

9.0 GENERAL INFRASTRUCTURE ELEMENT

(1) STORMWATER MANAGEMENT DATA AND ANALYSIS REQUIREMENTS

a) Stormwater Management System Inventory

MODESTO A. MAIDIQUE CAMPUS

The Modesto A. Maidique Campus (MMC) covers approximately three hundred and fifty-three (353.5) acres, located in unincorporated Miami-Dade County. The stormwater management plan for Modesto A. Maidique Campus is a combination of percolation, overland flow, exfiltration systems and positive drainage systems with outfalls to onsite lakes. There are no offsite discharge connections as all rainfall is contained onsite. Per Figure 9.1a – MMC Drainage System Map, the breakdown of these methodologies is as follows:

Percolation and exfiltration trench systems:

- The Student Housing Area
- Portions of the roadway system
- Parking Garage 6 (PG6), adjacent streets
- Portion of SW 10th Street from 109th Ave passed the roundabout on 112th Avenue
- Part of the parking lot northwest of the College of Business Complex (CBC)
- Some of the parking lots in the physical plant building area.
- Areas East & West of the Market Station (PG5)
- Portions of SW 10th Street and SW 108th Avenue
- Panther Stadium
- The expansion of the Rec Center
- Parkview Housing Phase 1
- Parkview Housing Phase 2
- Portion of SW 17th Street from the Stadium to Frost Museum
- Parking Garage 3 (PG3) west exit drive

The positive drainage systems with an outfall to a water body include:

- Parking lots south of the Primera Casa building,
- Roof runoff and plaza drainage in the core building area, and
- Ocean Bank Convocation Center
- Practice Fields with overflow into preserve

The balance of the site, which is recreation or undeveloped open space, relies on swale drainage, sheet flow to low lying areas, and percolation through the soil.

Based on the Miami-Dade County Flood Criteria Map, the minimum allowable elevations of the ground surface and crown of roads is 7.5 ft. NGVD. For exfiltration trench design, the groundwater elevation ranges from 4.0 to 4.2 from east to west across the campus. From the Federal Emergency Management Agency (FEMA), Flood Insurance Rate Map, Community Panel Numbers 120635-0288L and 120635-0269L (with effective date of September 11, 2009), the campus mostly lies within Zone AH (Base Flood Elevation at 8.0 feet), which is a Special Flood Hazard Area (SFHA) subject to inundation by the 1% Annual Chance Flood (100-year flood), with flood depths ranging from 1 to 3 feet. All new construction must abide by hazard mitigation standards.

BISCAYNE BAY CAMPUS

The Biscayne Bay Campus (BBC) property covers approximately one hundred and ninety-eight (198.6) acres, located in the City of North Miami within Miami-Dade County. The stormwater management plan for Biscayne Bay Campus is a combination of percolation, overland flow, exfiltration systems and positive drainage systems with outfalls to onsite lakes. Currently, this stormwater drainage system has four (4) outfalls located on the north and east sides of the site.

The north outfall system consists of a 42-inch culvert, and two 36-inch culverts. The east outfall consists of an 8"x 12" culvert.

On Site Lakes and Exfiltration Trench Drainage System:

As shown on Figure 9.3a – BBC Drainage System Map, Biscayne Bay Campus has a canal running along the North and East property lines, which separates the campus from the mangroves of Oleta State Park. Also, on the East and South lies the Biscayne Bay. A mangrove preserve and landfill lie west of the campus. There are three (3) onsite lakes: two (2) are located South of the Wolfe University Center (WUC) and one (1) is located East of the Physical Plant (S03) Building. Runoff from roofs and most parking areas is collected and discharged into the above-mentioned onsite lakes. Parking Lots No. 6 and 7 use exfiltration trench drainage systems.

Based on the Miami-Dade County Flood Criteria Map, the minimum allowable elevations of the ground surface and crown of roads is 5.5 ft. NGVD. The Biscayne Bay is a tidal water body which affects the groundwater elevations on adjacent properties. The nearest average October groundwater level contour with elevation 2.0 feet is located near US1. From the Federal Emergency Management Agency (FEMA), Flood Insurance Rate Map, Community Panel Numbers 120655-0142L and 120655-0144L (with effective date of September 11, 2009), the campus mostly lies within Zone AE (Base Flood Elevation at 9.0 feet), which is a Special Flood Hazard Area (SFHA) subject to inundation by the 1% Annual Chance Flood (100-year flood). A very small portion along the southern edge of the campus is Zone AE (Base Flood Elevation at 10.0 feet) and Zone VE (Base Flood Elevation at 10.0 feet). Zone VE is a Special Flood Hazard Area (SFHA), characterized as a coastal flood zone, subject to inundation by the 1% Annual Chance Flood (100-year flood) with an additional velocity hazard (wave action). All new construction must abide by hazard mitigation standards.

ENGINEERING CENTER

The Engineering Center (EC) site is thirty-six (36.6) acres located one mile north of Modesto A. Maidique Campus in unincorporated Miami-Dade County. At this site, water management drainage systems are designed to handle all major stormwater rainfall events on site. Currently, the stormwater runoff generated by these developments are conveyed to existing exfiltration trenches, on site dry retention areas, drainage swales, overland flow, and positive drainage pipe system. It appears that these stormwater drainage systems were not designed for any future developments. Therefore, any new development must meet all of the drainage requirements to obtain surface water permits (see Figure 9.2a – EC Drainage Map).

Based on the Miami-Dade County Flood Criteria Map, the minimum allowable elevations of the ground surface and crown of roads is 7.5 ft NGVD. For exfiltration trench design, the groundwater elevation is approximately 3.75 ft across the campus. From the Federal Emergency Management Agency (FEMA), Flood Insurance Rate Map, Community Panel Number 120635-0288L (with effective date of September 11, 2009), the campus mostly lies within Zone X, which is an area determined to be outside the 0.2% annual chance floodplain (500-year flood). All new construction must abide by hazard mitigation standards.

1. Existing Facility Capacity Analysis

The capacities of the existing stormwater systems at each of the FIU sites are sufficient for present development.

MODESTO A. MAIDIQUE CAMPUS

The positive drainage systems with lake outfalls rely on storage of the runoff within the lake banks until infiltration into the groundwater or evaporation return the water levels to normal levels. These systems require a difference of elevation between the drainage area and the lake water surface to drain the runoff through the pipes. In addition, per Section 24-42(3) of the Miami-Dade County Code of Ordinances, stormwater discharge must be pretreated by exfiltration trench or dry retention ponds prior to discharging into lakes or wet retention areas.

All the water bodies on the campus are not interconnected. This does not allow the drainage subbasins to compensate each other for inconsistencies in rainfall and runoff areas. As a result, some areas within the campus have drainage problems.

BISCAYNE BAY CAMPUS

The existing development is concentrated in the northern portion of the campus. Only the primary systems of the water and sanitary sewer infrastructure have been constructed in the southern portion. A master drainage plan was not available. The volume of runoff is handled by the existing lakes, exfiltration trenches, outfall structures and ponding in the low-lying, undeveloped areas. As is the case with Modesto A. Maidique Campus, the water bodies on the campus are not interconnected. This does not allow the drainage subbasins to compensate each other for inconsistencies in rainfall and runoff areas.

Projected Facility Demand and Capacity Analysis

The planning time frame extends to 2030. Based on projected student populations and demand, it is estimated that future development will require further exfiltration trench and/or a lake outfall system at Modesto A. Maidique Campus, Biscayne Bay Campus, and the Engineering Center. The sites appear to have sufficient area to provide additional lake area and/or exfiltration trench for future development. Implementation of any drainage improvements associated with future build-out should be ahead of development to ensure appropriate flood control.

It should be noted that the lakes at Modesto A. Maidique Campus are not interconnected which causes each area to operate as an individual subbasin. Once these subbasins are connected, some compensation on runoff exceedances can be distributed. The impact on flood protection by the removal of open space will be minimized by the implementation of a master drainage plan. A master drainage plan would enable the completion of stormwater management improvements prior to proposed development to ensure appropriate flood control.

Best Management Practices (BMP) should be incorporated into the drainage infrastructure design to minimize the impacts to ground and surface water quality. These BMP's include down-turned elbows in catch basins to collect oils and grease in the runoff prior to discharge to the ground or surface water. All new construction must abide hazard mitigation standards.

2. Existing Performance Evaluation

MODESTO A. MAIDIQUE CAMPUS

The capacities of the existing swale, exfiltration trench, and lake system are sufficient for the demand generated by the present development. The system capacity analysis shows that the campus has sufficient area to provide additional lake area and/or exfiltration trench for future development. The lakes are not interconnected which causes each area to operate as an individual sub basin. Once these subbasins are connected, some compensation on runoff exceedances can be distributed.

BISCAYNE BAY CAMPUS

The capacities of the existing swale, exfiltration trench, and lake system are sufficient for the runoff generated from the present development. The existing drainage pipes and exfiltration trench should not have excess capacity as they were probably designed for a specific drainage area.

[Irrigation Study and sea level rise issues](#)

ENGINEERING CENTER

The existing exfiltration trenches, on site dry retention areas, drainage swales, overland flow, and positive drainage pipe system are sufficient to meet the demand for drainage generated from the present development.

3. Host Community

All stormwater runoff is handled by onsite facilities at Modesto A. Maidique Campus, the Engineering Center, and Biscayne Bay Campus. None of these sites have off-campus discharge connections nor do they share stormwater facilities with the neighboring host community.

FIU has operational responsibility for the management and maintenance of the stormwater systems at Modesto A. Maidique Campus, Biscayne Bay Campus, and the Engineering Center.

b) System Analysis and Recommendations

The existing exfiltration trench and drainage pipe systems at Modesto A. Maidique Campus, Biscayne Bay Campus, and the Engineering Center were designed for specific drainage areas and, in some cases, do not have excess capacity for future development. To address this issue, the following is needed:

- Future development will require exfiltration trench and/or a lake outfall system.
- Should lake outfall systems be proposed, they should meet pretreatment requirements prior to discharging into lakes or wet retention ponds per Section 24-42(3) of the Miami-Dade County Code of Ordinances. Lakes are considered the exposed portion of the Biscayne Aquifer and therefore stormwater runoff from pervious and impervious areas have to be pre-treated prior to discharge into the Aquifer.
- All water bodies should be interconnected whenever possible to eliminate isolated subbasins and minimize the possibility of one subbasin being overburdened and another underutilized.
- Any proposed development that connects to an existing drainage system should evaluate the impacts on that system.
- A master drainage plan should be prepared based on the proposed development. Implementation should be ahead of development to ensure appropriate flood control.
- Regularly monitor and re-evaluate Disaster Resistant University-FEMA Hazard Mitigation Plan, based on proposed development and improvements.
- Best management practices (BMP's) should be incorporated into the drainage infrastructure design to minimize the impacts to the ground and surface water quality.

The level of service (LOS) for future program elements must meet state water quality and quantity regulations according to Chapters 40E-4, 40E-40, and 40E-400, FAC and other applicable local, state, and federal regulations.

Level of service for storm water drainage is a threshold beyond which a particular infrastructure is considered flooded. Table 9.1 describes the LOS standards of the Division of Environmental Resources Management of DRER. Each of the FIU sites can meet the LOS standards.

To assure that FIU continues to meet the LOS standards, it is recommended that all new developments prepare a pre-post analysis of the entire site to evaluate the 100-year flood stages.

Please note that finish floor elevations (FFEL) for proposed development must also abide by existing and new flood protection standards outlined in the 2020 Florida Building Code (FBC) and ASCE 24-05. In March 2012, additional requirements were added to the FBC and ASCE 24-05 for coastal zone Special Flood Hazard Areas (SFHA), which affects a portion of the Biscayne Bay Campus (BBC) due to its proximity to the Florida coastline.

In addition to SFHA designation, finish floor elevation standards are also governed by building use. Per Table 1-1 of ASCE 24-05, Colleges and Education Facilities are classified as Category III structures, which encompass most buildings located within the MMC, BBC and EC sites. The Recreation Complex (RC) at the MMC serves as the designated hurricane shelter for Monroe County, therefore being classified as a Category IV structure.

Table 9.1 Miami-Dade RER's LOS Standards

Type of Infrastructure	Rainstorm Design Return Period	Flooding Limits
Miami River (Primary Canal)	100-years	Top of Bank
Canals (Secondary Canal)	25-years	Top of Bank
Residential, commercial, and public structures	100-years	15 feet from front step
Principal Arterial (Evacuation routes)	100-years	Impassable at 8 inches above top of crown
Minor Arterial (4-lane roads in high traffic area)	10-years	To outer edge of traffic lanes
Collector Roads (2-lane roads on residential and commercial areas)	5-years (except 10-years for bridge of culvert in the canal system)	To crown of street
Local Roads (residential roads)	5-years	To crown of street or within 15 feet of occupied structure, whichever is lower

Source: Division of Environmental Resources Management, of Department of Regulatory and Economic Resources (DRER)

c) Existing Regulations and Programs

There are some federal, state, and local regulations governing land use and development of drainage features.

Water Quality Act of 1987

Federal legislation known as the "Water Quality Act of 1987" amended the Clean Water Act and provided federal provisions for the permitting of stormwater drainage. [This results in all stormwater discharges to waters of the United States from construction activities which disturbs a total land area of 5.0 or more acres must be authorized by a National Pollution Discharge Elimination System \(NPDES\) permit from the United States Environmental Protection Agency.](#)

Federal Emergency Management Agency (FEMA)

Federal Emergency Management Agency (FEMA) regularly updates and publishes Flood Insurance Rate Maps (FIRM) to establish eligibility for federal flood insurance.

U.S. Army Corps of Engineers and the State of Florida Department of Environmental Protection

The U.S. Army Corps of Engineers and the State of Florida Department of Environmental Protection have overlapping dredge and fill permitting criteria concerning the protection of wetland habitats and function.

South Florida Water Management District

[South Florida Water Management District has regulatory responsibility for stormwater discharge, consumptive use, and surface water management permits.](#)

Division of Environmental Resources Management, of Department of Regulatory and Economic Resources (DRER)

This Division was previously known as the Miami-Dade County Department of Environmental Resources Management (DERM) and most recently the Miami- Dade County Permitting Environmental & Regulatory Affairs (PERA). For the majority of projects in Miami-Dade County, this Division of DRER has been delegated stormwater permit responsibilities.

All stormwater management systems must obtain a Class II Permit for outfalls and a Standard Permit from the Water Control Section of the Division of Environmental Resources Management. The Division of Environmental Resources Management has an operating agreement with the South Florida Water Management District (SFWMD) to issue surface water management permits under Chapters 40E-40 and 40E-400, F.A.C.

(2) POTABLE WATER DATA AND ANALYSIS REQUIREMENTS

a) Potable Water Facility Inventory

MODESTO A. MAIDIQUE CAMPUS

The property is located within the Miami-Dade County Water and Sewer Department (M-D WASD) franchised water service area. A 30-inch main abuts the site along SW 8th Street (north side). A 12-inch main abuts the site along SW 107th Avenue on the east side and a 36-inch main also abuts the site along 117th Avenue on the west side. The site is serviced from the North by a 16-inch main, which runs along the main entrance of SW 8th Street and 112th Avenue, which is connected to internal secondary lines, composed of 8-inch and 12-inch mains. The site is also serviced from the East by three 12-inch mains connecting to SW 107th Avenue and running into campus along SW 11th Street, University Apartments Complex and Ronald W. Reagan Presidential House, respectively. From the West, two additional 12-inch mains service the site connecting to SW 117th Avenue and running into campus along SW 17th Street and the parking lot north of the FIU Campus Support Complex. All these water mains are owned and operated by M-D WASD. All water consumption is measured using water meters.

Additionally, water extension permits 20120-WAT-EXT-00098, 2011-WAT- EXT-00037 and 2012-WAT-EXT-00132 have been issued by the Water and Wastewater Engineering Section of the Division of Environmental Resources Management, of the Department of Regulatory and Economic Resources (DRER). However, none of these permits have been certified.

The source for this water supply is the Alexander Orr Water Treatment Plant, which is owned and operated by M-D WASD and has sufficient capacity to provide current water demand. The plant is presently producing water that meets Federal, State, and County drinking water standards.

BISCAYNE BAY CAMPUS

The property is located within the City of North Miami franchised water service area. A 16-inch main abuts the site along NE 151st Street to the north side, as well as a 30-inch main along NE 135th Street, to the south side of the property. The water distribution system on site consists of water mains of 8, 10, 12, and 16-inches in diameter, which tie into the before mentioned distribution mains. Water meters for each building measure all water consumption.

The source of this water is the Winson Water Treatment Plant, which is owned and operated by the City of North Miami and has sufficient capacity to provide current water demand. The plant is presently producing water that meets Federal, State, and County drinking water standards.

To reduce the irrigation demand on the potable water system, the University utilizes on site surface water lakes as the source for the campus irrigation. [A prior connection to irrigation quality, treated effluent from the North District Wastewater Treatment Plant remains, but is not being utilized due to water quality concerns. \(? Review the irrigation report that was done?\)](#) The North District Wastewater Treatment Plant is owned and operated by M-D WASD. Since this campus is on the forefront of sea level rise and salinity of the on-campus lakes is a concern, FIU should work with WASD to improve the quality of this reclaimed source to provide a more sustainable irrigation water source for the campus.

ENGINEERING CENTER

The property is located within the M-D WASD franchised water service area. A 16-inch main abuts

the site along W Flagler Street and another 16-inch main abuts the site along SW 107th Avenue. The water distribution system on site consists of 12-inch and 8-inch water mains, which tie into the before mentioned distribution mains. All these water mains are owned and operated by M-D WASD. Water meters for each building measure all water consumption for the site.

The source for this water supply is the Hialeah Preston Water Treatment Plant, which is owned and operated by M-D WASD and has sufficient capacity to provide current water demand. The plant is presently producing water that meets Federal, State, and County drinking water standards.

1. Existing Facility Capacity Analysis

i. Existing Condition

The physical condition of the water main distribution systems at all FIU sites is adequate. Pressure tests are performed regularly to assure the distribution systems meet all of the required potable water demands.

Although the water facilities of the host communities appear to have adequate capacity to serve the University, it is expected that the 10-year Water Supplies Facilities Work plan of the Miami-Dade Water and Sewer Department will call for (1) water conservation and re-use efforts, (2) facility improvements, and (3) stricter requirements for development. As per Senate Bill 360, the Work plan will restrict development unless there is sufficient water supply to meet the needs of future projects. FIU will need to work closely with M-D WASD and the host communities to assure there is sufficient capacity to meet the water consumption needs of future University development.

The potable water consumption for 2011-2012 at Modesto A. Maidique Campus, Biscayne Bay Campus and Engineering Center are shown in Tables 9.2, 9.3 and 9.4.

Table 9.2 Potable Water Consumption – Modesto A. Maidique Campus (FY 2018-19)

Building		Annual Consumption	Average GPD
CU	Chilled Water I	26,892,844	73,679
CU Expansion	Chilled Water II	30,211,720	82,772
GC I	ERNEST R. GRAHAM UNIV. CTR.	10,657,576	29,199
GC II	ERNEST R. GRAHAM UNIV. CTR.	1,263,372	3,461
GC III	ERNEST R. GRAHAM UNIV. CTR.	841,500	2,305
ENGINEERING & COMPUTER SCIENCE	ENGINEERING & COMPUTER SCIENCE	1,523,676	4,174
CBC	COLLEGE OF BUSINESS COMPLEX	1,679,460	4,601.26
W5 / W6	WEST 5 & 6	14,232,196	38,992.32
TWR I	TOWER (PUBLIC SAFETY)	102,476	280.76
TWR II	TOWER (PUBLIC SAFETY)	80,036	219.28
TWR III	TOWER (PUBLIC SAFETY)	98,736	270.51
VIERTES HAUS	VIERTES HAUS	962,640	2,637.37
DEUXIEME MAISON	DEUXIEME MAISON	2,075,736	5,686.95
CHARLES E. PERRY PRIMERA CASA	CHARLES E. PERRY PRIMERA CASA	3,424,818	9,383.06
CP	CHEMISTRY & PHYSICS	3,394,130	9,298.99
OE	OWA EHAN	2,136,288	5,852.84
OE Sprinkler	OWA EHAN	7,480	20.49
DC	DUPLICATING CENTER	61,336	168.04
GPA	OCEAN BANK CONVOCATION CENTER	3,949,440	10,820.38
	Fire Lines	118,932	325.84
UHSC	UNIVERSITY HEALTH SVC. COMPLEX	179,432	491.59
	BIOCLIMATE	102,476	280.76

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RB	RYDER BUSINESS BUILDING	856,136	2,345.58
RB Sprinkler	RYDER BUSINESS BUILDING	1,946,954	5,334.12
MMCIC	INFORMATION BOOTH	26,928	73.78
SANDFORD & DOLORES ZIFF EDU	SANDFORD & DOLORES ZIFF EDU.	523,600	1,434.52
GL I	STEVEN & DOROTHEA GREEN LIB.	1,029,996	2,821.91
GL II	STEVEN & DOROTHEA GREEN LIB.	1,401,004	3,838.37
GL Sprinkler	STEVEN & DOROTHEA GREEN LIB.	2,199,120	6,024.99
PCA	PAUL CEJAS ARCHITECTURE	1,186,328	3,250.21
W01/W03/W01A/W01B/W02	WEST 1/WEST 1 A/WEST 1 B/WEST 2/WEST 3	6,985,572	19,138.55
WC	WERTHEIM CONSERVATORY	178,024	487.74
WPAC I	HERBERT & NICOLE WERTHEIM CTR.	223,652	612.75
WPAC II	HERBERT & NICOLE WERTHEIM CTR.	111,452	305.35
CS	Campus Support Complex	497,664	1,363.46
CS	Campus Support Complex	2,401,080	6,578.30
CS	Campus Support Complex	341,836	936.54
ACH1 & ACH2	ACADEMIC HEALTH CENTER 1 & 2	2,233,528	6,119.25
RH	RONALD W. REAGAN PRES. HOUSE	1,347,178	3,690.90
M01	RECREATION TRAILER	55,360	151.67
RDB	RAFAEL DIAZ-BALART HALL	764,456	2,094.40
PPFAM	PATRICIA&PHILLIP FROST MUSEUM	202,708	555.36
AHC3	ACADEMIC HEALTH CENTER 3	738,724	2,023.90
SIPA	SCHOOL INTER. & PUBLIC AFFAIRS	1,366,596	3,744.10
Aux (Housing/Park/MARC/REC)	*Note: Breakout by building not available	17,660,381	48,384.61
TOTAL		148,274,577	406,231.72

Source: Water Consumption and Sewage Report for 2018-2019, Facilities Management

Table 9.3 Potable Water Consumption – Biscayne Bay Campus (FY 2018-19)

Building		Annual Consumption	Average GPD
HM	HOSPITALITY MANAGEMENT	874,000	2,395
HM II	HOSPITALITY MANAGEMENT	0	0
	IRRIGATION	36,000	99
	IRRIGATION II	436,000	1,195
AC1	ACADEMIC ONE	11,076,000	30,345
WUC	GREGORY B. WOLFE UNIV. CTR	1,339,000	3,668
S03	PHYSICAL PLANT	643,000	1,762
AC2	ACADEMIC TWO	370,000	1,014
AC2	ACADEMIC TWO	394,000	1,079
HL	GLENN HUBERT LIBRARY	592,000	1,622
	FIRELINES	0	0
P04	PDC-Administration	0	0
AQRC	AQUATIC RECREATION CENTER	1,366,000	3,742
KCC I	ROZ&CAL KOVENS CONFERENCE CTR.	980,725	2,687
KCC II	ROZ&CAL KOVENS CONFERENCE CTR.	0	0
P09	BBC WELLNESS CENTER	65,000	178
MSB	MARINE SCIENCES	720,000	1,973
Aux (Housing/Park/MARC/REC)	*Note: Breakout by building not available	8,727,000	23,910
TOTAL		27,618,725	75,668

Source: Water Consumption and Sewage Report for 2018-2019, Facilities Management

Table 9.4 Potable Water Consumption –Engineering Center (EC) (FY 2018-19)

Building		Annual Consumption	Average GPD
EC I	ENGINEERING CENTER	8,756,088	23,989
EC II	ENGINEERING CENTER	4,645,148	12,726

	FIRELINES	2,992	8
TOTAL		13,404,228	36,724

Source: Water Consumption and Sewage Report for 2018-2019, Facilities Management

ii. Projected Facility Demand and Capacity Analysis

Below are the projected levels of service for 2030 based on student growth and existing water consumption patterns. Projections for the Medical School are not included.

Table 9.5 Projected Need for Potable Water - Modesto A. Maidique Campus

Year	Head Count	Average GPD
2019-20	29,622	XXXX
2021-22	29,622	XXXX
2022-23	29,622	XXXX
2023-24	29,622	XXXX
2024-25	29,622	XXXX
2025-26	29,622	XXXX
2026-27	29,622	XXXX
2027-28	29,622	XXXX
2028-29	29,622	XXXX
2029-30	29,622	XXXX
2030-2031	29,622	
Average Gallons per Capita per Day		XX.XX

1) Source: FIU Enrollment Matrix

2) Source: Water Bill readings for 2018-2019, Facilities Management

3) Source: FIU Enrollment Matrix; HC was not provided for faculty/staff for 2014-2015 and 2019-2020. Therefore faculty/staff HC was calculated based on the faculty/staff to student ratio for 2011-2012.

Table 9.6 Projected Needs for Potable Water at Engineering Center

Year	Head Count	Average GPD
2019-20	2,216	XXXX
2021-22	2,216	XXXX
2022-23	2,216	XXXX
2023-24	2,216	XXXX
2024-25	2,216	XXXX
2025-26	2,216	XXXX
2026-27	2,216	XXXX
2027-28	2,216	XXXX
2028-29	2,216	XXXX
2029-30	2,216	XXXX
2030-31	2,216	XXXX
Average Gallons per Capita per Day		XX.XX

1) Source: FIU Enrollment Matrix

2) Source: Water Bill readings for 2018-2019, Facilities Management

3) Source: FIU Enrollment Matrix; HC was not provided for faculty/staff for 2014-2015 and 2019-2020. Therefore faculty/staff HC was calculated based on the faculty/staff to student ratio for 2011-2012.

Table 9.7 Projected Needs for Potable Water at Biscayne Bay Campus

Year	Head Count	Average GPD ⁽⁴⁾
2019-20	3,418	XXXX
2021-22	3,418	XXXX
2022-23	3,418	XXXX
2023-24	3,418	XXXX
2024-25	3,418	XXXX
2025-26	3,418	XXXX
2026-27	3,418	XXXX

2027-28	3,418	XXXX
2028-29	3,418	XXXX
2029-30	3,418	XXXX
2030-31	3,418	XXXX
Average Gallons per Capita per Day		XX.XX

- 1) Source: FIU Enrollment Matrix
- 2) Source: Water Bill readings for 2018-2019, Facilities Management
- 3) Source: FIU Enrollment Matrix; HC was not provided for faculty/staff for 2014-2015 and 2019-2020. Therefore faculty/staff HC was calculated based on the faculty/staff to student ratio for 2011-2012.
- 4) Does not include Reclaimed Water

2. Existing Performance Evaluation

General Performance, Condition and Expected Life of Facilities

As stated previously, the physical condition of the water main distribution systems at each of the FIU sites are adequate. Within the next ten years, M-D WASD and the host communities, which provide water supply to FIU, will be making improvements to their facilities. The improvements are expected to increase the capacity of the water plants and improve water conservation throughout the County. The intent is to increase capacity, while protecting Miami-Dade County's water resources.

To assure that future development at FIU has a minimum impact on the region's water supply, all water main improvements shall be hydraulically modeled to determine the impact to the system. In addition, hydraulic modeling of the water distribution system enables the University and M-D WASD to identify areas of concern and ensure that sufficient capacity and pressure are provided to meet future demands.

Level of Service

The water LOS is based on historical water consumed per enrolled student (population).

Water consumed by the Modesto A. Maidique Campus (MMC), Engineering Center (EC), and the Biscayne Bay Campus (BBC) during fiscal year 2018- 2019 was approximately XX million gallons (provided by FIU Facilities Management; does not include XX million gallons from reclaimed water at BBC). Based on the total number of students, faculty, and staff at FIU (xx,xxx students and x,xxx faculty & staff), it is estimated that the water consumed per student/faculty/staff was ____ (xx) gallons per day (gpd).

Table 9.8 Level of Service by University Site

FIU SITE SERVED BY FACILITY	WATER CONSUMPTION FY 2018-19	HEAD COUNT ⁽¹⁾	LOS AT FIU SITE 2018-19
Modesto A. Maidique Campus	xx,xxx,xxx Gallons	xx,xxx	xx.x Gallons per Capita per day
Engineering Center	xx,xxx,xxx Gallons	xx,xxx	xx.x Gallons per Capita per day
Biscayne Bay Campus	xx,xxx,xxx Gallons	xx,xxx	xx.x Gallons per Capita per day
Total	xxx,xxx,xxx	xx,xxx	xx.x Gallons per Capita per day

Source: Water Consumption and Sewage Report for 2018-2019, Facilities Management

- 1) LOS at FIU is based on Head Count for 2018-2019. The total only includes the campuses stated above.
- 2) BBC LOS does not include reclaimed water.

3. Host Community

MODESTO A. MAIDIQUE CAMPUS

For the Modesto A. Maidique Campus, the potable water and fire flow needs are provided by the Miami-Dade Water and Sewer Department (M-D WASH) from the Alexander Orr Water Treatment Plant. The primary source of potable water for the Modesto A. Maidique Campus is the Biscayne Aquifer. M-D WASH is the utility company, which removes the water from the aquifer, and the Alexander Orr Water Treatment Plant is where the water is treated.

The Alexander Orr Water Treatment Plant currently has a permitted rated capacity of 214.74 MGD and a total installed capacity of 256 MGD per Water-Use permit no. 13-00017-W, re-issued on July 16, 2012.

BISCAYNE BAY CAMPUS

The potable water and fire flow needs are provided by the City of North Miami Public Utilities. The water supply is from two sources, Norman Winson Water Plant and M-D WASH. All the main distribution lines are owned and operated by the City.

The City of North Miami Winson Water Plant has the capacity to supply 9.3 million gallons a day (MGD). The City of North Miami reports that on average, the plant only produces 60% of the total demand (13.5 MGD) for the City of North Miami, which is 8.7 MGD. The remaining 40% of the total demand is provided by water purchased from M-D WASH.

All of the host communities provide potable water to FIU based on demand. There is no allocation cap on potable water usage at Modesto A. Maidique Campus, Biscayne Bay Campus or the Engineering Center. However, it should be noted that an agreement between the Florida Board of Regents and M-D WASH was executed in 1975 regarding water distribution facilities at Modesto A. Maidique Campus. The agreement does not specify the amount of potable water to be allocated. It only states that an adequate supply of water shall be provided to the Modesto A. Maidique Campus property. The lease agreement has a term of forty (40) years from the date it was executed (July 1, 1975). At the end of the term (July 1, 2015), the lease agreement between the Florida Board of Regents and M-D WASH will automatically renew unless either party gives a 30-day advance notice of an intent not to renew. This is currently being negotiated.

ENGINEERING CENTER

For the Engineering Center site, the potable water and fire flow needs are provided by the Miami-Dade Water and Sewer Department (M-D WASH) from the Hialeah Preston Water Treatment Plant. The primary source of potable water for the Engineering Center is the Upper Floridian Aquifer. M-D WASH is the utility company, which removes the water from the aquifer, and the Hialeah Preston Water Treatment Plant is where the water is treated.

The Hialeah Preston Water Treatment Plant currently has a permitted rated capacity of 225 MGD and a total installed capacity of 235 MGD per Water- Use permit no. 13-00017-W. In 2013, a reverse osmosis (RO) treatment plant producing 7.5 MGD began operation. In 2015 the RO treatment plant expanded to produce a total of 10 MGD. Permit 13-00017-W was re-issued on February 9, 2015.

Table 9.9 Current Demand on Capacity for Each Facility Providing Potable Water to FIU

UNIVERSITY SITE	HOST COMMUNITY	DEMAND
Modesto A. Maidique Campus	Miami-Dade County	Alexander Orr: 214.74 MGD
Engineering Center	Miami-Dade County	Hialeah Preston: 225 MGD
Biscayne Bay Campus	City of North Miami	Winson Water Plant: 9.3 MGD

b) System Analysis and Recommendations

MODESTO A. MAIDIQUE CAMPUS

There is sufficient water treatment capacity at the Alexander Orr Water Treatment Plant for future

development at Modesto A. Maidique Campus and the Engineering Center.

The onsite primary distribution system will need expansion for future development and missing links to provide a "looped" system. New secondary systems and elimination of dead-end systems will be required.

BISCAYNE BAY CAMPUS

There is sufficient treatment capacity at the City's Norman Winson Water Plant for future development at Biscayne Bay Campus. In addition, their agreement with M-D WASD would further provide capacity if necessary. The onsite primary distribution system is sufficient for future development; however, new secondary systems will be required. Also, some existing secondary systems are presently dead end and need to become a "looped" system.

ENGINEERING CENTER

There is sufficient water treatment capacity at the Hialeah Preston Water Treatment Plant for future development at the Engineering Center.

The onsite primary distribution system will need expansion for future development and missing links to provide a "looped" system. New secondary systems and elimination of dead-end systems will be required.

c) Existing Regulations and Programs

Federal Regulations: The Federal Safe Drinking Water Act (Public Law 93-523) establishes operating standards and quality controls for the protection of public water supplies. As directed by this Act, the Environmental Protection Agency (EPA) has established minimum drinking water standards, to which every public water supply system must conform. Included are "primary" standards required for public health, and "secondary" standards which are recommended to attain a higher aesthetic quality of water.

State Regulations: In accordance with federal guidelines, the Florida Safe Drinking Water Act (Sections 403.850 -403.864, F.S.) has been adopted, which designates the Florida Department of Environmental Protection (DEP) as the state agency responsible for the regulation of drinking water. The DEP has therefore promulgated rules classifying and regulating public water systems, including mandatory water treatment criteria (Chapter 17-550, F.A.C.). The DEP enforces both the primary and secondary water quality standards for public water supplies in Florida.

In addition to the Florida Statutes discussed above, in 2005 the Florida Legislature passed Senate Bill 360. This legislation requires all jurisdictions to amend their comprehensive plans to include the following provisions:

- Require adequate water supplies no later than certificate of occupancy.
- Provide for alternative water supply development funding, more comprehensive regional water supply plans and enhanced consumptive use permitting, as per SB 444, an act relating to water resource protection and sustainability. Municipalities must identify alternative water supply projects within 18 months after the regional water supply plan is updated.
- Coordinate local government water supply plans with water management districts' regional water supply plans. Requires consultation on population projections, timing of development, annexation, and any issue that may impact water supply.

Local Regulations: FIU is subject to the State Uniform Building Code for Public Educational Facilities and exempt from local regulations. Section 6A-2.012, F.A.C. states,

"All educational facilities constructed by a board ... are hereby exempt from all other state, county, district, municipal, or local building codes, interpretations, building permits and assessments of fees for building permits, ordinances and impact fees or service availability fees."

Rule 6A-2.001(48), F.A.C., however, states that educational facilities are not exempt from assessments "...for that length and size of line actually needed to service the educational or ancillary plant on that site".

Although Modesto A. Maidique Campus is not required to obtain building permits for their projects, they regularly review projects with and pay water meter fees to the local agencies charged with regulating, monitoring and operating water facilities. The Division of Environmental Resources Management of DRER is responsible for regulating and monitoring the operation of water facilities under Chapter 24 of the County Code. M-D WASD is responsible for the distribution of potable water throughout Miami-Dade County.

Biscayne Bay Campus reviews projects with the City of North Miami and pays to the City of North Miami fees associated with installation of water meters.

d) Reclaimed Water Use

MODESTO A. MAIDIQUE CAMPUS AND ENGINEERING CENTER

Currently, Miami-Dade Water and sewer Department (M-D WASD) does not provide reclaimed water services to the West Miami-Dade County area.

BISCAYNE BAY CAMPUS

The Biscayne Bay Campus had an annual consumption (FY 2018-19) of reclaimed water of xx,xxx,xxx Gallons for irrigation.

(3) SANITARY SEWER DATA AND ANALYSIS REQUIREMENTS

a) Sanitary Sewer System Inventory

MODESTO A. MAIDIQUE CAMPUS

The property is located within the Miami-Dade County Water and Sewer Department (M-D WASD) franchised sanitary sewer service area. The closest WASD sanitary sewer is an abutting a 36-inch force main located along SW 117th Avenue. The campus sanitary sewer system consists of gravity sewer lines of 4, 6, 8, 10, and 12-inches in diameter, as well as a series of nine (9) sanitary sewer lift stations permitted under PSO 428 (99-00428A, 99-00428B, 99-00428C, 99-00428D, 99-00428E, 99-00428F, 99-00428G, 99-00428H and 99-00428I). Master lift stations LS-1 (serves east portion of campus) and LS W-1 (serves west portion of campus) transmit all the wastewater flow to the M- D WASD 36-inch force main located on the west side of the campus. The force main directs the flow to pump station 30-0187, which then transfers the flow to the Central District Wastewater Treatment Plant (CDWTP).

The 36-inch force main, pump station 30-0187, and treatment plant are owned and operated by M-D WASD. Pump stations 99-00428D and 99-00428H are in initial moratorium (IM) status. Pump station 99-00428B is in temporary moratorium (TM) status. Pump station 99-0428I is in incomplete (IN) status. The remaining five (5) private pump stations and pump station 30-0187, are currently working within the mandated criteria set forth in the First and Second Partial Consent Decree. At this time the CDWTP has sufficient capacity to treat current discharge.

Pump Stations LS-2, LS-3, LS-6 and LS-9 currently serve the East portion of the MMC. Pump Station LS-6 transmits sewage from the University Apartments (UA); Pump Station LS-3 transmits sewage from the Ronald W. Reagan Presidential House (RH); Pump Station LS-2 transmits sewage from the Academic Health Centers 1, 2 & 3 (AHC1, AHC2 & AHC3); and LS-9 transmits sewage from the Market Station (PG5). These four (4) submersible pump stations discharge into the sanitary sewer gravity collection system which flows into master lift station LS-1.

Pump Stations LS-4, LS-7, LS-8 currently serve the South and West portions of the MMC. [Pump Station LS-7 transmits all the sewage flow from the US Century Bank Arena only \(GPA\). Pump](#)

Station LS-4 transmits sewage flow from several buildings and facilities, including the Management and Advanced Research Center (MARC). Pump Station LS-8 serves the Recreation Complex (RC), the Rafael Diaz-Balart Hall (RDB) and the Labor Center (LC). These three (3) pump stations discharge into the sanitary sewer gravity collection system which flows into master lift station LS W-1.

BISCAYNE BAY CAMPUS

The property is located within the City of North Miami franchised sanitary sewer service area. The closest sanitary sewer is an abutting 12-inch force main located along Bay Vista Boulevard. The campus sanitary sewer system consists of gravity sewer lines 4, 6, 8 and 10-inches in diameter, as well as a sanitary sewer lift station permitted under PSO 756. This lift station directs the flow into pump station 06-FIU-W, which then transfers the flow to the North District Wastewater Treatment Plant (NDWTP). The above noted pump stations are at present working within the mandated criteria. The NDWTP has sufficient capacity to treat current wastewater generation.

ENGINEERING CENTER

The property is located within the M-D WASD franchised sanitary sewer service area. The closest WASD sanitary sewer is an abutting a 36-inch force main located along W Flagler Street. The campus sanitary sewer system consists of gravity sewer lines of 4, 6, and 8-inches in diameter, as well as a sanitary sewer lift station permitted under PSO 621. This lift station directs the flow into pump station 30-0187, which then transfers the flow to the CDWTP. The above noted pump stations are currently working within the mandated criteria. The CDWTP has sufficient capacity to treat current wastewater generation.

1. Existing Facility Capacity Analysis

i.Existing Condition

MODESTO A. MAIDIQUE CAMPUS

The University has taken corrective measures to improve previously identified infiltration and inflow problems. All recommended improvements have been completed.

BISCAYNE BAY CAMPUS

The University has taken corrective measures to improve previously identified infiltration and inflow problems. All recommended improvements have been completed. In addition, the University is upgrading the sanitary sewer station to handle current and projected demands. The project is currently being permitted.

ENGINEERING CENTER

The University has taken corrective measures to improve previously identified infiltration and inflow problems. All recommended improvements have been completed. In addition, the University is upgrading the sanitary sewer station to handle current and projected demands. The project is currently being permitted.

ii. Projected Facility Demand and Capacity Analysis

MODESTO A. MAIDIQUE CAMPUS

Table 9.10 calculates the sanitary sewage flows based on the statistical generation rates by head count for each fiscal year.

Table 9.10 Projected Need for Wastewater Treatment - Modesto A. Maidique Campus

Year	Head Count	Average GPD
2019-20	29,622	xxx,xxx
2021-22	29,622	xxx,xxx
2022-23	29,622	xxx,xxx
2023-24	29,622	xxx,xxx
2024-25	29,622	xxx,xxx
2025-26	29,622	xxx,xxx
2026-27	29,622	xxx,xxx
2027-28	29,622	xxx,xxx
2028-29	29,622	xxx,xxx
2029-30	29,622	xxx,xxx
2030-31	29,622	xxx,xxx
Gallons per Capita per Day		xx.x

- 1) Source: FIU Enrollment Matrix
- 2) Source: Water Bill readings for 2018-2019, Facilities Management
- 3) Source: FIU Enrollment Matrix; HC was not provided for faculty/staff for 2014-2015 and 2019-2020. Therefore faculty/staff HC was calculated based on the faculty/staff to student ratio for 2011-2012.

ENGINEERING CENTER

Table 9.11 calculates the sanitary sewage flows based on the statistical generation rates by head count for each fiscal year.

Table 9.11 Projected Need for Wastewater Treatment – Engineering Center

Year	Head Count	Average GPD
2019-20	2,216	xxx,xxx
2021-22	2,216	xxx,xxx
2022-23	2,216	xxx,xxx
2023-24	2,216	xxx,xxx
2024-25	2,216	xxx,xxx
2025-26	2,216	xxx,xxx
2026-27	2,216	xxx,xxx
2027-28	2,216	xxx,xxx
2028-29	2,216	xxx,xxx
2029-30	2,216	xxx,xxx
2030-31	2,216	xxx,xxx
Gallons per Capita per Day		xx.x

- 1) Source: FIU Enrollment Matrix
- 2) Source: Water Bill readings for 2018-2019, Facilities Management
- 3) Source: FIU Enrollment Matrix; HC was not provided for faculty/staff for 2014-2015 and 2019-2020. Therefore faculty/staff HC was calculated based on the faculty/staff to student ratio for 2011-2012.

BISCAYNE BAY CAMPUS

Table 9.12 calculates the sanitary sewage flows based on the statistical generation rates by head count for each fiscal year.

Table 9.12 Projected Needs for Wastewater Treatment - Biscayne Bay Campus

Year	Head Count	Average GPD
2019-20	3,418	xxx,xxx
2021-22	3,418	xxx,xxx
2022-23	3,418	xxx,xxx
2023-24	3,418	xxx,xxx
2024-25	3,418	xxx,xxx
2025-26	3,418	xxx,xxx
2026-27	3,418	xxx,xxx

2027-28	3,418	xxx,xxx
2028-29	3,418	xxx,xxx
2029-30	3,418	xxx,xxx
2030-31	3,418	xxx,xxx
Gallons per Capita per Day		xx.x

- 1) Source: FIU Enrollment Matrix
- 2) Source: Water Bill readings for 2018-2019, Facilities Management
- 3) Source: FIU Enrollment Matrix; HC was not provided for faculty/staff for 2014-2015 and 2019-2020. Therefore faculty/staff HC was calculated based on the faculty/staff to student ratio for 2011-2012.

2. Existing Performance Evaluation

MODESTO A. MAIDIQUE CAMPUS

The design of sanitary sewer facilities is based on a specific service area and sewage flows. For excess capacity to be available, some master planning would have been required. The major limitation to the sewage collection system is the depth of the gravity sewer mains and pump station which affects service area. The sanitary sewer subsystems, except Pump Stations LS-1 and LS W-1, are limited in the way of changes from current operation. However, LS-1 and LS W-1 should have flexibility since they operate as the master pump stations for the campus.

An Engineering Master Plan for the East Campus Sanitary Sewer System was prepared in April 2011 by C3TS. It was found that the four (4) existing pump stations (LS-2, LS-3, LS-6 and LS-9) serving the East portion of the campus, and their associated gravity sanitary sewer collection systems, are not suitable for the planned development and re-development of the area which consists of the proposed 30-acre Academic Health Sciences Center. As described in the East Campus Sanitary Sewer System Master Plan by C3TS, improvements to the gravity sanitary sewer system, and the replacement of the four (4) existing small submersible pump stations with a main submersible triplex Pump Station (LS E-1) would be required to meet the demand of the Academic Health Sciences Center. The LS E-1 would be similar to the existing LS W-1 pump station located on the West side of the campus.

Table 9.13 Sanitary Waste Generations – Modesto A. Maidique Campus (FY 2018-2019)

FLOW METER	WASTE GENERATED FY 2018-19	AVERAGE GPD
MODESTO A. MAIDIQUE CAMPUS	xxx,xxx,xxx	xx,xxx

SOURCE: FIU Water Bills readings provided by Facilities Management

BISCAYNE BAY CAMPUS

The sanitary sewer system should be adequate to handle future development of Biscayne Bay Campus. Modifications to the existing system may be necessary due to the site plan and/or system configuration. Due to the age of the system, infiltration and pump station conditions may need to be evaluated. However, the system is owned and maintained by the City of North Miami. Purchase of this sewer system by FIU is anticipated in the near future.

While the present treatment capacities of the NDWWTP exceed demand, the pump station operating time criteria may affect the issuance of a water meter.

Table 9.14 Sanitary Waste Generations – Biscayne Bay Campus (FY 2018-2019)

FLOW METER	WASTE GENERATED FY 2011-12	AVERAGE GPD
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BISCAYNE BAY CAMPUS	xxx,xxx,xxx	xx,xxx
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SOURCE: FIU Water Bills readings provided by Facilities Management

ENGINEERING CENTER

Table 9.15 Sanitary Waste Generations – Engineering Center (FY 2018-2019)

FLOW METER	WASTE GENERATED FY 2011-12	AVERAGE GPD
ENGINEERING CENTER	xxx,xxx,xxx	xx,xxx

SOURCE: FIU Water Bills readings provided by Facilities Management

3. Host Community

All the host communities provide sewer service to FIU sites based on usage. There is no allocation agreement on capacity at Modesto A. Maidique Campus, Biscayne Bay Campus, or the Engineering Center.

No data is available regarding the proportional capacity of the host community facility to meet the existing University need.

MODESTO A. MAIDIQUE CAMPUS AND ENGINEERING CENTER

The sewage from Modesto A. Maidique Campus and the Engineering Center is treated by M-D WASD's South District Wastewater Treatment Plant (SDWWTP).

The service area for South District Wastewater Treatment Plant (SDWWTP) also includes all the residential and commercial areas that border the University, the City of Sweetwater, and southern Miami-Dade County.

BISCAYNE BAY CAMPUS

The City of North Miami is the utility company that invoices FIU for the sanitary sewage produced at Biscayne Bay Campus. However, they contract with M-D WASD to provide the treatment and disposal. M-D WASD's North District Wastewater Treatment Plant (NDWWTP) is located less than a mile away from the campus near the corner of Biscayne Blvd. & NW 151 St.

The geographic service area of the City of North Miami sanitary sewer facility also includes the residential and commercial areas that constitute the City of North Miami.

Table 9.16 Facility Demand and Capacity

M-D WASD FACILITY	FIU SITE SERVED BY FACILITY	M-D WASD FACILITY 12-MONTH AVERAGE (MGD)	M-D WASD FACILITY PLANNED CAPACITY (MGD)
South District Wastewater Treatment Plant	Modesto A. Maidique Campus	xx.x	xxx.xx
South District Wastewater Treatment Plant	Engineering Center	xx.x	xxx.xx
North District Wastewater Treatment Plant thru the City of North Miami	Biscayne Bay Campus	xx.x	xxx.xx

Source: Miami-Dade County Evaluation and Appraisal Report: [YEAR??](#)

b) System Analysis and Recommendations

The Miami-Dade County Water and Sewer Department (M-D WASD) has made significant improvements to the County's sewer system as a result of the implementation of the requirements under the First and Secondary Partial Consent Decree (CASE 93-1109 CIV-MORENO), between the Miami Dade County and the Environmental Protection Agency. All the sanitary sewer pump stations are currently monitored to assure compliance with the Consent Decree as the County must certify that there is capacity in the collection and transmission system for new construction or increases in flows. The implementation of the Consent Decree also has helped to reduce infiltration and inflow in the County's collection system. While this reduction provides some additional capacity in the system, it may not be sufficient to meet the needs of the projected growth in Miami-Dade County. As a result, the County evaluates development orders that generate additional wastewater flows on a case-by-case basis. This work is accomplished under the Sewer Certification program implemented by the Division of Environmental Resources Management of DRER.

Plans to increase capacity of the system are also being reviewed and approved by the Division of Environmental Resources Management of DRER. All of these factors could have an impact on the expansion plans of the University.

The University may need to develop more specific agreements with M-D WASD and the other host communities to assure that all the University sites have sufficient capacity to meet the existing and future development needs of FIU.

c) Existing Regulations and Programs

Federal Regulations: The Federal Pollution Control Act (PL 92-500) is the controlling national legislation relating to the provision of sanitary sewer service. The goal of this act is the restoration and/or maintenance of the chemical, physical and biological integrity of the nation's waters. The act established the national policy aimed at implementing area-wide waste treatment and management programs to ensure adequate control of pollutant sources.

In addition, the First and Secondary Partial Consent Decree (CASE 93-1109 CIV-MORENO) between the Miami-Dade County and the United States Environmental Protection Agency, requires that any new construction or increase in flow within the County must obtain a Sewer Capacity Certification from the Division of Environmental Resources Management of DRER. The Sewer Capacity Certification requirement does not constitute an actual construction permit; however, all County, State or Federal properties must comply with this requirement.

State Regulations: At the State level, the Florida Department of Environmental Protection (DEP) is responsible for compliance with federal and state regulations within Florida. Florida's Safe Drinking Water Act provides for the regulation of public water systems. The act is administered under Chapter 17-22, F.A.C. which contains State standards for potable water.

Local Regulations: As a Board of Trustees facility, FIU is subject to the State Uniform Building Code for Public Educational Facilities and exempt from local regulations. Section 6A-2.012, F.A.C. states,

"All educational facilities constructed by a board ... are hereby exempt from all other state, county, district, municipal, or local building codes, interpretations, building permits and assessments of fees for building permits, ordinances and impact fees or service availability fees."

Rule 6A-2.001(48), F.A.C., however, states that educational facilities are not exempt from assessments "...for that length and size of line actually needed to service the educational or ancillary plant on that site".

Although the Modesto A. Maidique Campus is not required to pull building permits for their projects, they regularly review projects with and pay water meter fees to the local agencies charged with regulating, monitoring and operating water facilities. The Division of Environmental Resources Management, of DRER is responsible for regulating and monitoring the operation of water facilities under Chapter 24 of the County Code. M-D WASD is responsible for the distribution

of potable water throughout Dade County.

The requirements of the First and Secondary Partial Consent Decree (CASE 93-1109 CIV-MORENO) between the Miami-Dade County and the United States Environmental Protection Agency (described above under the “Federal Regulations” section) pertaining to the Sewer Capacity Certification were incorporated into a County Ordinance (99-166) and codified into Chapter 24 of the Miami-Dade County Code of Ordinances. As mentioned above, all County, State or Federal properties must comply with this requirement.

(4) SOLID WASTE DATA AND ANALYSIS REQUIREMENTS

a) Solid Waste Collection Facilities Inventory

MODESTO A. MAIDIQUE CAMPUS, ENGINEERING CENTER & BISCAYNE BAY CAMPUS

Solid Waste collection and disposal is accomplished at all campuses, including the Modesto A. Maidique Campus, Engineering Center, and Biscayne Bay Campus through a combination of utilizing University staff, private contractors, and public entities. Following is a description of the solid waste collection and disposal methods used by type of material.

Trash Collection: Trash is collected in dumpsters at all campuses using various on-campus locations. Tables 9.17 & 9.18 indicate the dumpster location, size and number of pick-ups scheduled each week. Trash collection fluctuates by season.

Table 9.17 Trash Collection Facilities: Modesto A. Maidique Campus & Engineering Center

SERVICE LOCATIONS	CONTAINERS	SIZE CONTAINER (YD)	ESTIMATED FREQUENCY OF SERVICE (DAYS/WEEK)	DAYS OF SERVICE
MODESTO A. MAIDIQUE CAMPUS (MMC)				
Charles E. Perry / Primera Casa (PC)	1	6	6	M-SAT
Management & Advanced Research Center (MARC)	1	6	5	M-F
Academic Health Center 1 (AHC1)	1	6	5	M-F
Academic Health Center 2 (AHC2)	1	6	5	M-F
Academic Health Center 3 (AHC 3)	1	6	5	M-F
Paul L. Cejas School of Architecture (PCA)	1	8		M-F
Ronald W Reagan Presidential House (RH)	1	2	5	M-SAT
Chemistry & Physics	1	6	5	M-F
Sanford & Dolores Ziff Education Building (ZEB)	1	4	3	M, W, F
Herbert & Nicole Wertheim Performing Arts Center (WPAC)	1	4	3	M, W, F
Herbert & Nicole Wertheim Performing Arts Center (WPAC)	1	20	On Call	On Call
Patricia & Philip Frost Art Museum (PPFAM)	1	2	3	M, W, F
Ryder Business Building (RB)	1	4	5	M-F
College of Business Complex (CBC)	1	8	5	M-F
Art Studio	1	4	3	M, W, F
Owa Ehan	1	6	5	M-F
US Century Bank Arena (GPA)	1	8	6	M-SAT
Deuxieme Maison	1	6	5	M-F
Steve & Dorothea Green Library (GL)	3	6	6	M-SAT
Campus Support Complex (CSC)	1	8	3	M, W, F
Campus Support Complex - Compound	1	30	1	W
Ernest R. Graham Center (GC) - Bookstore	1	8	6	M-SAT
Ernest R. Graham Center (GC) - Cafeteria Compactor	1	30	2	M, W
Recreation Complex (RC)	1	6	3	M, W, F
Rafael Diaz-Balart Hall (RDB)	1	6	5	M-F
Duplicating Center (DC)	1	2	5	M-F
Ceramics (W01C)	1	4	3	M, W, F
West 1 (W01)	1	20	On Call	On Call
West 2 (W02)	1	2	5	M-F
West 3 (W03) – Grounds (Yard Waste/Grapple)	Grapple	Grapple	3	M, W, F
West 6 (W06)	1	2	5	M-F
West 7 (W07)	1	20	On Call	On Call
W10-Support (W10)	1	20	On Call	On Call
PI Kappa Alpha	1	4	2	M, W
Phi Gamma Delta	1	4	2	M, W
FIU Baseball Stadium (BBS) & FIU Community Stadium (FIUS)	2	6	3	M, TH, SAT
Nature Preserve	1	6	3	M, TH, SAT
University Apartments (UA)	7	6	6	M-SAT
University Towers (UT)	4	4	6	M-SAT
Everglades Residence Hall (EH)	2	4	6	M-SAT
	1	2	6	M-SAT
Panther Residence Hall (PH)	3	4	6	M-SAT
	1	2	6	M-SAT
Lakeview Housing North (LVN)	2	4	6	M-SAT
Lakeview Housing South (LVS)	2	4	6	M-SAT
Lakeview Housing South (LVS)	2	4	6	M-SAT
Red Parking Garage (PGR)	1	6	5	M-F
Market Station (PG5) – Cafeteria Compactor	1	30	1	W
School of International and Public Affairs (SIPA)	1	6	3	M, W, F
ENGINEERING CENTER (EC)				
	2	6	6	M-SAT
	3	20	On Call	On Call

Source: FIU Facilities Management

Table 9.18 Trash Collection Facilities - Biscayne Bay Campus

SERVICE LOCATIONS	CONTAINERS	SIZE CONTAINER (YD)	ESTIMATED FREQUENCY OF SERVICE (DAYS/WEEK)	DAYS OF SERVICE
BISCAYNE BAY CAMPUS (BBC)				
Glenn Hubert Library (HL)	1	8	3	M, W, F
Academic Center 1 & 2 (AC1 & AC2)	1	8	3	M, W, F
Roz & Cal Kovens Conference Center (KCC)	2	2	3	M, W, F
Physical Plant (S03)	1	8	3	M, W, F
	2	20	On Call	On Call
Ecotoxicology Lab	1	8	3	M, W, F
Marine Science (MS)	1	2	3	M, W, F
Bay Vista Housing (BH1)	4	4	6	M-SAT
Wolf University Center (WUC) - Cafeteria Compactor	1	30	2	M, W

Source: FIU Facilities Management

Recycling Program Outline: The Facility Management Department's recycling program is executed by the Custodial services Department for all E&G areas on the Modesto A. Maidique Campus (MMC), the Engineering Center (EC) and the Biscayne Bay Campus (BBC).

The University's recycling efforts are governed by the State of Florida under the Florida Statute 403.714 and the Florida Solid Waste Management Act of 1988.

Single Stream Recycling Program: The FIU Facilities Management Department commenced the single stream recycling program at the MMC, EC and BBC in June 2009. The single stream recycling program eliminates the use of separate recycling bins by enabling the use of a single bin where all recyclable materials may now be placed. This program was made possible with the launch of a single stream recycling plant in South Florida operated by Waste Management Corporation.

Single stream recycling items include:

- Paper (all types)
- Boxboard & Cardboard
- Aluminum cans
- Glass jars and bottles
- Plastic bottles #1-7
- Steel and tin cans
- Paper bags

As of August 2019, there are currently over x,xxx single stream recycling bins located throughout the Modesto A. Maidique Campus, the Engineering Center, and the Biscayne Bay Campus. Single stream recycling bins have been located at the following places:

- Small bins inside all offices
- Medium-size bins by all copy room areas
- Medium-size bins near vending areas
- Medium-size bins near elevators
- Medium-size bins in hallways where classrooms are located
- Large bins located at all loading zones for all buildings
- Large bins located at all athletics facilities (FIU Community Stadium, FIU Baseball Stadium and US Century Bank Arena)
- Large bins located at all housing complexes on both MMC and BBC (on the exterior placed strategically throughout the complex)

In addition to the items listed above for single source recycling, the following items are being recycled independently:

- **Confidential Paper Destruction:** Bins with locks are delivered and picked up as

requested. Materials are shredded on-site by Micro-Shred.

- **Corrugated Paper (cardboard):** Eighteen (18) 8-yard containers for the collection of folded cardboard are located throughout the Modesto A. Maidique Campus (in buildings AHC1, AHC2, AHC3, MARC, DM, PC, CP, OE, RB, GC, CSC, CBC, GL, PG5 and SIPA), the Engineering Center and the Biscayne Bay Campus (in building AC1).
- **Tires:** Waste tires are stored in the Modesto A. Maidique Campus Nursery. The tires are then recycled through Motor Vehicle Services.
- **Wooden Pallets:** All wooden pallets are collected from different loading zones by the FIU recycling staff and taken to the recycling compound. Reusable pallets are then redistributed to University's vendors for reuse.
- **Yard Waste:** Small and medium branches are chipped on campus. Large branches, limbs and tree trunks are transported to the North Dade landfill for mulching. Grass clippings and fallen tree leaves are left on the ground to decompose.
- **Oil Filters:** Two drums for the collection of used oil filters are located at the Modesto A. Maidique Campus motor pool area, and when filled are disposed according to regulations.
- **Auto Batteries:** Auto batteries are collected by the FIU recycling staff and stored on pallets within the nursery area at Modesto A. Maidique Campus. The batteries are then recycled through Motor Vehicle Services.
- **Alkaline Batteries & Cell Phone Batteries:** All alkaline batteries and cell phone batteries are being recycled, e.g. those from electronic equipment, such as electronic door locks. Drop-off locations for students, faculty and staff are located at the Modesto A. Maidique Campus, Campus Support Complex (CSC) room 1132, and at the Biscayne Bay Campus, Academic Center 1 (AC1) room 195. The materials are picked up and recycled by AERC Recycling Solutions.
- **Cartridges & Cell Phones:** Printer toner cartridges and cell phones are being recycled. There are several drop-off locations throughout all main University buildings. In addition, there are drop-off locations for students, faculty and staff located at the Modesto A. Maidique Campus, Campus Support Complex (CSC) room 1132, and at the Biscayne Bay Campus, Academic Center 1 (AC1) room 195.
- **Light Bulbs & Ballasts:** All light bulbs as well as electrical ballasts being replaced on the Modesto A. Maidique Campus, Engineering Center and the Biscayne Bay Campus are being recycled. Bulbs are packaged in the same boxes that the new bulbs came in and are picked up by AERC Recycling Solutions which delivers them to a recycling plant in Palm Beach County.

Hazardous Waste:

- **Used Motor Oil:** Drums for the collection of used motor oil are located at each motor pool. The oil is then recycled through Motor Vehicle Services.
- **Hazardous Chemical Waste:** Materials classified as hazardous waste by the Environmental Protection Agency (EPA) is stored and disposed of in accordance with the Department of Environmental Protection (DEP), 40 CFR Part 261, and FAC 62-730.

Entities that generate hazardous are required to determine their generator category based on how much waste is generated per month. The larger the quantity of waste generated, the more stringent the requirements. FIU campuses are categorized as follows:

Modesto Maidique Campus (MMC) - Large Quantity Generator (LQG)
 Biscayne Bay Campus (BBC) - Small Quantity Generator (SQG)
 Engineering Center (EC) - Very Small Quantity Generator (VSQG)

Any waste generated by users is stored at the point of generation in a Satellite Accumulation Area (SAA) until ready for pick up by Environmental Health & Safety staff. The waste must be labeled, placed in compatible leak-proof containers, and stored in secondary containment.

Once EH&S receives a pick-up request, the collected waste is transferred to the Central Accumulation Area (CAA) to await pick-up and disposal by an approved hazardous waste vendor. During special circumstances, such as a lab clean out or high-hazard waste, the waste will be collected directly from the point of generation by the vendor. The amount of time the waste will be stored in the CAA depends on the generator classification. Per EPA, the waste can be stored on site no longer than 180 days. EH&S schedules disposal with the vendor once a month for all CAA locations.

CAAs are located on each campus in the following areas:

Modesto Maidique Campus (MMC) - Academic Health Center 4 (AHC4), room 123
 Biscayne Bay Campus (BBC) - Marine Science Building, room 117
 Engineering Center (EC), room 1510

- **Biohazardous Waste:** Biohazardous waste is stored and disposed of in accordance with FAC 64E-16, the Department of Environmental Protection (DEP), and the Department of Health (DOH) Biomedical Waste permit. Pick-up requests are coordinated and tracked by EH&S. Waste is picked up from the point of generation by an approved biomedical waste disposal vendor. The vendor also provides supplies for waste containment - biohazard containers, red biohazard bags, and sharps containers. For pharmaceutical waste, users can request a black box from the biomedical waste vendor for disposal. An itemized list of contents must be included prior to pick up. The pick-up schedule for the points of generation (academic labs, research labs, and clinics) depends on the amount of waste generated but does not exceed every 30 days. The schedule ranges from every week to once a month. Biohazardous waste is generated at MMC, BBC, and EC. EH&S has a designated biohazardous waste storage room located in AHC4 123 (MMC) to accommodate for potential overflow of waste and storage of waste supplies. MMC is currently the largest generator of biohazardous waste due to the type and level of research activities.
- **Radiation Protection Program and Radioactive Waste:** FIU has a broad radiation license and an approved Radiation Protection Program (RPP) with the State of Florida's Bureau of Radiation (BoR). The RPP is detailed in FIU's Radiation Safety Manual and involves 4 areas: (1) purchase and handling of radioactive materials and the procedures for handling and disposing of radioactive waste; (2) semi-annual, legally required, testing of sealed radioactive sources on instruments at FIU; (3) registration and safe operation of x-ray generating devices; and (4) tracking of small radioactive, check sources.

Radioactive waste materials are stored in accordance with the Bureau of Radiation

Control, Chapter 64E-5, Florida Statute Chapter 404, and the FIU Broad scope Radioactive Materials license requirements. Radioactive waste is currently generated only at the MM and Engineering campuses. The single radioactive waste storage area at each of these 3 locations are at: AHC4-123C on MMC; and OU-108 on EC. There is no radioactive waste currently generated on Biscayne Bay Campus (BBC). Only the RSO, FIU Authorized Users and trained and certified staff under these Authorized Users can handle radioactive waste to move it into the locked storage areas. On the MM Campus, waste is retrieved by the RSO and transferred to the EH&S Radioactive Waste Storage room in AHC4 123C. The short-lived radioactive waste remains in the storage room until it decays to natural background radiation levels. Longer-lived radioactive waste is disposed through an approved radioactive waste vendor. The RSO coordinates with a commercial radioactive waste vendor and the FL BoR for an annual pick up of radioactive waste. Radioactive waste is not generated in teaching laboratories but in research laboratories. The volume of radioactive waste generated each year does not change much from year to year.

Solid Waste Generation:

Table 9.19 indicates the amount of solid waste generated by campus. The amounts shown include all mixed solid waste, including waste that was recycled (average of 30% of solid waste stream is recycled by the University)

Table 9.19 Solid Waste Generation 2019-2020

Campus	Tons/Year	Tons/Day
MODESTO A. MAIDIQUE CAMPUS	X,XXX	X.XX
ENGINEERING CENTER	XXX	X.XX
BISCAYNE BAY CAMPUS	XXX	X.XX
TOTAL	X,XXX	X.XX

Source: FIU Facilities Management

1. Existing Facility Capacity Analysis

Existing Condition

Miami-Dade County is responsible for providing the landfill for the disposal of solid waste materials for solid waste generated at all University sites. Therefore, FIU is only responsible for the collection and hauling of the solid waste materials to the disposal locations. FIU currently has an aggressive solid waste recycling program and is exceeding all state recycling requirements. The specific solid waste volume at institutional facilities is dependent upon the number of University staff and support personnel, student enrollment classification mix, student on-campus housing/boarding, operating methods, materials purchased, and other related factors.

Below is an account of the solid waste and recycling material generated by each FIU site. Per results from RecycleMania Competition 2011, FIU recycled 27.74% of its total waste stream.

Table 9.20 Solid Waste and Recycling Material Generated by FIU Site: July 2019- June 2020

FIU Site	Solid Waste(Tons)	Single Stream Recycling (Tons)	Total Tons
Modesto A. Maidique Campus	X,XXX	X,XXX	X,XXX
Engineering Center	X,XXX	X,XXX	X,XXX
Biscayne Bay Campus	X,XXX	X,XXX	X,XXX
Total	X,XXX	X,XXX	X,XXX

Source: FIU Facilities Management & RecycleMania Competition [YEAR] results

Projected Facility Demand and Capacity Analysis

Below is an account of the level of service provided at each FIU site for solid waste and recycling:

Table 9.21 Solid Waste and Recycling Level of Service: July 2019- June 2020

FIU Site	FTE ⁽¹⁾	Solid Waste ⁽²⁾	Recycling ⁽³⁾
Modesto A. Maidique Campus	x,xxx	x.xx lbs per capita per day	x.xx lbs per capita per day
Engineering Center	x,xxx	x.xx lbs per capita per day	x.xx lbs per capita per day
Biscayne Bay Campus	x,xxx	x.xx lbs per capita per day	x.xx lbs per capita per day
Total	xx,xxx	x.xx lbs per capita per day	x.xx lbs per capita per day

- 1) Source: FIU Enrollment Matrix
- 2) Source: FIU Facilities Management
- 3) Source: RecycleMania Competition 2019 results

Table 9.22 indicates the projected five and ten-year solid waste generation for the University, and it is based on the estimated total pounds per full time equivalent (FTE) student and faculty/staff, per day calculated for each campus on Table 9.21.

Table 9.22 Projected Solid Waste and Recycling Material Generation 2020-2023

2020-2021			
	FTE's	TONS/YEAR	TONS/DAY
MODESTO A. MAIDIQUE CAMPUS	x,xxx ⁽¹⁾	x,xxx (2)	x.xx
ENGINEERING CENTER	x,xxx ⁽¹⁾	xxx (2)	x.xx
BISCAYNE BAY CAMPUS	x,xxx ⁽¹⁾	xxx (2)	x.xx
TOTAL	xx,xxx	x,xxx	x.xx
2021-2022			
MODESTO A. MAIDIQUE CAMPUS	xx,xxx ⁽³⁾	x,xxx	x.xx
ENGINEERING CENTER	x,xxx ⁽³⁾	x,xxx	x.xx
BISCAYNE BAY CAMPUS	x,xxx ⁽³⁾	x,xxx	x.xx
TOTAL	xx,xxx	x,xxx	x.xx
2022-2023			
MODESTO A. MAIDIQUE CAMPUS	xx,xxx ⁽³⁾	x,xxx	x.xx
ENGINEERING CENTER	x,xxx ⁽³⁾	x,xxx	x.xx
BISCAYNE BAY CAMPUS	x,xxx ⁽³⁾	x,xxx	x.xx
TOTAL	xx,xxx	x,xxx	x.xx

- 1) Source: FIU Enrollment Matrix
- 2) Source: FIU Facilities Management
- 3) Source: FIU Enrollment Matrix; FTE was not provided for faculty/staff for 2014-2015 and 2019-2020. Therefore faculty/staff HC was first calculated based on the faculty/staff to student ratio for 2011-2012. Faculty/staff FTE was then calculated based on faculty/staff HC to FTE ratio for 2011-2012.
- 4) Since the pandemic took place during 2020-2021, data is not concurrent with the previous and future projections

2. Existing Performance Evaluation

The University has sufficient facility capacity and maintenance personnel to serve the current solid waste generation at the Modesto A. Maidique Campus, Biscayne Bay Campus, and Engineering Center.

3. Host Community

FIU utilizes the Miami-Dade County solid waste facilities, which serve the entire County. None of the FIU sites have an allocation agreement regarding the disposal of solid waste.

Miami-Dade County is responsible for providing a landfill for the disposal of solid waste materials. Therefore, FIU is only responsible for the collection and hauling of the solid waste materials to the disposal locations from each campus. Table 9.23 is a list of solid waste service providers.

Table 9.23 Solid Waste Service Providers

SERVICE PROVIDER	VOLUME
Waste Management, Inc. of Florida - Trash removal service 2125 NW 10 CT Miami, FL 33127 (305) 471-4444	Average 5,000 tons/year
Waste Management, Inc. of Florida Single Stream Recycling 2125 NW 10 CT Miami, FL 33127 (305) 471-4444	Average 1,400 tons/year
Waste Management, Inc. of Florida – Cardboard Recycling 2125 NW 10 CT Miami, FL 33127 (305) 471-4444	Average 100 tons/year
Motor Pool Tires	Not available
Ricky's Waste Oil Used motor oil 6330 W. 16 AVE, Hialeah, FL: 33012 (305) 822-2253	Approximately 6 drums/year
Ricky's Waste Oil Used oil filters 6330 W. 16 AVE, Hialeah, FL: 33012 (305) 822-2253	Not available
E-Scrap Light bulbs, ballasts and batteries 2220 East 11 th AVE, Miami, FL 33013	Average 500 tons/year
Micro-Shred- Confidential Paper 19593 NE 10 AVE, Miami, FL 33179	Average 200 tons/year

Source: FIU Custodial Solid Waste Recycling Department, February 2001; revised in September 2012 for Facilities Management

The solid waste facilities include the Resources Recovery waste-to-energy facility, the North Dade Landfill (a trash-only facility) and the South Dade Landfill (a garbage and trash facility). These facilities are supported by three regional waste transfer stations.

The predominant land uses served by the County's disposal facilities include residential and commercial areas.

b) System Analysis and Recommendations

Based on the information provided by the FIU Facilities Management and RecycleMania Competition, the University has continued to increase the percentage of solid waste being recycled and shown a decrease in total tonnage of solid waste generated at the Modesto A. Maidique and Biscayne Bay Campuses between FY 2010 and FY 2011. As shown in Table 9.21, there are opportunities to further reduce waste generation at the Biscayne Bay Campus and Engineering Center, which generate an average of 1.17 pounds per capita per day of solid waste, in comparison to 0.93 pounds per capita per day of solid waste generated at the Modesto A. Maidique Campus.

The University should identify factors at the Biscayne Bay Campus and Engineering Center which are causing the increased solid waste generation and provide strategies for reducing the solid waste generation. This may include enhanced recycling campaigns, evaluation of recycling bin locations, and modifications to processes which may be generating additional waste.

Additional Recycling Opportunities:

Absent from the list of recycled materials are white goods, which may be generated by the campus housing units, University food courts and faculty/student lounges. As part of the solid waste goals, objectives and policies, attention should be given to policies which lead to the implementation of programs for the recycling of these additional materials.

The University may also investigate policies requiring contractors to recycle a percentage of

construction waste generated by renovation/redevelopment projects.

Solid Waste Management Trust Fund: The Florida Department of Environmental Protection (DEP) administers the Solid Waste Management Trust Fund as a source of money for grants to local governments for solid waste management, recycling, and public education; for demonstration projects, college, and university research, and to administer the Department's solid waste management programs.

The Solid Waste Management Trust Fund also is used for demonstration grants and research into the proper management and recycling of solid waste, including used oil, waste tires, manufacture of plastic foam products, disposal of white goods, disposal of seafood wastes, the use of rubber from used tires and plastics in building materials and in transportation, and for composting.

During the development of the solid waste goals, objectives and policies consideration will be given to formulation of a policy whereby FIU will seek to participate in the Solid Waste Management Trust Fund Program.

Compactors: Research should be conducted to study the benefits of replacing the standard front-load containers with vertical compactors. Most compactors have an average compact ratio of 1:3, greatly reducing the volume of waste and resulting in a significant reduction in frequency of hauling solid waste to the corresponding landfills.

c) Existing Regulations and Programs

Federal Regulations: The federal government regulates solid waste to minimize the potential for environmental impacts, and to encourage resource recovery. The U.S. Environmental Protection Agency (EPA) reviews solid waste management facilities for air and water quality impacts. The U. S. Army Corps of Engineers, along with the Florida Department of Environmental Protection (DEP), regulate filling activities in wetlands. The 1976 Federal Resource Conservation and Recovery Act (PL 94-580) removed the regulatory constraints that impeded resource recovery in order to encourage states to conserve materials and energy.

The Resource Conservation and Recovery Act also addresses the regulation of hazardous wastes. Pursuant to this Act, EPA has set forth guidelines and standards for the handling of hazardous wastes, and directs state agencies, including Florida's DEP, to regulate hazardous waste management. To aid in hazardous waste management financing, the EPA "Superfund" Program was established by the Comprehensive Emergency Response and Compensation Liability Act of 1980. This Act provided EPA with the funds to respond to sites requiring clean-up and emergency mitigation and allows local governments to apply for funding of their hazardous waste management projects.

State Regulations: The environmental impacts of solid waste are regulated at the state level by the Florida Department of Environmental Protection (DEP). The DEP follows the solid waste management guidelines set forth in Rule 17-701, F.A.C. when permitting solid waste facilities. Specifically, the DEP has established evaluation criteria for the construction, operation, closure, and long-term care of landfills. The agency also regulates the handling, classification, and disposal of wastes, as well as resource recovery operations.

The 1974 Florida Resource Recovery and Management Act (Chapter 403.701, F.S.) required each county to prepare a Solid Waste Management Plan. In 1988 this Act was amended by the Solid Waste Management Act to establish state goals, regulations, and programs for a host of solid waste activities. A central focus of the amendment is recycling. It mandates those counties recycle thirty percent of their total municipal solid waste by December 1994 and requires counties and municipalities to have initiated recycling programs by July 1, 1989. No more than half of the 30% can be met with yard trash, white goods, construction debris and tires. It requires that, at minimum, a majority of newspaper, aluminum cans, glass and plastic must be separated from the solid waste stream and offered for recycling. The State imposes deadlines for the separate handling of various special wastes, including construction and demolition debris, yard waste, white goods and used

batteries and oil, to divert their disposal away from the landfills. Composting of other mechanically treated solid waste and yard trash is also encouraged.

Additionally, the new law requires municipalities to determine the full cost of solid waste management, to update it annually, and to provide this cost information to consumers. Other changes include the establishment of a Solid Waste Management Trust Fund to encourage innovative solutions to solid waste management and recycling, and encouragement of the use of enterprise funds to operate solid waste services.

Miami-Dade County Regulation: The principal authority of the County to regulate solid waste collection and disposal in the incorporated and unincorporated areas of County is provided for in the Home Rule Charter. Pursuant to Article 1, Section 1.01, Paragraph 9 of the Miami-Dade County Home Rule Charter, the Board of County Commissioners has the power to provide and regulate waste collection and disposal and, for incorporated areas, to delegate this authority to municipal governments.

Additional authority is provided for in Section 403.706(1) and (2)(b), F.S. In this section, the State of Florida mandates the establishment of a local Resource Recovery and Management Program. Furthermore, it designates that, unless otherwise agreed upon by interlocal agreement:

"... the board of county commissioners shall administer and be responsible for the local resource recovery program ... for the entire county."

Accordingly, through Chapter 15 of the Miami-Dade County Code, the Board of County Commissioners regulates all waste collection and disposal activities. This authority has been exercised through a number of County ordinances, one of which prohibits private collectors from disposing of solid waste in any location other than a County approved facility.

Responsibility for the collection and disposal activities has been assigned in the County Code as follows: The Public Works and Waste Management Department is designated to perform the function of solid waste disposal countywide in Chapter 2, Article XIV, Section 2-100, (f) and the Director of Solid Waste Collection Department is empowered to operate and administer the collection service, designate collection areas in the unincorporated area and enforce collection procedures.

The environmental impacts of solid waste disposal facilities are addressed in the extensive permitting requirements at the state and federal levels. Potential impacts of solid waste facilities on air and water quality are reviewed by the U.S. Environmental Protection Agency and the Florida Department of Environmental Regulation. At the local level, the Division of Environmental Resources Management, of Department of Regulatory and Economic Resources (DRER) has broad authority under Chapter 24 of the Code of Miami-Dade County to regulate facilities to protect the environment. (Source: Miami-Dade County Comprehensive Plan).