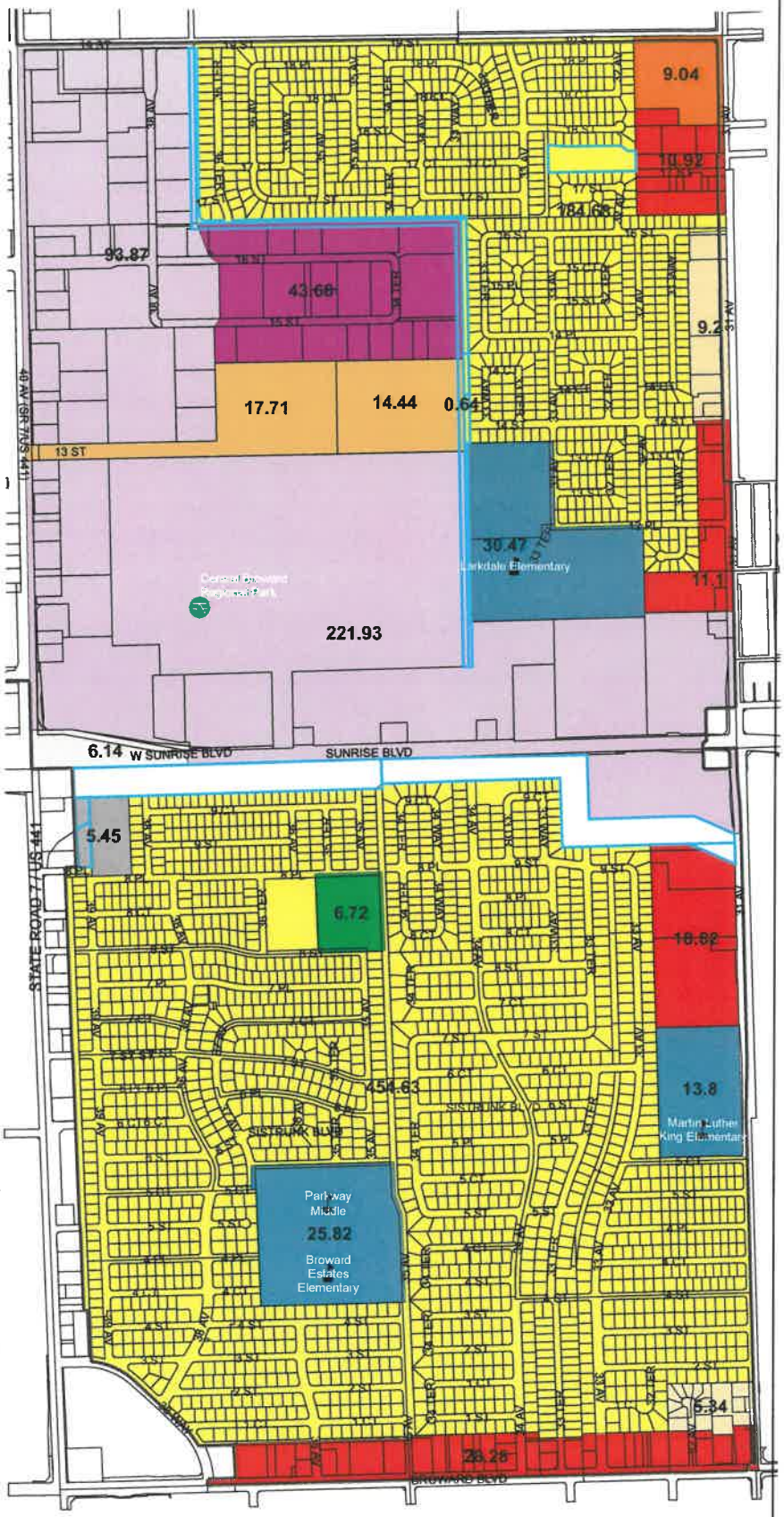


Sheet 4

Amended by: ORDINANCE NO. 06O-07-145, July 31, 2006.
Amended by: ORDINANCE NO. 06O-09-172, October 30, 2006.

p:/LandUseMaps/FutureLandUse/flu72_sheet4Rev12_8_06.mxd

CITY OF LAUDERHILL
FUTURE LAND USE MAP SERIES
OCTOBER 2006
Flex Zone 52



N

0 250500 1,000 Feet

CITY LIMITS

Points of Interest

Central Broward Regional Park

BODIES OF WATER

LAND USE CATEGORIES

- RECREATION - OPEN SPACE
- LOW (5) RESIDENTIAL
- LOW MEDIUM (10) RESIDENTIAL
- MEDIUM (16) RESIDENTIAL
- MEDIUM HIGH (25) RESIDENTIAL
- HIGH (50) RESIDENTIAL
- COMMUNITY FACILITY
- COMMERCIAL
- INDUSTRIAL
- TRANSPORTATION
- TRANSIT ORIENTED CORRIDOR
- UTILITIES

Sheet 5

p:\LandUseMaps\FutureLandUse\FLU52_SHEET5Rev12_8_06.mxd

Amended by: ORDINANCE NO. 05O-04-141, MAY 9, 2005, 06O-07-145, JULY 31, 2006.