

APPENDIX C

**10-YEAR
WATER SUPPLY
FACILITIES WORKPLAN**

July 2008



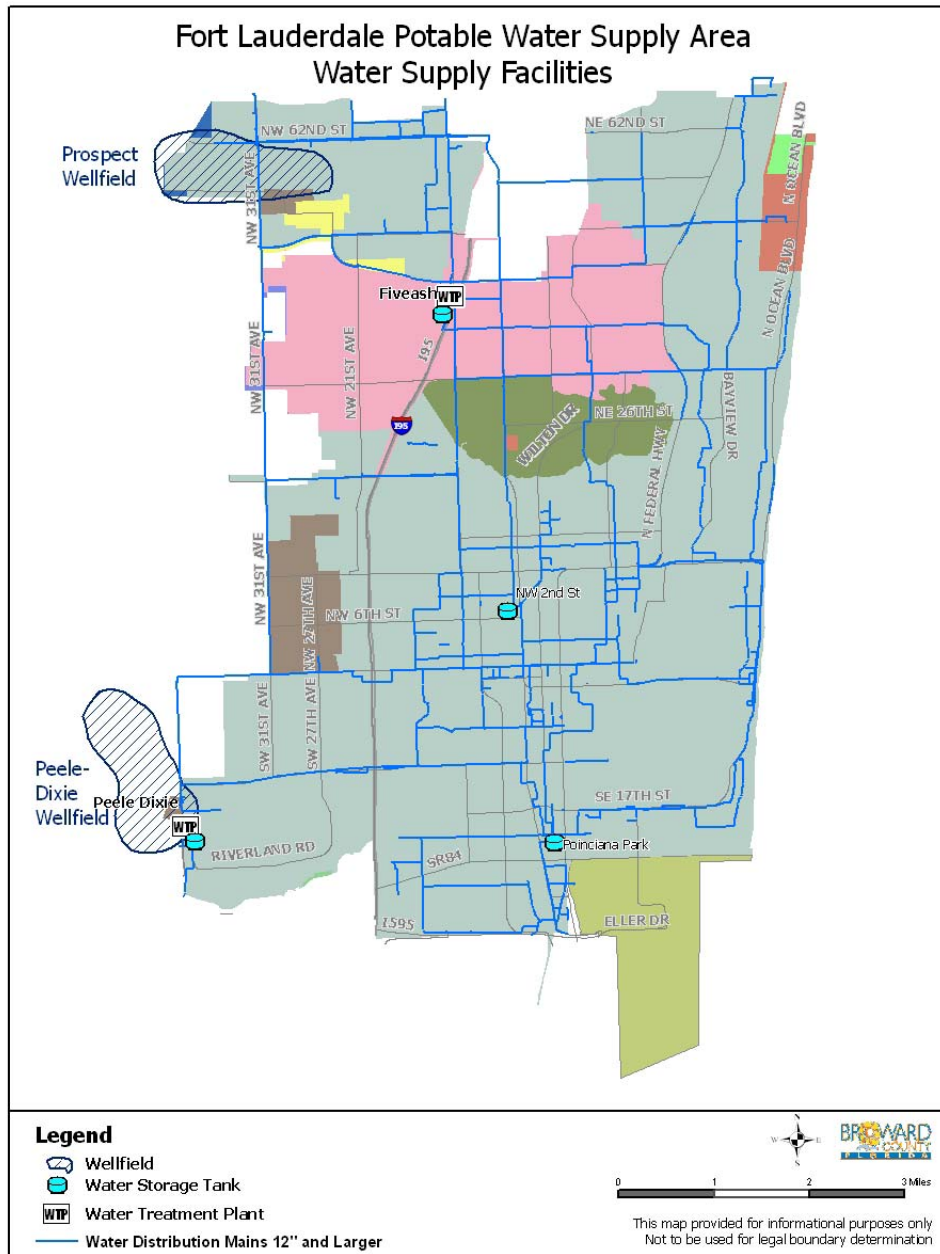
BOARD OF COUNTY COMMISSIONERS

**Environmental Protection and Growth Management Department
Natural Resources Planning and Management Division**

**Public Works and Transportation Department
Water & Wastewater Services**

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Figure 3



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for the years 2010, 2015, 2020, 2025, and 2030. Water use does not include the distribution system loss which is added when computing finished water demand. The methods and results are described below. The water use projections were based upon the following data and information:

- 2005 billed water use of each customer category by traffic analysis zone (TAZ);
- Population projections supplied by Broward County's Planning Services Division (BCPSD) to the City of Fort Lauderdale;
- Current commercial and residential development efforts within Fort Lauderdale's service area; and,
- Commercial build-out of the remaining vacant land areas that are not likely to be residential and are not classified as wetlands.

Future finished water demands on the Fort Lauderdale water utility by user category are presented in **Table 2**. The 2005 water billing records were spatially allocated to determine the total annual average daily residential water consumption in each TAZ. Forecasts were completed by multiplying the 2005 residential billed water use in each TAZ by one, plus the forecasted percent change in population within that TAZ. Commercial water use is expected to increase as Fort Lauderdale approaches build out by 2025 and demand for local commercial goods and services results in increased water use by existing and new commercial establishments within the City. The 2025 forecast of average daily commercial water use within each TAZ was estimated as the average daily commercial water use in 2005 increased by 27 percent, the forecasted percent increase in the Broward County population from 2005 to 2025. Commercial water use forecasts between 2005 and 2025 were interpolated between the 2005 actual retail commercial water use and the 2025 forecast.

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Table 2.
Fort Lauderdale Service Area Finished Water Demand Forecast, 2005-2025
(MGD)

	2005	2010	2015	2020	2025
Residential (a)	19.47	20.48	21.70	22.90	24.76
Commercial (b)	8.90	9.51	10.13	10.74	11.346
Irrigation (c)	9.16	9.16	9.16	9.16	9.16
Wholesale (d)	7.61	8.41	9.50	10.72	12.04
Subtotal	45.14	47.57	50.49	53.52	57.32
Distribution System Loss of 7.6% (e)	3.98	4.19	4.45	4.72	5.05
TOTAL FINISHED WATER DEMAND	49.12	51.76	54.94	58.24	62.37
Per Capita Estimate (f)	205.76	205.32	203.82	202.51	203.69

- (a) Residential includes all single-family, multifamily, and condominium water customers.
- (b) Commercial includes all retail water users other than residential and irrigation accounts.
- (c) Irrigation accounts represent separate meters used to bill irrigation use separately-residential and commercial.
- (d) Wholesale customers include Port Everglades and surrounding cities that purchase water for resale.
- (e) Distribution loss is calculated as 8.1 percent of total finished water production.
- (f) Per capita estimate provided for comparison purposes only. The City's stated level of service is to provide 230 gallons per capita per day.

Residential and commercial customers also have the option of opening accounts that meter and bill for landscape irrigation water use only. Charges for these accounts do not include wastewater user rates. Water use of these accounts is not expected to increase in the future as residential and commercial buildings are expected to occupy more and more of the pervious land cover within each TAZ and conservation measures are implemented that reduce landscape irrigation demand. For the purposes of these water use forecasts, the amount of water used by sprinkler/irrigation accounts in each TAZ was held constant from 2005 to 2025.

The City of Fort Lauderdale also provides wholesale water service to large users adjacent to the service area, through master meters. There may be more than one master meter per wholesale customer. Depending on the type of customer and the purpose of the water use, different methods were used to determine future demand. For the major municipalities supplied water by Fort Lauderdale, the 2005 water use was increased by the projected percent increase in population associated with the geographic areas served by the water supply and as presented in the population forecasts. For Port Everglades, 2005 water use was increased by five percent each year through 2025 as determined by planning consultants for the Port. Two other master meter customers – one for irrigation at the Fort Lauderdale – Hollywood International Airport (with WWS) and one for potable water at the Florida Department of Transportation at a toll booth are not included here, as they represent only very minor future demands.

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The per capita rate of water consumption calculated for the utility’s retail and wholesale customers was based on population estimates for 2005 and the annual average daily flow (ADF) that was delivered to each of the utility’s service areas. Distribution losses were taken into account and included in the Retail Service Area flow information. The per capita water demand averaged 206 GPD throughout the utility’s supply area (**Figure 2, Table 3**).

Table 3
City of Fort Lauderdale
Total Water Consumption – Baseline Conditions

	Population 2005	Average Daily Flow (MGD)	Per Capita Demand (MGD)	Per Capita Demand (GPD)
Retail Service Area	187,713	41.51	0.0002211	221
Wilton Manors	12,390	1.6	0.0001291	129
Oakland Park	29,863	4.41	0.0001477	148
Tamarac	6,359	0.19	0.0000298	30
Davie-Hacienda Village	2,400	0.10	0.0000416	42
Port Everglades		1.31		
Total/Average	238,725	49.12		206

*Average daily flow measured in 2005 in millions of gallons per day (MGD), and the per capita water demand for each of the service areas in gallons per day (GPD). The Retail Service Area includes Fort Lauderdale, Lauderdale by the Sea, Sea Ranch Lakes, Lazy Lake, and Unincorporated Broward neighborhoods. The per capita water demand measured in 2005 is provided for informational purposes only.

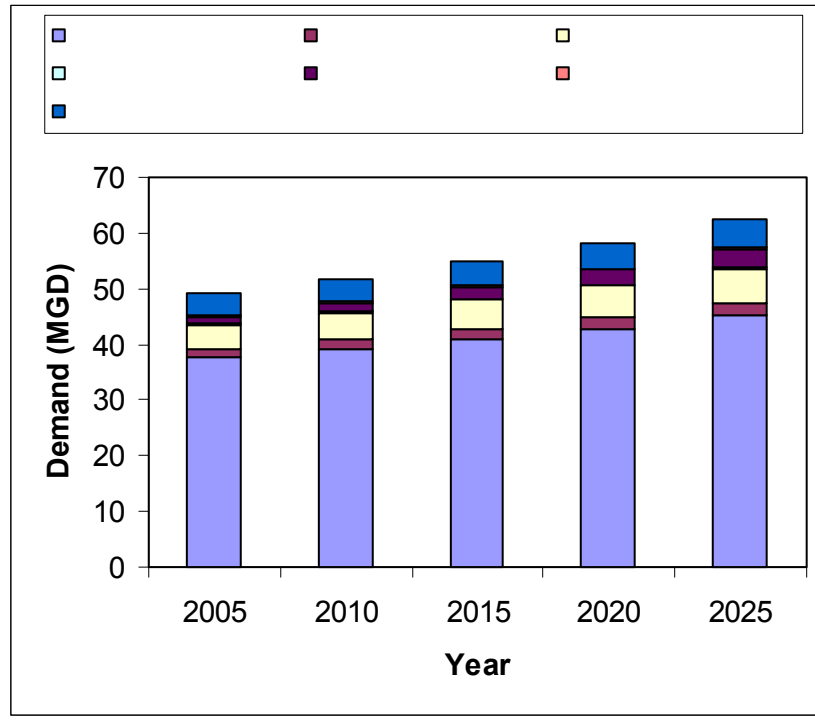
The population of Fort Lauderdale and the other municipalities in the Water Service Area was forecasted by using the Broward County Population Forecasting Model (BCPFM). The Model employs a cohort-survival methodology to project population. The Florida Department of Community Affairs has found that the BCPFM complies with the population projection methodology requirements of Chapter 9J-5, FAC. For purpose of the City’s analysis the Broward County Model was used as the basis of the forecast (**Table 4**).

As a cross reference, finished water demands for the future were also calculated using the average per capita demand in 2005 throughout the service area (208 GPD) multiplied by these same population estimates (**Table 2**). Since it may be assumed that local water demands will increase at a rate proportional to that of population growth, future demands using this method were calculated as:

$$\text{Future Demand (MGD)} = \text{Per Capita Demand (GPD)} * \text{Projected Population}$$

where the future water demand is in millions of gallons per day (MGD), the per capita demand is in gallons per day (GPD) averaged throughout the service area and is based on population and total water consumption measured in 2005, and the projected population is obtained from the City’s estimates based on BCPSD’s population projections. This method provides slightly

Figure 4
Projected Water Demands by Service Area
for the City of Fort Lauderdale Water Utility



This ratio of MDF:ADF is referred to as the peaking factor. According to Fort Lauderdale, the peaking factor for the combined Peele-Dixie and Fiveash facilities is estimated at 1.4 (Maurice Tobon, personal communication, 2007). This peaking factor was used to estimate future peak demands. Between 2005 and 2025, demands on the Fort Lauderdale water utility are projected to increase 27% to 62 MGD, with a peak demand of 87.32 MGD (**Table 5**). The future water supply needs estimated in this study were compared to projections prepared by the SFWMD, as presented in the 2005-2006 LEC Plan Update. Comparison of the Fort Lauderdale and LEC Plan Update data suggests that demands presented in the 2005-2006 LEC Plan Update might significantly overestimate long-term water needs by as much as 20.23 MGD, or 342% by 2025 (**Table 5**). This discrepancy appears to be explained by differences in population projections and a higher per capita demand than reported by the City of Fort Lauderdale’s utility. Nonetheless, this information is presented for comparison purposes in **Figure 5**. Additionally, should Fort Lauderdale adopt a water demand reduction ordinance, as proposed as part of its Conservation effort, finished water demands are expected to be reduced by 10 percent (see discussion). Projections under the 10 percent reduction Conservation scenario are presented in **Table 5** and **Figure 5** for comparison purposes as well.

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**Table 5.
Projected Water Demands for the City of Fort Lauderdale Water Utility***

	2005		2010		2015		2020		2025	
	ADF	MDF	ADF	MDF	ADF	MDF	ADF	MDF	ADF	MDF
Retail Service Area(a)	37.534		39.15		40.994		42.81		45.289	
Wilton Manors	1.60		1.70		1.82		1.94		2.04	
Oakland Park	4.41		4.74		5.72		5.782		6.18	
Tamarac	0.19		0.20		0.21		0.22		0.23	
Port Everglades	1.310		1.68		2.14		2.73		3.49	
Davie – Hacienda Village	0.10		0.10		0.10		0.10		0.10	
System Loss	3.98		4.19		4.45		4.72		5.05	
TOTAL	49.12	68.77	51.76	72.46	54.94	76.92	58.24	81.54	62.37	87.32
Conservation Ordinance Demand (b)			46.60		49.40		52.40		56.10	
2005-2006 LEC Plan	47.80				65.30				82.60	
Update Projected Demand										
<p>(a) Retail Service Area includes residential, commercial, and irrigation demands for Fort Lauderdale, Lazy Lakes, Lauderdale by the Sea, Sea Ranch Lakes, and Unincorporated Areas served by Fort Lauderdale Utility.</p> <p>(b) Fort Lauderdale proposes passing a conservation based water demand reduction ordinance in 2008 that is anticipated to result in a 10 percent reduction in demand</p> <p>* Demands are estimated from the projected water needs of retail, commercial and wholesale customers and are in millions of gallons per day (MGD). Calculation of the average daily flow (ADF) was based on per capita water demands measured in 2005 and population projections for each of the service areas. The maximum daily flow (MDF) was calculated as the ADF multiplied by a peaking factor of 1.4. Demands presented for 2005 were the actual rates of consumption measured in that year. Also shown are the projected water demands presented by the South Florida Water Management District in the Lower East Coast Water Supply Plan Update 2005-2006.</p>										

