

# 3 Future Conditions

This Reuse Feasibility Study evaluates potential reuse opportunities for the 20-year planning period from 2005 to 2025. For this analysis, the MDWASD service boundary was extended to the 2015 urban development boundary line, as shown on Figure 2.3.1-1 in the previous section. All projections are based on the 20-year planning period and are evaluated to 2025.

## 3.1 GENERAL CONDITIONS

### 3.1.1 Future Land Use

Miami-Dade County's CDMP is the official document for future development planning for Miami-Dade County. The latest adopted land use plan (LUP) that presents the future land use and development needs for Miami-Dade was printed in 1998. Figures 3-1(A) and 3-1(B) of the 1998 MDWASD Reuse Feasibility Study present the LUP. The future land uses defined in the LUP do not differ much from the existing land use pattern.

Since then, the southern portion of Miami-Dade County has received more attention in regards to development needs. Most of the future urbanization is expected to occur in South Dade and a continued transition from agriculture to urban development is expected. The South Miami-Dade Watershed Study addresses this issue. The plan, still under development, takes a watershed management, or holistic, approach towards urban planning. Factors such as community character, economic development, and infrastructure needs are being addressed while considering the ecological needs for a healthy Biscayne Bay. A final recommendation has not yet been developed, but a preliminary plan, based on the test scenarios being evaluated, is presented in Figure 3.1.1-1. This figure shows the metropolitan and community urban centers as depicted in the land use element of the CDMP. In general, these centers are located along the main transportation corridors of US Highway 1 and Kendall Drive. With the exception of densities for residential areas and some shifts from agricultural to residential land use within the UDB, land use patterns are similar to the adopted plan.

As a result of future population growth in South Miami-Dade County, agricultural land may be converted to urbanized areas. These changes in future land use will impact reuse opportunities.

### 3.1.2 Population

Population projections for Miami-Dade County indicate that the increasing population trend will continue. In 2025, the population in Miami-Dade County is projected to increase to 3.02 million people from the 2.40 million estimated in 2005. This represents an increase of 26% in 20 years at an annual growth rate of 1.16%. Table 3.1.2-1 provides a summary of the population projections for Miami-Dade.

**Table 3.1.2-1. Miami-Dade County Population Projections**

Year	Population	% Increase
2005	2,402,105	1.25%
2006	2,431,819	1.24%
2007	2,461,577	1.22%
2008	2,491,396	1.21%
2009	2,521,294	1.20%
2010	2,551,284	1.19%
2011	2,581,380	1.18%
2012	2,611,601	1.17%
2013	2,641,953	1.16%
2014	2,672,453	1.15%
2015	2,703,114	1.15%
2016	2,733,943	1.14%
2017	2,764,956	1.13%
2018	2,796,162	1.13%
2019	2,826,571	1.09%
2020	2,858,185	1.12%
2021	2,890,031	1.11%
2022	2,922,109	1.11%
2023	2,954,422	1.11%
2024	2,986,979	1.10%
2025	3,019,785	1.10%

Source: Miami-Dade County Planning and Zoning 2005b

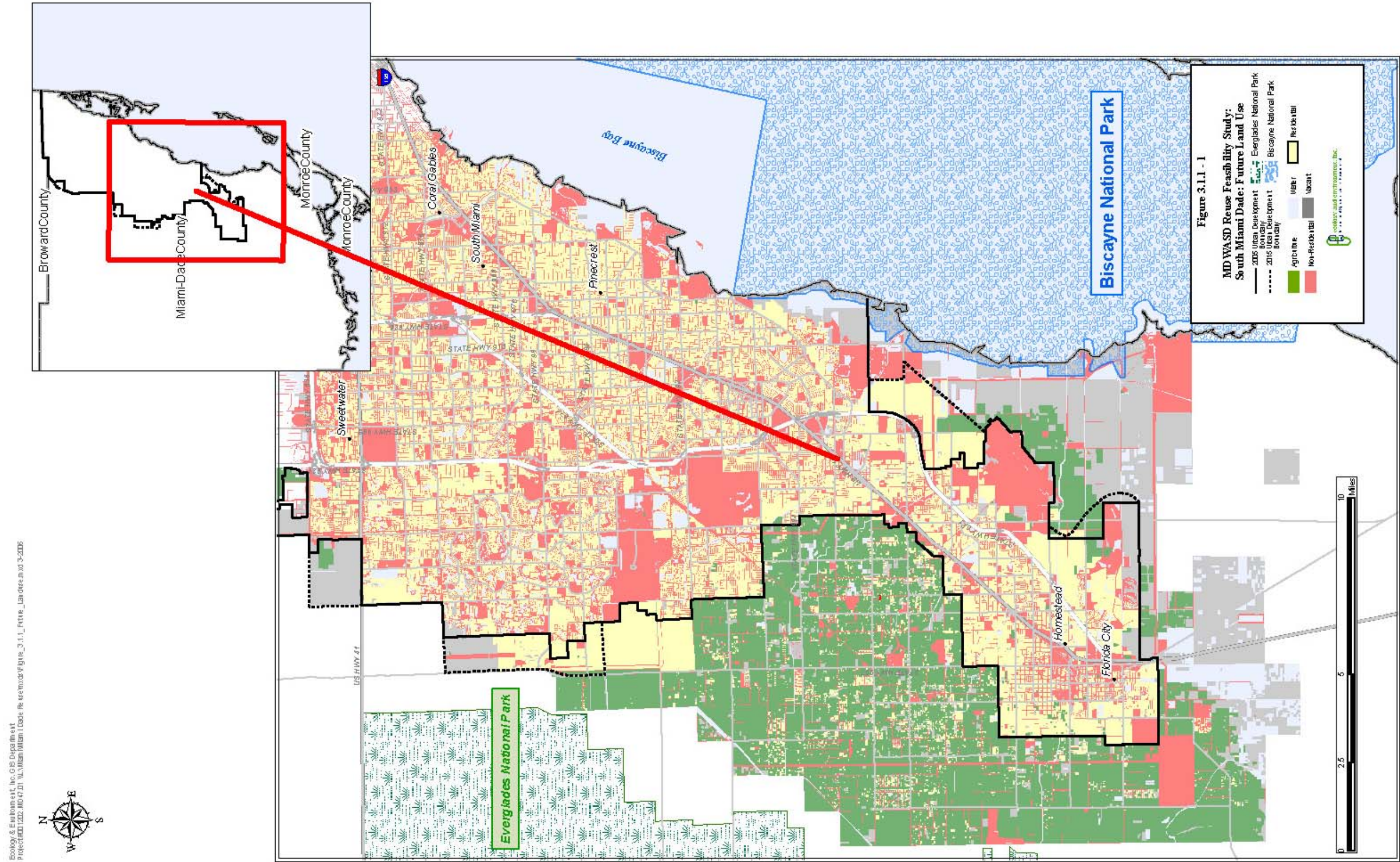
## 3.2 WASTEWATER MANAGEMENT

Information for this section has been provided by MDWASD personnel.

### 3.2.1 Wastewater Flow Projections

Approximately 297 MGD of wastewater were generated in Miami-Dade County during the year 2005. This number represents a slight decrease from the year 2000 numbers. Projected increases in wastewater generated up to 2025 are shown in Table 3.2.1-1, with the total volume estimated to be 374 MGD. The bulk of the increase is related to population growth; however, a small portion of the wastewater increase is related to the elimination of septic tanks and the tying-in of those residences to the regional wastewater treatment systems.







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**Table 3.2.1-1. Miami-Dade County Wastewater Flow Projections**

Year	System Wide MGD	NDWWTP MGD	CDWWTP MGD	SDWWTP MGD
2005	297	78.60	122.10	96.30
2010	320	85.56	122.35	112.09
2015	343	91.71	131.15	120.14
2020	358	95.72	136.88	125.40
2025	374	100.00	143.00	131.00

Source: Valdes 2006c.

Key:

CDWWTP = Central District Wastewater Treatment Plant.

MGD = million gallons per day.

NDWWTP = North District Wastewater Treatment Plant.

SDWWTP = South District Wastewater Treatment Plant.

Table 3.2.1-1 shows a breakdown of the projected flows by district WWTP. The NDWWTP wastewater volume generated is expected to reach 100.00 MGD by the year 2025, the CDWWTP volume is expected to reach 143.00 MGD, and the SDWWTP volume is expected to reach 131.00 MGD.

### 3.2.2 Capacity of Existing Treatment Plants to Treat and Dispose Future Flows

Currently, the NDWWTP has an installed treatment capacity of 120 MGD with a permitted capacity of 112.5 MGD. The projected wastewater volume in the NDWWTP for the year 2025 is expected to reach 100.00 MGD. The wastewater volume projected for 2025 for the CDWWTP is anticipated to reach the existing rated capacity of the plant of 143 MGD. The projected 2025 wastewater volume for the SDWWTP exceeds the current SDWWTP treatment capacity by over 15% and exceeds the permitted capacity by more than 33%.

### 3.2.3 Planned Wastewater System Expansions

Currently, NDWWTP is permitted for 112.5 MGD, but the plant has an installed capacity of 120 MGD.

The only significant expansion/improvement planned in the regional system is for the SDWWTP. By 2012, an additional capacity of 18.75 MGD is expected to be added to the wastewater treatment plant. As part of a Consent Order with FDEP, MDWASD committed to provide high level disinfection, which will produce public access quality reclaimed water. With the proposed expansion and associated permit modifications, the SDWWTP will have the capacity to treat the flows projected through the year 2025 and ultimately provide 131 MGD of public access quality reclaimed water. Note that Miami-Dade County has committed to the CERP reuse project; if pilot efforts are successful and the full CERP project is authorized, Miami-Dade County will be the local sponsor and will treat the effluent to a higher quality than public access standards.

With the proposed wastewater system expansion and associated permit modifications at the SDWWTP, the treatment system will have the capacity to treat the flows projected through the year 2025 and provide 131 MGD of public access reuse quality water.

### 3.2.4 Potential Wastewater System Upgrades Needed Pending Regulations

As mentioned in Section 3.2.3, the SDWWTP is required to upgrade their treatment to produce effluent meeting FDEP HLD requirements. The upgrades were deemed necessary following an indication that the deeper Floridan Aquifer (Boulder Zone), where the SDWWTP effluent is injected, is possibly leaking upwards into the Upper Floridan. Since the Upper Floridan is defined as a USDW by the EPA, FDEP requires that the SDWWTP effluent meets HLD standards to ensure that any migration of the injected fluid into the Upper Floridan will not have negative impacts on the water quality of the USDW.

The NDWWTP currently disposes of the bulk of its effluent through ocean outfall in accordance with state standards. Any new or expanded discharge from the NDWWTP may require the completion of an anti-degradation determination in the vicinity of the outfall and surrounding area. The CDWWTP currently disposes of the bulk of its effluent through ocean disposal in accordance with federal standards. Discharges from the CDWWTP are subject to review at each permit renewal. To reduce impacts, additional treatment may be necessary. Recent discussions with regulatory agencies indicate that more stringent standards for ocean outfalls may soon be implemented. As a result, additional treatment may need to be implemented at both plants in the future.

## 3.3 WATER SUPPLY

In 2008, MDWASD will no longer supply water to the City of North Miami Beach. MDWASD commenced providing service directly to the City of Aventura, which was previously serviced by the City of North Miami Beach.

### 3.3.1 Demand Projections

The projected system-wide total average daily water demand for finished water for the year 2025 is 417.5 MGD – approximately 70 MGD greater than the existing demand (see Figure 3.3.1-1). The additional water demands will be offset in a number of alternative water supplies. MDWASD is implementing a 20-year water conservation plan that will result in a reduction of water consumption by 2025. The remaining demands will be offset by a combination of alternative water supplies including wastewater reuse. MDWASD's existing and proposed water supply system, treatment, storage, transmission, and distribution system can adequately handle the projected demand.

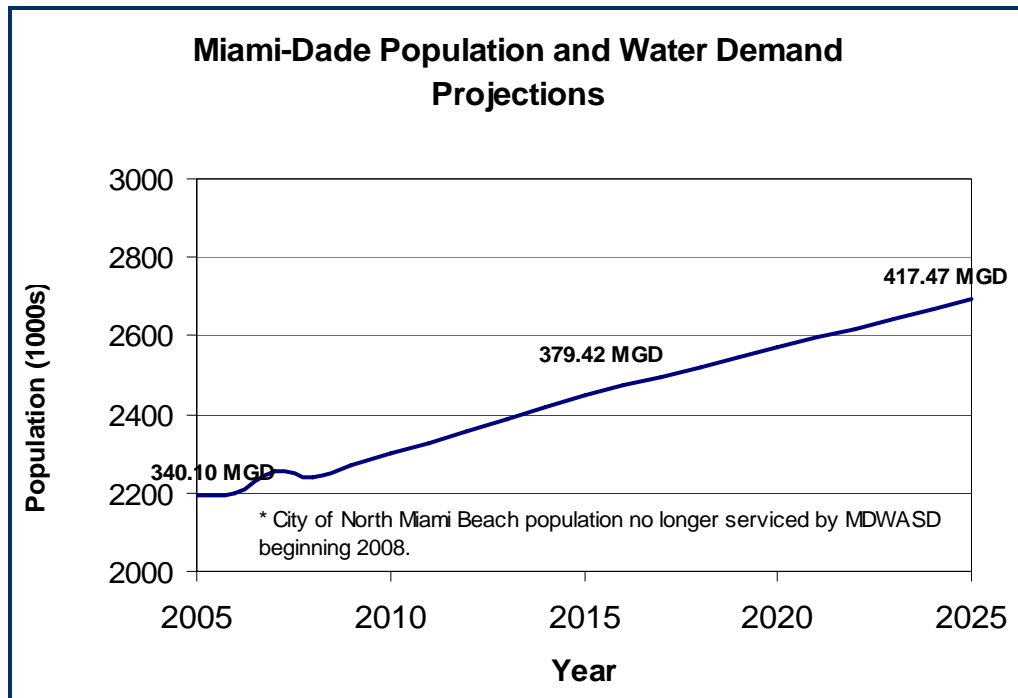


Figure 3.3.1-1. Miami-Dade County Population and Finished Water Average Annual Daily Demand Projections

The projected water demands for the Hialeah-Preston, Alexander Orr, and South Miami Heights service areas are all shown in Table 3.3.1-1. This projected water demand summary provides the average daily flow through year 2025.

Table 3.3.1-1. MDWASD Average Annual Daily Demand (AADD) Finished Water Projection

Year	Population Served	Finished Water per Capita (gpcd)	AADD Finished Water <sup>(a,b)</sup> (MGD)
2005 <sup>(c)</sup>	2,196,093	154.87	340.1
2006 <sup>(d)</sup>	2,200,000	155.14	341.3
2007	2,256,517	155	349.76
2008	2,239,564	155	347.13
2009	2,269,203	155	351.73
2010	2,298,841	155	356.32
2011	2,328,480	155	360.91
2012	2,358,119	155	365.51
2013	2,387,758	155	370.1
2014	2,417,397	155	374.7
2015	2,447,888	155	379.42
2016	2,472,437	155	383.23
2017	2,496,986	155	387.03
2018	2,521,535	155	390.84
2019	2,546,084	155	394.64
2020	2,570,634	155	398.45
2021	2,595,183	155	402.25
2022	2,619,732	155	406.06
2023	2,644,281	155	409.86

**Table 3.3.1-1. MDWASD Average Annual Daily Demand (AADD) Finished Water Projection**

Year	Population Served	Finished Water per Capita (gpcd)	AADD Finished Water <sup>(a,b)</sup> (MGD)
2024	2,668,830	155	413.67
2025	2,693,379	155	417.47

Source: Valdes 2006b.

Notes:

- (a) Average demands for 2005 represent actual usage taken from raw and finished water historical data. Average demands for 2006 represent 12 months preceding April 1, 2006.
- (b) Finished projections between 2010 and 2025 assume 155 gpcd total water system demand. North Miami Beach not serviced after 2007.
- (c) Population projections for City of North Miami Beach extracted from 2003 historical projections. Projections beyond 2008 exclude City of North Miami Beach
- (d) Average demands for 2006 represent 12 months preceding April 1, 2006.

Key:

gpcd = gallons per capita per day.  
 MDWASD = Miami-Dade Water and Sewer Department.  
 MGD = million gallons per day.

The estimated increase in annual average daily demand for finished water from year 2005 to 2025 from the Hialeah-Preston, Alexander Orr, and South Dade service areas are estimated to be 26.7 MGD, 40.71 MGD, and 10.09 MGD, respectively.

The new South Miami-Heights membrane water treatment plant is expected to go online in 2011. Once this plant is in operation, the Leisure City, Naranja, and Elevated Tank WTPs and their associated wellfields will be taken out of service. The new South Miami-Heights WTP will have an initial capacity of 18 MGD and will use membrane softening technology to treat water from the Biscayne Aquifer. Four new wellfields are also proposed: Former Plant, Caribbean Park, Roberta Hunter Park, and Rock Pit Park wellfields, with a total withdrawal capacity of 25.18 MGD.

A number of new storage facilities are also proposed for the MDWASD water supply system. Table 3.3.1-2 summarizes the proposed storage facilities.

**Table 3.3.1-2. MDWASD Proposed Storage Facilities**

Water Treatment Plant	Location	Type of Storage	Capacity (MG)
Hialeah WTP	Onsite	Clear Well	1.7
	NW 67th Street	1 Remote Tank	3.2
John E. Preston WTP	Onsite	Clear Well under 22 Filters	1.1
South Miami-Heights WTP	Onsite	1 Tank	5.0
<b>Total:</b>			<b>11.0</b>

Key:

MDWASD = Miami-Dade Water and Sewer Department.  
 MG = million gallons.  
 WTP = water treatment plant.



### 3.3.2 Future Water Supply Issues

The MDWASD holds an interim CUP from the SFWMD for the average withdrawal of 349.76 MGD. Currently, MDWASD is working with the SFWMD to obtain a 20-year CUP for additional withdrawals from the Biscayne and Floridan Aquifers to meet the projected demand. Due to the increasing regional demands on the Biscayne Aquifer, the SFWMD is requiring that additional withdrawals from the Biscayne Aquifer be fully offset by other means of potable water or alternative water supplies. This has been applied to all new demands over historic use that occurred when the 20-year CUP permit application was filed in 2003, regardless of what is stated in the previous consumptive use permit. MDWASD has currently projected that 77 MGD of new finished water demands for the next 20 years (until 2025) will need to be offset with alternative water supplies. This number is subject to change as the MDWASD is currently conducting analysis of future water needs. The SFWMD has stated that any activity that replaces the use of potable water; recharges the aquifer within or near wellfield protection areas and reduces water demands from the regional system including Lake Okeechobee and the Everglades; and/or increases groundwater or sheet flow water to Biscayne Bay can be considered a potential offset to Biscayne Aquifer withdrawals.

Examples of alternative water supplies throughout the state of Florida include:

- using surface water from large wetland land areas and lakes.
- treating and blending brackish water from deeper aquifers with fresh water.
- using potable water ASRs.
- construction of reuse water pipes to provide reclaimed water for irrigation and vehicle washing at city-owned facilities.
- utilizing desalinization plants.

This study is the first step in evaluating the feasibility of reuse as one of the means of offsetting MDWASD's withdrawals from the Biscayne Aquifer. The alternatives identified through this process may or may not be considered direct offsets; therefore, additional efforts will be necessary to determine the effects of wastewater reuse on the regional system and quantify those effects. Similarly, additional efforts must be undertaken to evaluate other alternative water supplies to offset Biscayne Aquifer withdrawals.

### 3.3.3 Sources of Water

Currently, the Biscayne Aquifer is the only source of potable water used in Miami-Dade County. Alternative water sources must be used for future demands either directly or as off-sets to the Biscayne Aquifer. Alternative water supplies that may be considered are: the use of the Floridan Aquifer, surface water, seawater, and reuse. Some examples of alternative water supplies throughout the state of Florida include:

- **City of West Palm Beach:** The City has been using surface water from a large wetland area and several lakes to provide potable water supply. West Palm Beach is also using reclaimed water to enhance wetlands. This project is still underway, but has received very positive support from the SFWMD and FDEP.

- **Collier County:** Collier County treats and blends brackish water from deeper aquifers with fresh water. They use potable water ASRs and have one reclaimed-water ASR. The County also provides reclaimed water for irrigation.
- **City of North Miami Beach:** The City of North Miami Beach will treat Floridan Aquifer water to supplement Biscayne Aquifer water and is in the planning stages for the installation of reuse water pipes (purple pipes) to provide reclaimed water for irrigation and for vehicle washing at one of the city-owned facilities.
- **City of Tampa:** The City of Tampa has a desalinization plant that uses reverse osmosis (RO) to supply potable water needs to a population of approximately 1.8 million. The Tampa Bay seawater RO plant was designed to produce an initial 25 MGD, with planned expansion for an additional 10 MGD. Located adjacent to Tampa Electric Big Bend Power Station, it is currently the largest of its kind in the United States. Tampa also reclaims wastewater for beneficial reuse. The South Tampa Area Reclaimed Water Project currently provides 7.2 MGD of reuse water for irrigation of lawns and landscaping.

Each alternative supply has very different treatment requirements, regulatory requirements, and costs. Furthermore, each alternative has varying degrees of technical feasibility and potential for implementation. A separate effort is underway to conduct a more detailed analysis of alternative water supplies as part of the MDWASD Water Facilities Master Plan, which will include the reuse projects that are recommended herein as a major component.

### 3.4 REUSE FACILITIES

As part of a Consent Order with FDEP in July 2003, Miami-Dade County agreed to provide 18.75 MGD of additional reuse as a component of the SDWWTP expansion. In addition, Miami-Dade County committed to being the local sponsor of the CERP South Miami-Dade Reuse Project. To date, federal funding for this CERP project remains in question. The CERP also includes a West Miami-Dade reuse facility. As part of the Wastewater Master Plan Update, the feasibility of a west Miami-Dade reuse facility will be evaluated. Note that the purpose of this study is to identify reuse opportunities and to evaluate the system improvements needed to implement the most feasible opportunities. Section 4 presents reuse scenarios and includes discussion of the reuse facility upgrades required for each projected reclaimed water use.