9.0 GENERAL INFRASTRUCTURE ELEMENT

STORM WATER MANAGEMENT SUB-ELEMENT

(1) DATA REQUIREMENTS.

a) Stormwater Management System Inventory

MODESTO A. MAIDIQUE CAMPUS

Modesto A. Maidique Campus covers approximately three hundred and forty two (342.2) acres. 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 9.1 – Drainage Map, the breakdown of these methodologies is as follows:

Percolation and exfiltration trench systems:

- The Student Housing Area,
- Portions of the roadway system,
- The parking lot north of the Engineering and Computer Science building,
- Part of the parking lot northwest of the Ryder Business Administration building, and
- Some of the parking lots in the physical plant building area.

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
- The Pharmed Arena area.

The balance of the site, which is recreation or undeveloped open space, relies on swale drainage, sheetflow 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, Flood Insurance Rate Map, Community Panel Number 125098-0170F, the campus lies within Zone X, areas of 500-year flood. All new construction must abide hazard mitigation standards.

BISCAYNE BAY CAMPUS

Biscayne Bay Campus property covers approximately one hundred ninety five (195) acres located in the northeast Miami-Dade County area. 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 two out falls located on the north and east sides of the site. The north out fall system consists of a 42-inch culvert and the east out fall consists of an 8“x 12” culvert.

On Site Lakes and Exfiltration Trench Drainage System:
As shown on Figure 9.3: Drainage System Map, Biscayne Bay Campus has a canal on the north and east that 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. Roof runoff and most of the parking areas runoff is collected and discharged into onsite lakes. Parking lots No. 6 and 7 use exfiltration trench drainage systems. There are two onsite lakes: one is adjacent to Academic One and the Wolfe University Center and the other is next to the Physical Plant Building.

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 effects the groundwater elevations on adjacent properties. The nearest average October groundwater level contour with elevation 2.0 is located near US1. From the Federal Emergency Management Agency, Flood Insurance Rate Map, Community Panel Number 125098-0092G the campus lies within Zone AE (el 8, 9 & 10) and Zone VE (el 10). The majority of the site is Zone AE (el 9) with a portion of the campus in the northwest corner as Zone AE (el 8). A very small portion along the southern edge of the campus is Zone AE (el 10) and Zone VE (el 10). Zone AE are special flood hazard areas inundated by a 100-yard flood with base flood elevations determined. Zone VE is the same as Zone AE with an additional velocity hazard (wave action). All new construction must abide hazard mitigation standards

ENGINEERING CENTER
The Engineering Center site is thirty-six (36) acres located one mile north of Modesto A. Maidique Campus in the western Miami-Dade County area. 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 and wet retention areas, drainage swales, lakes, 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 9.2: 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 ranges is approximately 3.75 ft across the campus. From the Federal Emergency Management Agency, Flood Insurance Rate Map, Community Panel Number 125098-0170F, the campus lies within Zone X, areas of 500-year flood. All new construction must abide hazard mitigation standards.

b) **System operation and maintenance**

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.

c) **Geographic service area and surrounding land uses**

MODESTO A. MAIDIQUE CAMPUS

Modesto A. Maidique Campus is bounded to the east by SW 107th Avenue, to the west by SW 117th Avenue, to the north by SW 8th Street and to the south by the Tamiami Park. The principal land use adjacent to the campus and extending out a mile radius is primarily low density single family residential development. Suburban character strip commercial development as well as higher density multifamily residential is clustered along portions of the main roadway arterials in the vicinity of the campus.

BISCAYNE BAY CAMPUS

Biscayne Bay Campus is located in the City of North Miami along NW 151st Street. The principal land use in the context area immediately surrounding the campus is Parks and Recreation and environmentally protected parks and open space. Beyond the public open space, extensive single family residential development extends to the south and west. Strip commercial development and multifamily development occurs along the two principal arterials in the context area, Federal Highway and Sunny Isles Boulevard.

ENGINEERING CENTER

The principal land uses adjacent to the site and extending out a mile radius are primarily low density single family residential development to the south and commercial and industrial use to the north. Strip commercial development and higher density multifamily residential is clustered along SW 107th Avenue and West Flagler Street.

d) **Facility demand and capacity**

The stormwater systems at each of the FIU sites are designed for a 100 year flood.

MODESTO A. MAIDIQUE CAMPUS

The capacities of the existing swale and lake system are sufficient for the demand generated by 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 sub basins 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.

ENGINEERING CENTER

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

e) **Level of service**

The level of service (LOS) for future program elements must meet state water quality and quantity regulations according to Chapter 40E 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. Below is a description of the LOS standards of the Miami-Dade Department of Environmental and Resource Management. Each of the FIU sites is able to meet the LOS standards.

Miami-Dade DERM'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	5-years	To crown of street or within

Type of Infrastructure	Rainstorm Design Return Period	Flooding Limits
roads)		15 feet of occupied structure, whichever is lower

Source: Miami-Dade Department of Environmental Resource Management (DERM)

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.

(2) ANALYSIS REQUIREMENTS

a) 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 evapotranspiration 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. All of 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, 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.

b) Projected facility demand and capacity analysis

The planning time frame extends to 2015. 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.

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

c) **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.
- 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.
- Disaster Resistant University-FEMA Hazard Mitigation Plan
- Best management practices (BMP's) should be incorporated into the drainage infrastructure design to minimize the impacts to the ground and surface water quality.

d) **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.

Department of Environmental Resource Management (DERM)
For the majority of projects in Miami-Dade County, the Department of Environmental Resource Management (DERM) has been delegated stormwater permit responsibilities.

POTABLE WATER SUB-ELEMENT

(1) DATA REQUIREMENTS.

a) **Potable water facility inventory**

MODESTO A. MAIDIQUE CAMPUS
The water main distribution system for Modesto A. Maidique Campus connects to 12" and 36" water mains located on SW 8th Street and SW 117th Avenue. These water mains are owned and maintained by Miami-Dade Water and Sewer Department (WASD). The primary distribution system ties into the existing water lines at several locations. Most of these connections are predominately 12 inches in diameter. There is a 16 inch diameter pipe, which runs along the main entrance drive from SW 8th Street to approximately the College of Health Building. This 16 inch primary line is connected to the secondary lines that supply the potable water to the buildings. This line also provides fire flow to a number of existing buildings. All of the site water mains are maintained by WASD

Many buildings receive water services and fire protection directly from the primary distribution system. There are a few secondary distribution systems that connect to the primary distribution system. Generally, these systems are smaller and specific to a building or limited service area. Pharmed Arena has a looped 8" water main and an 8" water main connects two links of the primary distribution system by

running along and providing service to the Central Utility, Viertes Haus, Green Library, Owa Ehan and Chemistry and Physics buildings. Water consumption is measured by the use of water meters.

BISCAYNE BAY CAMPUS

The water main distribution system for Biscayne Bay Campus connects to 16" and 30" water mains located on NW 151st Street and NW 135th Street. These primary transmission water mains are owned and maintained by the City of North Miami. The main primary distribution system that runs through the campus consists of 16" to 20" diameter water mains which connect to the 16" and 30" water main located on NW 151st and NW 135th Street. An 8" diameter water main serves as a secondary distribution line and provide the water needs for the Physical Plant/Public Safety Area and the Student Housing Area. Water meters for each building measure all water consumption. The core area of the campus has a secondary distribution system with a 10" diameter water main.

To reduce the irrigation demand on the potable water system, the University utilizes irrigation quality, treated effluent from the North Regional Wastewater Treatment Plant

ENGINEERING CENTER

The water distribution system for the Engineering Center site connects to a 30" water main located on SW 107th Avenue. This water main is owned and maintained by WASD. The primary system for this campus ties into a secondary system that provides water to the existing building. WASD maintain all of the on-site water mains up to the water meter. Water meters for each building measure all water consumption for both sites.

b) **System operation and maintenance**

MODESTO A. MAIDIQUE CAMPUS AND ENGINEERING CENTER

For Modesto A. Maidique Campus and the Engineering Center site, the potable water and fire flow needs are provided by the Miami-Dade Water and Sewer Department WASD) from the Alexander Orr Water Treatment Plant. The primary source of potable water for Modesto A. Maidique Campus and Engineering Center is the Biscayne Aquifer. WASD is the utility company, which removes the water from the aquifer, and the Alexander Orr Water Treatment Plant located at 6700 S.W. 87th Avenue is where the water is treated.

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 WASD. All of the main distribution lines are owned and operated by the City.

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 WASAD 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.

c) **Geographic service area and surrounding land uses**

MODESTO A. MAIDIQUE CAMPUS AND ENGINEERING CENTER

The service area for the Alexander Orr Plant, which provides potable water to Modesto A. Maidique Campus and the Engineering Center, extends from south of Flagler Street to S.W. 248 Street. The land uses are primarily residential and commercial. The geographic service area for the FIU facility is Modesto A. Maidique Campus and the Engineering Center. The predominant types of land uses served by the facility are; academic, support and recreation.

BISCAYNE BAY CAMPUS

The geographic service area of the City of North Miami water facility includes the Biscayne Bay Campus as well as the residential and commercial areas that constitute the City of North Miami. The geographic service area for the FIU facility is Biscayne Bay Campus. The predominant types of land uses served by the facility are; academic, support and recreation.

d) **Facility demand and capacity**

Since the Miami-Dade County Water and Sewer Department is the primary source of potable for all the facilities in the host communities, it is important to note that the County is in the process of renewing its Agreement with the South Florida Water Management District. The approval of the Agreement is contingent on the completion of the 10-year Water Supplies Facilities Workplan and the adoption of water conservation and re-use programs. FIU will need to work closely with WASD to assure that there is sufficient water capacity for new projects.

MODESTO A. MAIDIQUE CAMPUS AND ENGINEERING CENTER

Current improvements at the Alexander Orr Plant will increase the permitted rated capacity from 217.7 MGD, to 248 MGD in 2005, and 278 MGD in 2014.

BISCAYNE BAY CAMPUS

The City of North Miami has the capacity to supply 9.3 million gallons a day (MGD), but on average produces 8.7 MGD. This is about 60% of the total demand which is approximately 13.5 MGD. The other 40% of the demand is provided by water purchased from WASD.

The following provides the current demand on capacity for each of the facilities that provide potable water to FIU sites:

UNIVERSITY SITE	HOST COMMUNITY	HEAD COUNT* LOS AT FIU SITE 2005-06**
Modesto A. Maidique Campus	Miami-Dade County	Alexander Orr: 248 MGD in 2005
Engineering Center	Miami-Dade County	Alexander Orr: 248 MGD in 2005
Biscayne Bay Campus	City of North Miami	Winson Water Plant: 13.5 MGD

Below is a detailed account of water consumption per University site:

MODESTO A. MAIDIQUE CAMPUS

The potable water consumption for 2005-2006 at Modesto A. Maidique Campus is shown in Tables 9.1.

Table 9.1 Potable Water Consumption – Modesto A. Maidique Campus (FY 2005-06)

Building	Annual Consumption	Average GPD
GC	11,509,004	31,532
ECS	1,283,106	3,515
GC III 8429290745	663,476	1,818
P. Garage 3 8759085821	38,148	105
P. Garage 4 6128961769	26,928	74
W4 North	2,493,293	6,831
Tower	308,940	846
VH	2,514,028	6,888
CU	30,100,268	82,466
DM	1,210,264	3,316
PC	3,301,672	9,046
CP	5,765,584	15,796
OE Sprink	0	-
OE	2,294,862	6,287
Dupli'tng	89,760	246
GPA	4,373,546	11,982
Fire Lines	321,640	881
Health Svc	840,752	2,303
Bioclimat	965,665	2,646
BA	916,300	2,510
927522332 (Spr. BA)	627,572	1,719
Wellness	71,060	195
Inf. Booth 1975233200	95,744	262
Ed. Bldg 2375233200	619,326	1,697
6725233200 (Library)	1,047,852	2,871
7725233200 (Library)	3,022,660	8,281
5175233200 (Library)	1,188,572	3,256
8963150556 (Sch. Of Arch)	554,268	1,519
Joint Ctr	151,096	414
GC2 8525233200	1,807,168	4,951
W1-W3 4806233200	4,681,733	12,827
BioGreen House	864,688	2,369
PAC 0625233200	197,472	541
PAC 1625233200	100,980	277
Parking Garage	106,964	293
Cam Suppt. 9806233200	287,980	789
Cam Suppt. 0906233200	1,172,592	3,213
Cam Suppt. 8806233200	436,125	1,195

Health and Life 3963953511	1,954,524	5,355
Pres House 4525233200	567,732	1,555
1687118786	214,441	588
MISC	12,000,000	32,877
Total	100,787,785	276,131

Source: Water Consumption and Sewage Report for 2005/2006, Facilities Management

BISCAYNE BAY CAMPUS

The potable water consumption for 2005-06 at Biscayne Bay Campus is shown in Table 9. 2.

Table 9.2 Potable Water Consumption – Biscayne Bay (FY 2005-06)

BUILDING	ANNUAL CONSUMPTION	AVERAGE GPD
Tc 02990	849,000	2,326
Irri/Pool 03020	4,795,000	13,137
Irri/Lib 03080	333,000	912
Aca I 03070	12,975,000	35,548
Stu Ctr 03010	1,906,000	5,222
Phy Pit 03170	448,000	1,227
Aca II 07890	456,000	1,249
Aca II 07892	487,000	1,334
Lib 03060	871,000	2,386
HRS 07885	61,000	167
Marine Bio. 7760	7,000	19
Swim Pool	285,000	781
Conf. Ctr. 03190	491,000	1,345
Conf. Ctr. 03180	458,000	1,255
TcC 03000	4,000	11
City of No. Miami Beach	426,000	1,167
Student Health 03050	82,000	225
Total	24,934,000	68,312

*Does not include Reclaimed Water (37,579,520 gallons for 2005/2006).
Source: Water Consumption and Sewage Report for 2005/2006, Facilities Management

ENGINEERING CENTER

Table 9.3 Potable Water Consumption –Engineering Center (EC) (FY 2005-06)

BUILDING	ANNUAL CONSUMPTION	AVERAGE GPD
Ceas/Cordis 6674233200	10,765,216	29,494
Ceas/Cordis 4674233200	1,240,934	3,400
Firelines 0774/1774	748	2
TOTAL	12,006,898	32,896

Source: Water Consumption and Sewage Report for 2005/2006, Facilities Management

e) Level of service

Table 9.4 Potable Water Level of Service by Facility

WASD FACILITY	REQUIRED FACILITY LOS	FIU SITE SERVED BY FACILITY	HEAD COUNT*	LOS AT FIU SITE 2005-06**
Alexander Orr Plant	200 Gallons per Capita per day	Modesto A. Maidique Campus and Engineering Center	27,307	11 Gallons per Capita per day
City of Miami Beach thru the Hialeah/Preston Plant	140 Gallons per Capita per day	Wolfsonian Museum and Annex		
Winson Water Plant thru the City of North Miami	125 Gallons per Capita per day	Biscayne Bay Campus	7,540	9 Gallons per Capita per day
		Total	34,847	11 Gallons per Capita per day

*LOS at FIU is based on Head Count for 2004/2005. The total does not include Broward Pines, Off-campus, or On-line students.
**BBC LOS does not include reclaimed water.
Source: Development Agreement Between the FIU Board of Trustees and Miami-Dade County the Development Agreement Between the FIU Board of Trustees and the City of North Miami, and the City of Miami Beach Comprehensive Plan.

(2) ANALYSIS REQUIREMENTS

a) Existing facility capacity analysis

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 Workplan 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 Workplan will restrict development unless there is sufficient water supply to meet the needs of future projects. FIU will need to work closely with WASD and the host communities to assure there is sufficient capacity to meet the water consumption needs of future University development.

b) Projected facility demand and capacity analysis

Below are the projected levels of service for 2015 based on student growth and existing water consumption patterns. Projections for the Medical School are not included.

MODESTO A. MAIDIQUE CAMPUS

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

Year	Head Count	Average GPD
2005-06		276,131
2006-07	29,255	321,805
2007-08	30,389	334,279
2008-09	31,568	347,248
2009-10	32,792	360,712
2010-11	34,065	374,715
2014-15	42,146	463,606
Average Gallons per Capita per Day		11

Source: Facilities Management

BISCAYNE BAY CAMPUS

Table 9.6 Projected Needs for Potable Water At Biscayne Bay Campus

Year	Head Count	Average GPD*
2005-06	7,540	68,312
2006-07	7,842	71,044
2007-08	8,155	73,886
2008-09	8,481	76,842
2009-10	8,821	79,915
2010-11	9,174	83,112
2014-15	9,541	86,436
Average Gallons per Capita per Day		9

*Includes Reclaimed Water
Source: Facilities Management

c) 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, 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.

Level of Service

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

Water consumed during fiscal year 2005-2006 was approximately 137 million gallons (provided by FIU Staff). Based on the total number of full-time students at FIU (34,847 students), it is estimated that the water consumed per student was eleven (11) gallons per day (gpd).

TABLE 9.7 Level of Service by University Site

FIU SITE SERVED BY FACILITY	WATER CONSUMPTION FY 2005-06	HEAD COUNT*	LOS AT FIU SITE 2005-06**
Modesto A. Maidique Campus and Engineering Center	100,787,785 Gallons 12,006,898 Gallons	27,307	11 Gallons per Capita per day
Wolfsonian Museum and Annex	32,500 Gallons		
Biscayne Bay Campus	24,934,000 Gallons	7,540	9 Gallons per Capita per day
Total	137,761,183	34,847	11 Gallons per Capita per day

*LOS at FIU is based on Head Count for 2004/2005. The total does not include Broward Pines, Off-campus, or On-line students.
**BBC LOS does not include reclaimed water.
Source: Water Consumption and Sewage Report for 2005/2006, Facilities Management

d) System Analysis and Recommendations

MODESTO A. MAIDIQUE CAMPUS AND ENGINEERING CENTER

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. However, the County should seek an increase in the permitted average day withdrawal allocation and maximum day allocation for the wellfield.

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 WASAD 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.

e) 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. Miami-Dade County Department of Environmental Resources Management

(DERM) is responsible for regulating and monitoring the operation of water facilities under Chapter 24 of the County Code. WASAD 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.

SANITARY SEWER SUB-ELEMENT

(1) DATA REQUIREMENTS.

a) **Sanitary Sewer system inventory**

MODESTO A. MAIDIQUE CAMPUS

Modesto A. Maidique Campus sanitary sewer system consists of gravity sewer lines, a series of sanitary lift stations, and two tie in connection points located at SW 8th Street and SW 117th Avenue. These two force mains are owned and maintained by WASD. Sewage flow from Modesto A. Maidique Campus is processed and treated at the South District Wastewater Treatment Plant (SDWTP)

Pump Station No. 1 serves the student housing area. Sewage from this pump station is transmitted through a 4" force main, which discharges into the gravity line located north of Pump Station No. 2. Pump Station No. 2 is the master lift station of the campus. This pump station transmits all the sewage flow into the WASAD 36" diameter force main.

Gravity sewer lines range from 8" to 12" in diameter discharge into this lift station. Pump Station No. 3 transmits all the sewage flow from the Pharmed Arena only. Pump Station No. 4 transmits sewage flow from several buildings and facilities located on the west side of the campus. Pump Station No. 5 transmits all the sewage flow for the NOAA Hurricane building only.

BISCAYNE BAY CAMPUS

Biscayne Bay Campus sanitary sewer system consists of gravity sewer lines and a master pump station. The City of North Miami is contracted with WASD to provide treatment and disposal for this campus. Sewage flow for this campus is processed and treated at North District Wastewater and Treatment Plant (NDWTP) located on the corner of Biscayne Boulevard and N.W. 151st Street.

The master pump station is located near the Academic Two building. The gravity sanitary sewage flows to the pump station through pipe ranging from 8" to 15" in diameter. The discharge from this pump station is transmitted through a 12" force main, which connects to the WASD force main system.

ENGINEERING CENTER

The sanitary sewer system of the Engineering Center consists of gravity sewer lines and sanitary lift stations. The site is connected to a force main located at SW 117th Avenue, which is owned and maintained by WASD.

b) **Proportional capacity requirements**

All of 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.

c) **System operation and maintenance**

MODESTO A. MAIDIQUE CAMPUS AND ENGINEERING CENTER

The sewage from Modesto A. Maidique Campus and the Engineering Center is treated by WASD's South Regional Wastewater Treatment Plant (SRWTP).

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 WASD to provide the treatment and disposal. WASD's North Regional Wastewater Treatment Plant (NRWTP) is located less than a mile away from the campus near the corner of Biscayne Blvd. & NW 151 St.

d) **Geographic service area and surrounding land uses**

MODESTO A. MAIDIQUE CAMPUS AND ENGINEERING CENTER

The service area for South Regional Wastewater Treatment Plant, which provides sanitary sewer service to Modesto A. Maidique Campus and the Engineering Center, includes all the residential and commercial areas that border the University, the City of Sweetwater and southern Miami-Dade County.

The geographic service area for the FIU facility is Modesto A. Maidique Campus and the Engineering Center. The predominant types of land uses served by the facility are; academic, support and recreation.

BISCAYNE BAY CAMPUS

The geographic service area of the City of North Miami sanitary sewer facility includes the Biscayne Bay Campus as well as the residential and commercial areas that constitute the City of North Miami.

The geographic service area for the FIU facility is Biscayne Bay Campus. The predominant types of land uses served by the facility are; academic, support and recreation.

e) Facility demand and capacity

Table 9.8 Facility Demand and Capacity

WASD FACILITY	FIU SITE SERVED BY FACILITY	12 MONTH AVERAGE (MGD)	PLANNED CAPACITY (MGD)
South District Plant	Modesto A. Maidique Campus and Engineering Center	87.6	131.25
North District Plant thru the City of North Miami	Biscayne Bay Campus	74.7	135
City of Miami Beach	Wolfsonian Museum and Annex	NA	NA

Source: Miami-Dade County Evaluation and Appraisal Report: 2003

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 PS2, are limited in the way of changes from current operation. However, PS2 should have flexibility since it operates as the master pump station for the campus. See Table 9.6.

The sewage treatment capacities of the SRWTP are inadequate to handle the present County's system operation within permitted conditions. Miami-Dade County plans to resolve the sewage problems over the next 18 months.

Table 9.9 Sanitary Waste Generations – Modesto A. Maidique Campus (Fy 2005-2006)

FLOW METER	WASTE GENERATED FY 2005-06	AVERAGE GPD
MODESTO A. MAIDIQUE CAMPUS	242,369,852	664,027

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. See Table 9.10.

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

Table 9.10 Sanitary Waste Generations – Biscayne Bay Campus (Fy 2005-2006)

FLOW METER	WASTE GENERATED FY 2005-06	AVERAGE GPD
BISCAYNE BAY CAMPUS	28,998,500	79,448

SOURCE: FIU Water Bills readings provided by Facilities Management

ENGINEERING CENTER

Table 9.11 Sanitary Waste Generations – Engineering Center (Fy 2005-2006)

FLOW METER	WASTE GENERATED FY 2005-06	AVERAGE GPD
ENGINEERING CENTER	12,006,150	32,894

SOURCE: FIU Water Bills readings provided by Facilities Management

f) Level of service

Table 9.12 Level of Service

WASD FACILITY	REQUIRED FACILITY LOS	FIU SITE SERVED BY FACILITY	LOS AT FIU SITE 2005-06
South District Plant	102% of Avg. Daily Demand for 5 Years	Modesto A. Maidique Campus and Engineering Center	26 Gallons per Capita per Day
North District Plant thru the City of North Miami	100 Gallons per Capita per Day	Biscayne Bay Campus	11 Gallons per Capita per Day

Source: Development Agreement Between the FIU Board of Trustees and Miami-Dade County the Development Agreement Between the FIU Board of Trustees and the City of North Miami, and the City of Miami Beach Comprehensive Plan.

(2) ANALYSIS REQUIREMENTS

a) Existing facility capacity analysis

MODESTO A. MAIDIQUE CAMPUS

The University is undertaking a study to evaluate and provide recommendations for taking corrective measures to improve infiltration and inflow problems. FIU has identified funding to further improve the system.

BISCAYNE BAY CAMPUS

The City of North Miami has upgraded the existing sanitary sewer force main leaving the FIU pump station. The pump station will require comparable upgrades to assure adequate service and capacity.

ENGINEERING CENTER

The sanitary sewer system is in good condition. No master infiltration or inflow problems exist at this time and no major repairs have been warranted over the last several years.

b) Projected facility demand and capacity analysis

MODESTO A. MAIDIQUE CAMPUS

Table 9.13 calculates the sanitary sewage flows based on the statistical generation rates by head count for each fiscal year.

Table 9.13 Projected Need for Wastewater Treatment - Modesto A. Maidique Campus

Year	Head Count	Average GPD
2004-05	26,227	664,027
2006-07	29,255	740,691
2007-08	30,389	759,725
2008-09	31,568	789,200
2009-10	32,792	819,800
2010-11	34,065	851,625
2014-15	42,146	1,053,650
	Gallons per Capita per Day	25

SOURCE: FIU Water Bills readings provided by Facilities Management

BISCAYNE BAY CAMPUS

Table 9.14 calculates the sanitary sewage flows based on the statistical generation rates by head count for each fiscal year.

Table 9.14 Projected Needs for Wastewater Treatment - Biscayne Bay Campus

Year	Head Count	Average GPD
2004-05	7,540	79,448
2006-07	7,842	82,626
2007-08	8,155	89,708
2008-09	8,481	93,296
2009-10	8,821	97,028
2010-11	9,174	100,909
2014-15	9,541	104,946
	Gallons per Capita per Day	11

SOURCE: FIU Water Bills readings provided by Facilities Management

c) 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 PS2, are limited in the way of changes from current operation. However, PS2 should have flexibility since it operates as the master pump station for the campus.

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.

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

d) **System Analysis and Recommendations**

The Miami-Dade County Water and Sewer Department has made some significant improvements to the County's sewer system as a result of an Agreement with the Environmental Protection Agency. Pump stations are now monitored and certified by the County. Infiltration and inflow improvements have also helped to reduce the average flow of the system.[1] However, these improvements may not be sufficient to meet the needs of the projected growth in Miami-Dade County. As a result, the County is evaluating development orders that generate additional wastewater flows on a case-by-case basis. Plans to increase capacity are also being considered. All of these factors could have an impact on the expansion plans of University.

The University may need to develop more specific agreements with 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.

f) **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.

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

1 Initial Recommendations: October 2004 Applications to Amend the Comprehensive Development Master Plan for Miami-Dade County. March 30, 2005

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. Miami-Dade County Department of Environmental Resources Management (DERM) is responsible for regulating and monitoring the operation of water facilities under Chapter 24 of the County Code. WASD is responsible for the distribution of potable water throughout Dade County.

SOLID WASTE SUB-ELEMENT

(1) DATA REQUIREMENTS.

a) **Solid Waste collection facilities inventory**

MODESTO A. MAIDIQUE CAMPUS

Solid Waste collection and disposal is accomplished at Modesto A. Maidique 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 Modesto A. Maidique Campus using various on-campus locations. Table 9.15 indicates the dumpster location, size and number of pick-ups scheduled each week. Trash collection fluctuates by season.

Table 9.15 Trash Collection Facilities: Modesto A. Maidique Campus, Engineering Center

SERVICE LOCATIONS	CONTANERS	SIZE CONTAINER (YD)	DAYS OF SERVICE
Modesto A. Maidique Campus	1	6	M-F
CP	1	8	M-F
ECS	1	6	M-F
ZEB	1	8	M-F
RB	2	4	M-F
PAC	1	6	M-F
OE	1	8	M-F
GPA	3	8	M-SAT
DM	2	8	M-F
GL/AT	1	2	M-SAT
LABOR	1	2	M-F
PUBLIC SAFETY TOWER	1	6	M-F
VH-CU	2	2	M-F
W-1	1	2	M-F
W-2	1	6	M-F
W-10	1	6	M-F
CHARLES PERRY-PC	2	8	M-F
CAMPUS SUPPORT	1	4	M-F
PHI GAMMA DELTA	1	2	2 TIMES PER WEEK
UNIVERSITY HOUSE	1	8	M-SAT
HEALTH & SCIENCE	1	8	M-F
P.C ARCHITECTURE-PCA	1	8	M-F
HLS-2	1	4	M-F
PHI KAPPA ALPHA	1	8	2 TIMES PER WEEK
MARC	1	8	M-F
GC-BOOKSTORE	1	6	3 TIMES PER WEEK
STUDENT APARTMENTS	8	2	3 TIMES PER WEEK
PANTHER RESIDENCE HALL	1	4	M-SAT
MODESTO A. MAIDIQUE CAMPUS TOWERS	4	2	M-SAT
EVERGLADES HALL HOUSING	1	2	M-SAT
PG-1-GOLD	1	2	M-F
PG-2- BLUE	1	2	M-F
PG-3-PANTHER	1	2	M-F
PG-4-RED	1	6	M-F
FOOTBALL STADIUM	1	6	M,TH,SAT
BASEBALL STADIUM	1	20	M,TH,SAT
PHYSICAL PLANT COMPOUND	2	30	M,W
CSC COMPOUND	2	20	W
PAC	1	20	
W-1	1	20	
W-7	1	20	
EC, EAST 10555 W.FLAGLER	1	20	
EC, WEAST 10555 W.FLAGLER	1	20	
GC-CAFETERIA COMPACTOR	1	30	M,W
ENGINNERING CENTER	2	8	M-F

Table 9.16 Trash Collection Facilities – Biscayne Bay Campus

BISCAYNE BAY	1		
LIBRARY	1	8	4 TIMES PER WEEK
ACADEMIC 1&2	1	8	4 TIMES PER WEEK
KOVENS	1	8	4 TIMES PER WEEK
PHYSICAL PLANT	1	8	4 TIMES PER WEEK
BBC-BAY VISTA HOUSING	4	4	M-SAT
BBC-PHYSICAL PLANT-20YD	1	20	1 TIME PER WEEK
BBC-CFETERIA COMPACTOR	1	30	2 TIME PER WEEK

Recycling:
The following is a description of FIU's recycling programs:

- Paper: Bins for the collection of recyclable paper (any paper) are located inside buildings on campus. FIU Recycling staff services the bins and transports the materials to recycling centers.

- Confidential Paper Destruction: Bins with locks are delivered and picked pup as requested. Materials are shredded on-site by Micro-Shred.

- Cardboard: Containers are located in various locations for the collection of cardboard for recycling. FIU Physical Plant Staff is responsible for the operation of the on-site compactor.

- Aluminum Cans: Approximately bins are used for the collection of aluminum cans are located on campus. Two bins are generally provided for each principal building on campus. FIU Recycling staff services these bins and the aluminum cans are sold locally.

- Tires: Waste tires are stored in the Modesto A. Maidique Campus Nursery. The tires are then delivered to the Miami-Dade County incinerator by FIU personnel.

- Wooden Pallets: Wooden Pallets are recovered, by the FIU recycling staff and redistributed to University 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.

- Phone Books: Southern Bell phone books are collected for recycling.

- 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 periodically sold to the vendor.

- Alkaline Batteries: All alkaline batteries are being recycled, e.g. those from electronic equipment, such as electronic door locks.

- Light Bulbs: All light bulbs are crushed on campus and send to the local recycle agency.

Hazardous Wastes:

- Used Motor Oil: Drums for the collection of used motor oil are located at each motor pool for periodic collection by the vendor for proper disposal.

- Hazardous, Biohazards and Radioactive Wastes: The current waste disposal procedures consist of collection from generator departments throughout the University (by Environmental Health & Safety staff) and storage to await and pick-up and disposal by hazardous waste disposal companies, or by direct pick-up from the point of generation by the selected waste disposal company. Large volumes of wastes such as that generated by the Chemistry Department are picked from the point of generation. Hazardous wastes, once picked up by the Environmental Health and Safety Department, are stored in the Hazardous Waste Shed located on the west side of Modesto A. Maidique Campus. Waste generated at Biscayne Bay Campus is stored at Academic I. A room will be designated in the Marine Biology Building for radioactive waste. Material classified as hazardous waste is picked up by a hazardous waste disposal company. The volume of hazardous waste generated at the Biscayne Bay Campus is very small compared to that generated at Modesto A. Maidique Campus.

- Biohazardous Waste: Biohazardous wastes are, in most part, picked up from the point of generation by the disposal company. There is currently one outside storage container at Modesto A. Maidique Campus and at Biscayne Bay Campus from which waste is picked up once per month. Pick-up from the points of generation (labs and clinics) takes place on a periodicity convenient for the generators and ranges from one to two week periods. Biohazardous waste is generated at both campuses.

- Radioactive: Radioactive waste materials are currently stored in OE 152 at Modesto A. Maidique Campus to allow decay to an acceptable level. Radioactive wastes are transported to this room by the generators themselves (professors and their graduate assistants). Because the handling of Radioactive waste is a regulated activity, this is currently the only acceptable arrangement. At Biscayne Bay Campus, radioactive waste is kept at the generator's lab to await pick up by an approved waste disposal company. The Marine Biology Building will have a designated room for the storage of radioactive waste.

The volume and types of wastes (hazardous, biohazardous and radioactive wastes) generated by departments throughout the University fluctuates and often depends on the time of the semester, the number of students registered for a course and the

amount of research activity.

As a rule hazardous wastes are disposed of every 180 days and are picked up by a waste disposal company that has met basic insurance and other permit requirements and which has submitted a competitive quotes.

It is anticipated that as the University grows and the volume and diversity of research activities increase, the volume and types of hazardous wastes will increase and will require planning for additional storage facilities.

b) Solid Waste Generation

Table 9.17 indicates the amount of solid waste generated by campus

Table 9.17 Solid Waste Generation 2005-2006

CAMPUS	TONS/YEAR	TONS/DAY
MODESTO A. MAIDIQUE CAMPUS	1,316	3.61
ENGINEERING CENTER	118	0.32
BISCAYNE BAY CAMPUS	211	0.58
TOTAL	1,654	4.53

c) System operation and maintenance

FIU utilizes the Miami-Dade County solid waste facilities. 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 9.18 is a list of solid waste service providers.

Table 9.18 **Solid Waste Service Providers**

SERVICE PROVIDER	VOLUME
Waste Management, Inc. Trash removal service 2125 NW 10 CT Miami, FL 33127 (305) 471-4444	5,850 tons/year
Waste Management, Inc. Trash/Cardboard compactors 2125 NW 10 CT Miami, FL 33127 (305) 471-4444	Not Available
Atlantic Paper Paper recycling, Phone books 3725 E 10 CT Miami, FL (305) 835-8046	300 tons/year
Waste Management, Inc. Aluminum cans, glass, plastics 2125 NW 10 CT Miami, FL 33127 (305) 471-4444	3 tons/year
Motor Pool Tires	Not available
Waste Management, Inc. Pallets and yard 2125 NW 10 CT Miami, FL 33127 (305) 471-4444	Not available

SERVICE PROVIDER	VOLUME
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
AERC-Bulbs and Batteries 2591 Mitchell Ave., Allentown, PA 18103	Not available
Micro-Shred- Confidential Paper 19593 NE 10 Ave., Miami, FL 33179	Not available

SOURCE: -FIU Custodial Solid Waste Recycling Department, February 2001
Revised in April 2006 for Facilities Management

d) Geographic service area and surrounding land uses

As explained previously, FIU utilizes the Miami-Dade County solid waste facilities, which serve the entire county. 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 and serve.

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

e) Facility demand and capacity

According to Miami-Dade County's Comprehensive Plan, the solid waste facilities must accommodate waste flows committed to the system for a period of five years. This includes commitments through long-term interlocal agreements or contracts with municipalities and private haulers, and anticipated non-committed waste flows.

A capacity analysis conducted by the Miami-Dade County Department of Solid Waste indicates that the County has sufficient capacity to meet the projected demand for five years. The facilities have some capacity for projected wastestreams until the year 2032. This determination is contingent upon the County's growth rate.

Below is an account of the solid waste and recycling material generated by each FIU site:

Table 9.19 Solid Waste and Recycling Material Generated by FIU Site: July 1 2005- June 30 2006

FIU Site	Solid Waste (Tons)	Recycling				Total Tons
		Cardboard (Tons)	Paper (Tons	Light Bulbs (Tons)	Aluminum, Plastic, Glass (Tons)	
Modesto A. Maidique Campus	1,316	67	371	5	13	1,771
Engineering	118	10	49	1		179

Center						
Biscayne Bay Campus	211	49	81			341
Wolfsonian Museum	9.4					9
Subtotal	1,654	126	501	5.9	13	2,300
Total	1,654	645				2,300

f) **Level of Service**

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

Table 9.20 Solid Waste and Recycling Level of Service: July 1 2005- June 30 2006

FIU SITE	FTE	SOLID WASTE	RECYCLING
Modesto A. Maidique Campus	16,745	0.43 lbs per capita per day	0.15 lbs per capita per day
Biscayne Bay Campus	3,323	0.35 lbs per capita per day	0.21 lbs per capita per day
Total	20,068	0.42 lbs per capita per day	0.16 lbs per capita per day

(2) ANALYSIS REQUIREMENTS

a) **Existing facility capacity analysis**

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.

b) **Projected facility demand and capacity analysis**

Table 9.21 indicates the projected five and ten-year solid waste generation for the university and is based on the present estimation of 0.58 pounds per full time equivalent student.

Table 9.21 Projected Solid Waste and Recycling Material Generation 2005-2015

2005			
	FTE's	**TONS/YEAR**	**TONS/DAY**
MODESTO A. MAIDIQUE CAMPUS	16,745	1,771	4.85
BISCAYNE BAY CAMPUS	3,323	341	0.93
TOTAL	20,068	2,112	5.79
2009-2010			
MODESTO A. MAIDIQUE CAMPUS	22,246	2,355	6.45
BISCAYNE BAY CAMPUS	4,417	468	1.28
TOTAL	26,663	2,822	7.73
2014-2015			
MODESTO A. MAIDIQUE CAMPUS	29,769	3,151	8.63
BISCAYNE BAY CAMPUS	5,889	623	1.71
TOTAL	35,658	3,774	10.34

Note: The Engineer Center (EC) generated 170 tons and the Wolfsonian Museum 9 tons of solid waste and recycling material from July 1, 2005 to June 30, 2006.

c) Existing performance evaluation

Information was not available to complete the required response.

d) System Analysis and Recommendations

Information was not available to complete the required response.

e) Existing regulations and programs

Federal Regulations: The federal government regulates solid waste in order 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 that 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 that 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 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 Miami-Dade Department of Environmental Resources Management has broad authority under Chapter 24 of the Code of Miami-Dade County to regulate facilities in order to protect the environment. (Source: Miami-Dade County Comprehensive Plan).

f) **Available Opportunities for solid waste reduction, re-use and recycling.**

Additional Recycling Opportunities: FIU is presently recycling or causing to be recycled the following materials: paper, phone books, aluminum cans, motor oil, oil filters, cooking oils, auto batteries and wooden pallets

Recycling for plastics, steel cans and glass has been implemented in five buildings as a pilot program. There are plans to expand the program in the near future. The University would also like to intensify its program for recycling card board paper.

Absent from the list of recycled materials are white goods. 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.

Solid Waste Management Trust Fund: The Department of Regulation 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.

g) **Service Agreements**

General Contract Provision: The bid solicitation and selection process is subject to the general conditions as established by Florida International University Purchasing Services Department. The contract contains supplemental conditions which are not germane to the specific solid waste removal and disposal operations and provide provisions related to the following items: vendor's right to payment; Prison Rehabilitative Industries (PRIDE); contract cancellation; travel; cancellation; renewal; protection of property; qualification of bidders; hold harmless; public entity crimes; identical tie bids; vendors notification of vendor ombudsman name and telephone number; award; availability of funds; insurance required; inspection of facilities; assembly and/or placement; delivery; environmental conditions F.O.B. Point and cancellation.

Trash Removal: Waste Management, Inc. is under contract with Florida International University to provide the previously described trash removal services. The contract provides for the trash removal services at both Biscayne Bay Campus and Modesto A. Maidique Campus. The specific trash removal specifications are as follows:

- Garbage and other refuse materials are to be collected in general on the campuses each business day, Monday and Friday. Collections at Biscayne Bay Campus Housing and Modesto A. Maidique Campus Housing areas shall be seven (7) days per week or as requested. Collections shall be made between the hours of 5:00 A.M. and 7:00 A.M.

- It shall be the responsibility of the contractor to provide and maintain all dumpsters in good repair and in a clean and sanitary condition at all times. Dumpsters must be odor free when empty.

- Provision shall be made for increases or decreases for cost of additional or eliminated collection points or frequency to be determined by the University per cost schedule.

- Provision shall be provided for special or one-time pick-up of construction, clean yard waste and other trash upon request of the University in both Options.

- All dumpsters shall have plastic covers instead of metal to facilitate access in depositing refuse.

- Collection point and container specifications -- Modesto A. Maidique Campus

are:

Location	Size	Pick-Up/Hauling
1. Key Bank	3-6 yd. dumpster	3 days/week
2. Owa Ehan Building	1-6 yd. dumpster	3 days/week
3. Tower Building	1-4 yd. dumpster	twice weekly
4. W-2 Building	1-4 yd. dumpster	3 days/week
5. W-10 Building	1-6 yd. dumpster	3 days/week
6. South of VH Building	2-6 yd. dumpster	3 days/week
7. S.W. 117 Ave. Entrance	1-20 yd. dumpster	once weekly
8. W-1 Bldg. (Sculpture)	1-6 yd. dumpster	once weekly
9. Pharmed Arena	1-6 yd. dumpster	3 days/week
10. Housing Complex	5-6 yd. dumpster	3 days/week
11. Chemistry/Physics Bldg.	1-8 yd. dumpster	3 days/week
12. Engineering Building	1-8 yd. dumpster	3 days/week
13. Business Admin. Bldg.	1-6 yd. dumpster	3 days/week

- Collection point and container specifications – Biscayne Bay Campus are:

Location	Size	Pick-Up/Hauling
1. P.P. Campus Support	1-6 yd. dumpster	Daily
2. Academic Two Building	1-4 yd. dumpster	Daily
3. Library (behind)	1-4 yd. dumpster	Daily
4. Housing Complex	1-8 yd. dumpster	7 days/week

- In rare case where dumpsters prove inadequate (i.e. when there is bagged refuse placed beside containers), it shall be the responsibility of the contractor to collect excess refuse and leave the area in an orderly condition. In instances where there is an ongoing problem, it shall be the responsibility of the contractor to notify the University so that changes in container size or frequency of collection may be changed per the cost schedule.

Recycling Collection Services: Waste Management, Inc. is under contract with Florida International University to provide compacting and recycling services at both Modesto A. Maidique Campus and Biscayne Bay Campus. The specific specifications are as follows:

- Compactors: Compactor (2) shall be a 20/30 yard compactor, self contained, leak proof, key operated, lockable disconnect, side loading, painted and labeled per University instructions, to be located one each at each campus at the designated site as agreed upon by the University. All environmental conditions required for the installation of the compactors shall be attached to your bid response. The University shall install the pad and the electrical requirements, etc. as required at the University's expense. The vendor shall deliver and install/hook up the compactor when notified and the service shall start within ten days of this notification. The vendor shall maintain the compactors (rental or purchased) in a clean and sanitary condition. All repairs shall be made within forty-eight (48) hours of notification.

- Collection Services: shall be made on call as necessary within forty-eight hours of such notice on normal week days before 8:00 A.M. A schedule of frequency of the pick-ups shall be determined by the contractor as agreed upon by the University with due regard to product production.

- Contaminated materials: The University shall keep and make every effort to keep the compactors free from contaminated products. The compactors shall be used for cardboard products only. All wax or plastic coated cartons, shoe boxes, newspaper, magazines, books, plastic, styrofoam, wood and metal shall be considered contaminated and shall be excluded. If contaminated, the University shall pay for the disposal at the prices stated.

- Records: The contractor shall record the weight of materials collected on each pick-up. The weights shall be recorded from a state of Florida certified and inspected scale for the purpose of ascertaining payments due to the University. Weight receipts are to be provided to the University on a monthly basis with the reimbursement. The University reserves the right to inspect and verify weight records and procedures.

- Payments/Reimbursements: Payments shall be made by the contractor to the University on or before the 20th day of each month for the previous month's collections. Payment shall be accompanied by an itemized statement showing the amount of recyclable product collected and contamination material removed under the provisions of the agreement. The contractor payments to the University shall be by check, payable to Florida International University (Recycle program) and shall be mailed or delivered to the Coordinator. After ninety (90) days, reimbursement payments/prices maybe negotiated based on the published monthly market such as the "Recycling Times" in writing.

- Training: The contractor shall train no less than ten (10) employees (5 per campus) on the proper operation of the compactor each year.

- Guarantees: The University offers no guarantee that a fixed amount of any recyclable product or material can be collected each month.

<u>Recycling Collection Services</u> for Source-Separated Program for Housing Complexes for both Campuses:

- Containers: Vendors shall supply a customized 30 cubic yard storage container compatible with hauling services for each housing complex with at least five (5) compartments, painted and labeled per university instruction, and installed. All environmental conditions required for the installation of the container shall be attached to your bid response. The University shall install the pad, etc. as required at the University's expense. The vendor shall deliver and install the containers when notified and service shall start within ten days of this notification. Vendor shall maintain the containers (rental or purchased) in a clean and sanitary condition. All

repairs shall be made within forty-eight (48) hours of notification.

- Collection Services: Vendor shall collect on call as necessary within forty-eight hours of such notice on normal week days before 8:00 A.M. The vendor shall collect and market clear glass, brown glass, plastic (H.D.P.E. and P.E.T. co-mingled), newspaper and metal cans (aluminum and tin co-mingled) from the University housing areas of Modesto A. Maidique Campus and Biscayne Bay Campus. A schedule of frequency of the pick-ups shall be determined by the contractor as agreed upon by the University with due regard to product production.

- Contaminated materials: The University shall keep and make every effort to keep the containers free from contaminated products. The containers shall be used as labeled. If contaminated, the University shall pay for the disposal at the prices stated.

- Records: The vendor shall record the weight of each product collected by collection site, date and product. The weights shall be recorded from a state of Florida certified in inspected scale and shall be recorded and certified by the contractor for the purpose of ascertaining payments due. Weight receipts are to be provided to the University on a monthly basis. The University reserves the right to inspect and verify weight records and procedures.

- Guarantees: The University does not guarantee that a fixed amount of any recyclable product or material can be collected each month.

- Addendum: As it may become appropriate or beneficial, other recyclable products or materials may be added or deleted to the scope of this contract at the discretion of the University based on the successful negotiations of the rates per specification 8 between the University and the vendor. All changes shall be in writing.

- Recycling Marketing: The vendor shall be totally responsible for the marketing of the recyclable collected with the exception of the contaminates. All materials collected must be recycled or reused.

- Payments/Reimbursements: Payments shall be made by the contractor to the University on or before the 20th day of each month for the previous month's collections. Payment shall be accompanied by an itemized statement showing the amount of recyclable product collected and contamination material removed under the provisions of the agreement. The contractor payments to the University shall be by check, payable to Florida International University (Housing Recycle Program) and shall be mailed or delivered to the Coordinator. After ninety (90) days, reimbursement payments/prices maybe negotiated based on the published monthly market such as the "Recycling Times".