980214-WS

ORIGINAL response to question 34 in staff's data requests

Systemwide Reuse Feasibility Study

Prepared for
United Water Florida

Submitted by

CH2MHILL

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June 1997

134336.X1

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CH2MHILL
Celebrating 50 Years

June 17, 1997

134336.X1

Mr. Todd Mackey, P.E. , Manager
Engineering and Technical Services
United Water Florida
1400 Mill Coe Road
Jacksonville, Florida 32239-8004

Dear Todd:

Subject: Submission of Final Report - Task Order No. 96-1 Reuse Feasibility Study
IWO No. 96105
Pr. No. E1224

In fulfillment of our scope of work for Task Order No. 96-1, we are enclosing ten (10) copies of the final report entitled *System-wide Reuse Feasibility Study*. We have included seven (7) signed and sealed copies for your use. In accordance with condition number VI. 2 of the Monterey WWTF permit (Permit No. FL0023604), two (2) signed and sealed copies should be submitted to FDEP offices in Jacksonville on or before July 1, 1997. In addition, two (2) signed and sealed copies should also be submitted to the local SJRWMD office.

We believe the final report addresses all of the pertinent review comments provided by UWFL staff since the initial draft report was October, 1996. We sincerely appreciate all of the assistance you and your staff have provided throughout the course of the project. We especially appreciate your assistance in the revenue requirement calculations and the analysis of the impact of the reuse alternatives on rates and fees.

If you have any questions or need additional information, please do not hesitate to call me at (904) 296-2334.

Sincerely,

CH2M HILL

Joel G. Hall

Joel G. Hall, P.E.
Project Manager

jgh:Enclosures: (10)
c: M. Sambamurthi/UWFL
[redacted]
Tom Waldeck/JAX
Mitch Griffin/GNV

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CHAPTER 1

Introduction

Background

United Water Florida (UWFL) is a wholly-owned subsidiary of United Water Resources, Inc., an investor-owned nationwide utility company. In the Jacksonville area, UWFL provides water and wastewater service to certificated service areas which are located in Duval, St. Johns, and Nassau Counties. Following is a listing of service areas in which UWFL provides both wastewater and water service in each county:

Duval County Service Areas:

- Holly Oaks
- Jacksonville Heights
- Monterey
- Royal Lakes
- San Jose
- San Pablo
- Ortega Hills
- Magnolia Gardens
- Hyde Grove
- Venetia Terrace

St. Johns County Service Areas:

- Ponce de Leon
- Ponte Vedra
- St. Johns North

Nassau County Service Areas:

- Yulee

The Ortega Hills wastewater treatment facility (WWTF) is scheduled for retirement in 1997 when an intertie with Ortega Utilities is completed. Similarly, UWFL has interties with the City of Jacksonville Department of Public Utilities for wastewater treatment in the Hyde Grove, Venetia Terrace, and Magnolia Gardens service areas. Consequently, since UWFL does not actually provide wastewater treatment in these areas, they are not included in the scope of this study.

In addition to the above listed joint water and wastewater service areas, UWFL also provides water only service to additional areas in Duval County including Forest Brook, Lake Forest, Bon Air, Milmar Manor, Greenfield, Brackridge, Ridgeland, Riverview, Town and Country, and Westwood. In most of these areas, UWFL purchases water from the City of Jacksonville through interties and resells the water to its customers. Since no wastewater facilities are associated with these service areas, they are not included in this reuse feasibility study.

Each of the service areas in which UWFL provides wastewater collection and treatment has a WWTF which operates under a Florida Department of Environmental Protection (FDEP) permit. Permits for some services areas are to be renewed during 1996; the remainder will be up for renewal within the next five years. The majority of the wastewater treatment facilities use surface water discharge as the primary means of effluent disposal. In accordance with Chapters 62-4 and 62-302, Florida Administrative Code (FAC), the feasibility of reuse as an effluent disposal method must be investigated and documented in a reuse feasibility study prior to permit renewal.

In addition, each of the service areas in which UWFL provides water supply, treatment, and distribution are regulated by St. John's River Water Management District (SJRWMD) consumptive use permits (CUPs). Renewal of CUPs also requires consideration of the feasibility of using reclaimed water to replace potable water use leading to reductions in groundwater withdrawals.

In response to requirements of the SJRWMD, UWFL prepared a reuse feasibility study which covered some of the service areas listed above in November 1986. At that time, UWFL concluded that reuse was not technically or economically feasible. Subsequent updates to the original study were prepared in May 1991, and September 1994 to reflect current situations. The conclusion of these updates indicated that, while some of the original barriers to implementing reuse identified in the original study were gone, reuse was still not economically feasible for UWFL service areas.

In November, 1991, FDEP published a document entitled *Guidelines for Preparation of Reuse Feasibility Studies for Applicants Having Responsibility for Wastewater Management*. These guidelines specify the discussion of existing and future conditions for the service area; the identification of the potential reuse alternatives; and the technical, environmental, and economic evaluation of each option. The economic evaluation includes the effect each potential reuse option may have on the utility rates and fees.

The FDEP has indicated that UWFL's existing studies do not address all of the aspects covered in the guidelines and that a new reuse feasibility study which conforms to the requirements of the guidelines must be submitted.

Purpose

This report is intended to satisfy the requirement to document the evaluation of reuse alternatives in accordance with the FDEP guidelines for each of the UWFL wastewater service areas. It is also intended to satisfy requirements of the SJRWMD relative to water system CUP renewals.

In the interest of expediency, UWFL has chosen to prepare a single comprehensive system-wide reuse feasibility study which addresses each individual service area in one document rather than preparing a separate report for each service area. As actual permit renewals occur, reference will be made to this document to satisfy the specific requirement to evaluate reuse for that service area. It is expected that the report will need to be updated periodically. This approach was discussed and agreed to with FDEP at a workshop held on August 2, 1996.

CHAPTER 2

Existing Conditions

United Water Florida (UWFL) has franchises for water and wastewater service areas located within the Jacksonville Metropolitan Area including Duval, Nassau, and St. Johns Counties. The ten joint service areas to be evaluated in this reuse feasibility study include Holly Oaks, Jacksonville Heights, Monterey, Royal Lakes, San Jose, and San Pablo in Duval County; Yulee in Nassau County; and Ponce de Leon, Ponte Vedra, and St. Johns North in St. Johns County. *Exhibit 2-1* presents an overall site plan outlining the boundaries of the ten service areas. The Ortega Hills service area is not included in the present scope of study as the Ortega WWTF is scheduled for retirement in 1997 when the intertie with Ortega Utilities is completed.

General Characteristics

Because of their proximity, there are many similarities in the general characteristics associated with the ten UWFL service areas. In some cases (for example, climate), characteristics are uniform across the entire area. In other instances, similarities are evident at the County level. Additionally, some information (for example, population) was not readily available for each individual service area, but could be obtained at the County level.

Due to these similarities, the discussion of existing general conditions within the ten UWFL service areas will be condensed and discussed at a regional or county level, as appropriate. This approach applies to the following general characteristics:

- Climate
- Population
- Existing Land Use
- Soils Information
- Surface Water Classification
- Hydrogeology
- Water Supply Wells

Specific information on existing wastewater management and water supply facilities will be presented following this general discussion for each service area.

Climate

The climate within the study area is characterized by long, warm, humid summers and mild winters. The Atlantic Ocean and the Gulf Stream have a moderating influence on maximum temperatures in summer and minimum temperatures in winter. The influence is pronounced along the coast but diminishes noticeably near the western boundary of the region.

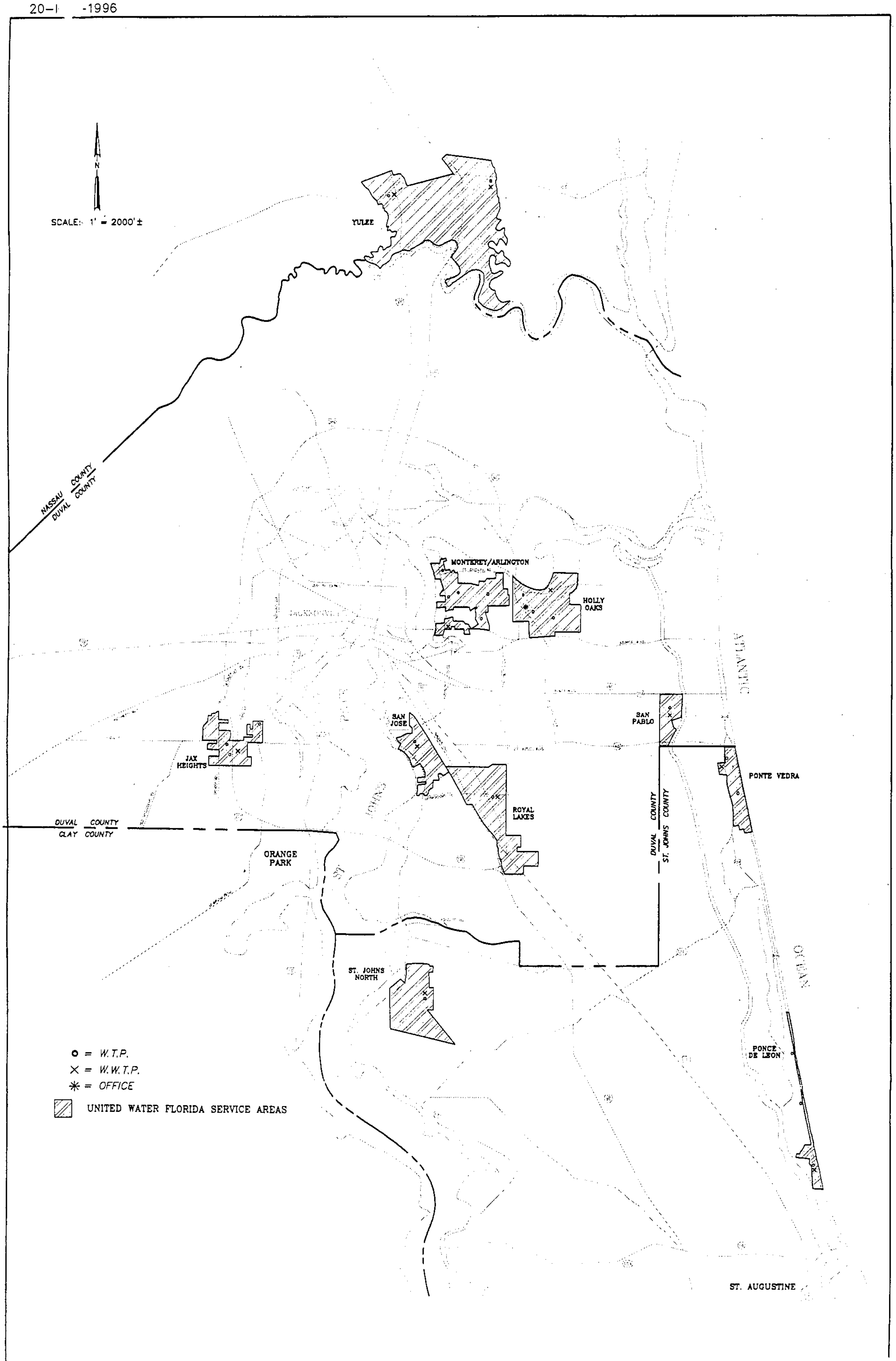

Exhibit 2-1
UNITED WATER FLORIDA
WATER/WASTEWATER SERVICE AREAS

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during which UWFL must complete an investigation of alternative effluent disposal methods. Upon completion of this investigation, UWFL must design, apply for and obtain a permit, construct and place into operation the selected and approved alternative wastewater disposal method.

The new permit includes construction of a new secondary clarifier, an underdrain system for both the northern and southern percolation ponds, and construction of a new outfall to Big Lige Branch. The permit also allows for construction of new effluent filters if needed to meet high level disinfection requirements.

The Administrative Order calls for completion of construction to upgrade the facility to meet Class I reliability including installation of proposed secondary clarifier and percolation pond underdrains by February 19, 1997. Construction of the new plant must commence by July 1, 1998 and the new facility must be placed into service by December 1, 1999.

The 1995 AADF was 0.14 mgd. *Exhibit 3-10* presents the historical AADF for the St. Johns North WWTF.

Yulee

The Yulee service area is roughly defined by U.S. A1A to the north, Lofton Creek to the east, Nassau River to the south, and Interstate 95 to the west. The Service Area is predominantly rural, with development occurring primarily in Yulee, Yulee Heights, Wilson Neck, and Hedges. *Exhibit 2-13* shows the Yulee wastewater and water service area along with floodplain information, water and wastewater treatment plant locations, and potential reuse sites. In these development areas, most residences are mobile homes with some single family and multi-family housing.

UWFL currently provides wastewater service through two small package plants located at the Amoco Station (near I-95 and A1A) and the Lofton Oaks subdivision. The Lofton Oaks WWTF, which is located on A1A (SR 200), east of Yulee in the Lofton Oaks subdivision, is operated under FDEP Permit No. DO45-260422 which expires on December 1, 1999. This is a 0.05 mgd extended aeration (activated sludge) wastewater treatment plant with chlorinated reclaimed water disposal to two percolation ponds.

The Amoco Service Station WWTF, which is located at I-95 and State Road 200, is operated by UWFL under FDEP Permit No. FLA011675 which expires on June 12, 2001. The Amoco WWTF is a 0.00336 mgd extended aeration wastewater treatment plant with chlorinated effluent disposal to one percolation pond.

A third WWTF located at the Nassau County Police Detention Facility was recently taken off line and is no longer operated by UWFL.

Future plans call for construction of a new regional WWTF for the Yulee service area in two phases. UWFL has a FDEP Permit (FL0167258) to construct and operate the first phase. This permit, which expires on May 8, 2001, allows construction of a new 0.5 mgd activated sludge advanced wastewater treatment facility consisting of influent screening, one anaerobic contact tank, two sequencing batch reactors, three centrifugal blowers, two traveling bridge filters, two UV disinfection trains, one aerobic digester, one effluent storage tank, and a polymer feed system. The WWTF is permitted to discharge treated effluent to

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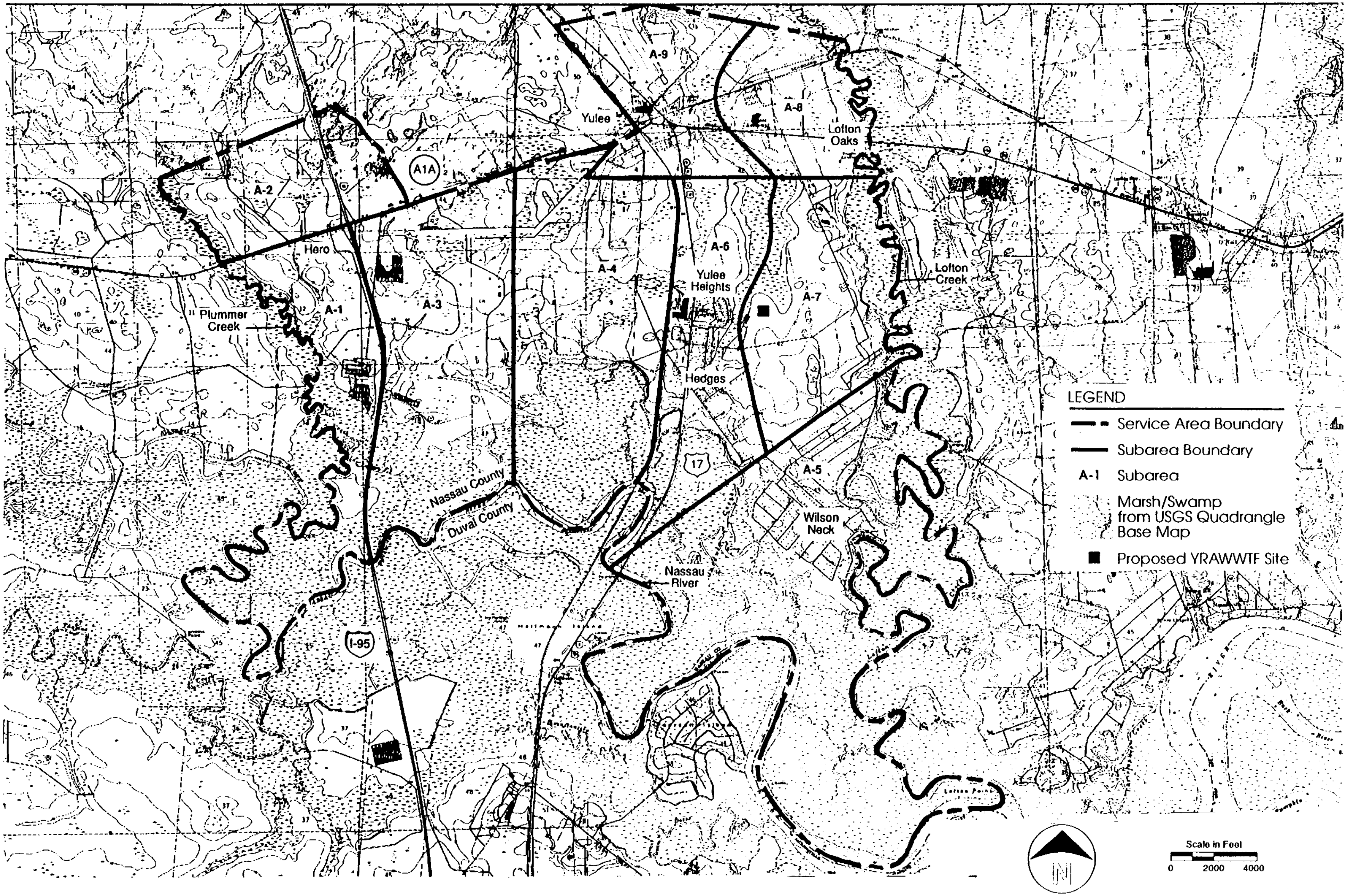

Exhibit 2-13. Yulee Service Area.

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Yulee Swamp, a receiving wetland. The schedule included in the permit requires construction to begin by July 1, 1997 with completion and startup by July 31, 1999.

Existing Water Supply Facilities

In addition to wastewater service, UWFL also provides potable water to customers in each of the service areas. In some service areas, water service is provided by a single water treatment plant (WTF), which operates under a specific consumptive use permit (CUP) from the SJRWMD. Included in this category are the Royal Lakes, San Jose, San Pablo, St. Johns North, and Yulee service areas.

In other cases, the water system is composed of multiple treatment plants which are interconnected to form a grid. For these cases, a single CUP applies for the entire grid rather than for each individual plant. Included in this category are the Arlington (Monterey), Holly Oaks, Jacksonville Heights, Ponce De Leon, and Ponte Vedra systems.

Information on large water users was reviewed and it was determined that none were candidates for reclaimed water service as they were all institutional, commercial, or multi-family residential accounts which required water service of potable water quality.

Following is a discussion of existing water facilities for each service area.

Holly Oaks Grid

Service Area

The Holly Oaks water system service area is essentially the same as the wastewater service area presented in *Exhibit 2-4.* The majority of water customers are single and multi-family residential and commercial.

Water Production and Demands

The Holly Oaks water system grid includes three WTFs: Holly Oaks WTF, Monument Road WTF, and Queen Akers WTF. *Exhibit 3-12* summarizes historical average daily water production from the three WTFs which make up the Holly Oaks Grid. Residential and commercial customers account for most of the water demand.

Sources of Water

Raw water supply for all of the Holly Oaks service area is obtained from wells drilled into the Floridan aquifer. Supply wells are located at each of the three WTFs. The current CUP for the Holly Oaks grid limits withdrawals to 1.319 mgd (annual average daily) and 2.860 mgd (maximum daily). In addition, there is an inter-tie with the City of Jacksonville located at Millcoe Road. When needed, water may be purchased from the City for resale to UWFL customers.

Water Treatment Facilities

Each plant has a single water supply well located on the plant site and provides treatment of raw water using aeration and disinfection prior to introduction into the distribution system. The location of the WTFs and water supply wells is shown in *Exhibit 2-4.* Following is a summary of pertinent information about each WTF.

The Monument Road WTF was constructed in 1983 and is the largest of the three plants in the Holly Oaks system. One 20-inch supply well approximately 984 feet deep supplies raw water. Treatment of raw water includes aeration and disinfection using chlorine. The plant has one 100,000 gallon steel ground storage tank and three high service pumps ranging from 330 gpm to 1,100 gpm capacity.

The Queen Akers WTF was constructed in 1960. One 8-inch supply well approximately 752 feet deep supplies raw water. Treatment of raw water includes aeration and disinfection using chlorine. The plant has two concrete ground storage tanks with capacities of 50,000 gallons and 18,000 gallons. Two high service pumps with capacities of 200 gpm and 600 gpm deliver treated water to the distribution system.

The Holly Oaks WTF was constructed in 1961 and is the smallest of the three plants in the system. One 6-inch supply well approximately 750 feet deep supplies raw water. Treatment of raw water includes aeration and disinfection using chlorine. The plant has one 45,000 gallon steel ground storage tank and one high service pump with a capacity of 200 gpm.

Jacksonville Heights Grid

Service Area

The Jacksonville Heights water system service area is essentially the same as the wastewater service area presented in *Exhibit 2-5*. The majority of water customers are single and multi-family residential and commercial.

Water Production and Demands

Exhibit 3-13 summarizes historical average daily water production from the three water treatment plants (WTFs) in the Jacksonville Heights service area. Residential and commercial customers account for most of the water demand.

Sources of Water

Raw water supply for all of the Jacksonville Heights service area is obtained from wells drilled into the Floridan aquifer. Supply wells are located at each of the three WTFs. The current CUP for the Jacksonville Heights grid limits withdrawals to 1.609 mgd (annual average daily) and 3.090 mgd (maximum daily). In addition, there is an inter-tie with the City of Jacksonville located at the Wheat Road WTF. When needed, water may be purchased from the City for resale to UWFL customers.

Water Treatment Facilities

The Jacksonville Heights water system includes three WTFs: Wheat Road WTF, Green Forest WTF, and Oak Hill WTF. Each plant has a single water supply well located on the plant site and provides treatment of raw water using aeration and disinfection prior to introduction into the distribution system. The location of the WTFs and water supply wells is shown in *Exhibit 2-5*. Following is a summary of pertinent information about each WTF.

The Wheat Road WTF was constructed in 1974 and is the largest of the three plants in the Jacksonville Heights system. One 16-inch supply well approximately 1,130 feet deep supplies raw water. Treatment of raw water includes aeration and disinfection using chlorine. The plant has one 140,000 gallon steel ground storage tank and three high service pumps ranging from 500 gpm to 1,000 gpm capacity.

The Green Forest WTF was constructed in 1959. One 12-inch supply well approximately 1,149 feet deep supplies raw water. Treatment of raw water includes aeration and disinfection using chlorine. The plant has one steel ground storage tanks with a capacity of 100,000 gallons. Three high service pumps with capacities of 300 gpm, 380 gpm, and 600 gpm deliver treated water to the distribution system.

The Oak Hill WTF was constructed in 1955. One 16-inch supply well approximately 1,304 feet deep supplies raw water. Treatment of raw water includes aeration and disinfection using chlorine. The plant has one 88,000 gallon steel ground storage tank and two high service pumps with capacities of 280 gpm each.

Arlington Grid

Service Area

The Arlington water system service area is essentially the same as the wastewater service area presented in *Exhibit 2-6*. The majority of water customers are single and multi-family residential and commercial.

Water Production and Demands

Exhibit 3-14 summarizes historical average daily water production from the five water treatment plants (WTFs) in the Arlington service area. Residential and commercial customers account for most of the water demand.

Sources of Water

Raw water supply for all of the Arlington service area is obtained from wells drilled into the Floridan aquifer. Supply wells are located at each of the five WTFs. The current CUP for the Arlington Grid limits withdrawals to 2.809 mgd (annual average daily) and 5.630 MGD maximum daily).

Water Treatment Facilities

The Arlington water system includes five WTFs: Alderman Park WTF, Columbine WTF, Elvia WTF, Lake Lucina WTF, and University Park WTF. The Alderman Park WTF has two supply wells - one located at the plant site and one located off-site. Each of the other four plants has a single water supply well located on the plant site and provides treatment of raw water using aeration and disinfection prior to introduction into the distribution system. The location of the WTFs and water supply wells is shown in *Exhibit 2-6*. Following is a summary of pertinent information about each WTF.

The Alderman Park WTF was originally constructed in 1959. Two 12-inch supply wells approximately 1,150 feet deep supply raw water. Treatment of raw water includes aeration and disinfection using chlorine. The plant has two steel ground storage tanks (50,000 gallon and 100,000 gallon) and two high service pumps rated at 600 gpm.

The Columbine WTF was constructed in 1954. One 12-inch supply well approximately 1,200 feet deep supplies raw water. Treatment of raw water includes aeration and disinfection using chlorine. The plant has one steel ground storage tank with a capacity of

100,000 gallons. Three high service pumps with capacities of 250 gpm, 500 gpm, and 500 gpm deliver treated water to the distribution system.

The Elvia WTF was constructed in 1959. One 16-inch supply well approximately 1,300 feet deep supplies raw water. Treatment of raw water includes aeration and disinfection using chlorine. The plant has one 250,000 gallon steel ground storage tank and three high service pumps with capacities of 600 gpm (2) and 1,000 gpm (1).

The Lake Lucina WTF was constructed in 1957. One 12-inch supply well approximately 1,000 feet deep supplies raw water. Treatment of raw water includes aeration and disinfection using chlorine. The plant has one 65,000 gallon steel ground storage tank and one 50,000 gallon concrete ground storage tank. The plant also has three high service pumps with capacities of 420 gpm (2) and 400 gpm (1).

The University Park WTF was constructed in 1958. One 12-inch supply well approximately 1,000 feet deep supplies raw water. Treatment of raw water includes aeration and disinfection using chlorine. The plant has one 30,000 gallon steel ground storage tank and one 275,000 gallon steel elevated storage tank. Three high service pumps with capacities of 300 gpm (2) and 700 gpm (1) deliver treated water to the distribution system.

Ponce De Leon Grid

Service Area

The Ponce De Leon water system service area is essentially the same as the wastewater service area presented in *Exhibit 2-10*. The majority of water customers are single and multi-family residential and commercial.

Water Production and Demands

Exhibit 3-15 summarizes historical average daily water production from the three water treatment plants in the Ponce De Leon service area. Residential and commercial customers account for most of the water demand.

Sources of Water

Raw water supply for all of the Ponce De Leon service area is obtained from wells drilled into the Floridan aquifer. Supply wells are located at each of the three WTFs. The current CUP for the Ponce De Leon grid is in the renewal process and limits withdrawals to 0.40 MGD (annual average daily) and 0.633 MGD (maximum daily).

Water Treatment Facilities

The Ponce De Leon water system includes three WTFs: Ponce De Leon WTF, A1A North WTF, and A1A South WTF. Each plant provides treatment of raw water using aeration and disinfection prior to introduction into the distribution system. The location of the WTFs and water supply wells is shown in *Exhibit 2-10*. Following is a summary of pertinent information about each WTF.

The Ponce De Leon WTF was constructed in 1988 and is the largest of the three plants in the Ponce De Leon system. Two supply wells (6 inch and 10 inch) ranging from approximately 252 to 400 feet deep supply raw water. Treatment of raw water includes aeration and disinfection using chlorine. The plant has one 500,000 gallon steel ground storage tank and four high service pumps with capacities of 250 gpm (1), 500 gpm (1), and 800 gpm (2).

The A1A North has one 6-inch artesian supply well approximately 750 feet deep. Treatment of raw water includes aeration and disinfection using chlorine. The plant has one steel ground storage tank with a capacity of 15,000 gallons. Two high service pumps with capacities of 250 gpm each deliver treated water to the distribution system.

The A1A South has one 6-inch artesian supply well approximately 750 feet deep. Treatment of raw water includes aeration and disinfection using chlorine. The plant has one 15,000 gallon steel ground storage tank and two high service pumps with capacities of 250 gpm each.

Ponte Vedra Grid

Service Area

The Ponte Vedra water system service area is essentially the same as the wastewater service area presented in *Exhibit 2-11*. The majority of water customers are single and multi-family residential and commercial.

Water Production and Demands

Exhibit 3-16 summarizes historical average daily water production from the two water treatment plants in the Ponte Vedra service area. Residential and commercial customers account for most of the water demand.

Sources of Water

Raw water supply for all of the Ponte Vedra service area is obtained from wells drilled into the Floridan aquifer. Supply wells are located at each of the two WTFs. The current CUP for the Ponte Vedra grid is in the renewal process, and limits withdrawals to 2.28 MGD (annual average daily) and 4.57 MGD (maximum daily).

Water Treatment Facilities

The Ponte Vedra water system includes two WTFs: Ponte Vedra WTF and Corona Road WTF. Each plant provides treatment of raw water using aeration and disinfection prior to introduction into the distribution system. The location of the WTFs and water supply wells is shown in *Exhibit 2-11*. Following is a summary of pertinent information about each WTF.

The Ponte Vedra WTF was constructed in 1968 and is the smaller of the two plants in the Ponte Vedra system. One 16x10 inch supply well approximately 857 feet deep supplies raw water. Treatment of raw water includes aeration and disinfection using chlorine. The plant has one 80,000 gallon concrete ground storage tank and two high service pumps with capacities of 600 gpm and 660 gpm , respectively.

The Corona Road WTF was originally constructed in 1966 and is the largest of the two plants in the Ponte Vedra grid. Two supply wells (16x10 and 16x12) ranging from approximately 857 to 880 feet deep provide raw water. Treatment of raw water includes aeration and disinfection using chlorine. The plant has one concrete ground storage tank with a capacity of 150,000 gallons. Three high service pumps with capacities of 600 gpm (2) and 2,000 gpm (1) deliver treated water to the distribution system.

Royal Lakes

Service Area

The Royal Lakes water system service area is essentially the same as the wastewater service area presented in *Exhibit 2-7*. The majority of water customers are single and multi-family residential and commercial.

Water Production and Demands

Exhibit 3-17 summarizes historical average daily water production from the Royal Lakes WTF. Residential and commercial customers account for most of the water demand.

Sources of Water

Raw water supply for all of the Royal Lakes service area is obtained from wells drilled into the Floridan aquifer. Three supply wells are located at the WTF. The current CUP for the Royal Lakes system limits withdrawals to 3.461 MGD (annual average daily) and 5.610 MGD (maximum daily).

Water Treatment Facilities

The Royal Lakes has three water supply wells located on the plant site and provides treatment of raw water using aeration and disinfection prior to introduction into the distribution system. The location of the WTF and water supply wells is shown in *Exhibit 2-7*. Following is a summary of pertinent information about the WTF.

The Royal Lakes WTF was originally constructed in 1970. Additional wells were added in 1981 and 1992. Three supply wells (12x8, 26x20, and 20x16x12) ranging from 1,066 to 1,312 feet deep provide raw water. Treatment of raw water includes aeration and disinfection using chlorine. The plant has two 500,000 gallon concrete ground storage tanks and one 150,000 gallon elevated steel tank. The plant also has four high service pumps with capacities of 1,000 gpm (2) and 2,150 gpm (2).

San Jose

Service Area

The San Jose water system service area is essentially the same as the wastewater service area presented in *Exhibit 2-8* . The majority of water customers are single and multi-family residential and commercial.

Water Production and Demands

Exhibit 3-18 summarizes historical average daily water production from the San Jose WTF. Residential and commercial customers account for most of the water demand.

Sources of Water

Raw water supply for all of the San Jose service area is obtained from wells drilled into the Floridan aquifer. Two supply wells are located at the WTF and one is located off-site. The current CUP for the San Jose system limits withdrawals to 2.247 MGD (annual average daily) and 2.860 (maximum daily).

Water Treatment Facilities

The San Jose WTF has two water supply wells located on the plant site and one well located off-site. Treatment of raw water includes aeration and disinfection prior to introduction into the distribution system. The location of the WTF and water supply wells is shown in *Exhibit 2-8*. Following is a summary of pertinent information about the WTF.

The San Jose WTF was originally constructed in 1955. An additional well was added in 1987. Actual treated flow averaged 2.185 MGD during 1995. One 12-inch supply well approximately 1,100 feet deep and one 9-inch supply well approximately 1,170 feet deep provide raw water at the plant site. The third off-site supply well is a 10-inch well approximately 1,200 feet deep. Treatment of raw water includes aeration and disinfection using chlorine. The plant has two 120,000 gallon concrete ground storage tanks and one 500,000 gallon ground storage tank in the system under construction. The plant also has four high service pumps with capacities of 1,500 gpm (2) and 900 gpm (2).

San Pablo

Service Area

The San Pablo water system service area is essentially the same as the wastewater service area presented in *Exhibit 2-9* . The majority of water customers are single and multi-family residential and commercial.

Water Production and Demands

Exhibit 3-19 summarizes historical average daily water production from the Marshview WTF. Residential and commercial customers account for most of the water demand.

Sources of Water

Raw water supply for all of the San Pablo service area is obtained from wells drilled into the Floridan aquifer. Two supply wells are located at the Marshview WTF. The current CUP for the San Pablo system limits withdrawals to 0.647 MGD (annual average daily) and 1.460 (maximum daily).

Water Treatment Facilities

The Marshview WTF has two water supply wells located on the plant site and provides treatment of raw water using aeration and disinfection prior to introduction into the distribution system. The location of the WTF and water supply wells is shown in *Exhibit 2-9.* Following is a summary of pertinent information about the WTF.

The Marshview WTF was upgraded in 1992. An additional well was added in 1996. Two supply wells (16 inch and 12 inch) ranging from approximately 600 to 835 feet deep provide raw water. Treatment of raw water includes aeration and disinfection using chlorine. The plant has two steel ground storage tanks (25,000 gallon and 42,200 gallon). The plant also has three high service pumps with capacities of 800 gpm (1) and 380 gpm (2).

St. Johns North

Service Area

The St. Johns North water system service area is essentially the same as the wastewater service area presented in *Exhibit 2-12* . The majority of water customers are single and multi-family residential and commercial.

Water Production and Demands

Exhibit 3-20 summarizes historical average daily water production from the St. Johns North WTF. Residential and commercial customers account for most of the water demand.

Sources of Water

Raw water supply for all of the St. Johns North service area is obtained from wells drilled into the Floridan aquifer. Three supply wells are located at the St. Johns North WTF. The current CUP for the St. Johns North system limits withdrawals to 0.245 MGD (annual average daily) and 0.560 (maximum daily).

Water Treatment Facilities

The St. Johns North WTF has three water supply wells located on the plant site and provides treatment of raw water using aeration and disinfection prior to introduction into the distribution system. The location of the WTF and water supply wells is shown in *Exhibit 2-12*. Following is a summary of pertinent information about the WTF.

The St. Johns North WTF was originally constructed in 1984. An additional well was added in 1993. Three supply wells (two 4-inch and one 8-inch) ranging from approximately 500 to 800 feet deep provide raw water. Treatment of raw water includes aeration and disinfection using chlorine. The plant has two steel ground storage tanks (30,000 gallons each). The plant also has three high service pumps with capacities of 480 gpm, 800 gpm, and 1,500 gpm.

Yulee

Service Area

The Yulee water system service area is essentially the same as the wastewater service area presented in *Exhibit 2-13* . The majority of water customers are single and multi-family residential and commercial.

Water Production and Demands

Exhibit 3-21 summarizes historical average daily water demands for the three UWFL water treatment facilities in the Yulee service area. This exhibit also shows projected future water demands for the service area over the 20-year planning period.

Water Supply

Raw water supply for the Yulee service area is obtained from wells drilled into the Floridan aquifer. One supply well is located at each of the three WTFs within the service area. The Yulee area is not within a SJRWMD Water Caution Area.

CHAPTER 3

Future Conditions

This chapter summarizes the planning considerations for water and wastewater management and reuse for the UWFL service areas.

General Conditions

The future conditions in Duval, Nassau, and St. Johns Counties are presented in this section, outlining the county population projections and future land use.

Population

Exhibit 3-1 presents population projections for the three counties as documented in the Florida Statistical Abstract.

Future Land Use

The future land use maps for Duval and St. Johns Counties and the Yulee area were reviewed and found to generally conform with the current land use maps within the study area. Future land use in the service areas is predominantly residential and commercial.

Wastewater Management

This section will discuss the future conditions relative to wastewater management for each service area. Flow projections for each service area were developed using a common methodology. The methodology applied was as follows:

1. Available historical flow data were plotted.
2. Growth rates beyond 1996 were initially developed based on assumed growth rates of 1 percent, 3 percent, and 5 percent, which represented a likely range of growth for all the service areas.
3. A workshop with UWFL staff was conducted to discuss growth potential within each area and to select a growth rate for planning purposes.
4. Flow projections were developed based on the selected growth rate.

Holly Oaks

Flow Projections

Projected wastewater flows for the 20-year planning period are summarized in *Exhibit 3-2*.

Exhibit 3-1
County-Wide Population Projections

County	Estimated Population (1,000s)	Projections by Year (1,000s)					
	1994	1995	2000	2005	2010	2015	2020
Duval	710.6						
Low		698.9	707.5	709.5	706.3	698.6	686.3
Medium		720.2	766.2	808.2	848.6	889.1	929.1
High		742.1	830.6	921.6	1,016.4	1,116.0	1,220.0
St. Johns	94.8						
Low		93.9	99.4	102.0	102.2	100.3	96.1
Medium		97.7	112.0	125.2	138.0	150.9	163.9
High		101.7	126.5	153.0	181.7	213.2	247.2
Nassau	47.4						
Low		46.4	46.7	46.1	44.7	42.6	39.7
Medium		48.3	52.8	56.9	60.8	64.7	68.6
High		50.3	59.5	69.1	79.4	90.4	102.2

Source: 1995 Florida Statistical Abstract, Bureau of Economic and Business Research

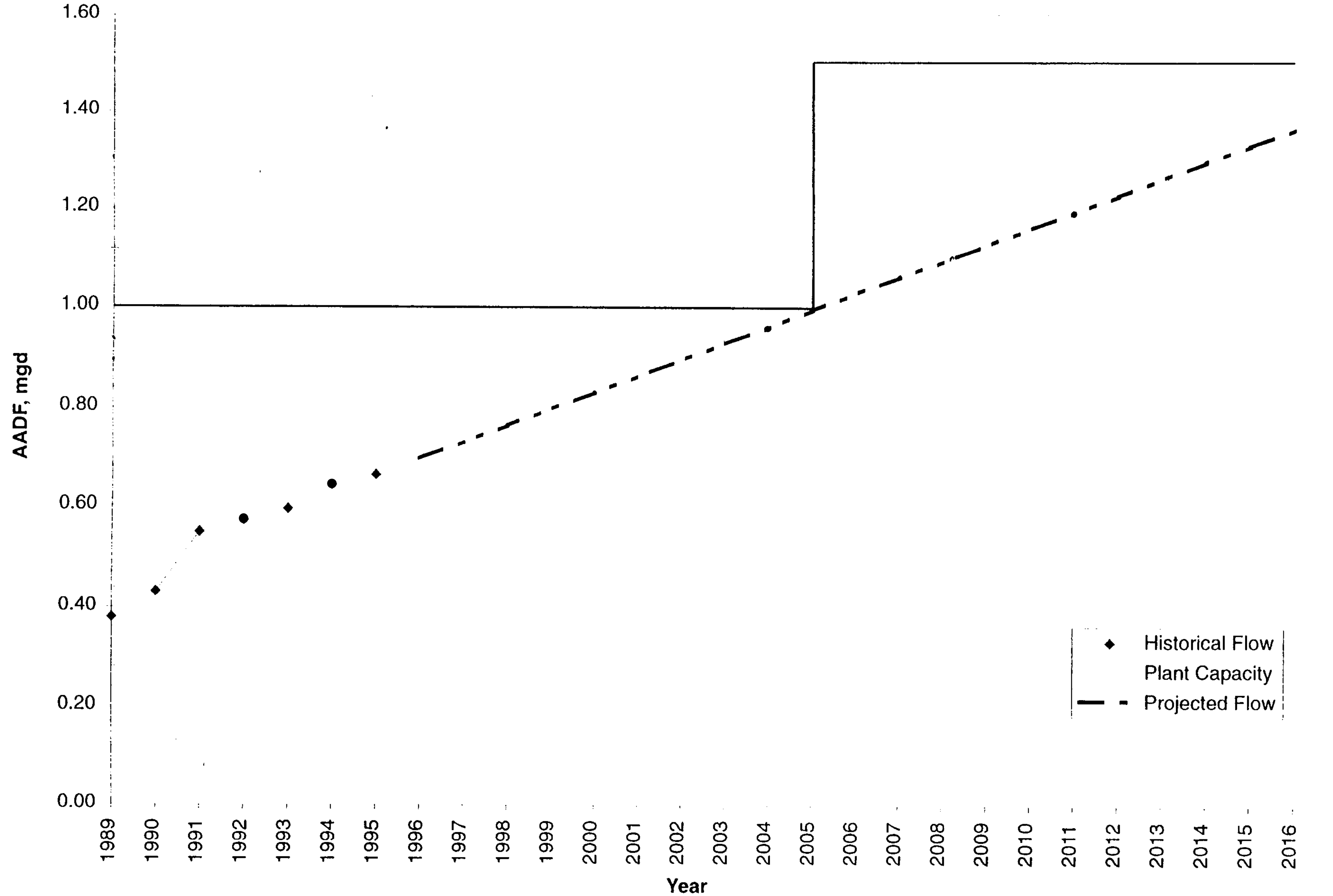

Exhibit 3-2. Holly Oaks WWTF Historical and Projected Wastewater Flow.

Expansion/Upgrade Plans

On the basis of the existing capacity of the plant and the flow projections described above, the Holly Oaks WWTF will require expansion before the end of year 2005. For purposes of this report, a 0.5 mgd expansion will be assumed for a total capacity of 1.5 mgd (AADF). This will provide for the needs of the system beyond the 20-year planning period for this study.

UWFL is currently planning for additional improvements to the Holly Oaks WWTF in 1997 which are not related to an increase in the permitted capacity of the plant. In addition to rehabilitation of the existing steel structures, these planned improvements include addition of a UV disinfection system, influent screening (Rotary Drum), selector zone, redundant blower, and a new electrical room.

Wastewater Management Constraints/Limitations

Sufficient capacity exists within the outfall pipeline to Cowhead Creek and it is anticipated that the Holly Oaks WWTF will be permitted to continue discharge to Cowhead Creek during the planning period.

Jacksonville Heights

Flow Projections

Projected wastewater flows for the 20-year planning period are summarized in *Exhibit 3-3*.

Expansion/Upgrade Plans

On the basis of the flow projections described above and the existing capacity of the plant, the Jacksonville Heights WWTF will not require expansion during the 20-year planning period.

Wastewater Management Constraints/Limitations

There are no known constraints or limitations to continued use of the existing effluent disposal system at the Jacksonville Heights WWTF.

Monterey

Flow Projections

Projected wastewater flows for the 20-year planning period are summarized in *Exhibit 3-4*.

Expansion/Upgrade Plans

Upon completion of the current expansion, the capacity of the Monterey WWTF will be limited to 3.2 mgd based on solids handling capabilities. Based on the projected wastewater flows presented in Exhibit 3-4, the projected buildout flow for the study period is approximately 4 mgd. The projected flows will exceed the capacity of 3.2 mgd around 2001. For this analysis, it is assumed that rehabilitation of the existing digester to provide at least 3.6 mgd will occur during 2001. Additional expansion from 3.6 mgd to 4.0 mgd will be

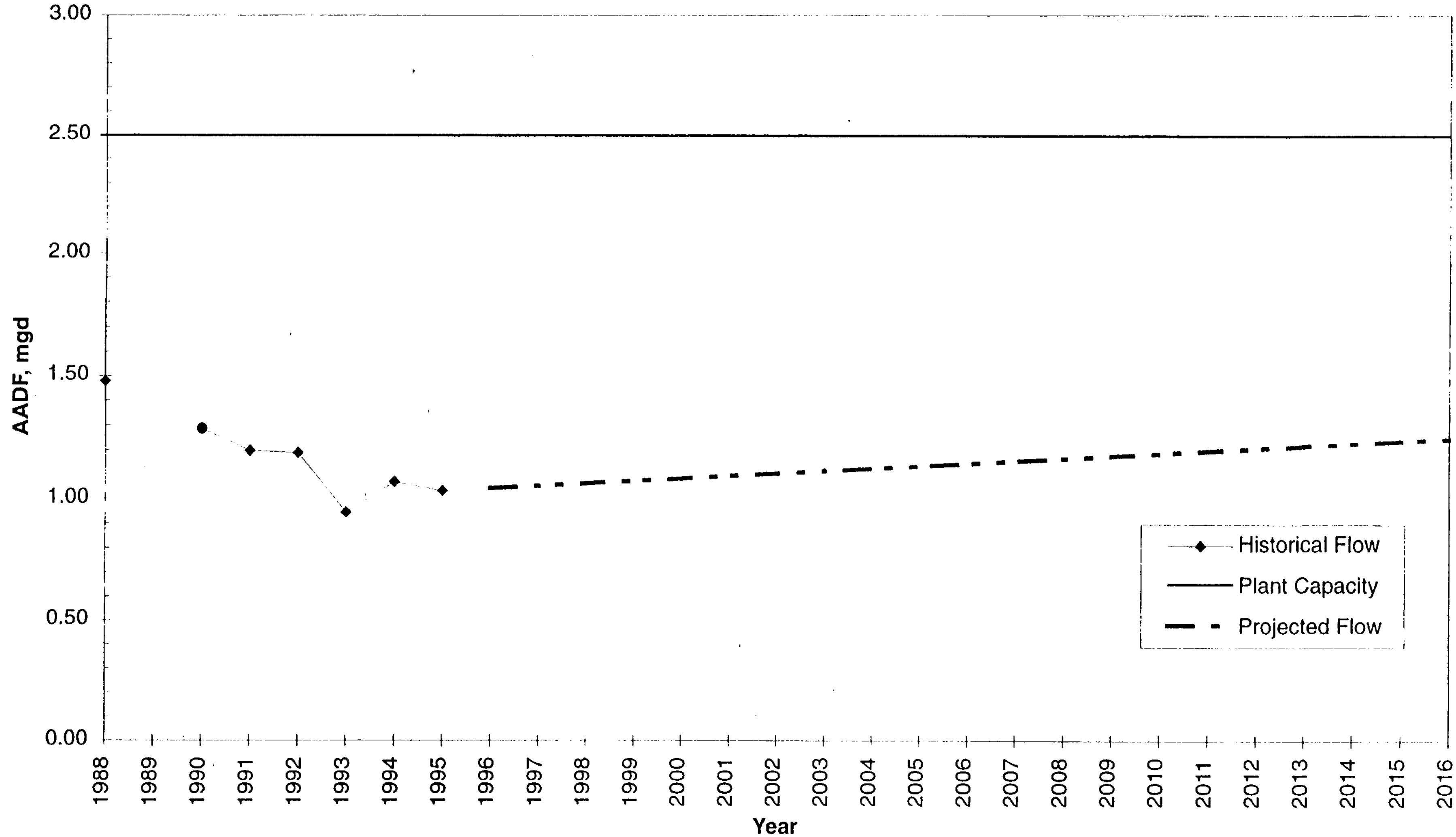

Exhibit 3-3. Jacksonville Heights WWTF Historical and Projected Wastewater Flow.

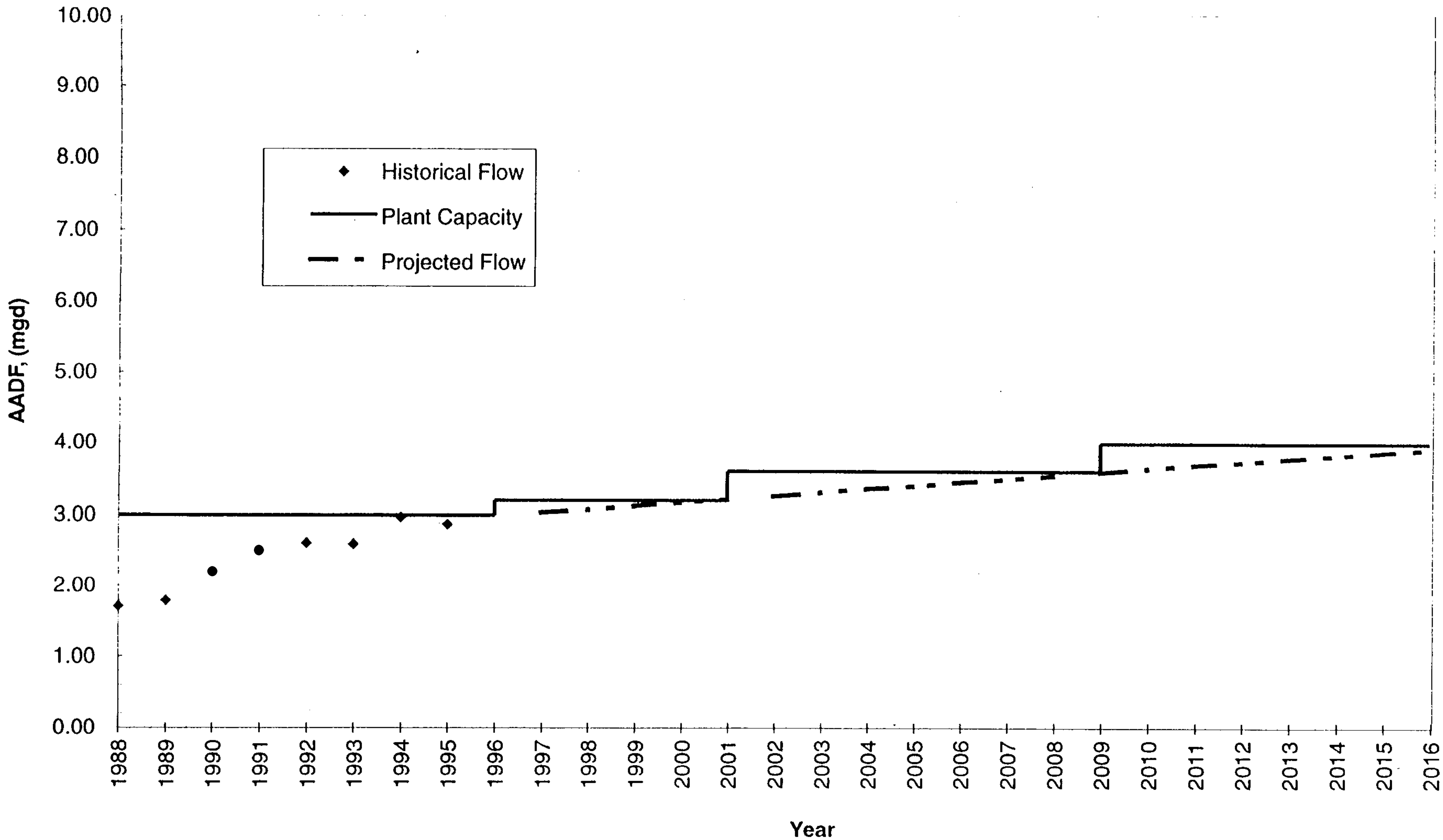

Exhibit 3-4. Monterey WWTF Historical and Projected Wastewater Flow.

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required during 2009. This will provide for the needs of the system beyond the design year for this study.

Wastewater Management Constraints/Limitations

The existing effluent disposal system has capacity to serve the full projected flow during the planning period and no known constraints exist to its continued use.

Royal Lakes

Flow Projections

Projected wastewater flows for the 20-year planning period are summarized in *Exhibit 3-5*.

Expansion/Upgrade Plans

On the basis of the flow projections described above and the existing capacity of the plant, the Royal Lakes WWTF will not require expansion before the end of the 20-year planning period.

Wastewater Management Constraints/Limitations

There are no known constraints or limitations to continued use of the existing effluent disposal system at the Royal Lakes WWTF.

San Jose

Flow Projections

Projected wastewater flows for the 20-year planning period are summarized in *Exhibit 3-6*.

Expansion/Upgrade Plans

On the basis of the flow projections described above and the existing capacity of the plant, the San Jose WWTF will not require expansion before the end of the 20-year planning period.

Wastewater Management Constraints/Limitations

There are no known constraints or limitations to continued use of the existing effluent disposal system at the San Jose WWTF.

San Pablo

Flow Projections

Projected wastewater flows for the 20-year planning period are summarized in *Exhibit 3-7*.

Expansion/Upgrade Plans

On the basis of the existing plant capacity and the flow projections described above, the San Pablo WWTF will exceed current permitted capacity before the end of year 1997. However, current plans are to re-rate the permitted capacity of the plant to a total capacity of 0.75 mgd (AADF). This will provide for the buildout needs of the system.

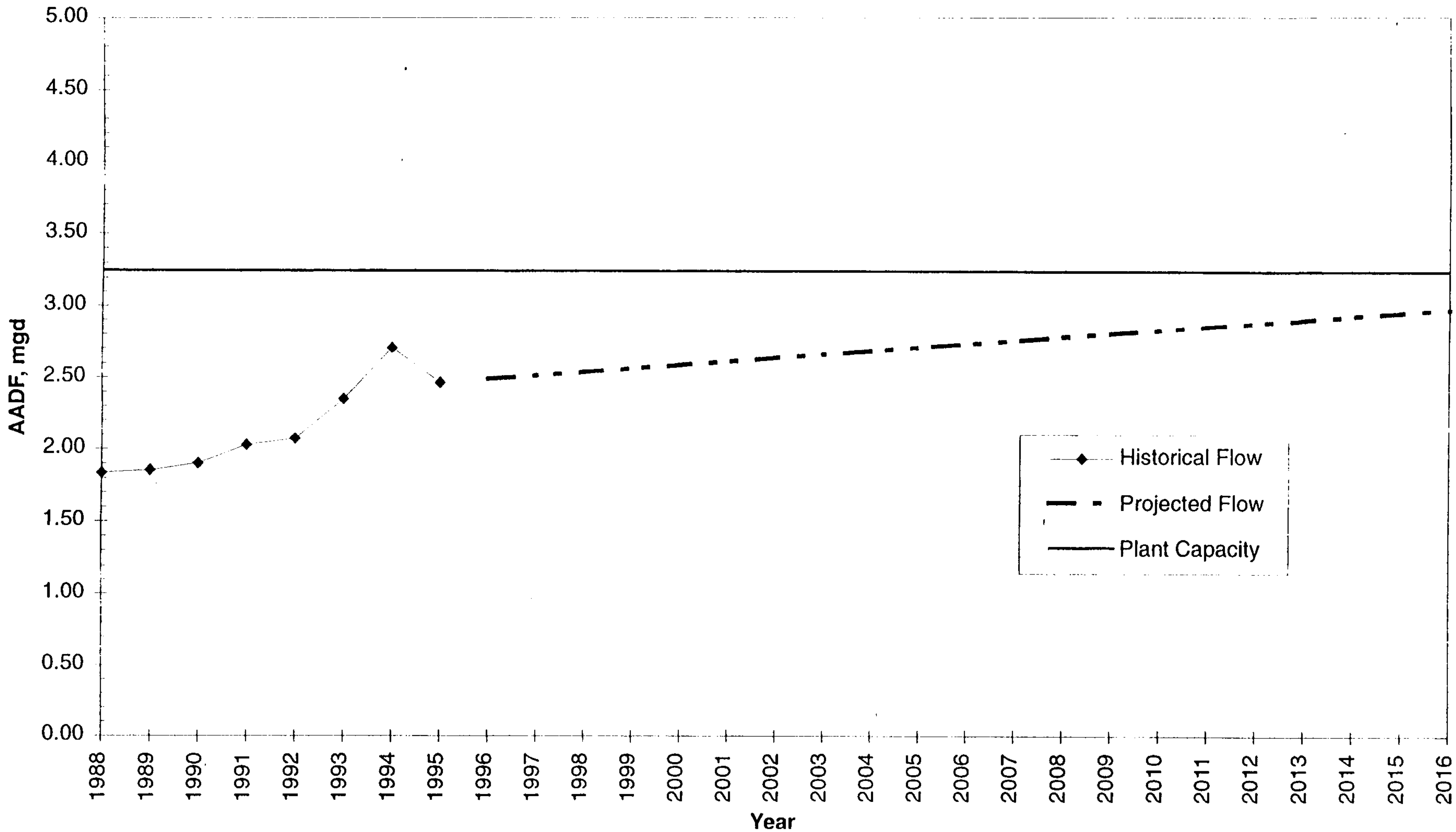

Exhibit 3-5. Royal Lakes WWTF Historical and Projected Wastewater Flow.

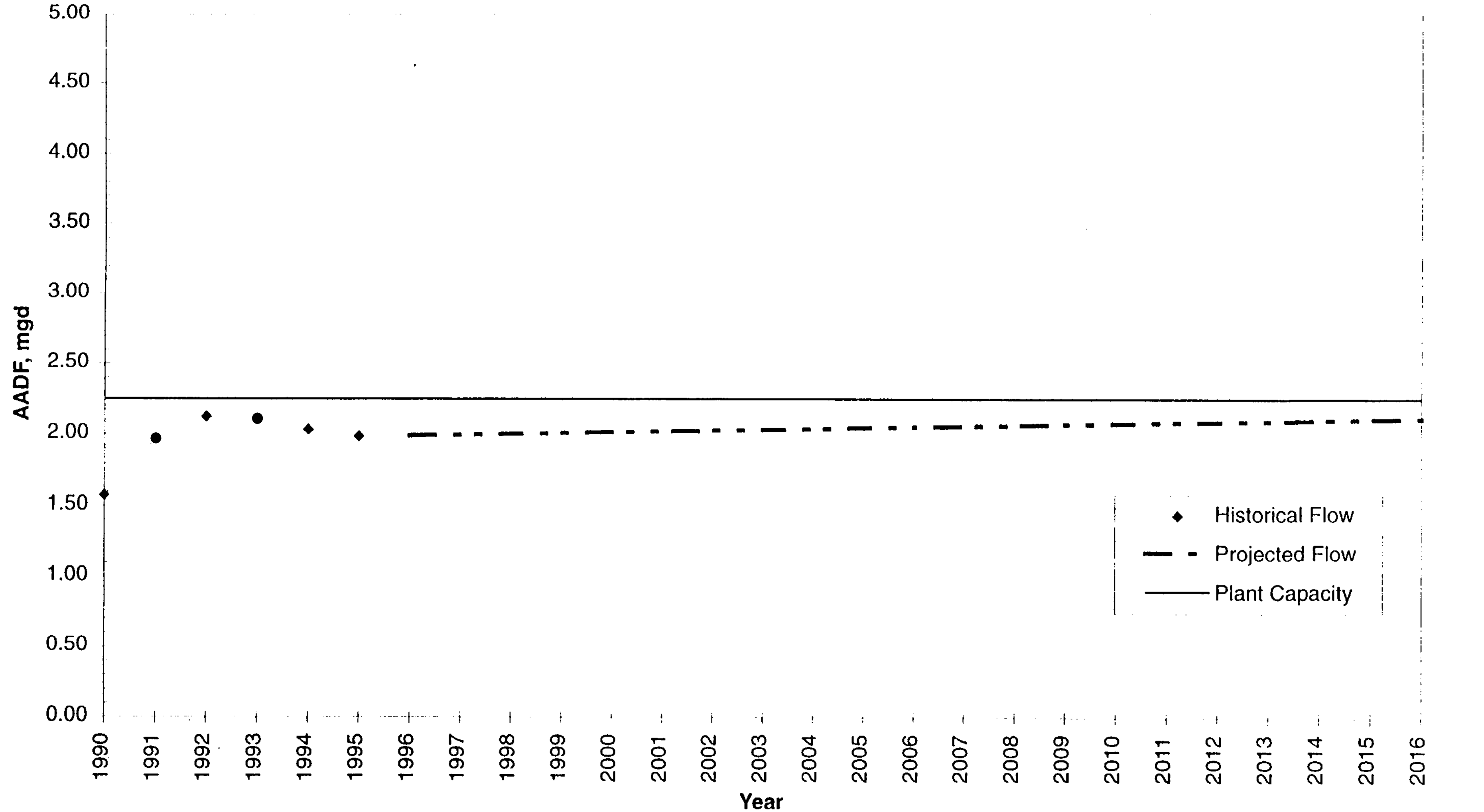

Exhibit 3-6. San Jose WWTF Historical and Projected Wastewater Flow.

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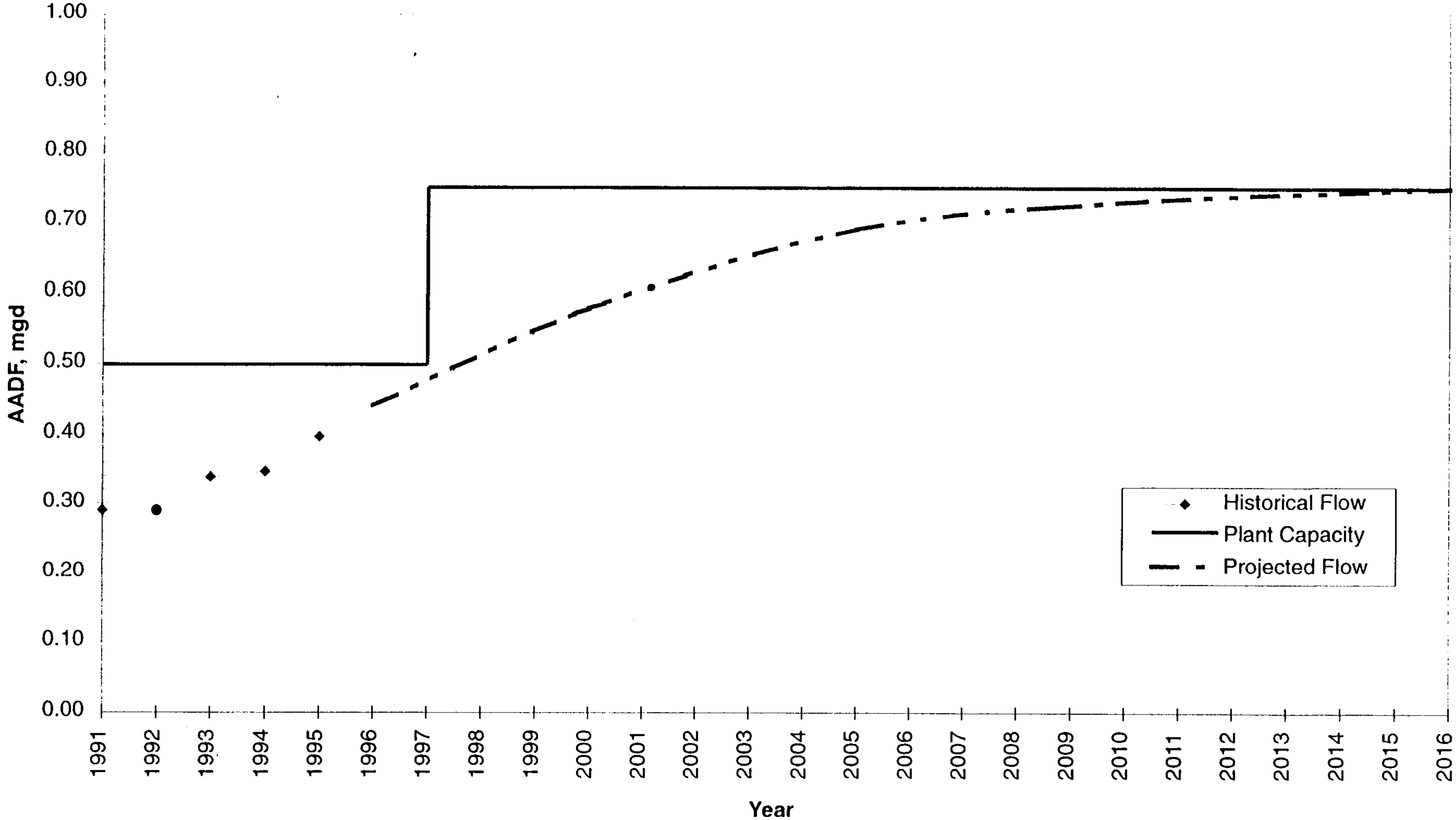

Exhibit 3-7. San Pablo WWTF Historical and Projected Wastewater Flow.

Wastewater Management Constraints/Limitations

Sufficient capacity exists within the outfall pipeline to the Intracoastal Waterway and it is anticipated that the San Pablo WWTF will be permitted to continue discharge during the planning period.

Ponce de Leon

Flow Projections

Projected wastewater flows for the 20-year planning period are summarized in *Exhibit 3-8*.

Expansion/Upgrade Plans

On the basis of the existing permitted capacity of the plant and the flow projections described above, the Ponce De Leon WWTF will exceed the current permitted capacity before the end of year 1999. However, this plant was originally designed and permitted for 0.4 mgd. Consequently, a re-rating of the plant back up to its original design capacity should be possible with little or no capital cost. On this basis, a total capacity of 0.4 mgd (AADF) will provide for the needs of the system through the planning period of this study.

Wastewater Management Constraints/Limitations

There are no known constraints or limitations to continued use of the existing effluent disposal system at the Ponce De Leon WWTF.

Ponte Vedra

Flow Projections

Projected wastewater flows for the 20-year planning period are summarized in *Exhibit 3-9*.

Expansion/Upgrade Plans

On the basis of the flow projections described above and the existing capacity of the plant, the Ponte Vedra WWTF will exceed current permitted capacity around year 2000.

The expansion of the Ponte Vedra WWTF is currently in design. The new facility will have a capacity of 0.6 mgd and will replace the existing facility. In accordance with the new FDEP permit, the new facility must be on line by March 31, 2000. The permitted discharge from the new facility will be to public access reuse within the service area and/or the Ponte Vedra Lake System (Class III waters). UWFL is currently in discussion with the Ponte Vedra Inn and Club regarding use of reclaimed water at the golf course. The design incorporates new filtration and chlorination facilities to meet this anticipated demand. Additionally, the facility is being designed for nitrogen limits of 3 mg/l for the surface water discharge.

Wastewater Management Constraints/Limitations

It is not anticipated that effluent management will become a constraint at the Ponte Vedra WWTF during the planning period.

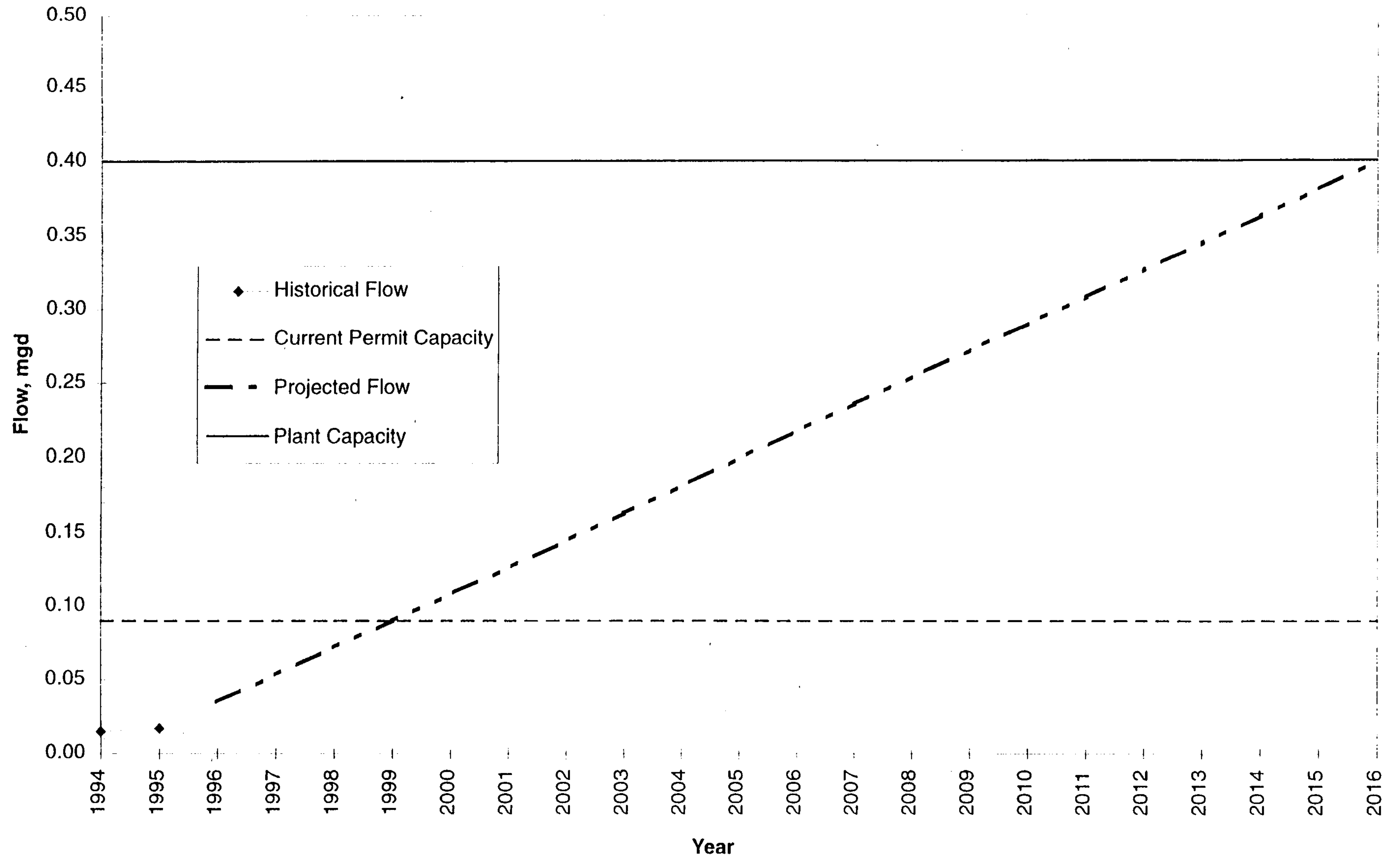

Exhibit 3-8. Ponce De Leon WWTF Historical and Projected Wastewater Flow.

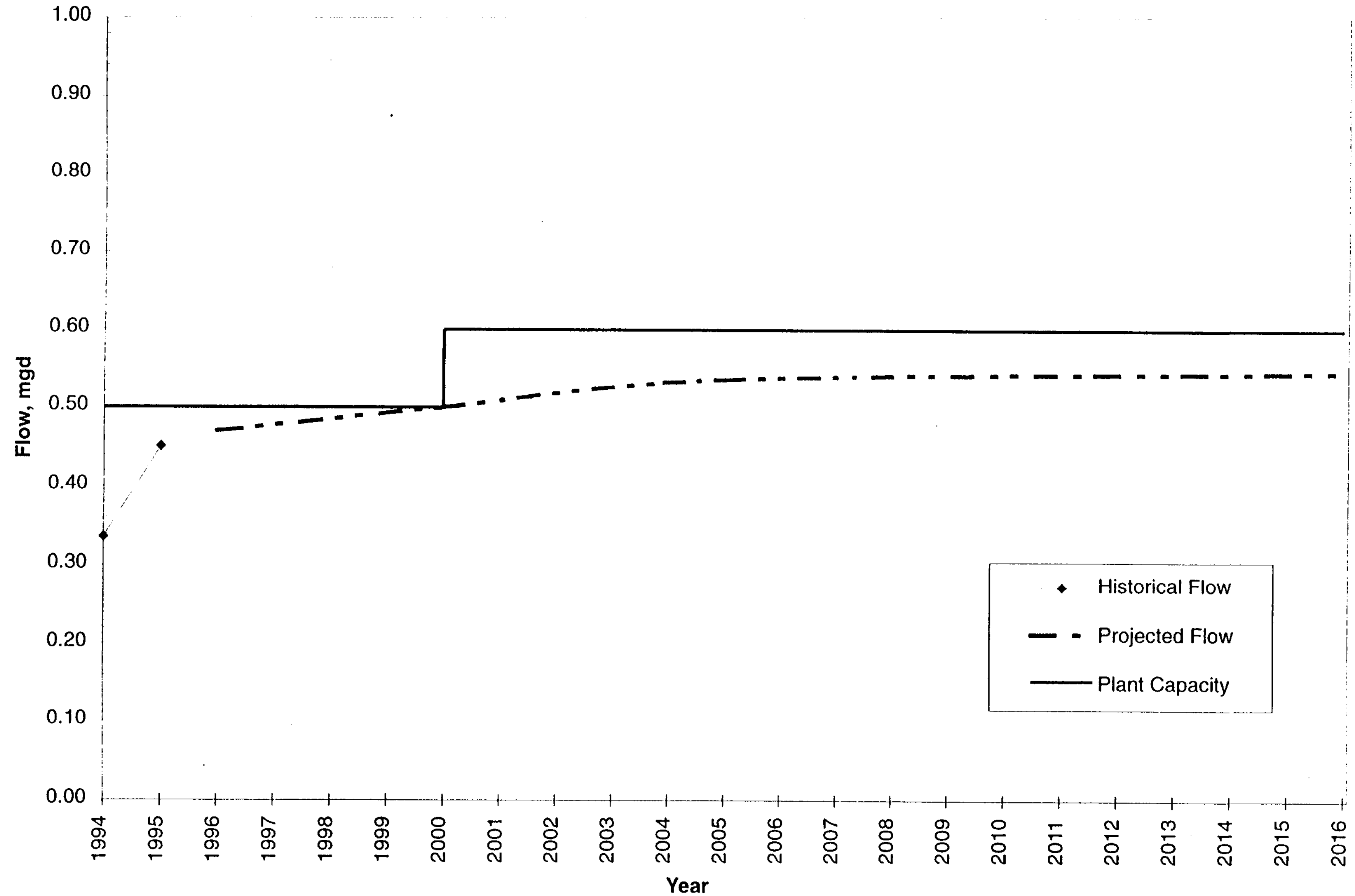

Exhibit 3-9. Ponte Vedra WWTF Historical and Projected Wastewater Flow.

St. Johns North

Flow Projections

Projected wastewater flows for the 20-year planning period are summarized in *Exhibit 3-10.*

Expansion/Upgrade Plans

On the basis of the flow projections described above and the existing capacity of the plant, the St. Johns North WWTF will require two expansions during the 20-year planning period. For purposes of this report, a 0.3 mgd expansion (for a total capacity of 0.6 mgd) will be assumed by end of year 1999. An additional 0.2 mgd expansion for a total capacity of 0.8 mgd (AADF) will be needed before the end of year 2008. This will provide for the needs of the system beyond the design year for this study.

Wastewater Management Constraints/Limitations

Currently, the capacity of the St. Johns North WWTF is limited by effluent disposal capacity. Upon installation of an underdrain system for the percolation ponds, UWFL will be allowed to discharge 0.225 mgd under an Administrative Order. UWFL is currently evaluating options to the percolation ponds including reuse, wetlands disposal, and river discharge.

Yulee

Flow Projections

Projected wastewater flows for the 20-year planning period are summarized in *Exhibit 3-11.*

Expansion/Upgrade Plans

The wastewater management plan for the Yulee service area include construction of a new 1.0 mgd regional advanced wastewater treatment facility. For the purposes of this study, the following phasing plan will be used for development of the regional WWTF:

Phase 1	0.5 mgd	2001 - 2003
Phase 2	0.5 mgd	2004 - 2016
TOTAL	1.0 mgd	

The system will be designed for discharge to a receiving wetland with ultimate discharge to the Nassau River.

Wastewater Management Constraints/Limitations

The planned system described above has been permitted for construction by FDEP. It is not anticipated that there will be any constraints or limitations on the system during the planning period.

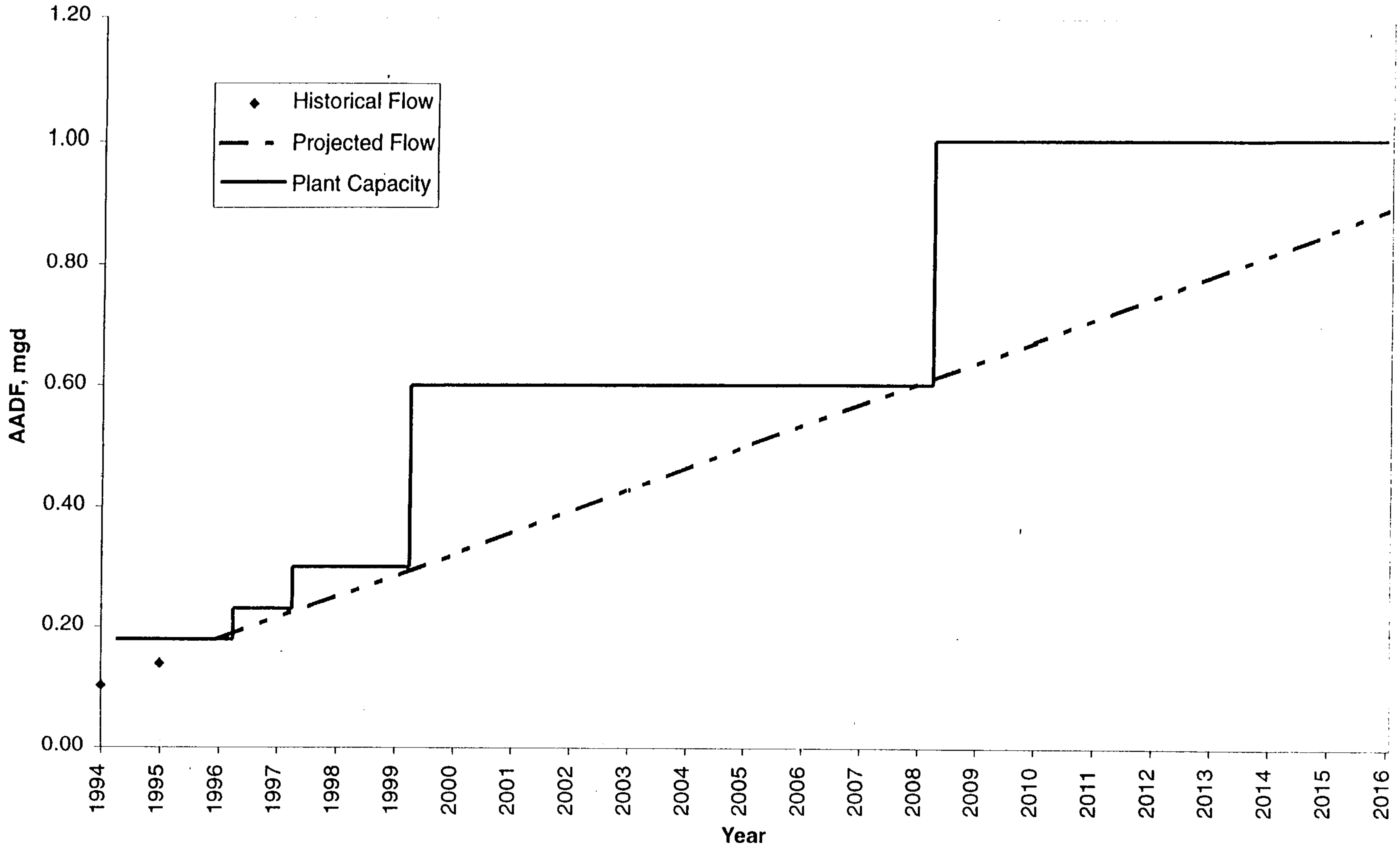

Exhibit 3-10. St. Johns North WWTF Historical and Projected Wastewater Flow.

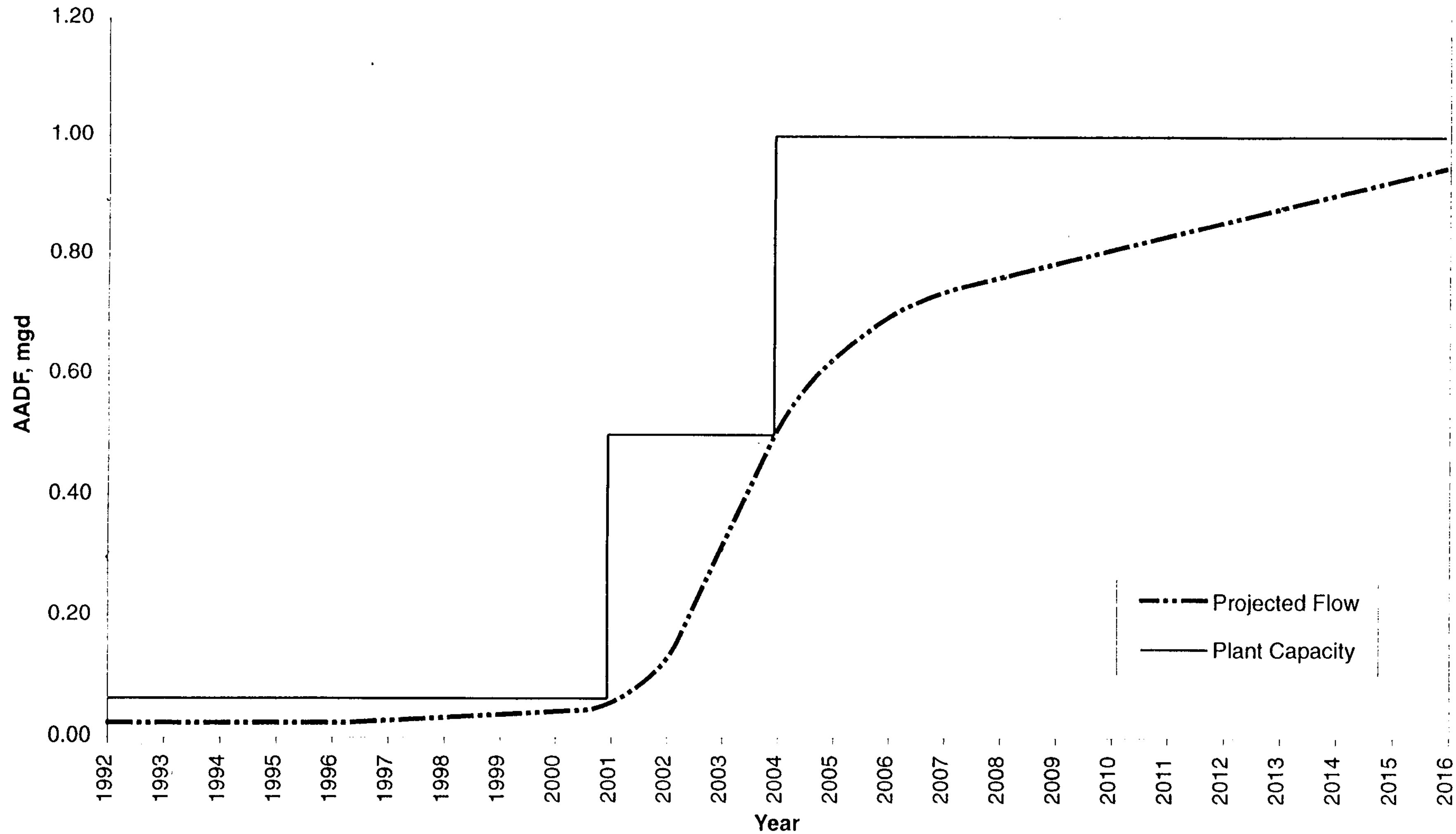

Exhibit 3-11. Yulee Service Area Historical and Projected Wastewater Flow.

Water Supply

Holly Oaks Grid

Demand Projections

Exhibit 3-12 summarizes projected average daily water usage for the 20-year study period for the Holly Oaks Grid. This projected water usage was developed by applying the same growth rate used for the wastewater flow projections to the 1995 annual average daily water demand.

Sources of Water

The current CUP for the Holly Oaks Grid limits groundwater withdrawals to 1.319 mgd AADD and 2.880 mgd MDD. This permit expires in March 2002. The projected design year (2016) demand for the service area is 2.3 mgd AADD. Consequently, additional well capacity will have to be provided to meet the projected demand for the design year 2016. This will also require an increase of approximately 1 mgd for the Holly Oaks Grid CUP.

Jacksonville Heights Grid

Demand Projections

Exhibit 3-13 summarizes projected average daily water usage for the 20-year study period for the Jacksonville Heights Grid. This projected water usage was developed by applying the same growth rate used for the wastewater flow projections to the 1995 annual average daily water demand.

Sources of Water

The current CUP for the Jacksonville Heights Grid limits groundwater withdrawals to 1.609 mgd AADD and 3.09 mgd MDD. This permit expires in March 2002. The projected design year (2016) demand for the service area is 1.5 mgd AADD. Consequently, no additional well capacity will have to be provided to meet the projected demand for the design year 2016. No increase to the current CUP will be needed.

Arlington Grid

Demand Projections

Exhibit 3-14 summarizes projected average daily water usage for the 20-year study period for the Arlington Grid. This projected water usage was developed by applying the same growth rate used for the wastewater flow projections to the 1995 annual average daily water demand.

Sources of Water

Raw water supply for all of the Arlington service area is obtained from wells drilled into the Floridan aquifer. Supply wells are located at each of the five WTFs. The current CUP for the Arlington Grid limits withdrawals to 2.809 mgd (annual average daily) and 5.630 mgd

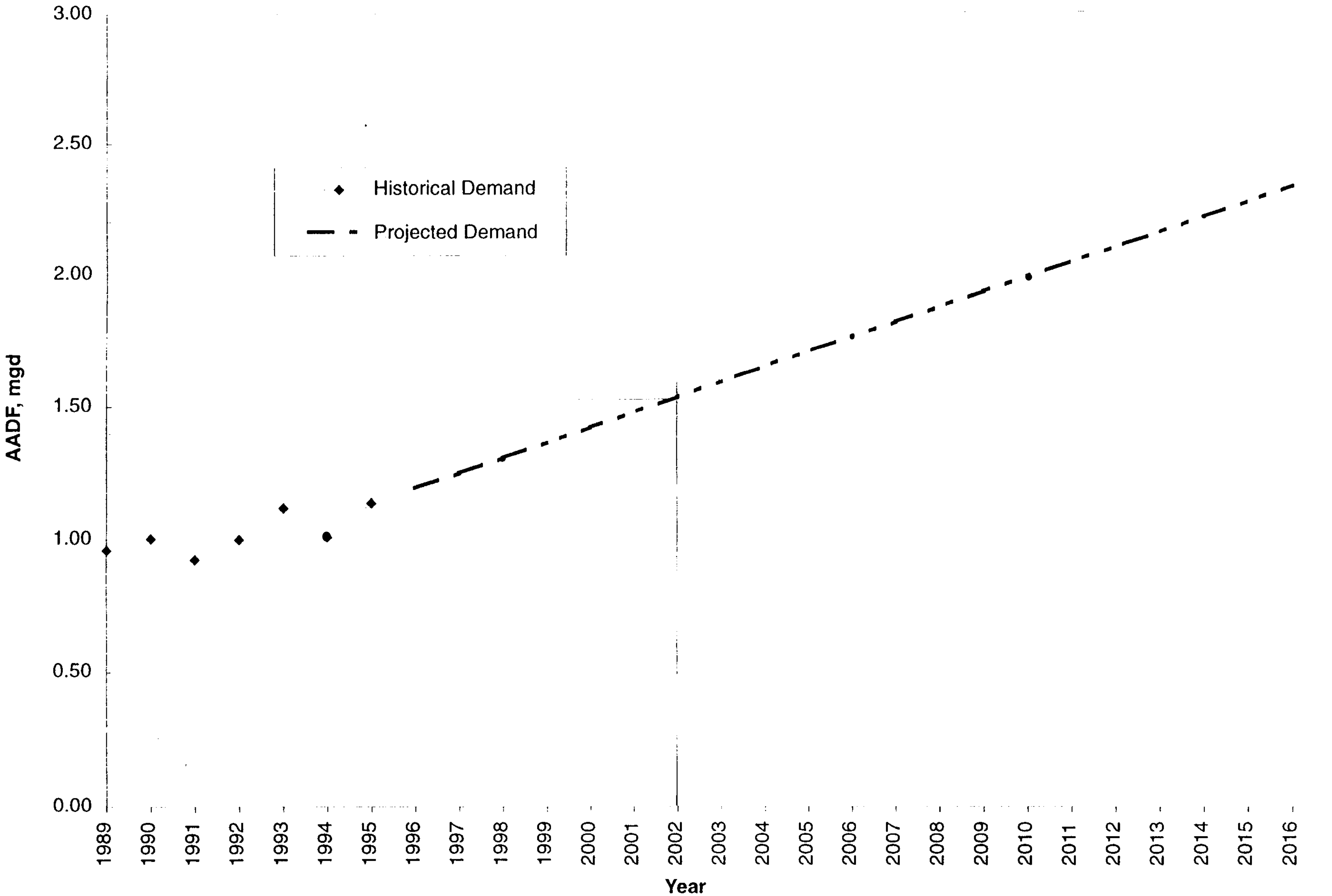

Exhibit 3-12. Holly Oaks Grid Water System Historical and Projected Water Demand.

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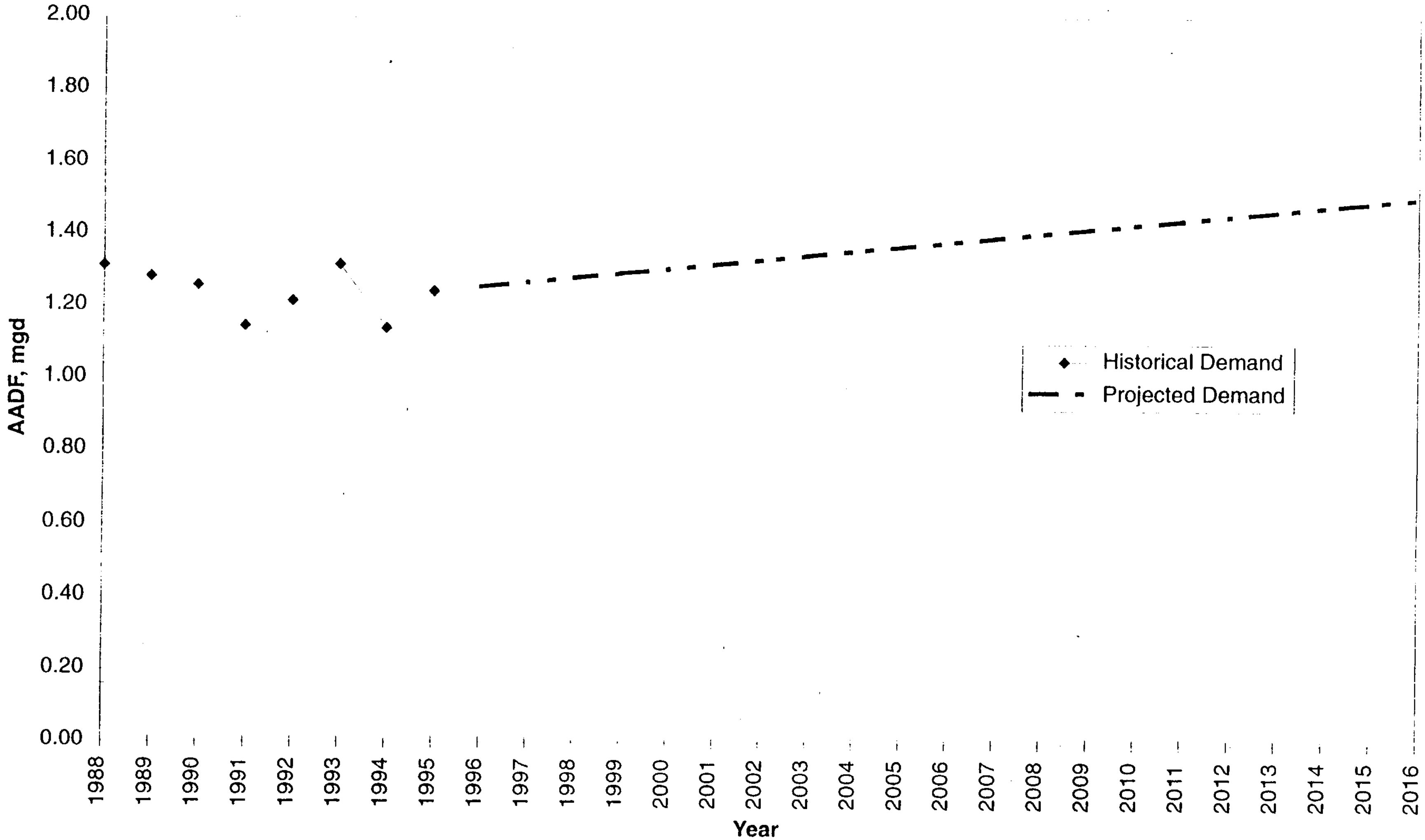

Exhibit 3-13. Jacksonvile Heights Grid Water System Historical and Projected Water Demand.

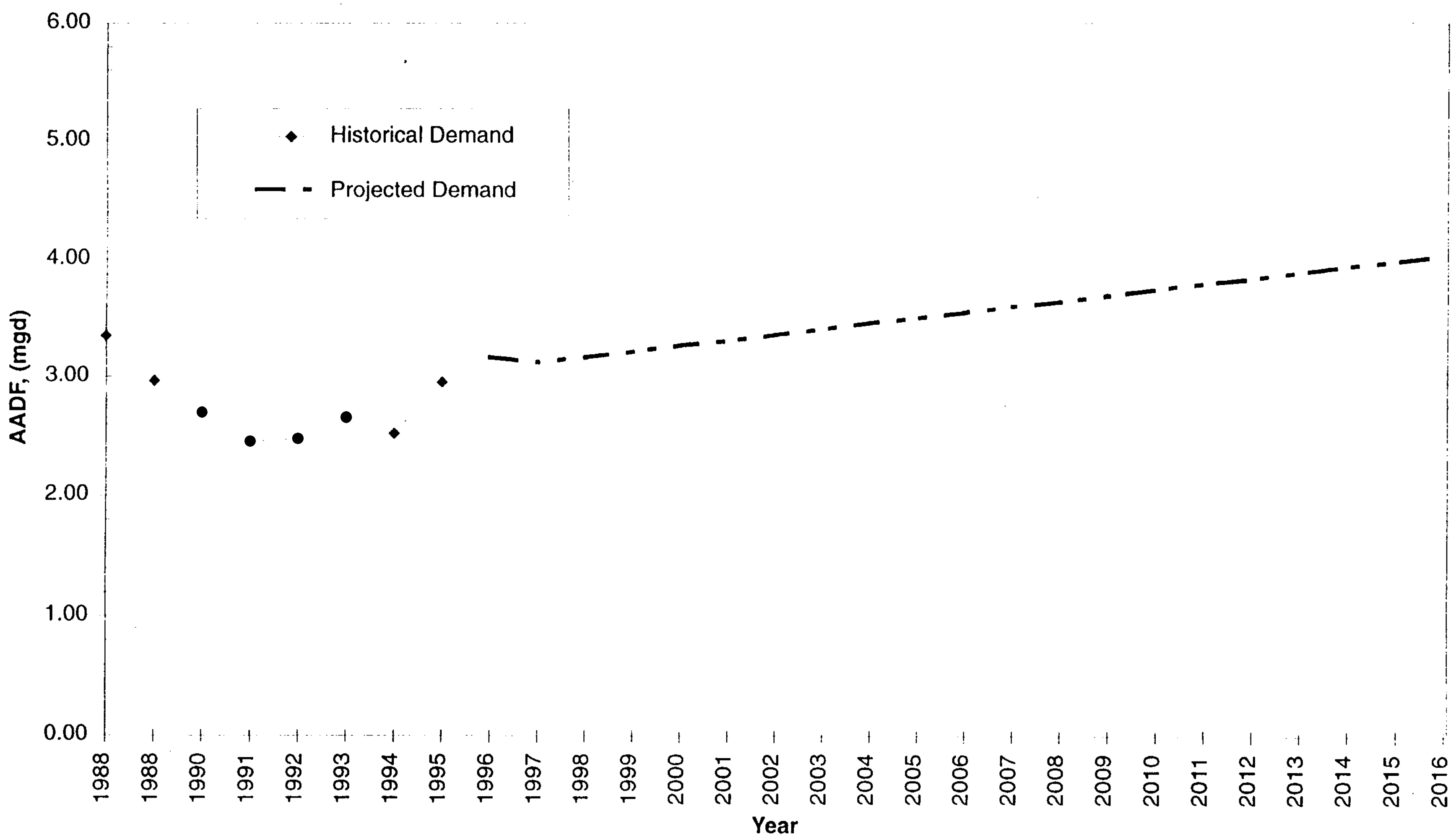

Exhibit 3-14. Arlington Grid Water System Historical and Projected Water Demand.

daily). As shown on *Exhibit 3-14,* annual average daily flow by the end of the planning period is projected to be 4.0 mgd. It is assumed that UWFL will install additional wells into the Floridan Aquifer to meet the additional supply needs. This will require a 1.23 mgd increase to the CUP.

Ponce de Leon Grid

Demand Projections

Exhibit 3-15 summarizes projected average daily water usage for the 20-year study period for the Ponce de Leon Grid. This projected water usage was developed by applying the same growth rate used for the wastewater flow projections to the 1995 annual average daily water demand.

Sources of Water

Raw water supply for all of the Ponce De Leon service area is obtained from wells drilled into the Floridan aquifer. Supply wells are located at each of the three WTFs. The current CUP for the Ponce De Leon grid is currently in the renewal process and limits annual withdrawals to 0.40 mgd (annual average daily) and 0.633 mgd (maximum daily). As shown on *Exhibit 3-15,* projected annual average daily demand in the year 2016 is approximately 0.4 mgd. Therefore no expansion of water supply capacity is needed during the 20 year study period.

Ponte Vedra Grid

Demand Projections

Exhibit 3-16 summarizes projected average daily water usage for the 20-year study period for the Ponte Vedra Grid. This projected water usage was developed by applying the same growth rate used for the wastewater flow projections to the 1995 annual average daily water demand.

Sources of Water

Raw water supply for all of the Ponte Vedra service area is obtained from wells drilled into the Floridan aquifer. Supply wells are located at each of the two WTFs. The current CUP for the Ponte Vedra grid limits withdrawals to 2.28 mgd (annual average daily) and 4.57 mgd (maximum daily). As shown on *Exhibit 3-16,* annual average daily flow by the end of the planning period is projected to be 1.3 mgd. It is assumed that no increase in the CUP will be needed.

Royal Lakes

Demand Projections

Exhibit 3-17 summarizes projected average daily water usage for the 20-year study period for the Royal Lakes Grid. This projected water usage was developed by applying the same growth rate used for the wastewater flow projections to the 1995 annual average daily water demand.

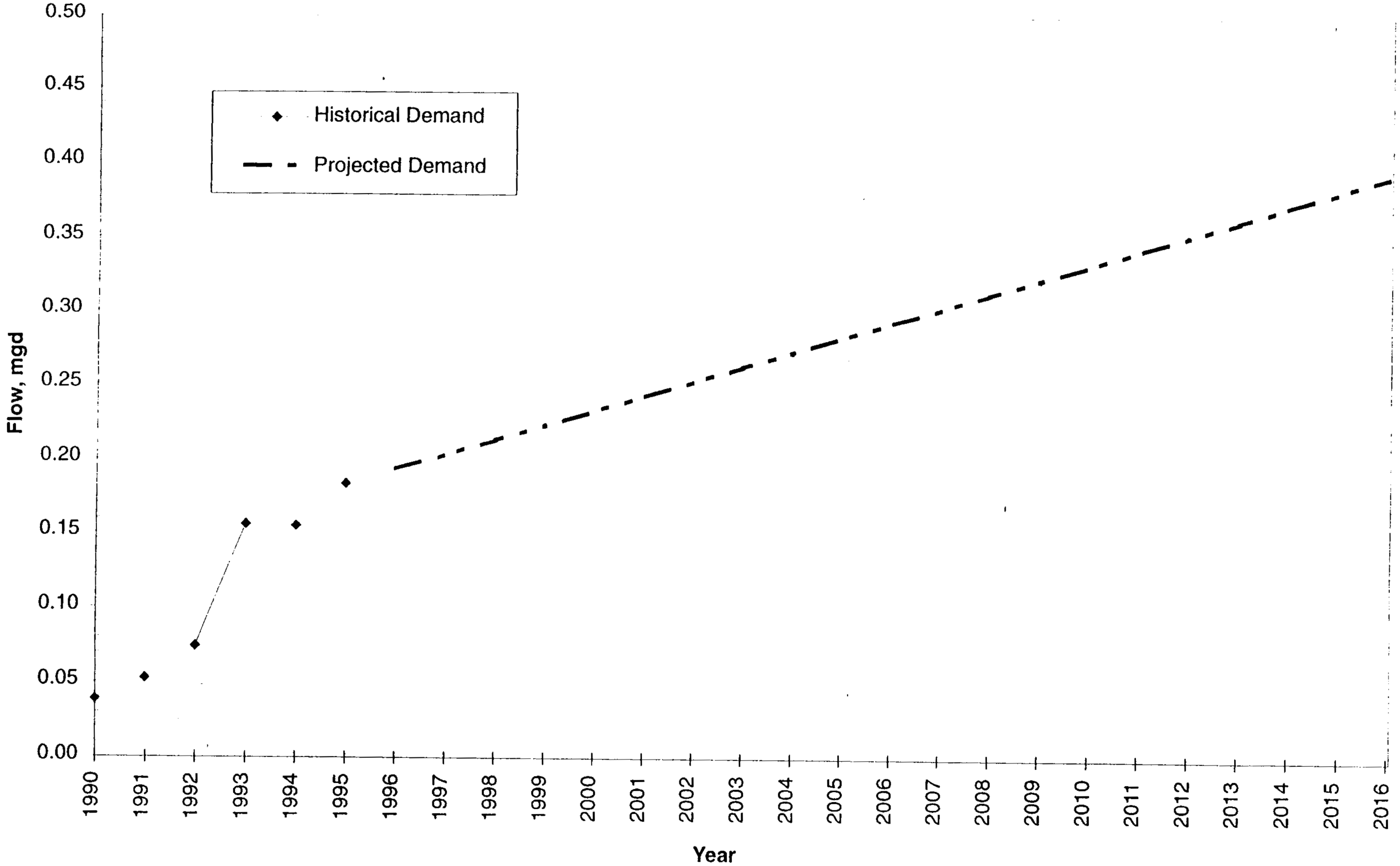

Exhibit 3-15. Ponce De Leon Grid Water System Historical and Projected Water Demand.

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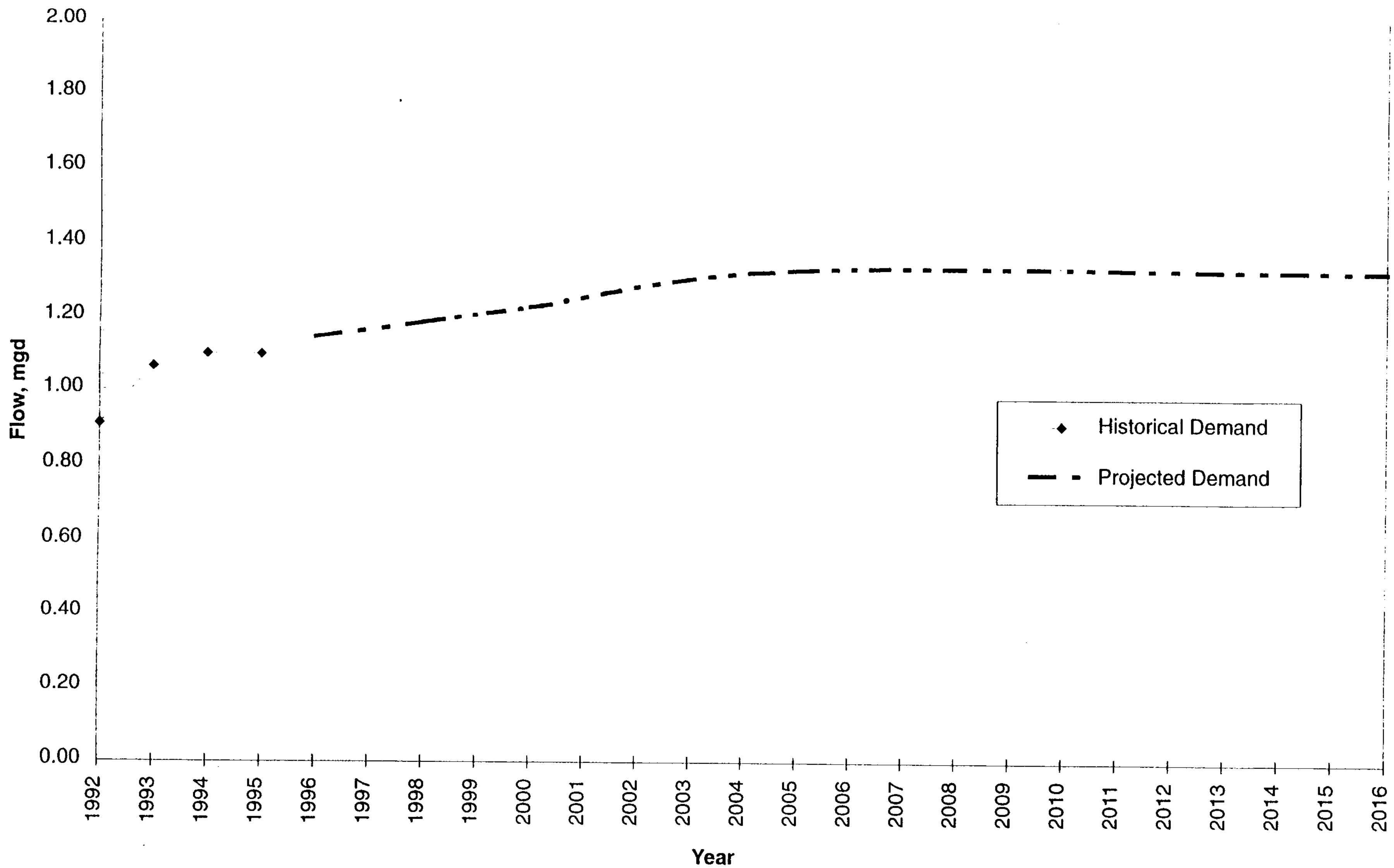

Exhibit 3-16. Ponte Vedra Grid Water System Historical and Projected Water Demand.

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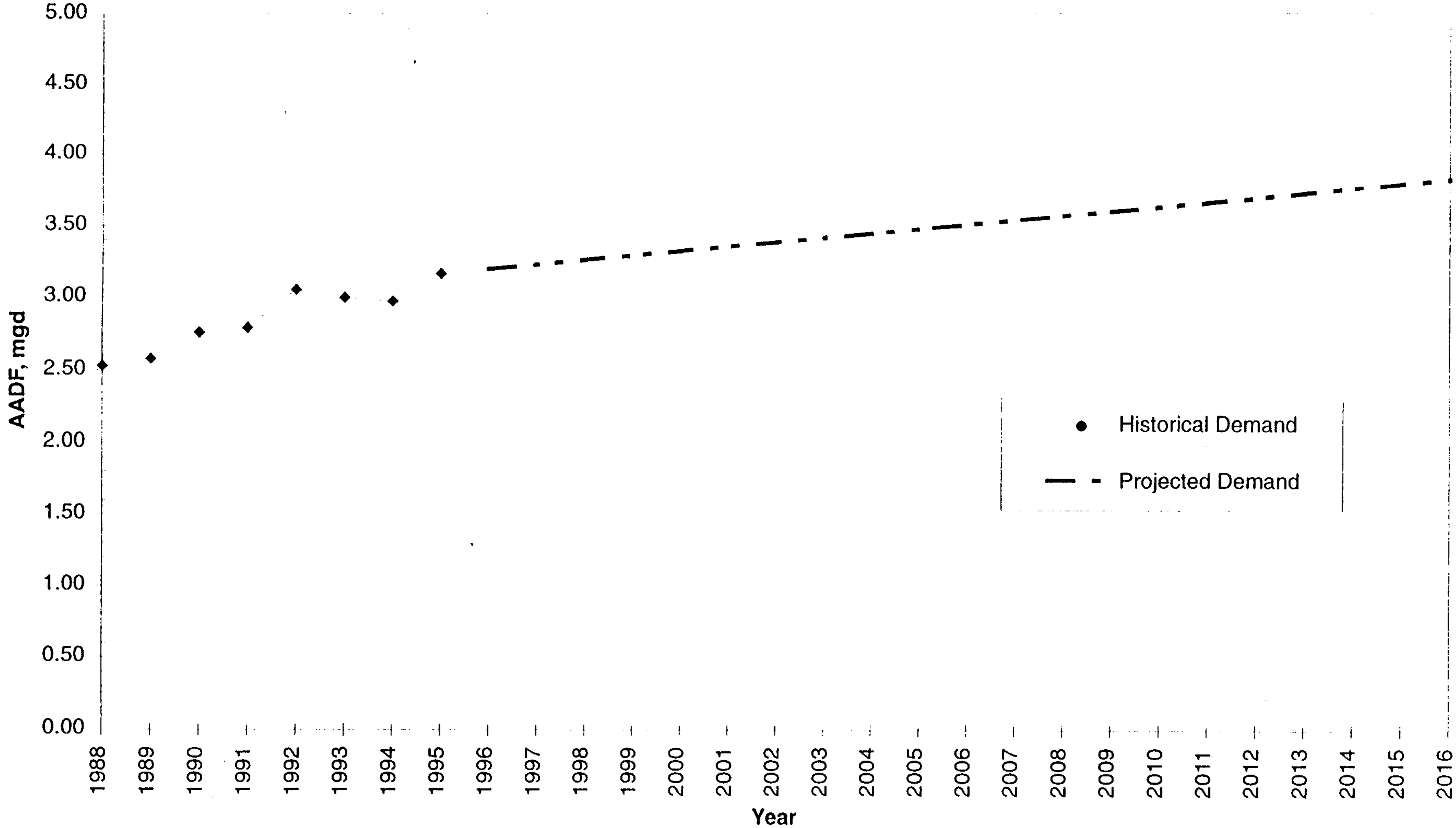

Exhibit 3-17. Royal Lakes WTF Historical and Projected Water Demand.

Sources of Water

Raw water supply for all of the Royal Lakes service area is obtained from wells drilled into the Floridan aquifer. Three supply wells are located at the WTF. The current CUP for the Royal Lakes system limits withdrawals to 3.461 mgd (annual average daily) and 5.610 mgd (maximum daily). As shown on *Exhibit 3-17*, projected annual average daily demand in the year 2016 is approximately 3.8 mgd. It is assumed that UWFL will install additional wells into the Floridan Aquifer to meet the water supply shortfall. This will require a 0.37 mgd increase to the CUP.

San Jose

Demand Projections

Exhibit 3-18 summarizes projected average daily water usage for the 20-year study period for the San Jose Grid. This projected water usage was developed by applying the same growth rate used for the wastewater flow projections to the 1995 annual average daily water demand.

Sources of Water

Raw water supply for all of the San Jose service area is obtained from wells drilled into the Floridan aquifer. Three supply wells are located at the WTF. The current CUP for the San Jose system limits withdrawals to 2.247 mgd (annual average daily) and 2.860 (maximum daily). Based on projection of annual average day demand of 2.3 in 2016 for the San Jose service area, a minor increase in the current allocation in the CUP should be adequate for the planning period. This will require a 0.05 mgd increase to the CUP.

San Pablo

Demand Projections

Exhibit 3-19 summarizes projected average daily water usage for the 20-year study period for the San Pablo Grid. This projected water usage was developed by applying the same growth rate used for the wastewater flow projections to the 1995 annual average daily water demand.

Sources of Water

Raw water supply for all of the San Pablo service area is obtained from wells drilled into the Floridan aquifer. Two supply wells are located at the Marshview WTF. The current CUP for the San Pablo system limits withdrawals to 0.647 mgd (annual average daily) and 1.460 (maximum daily). The projected annual average day demand in 2016 is 0.9 mgd. Therefore, UWFL will need to apply for increased allocation from the Floridan Aquifer and install additional wells to meet projected demands. This will require a 0.25 mgd increase to the CUP.

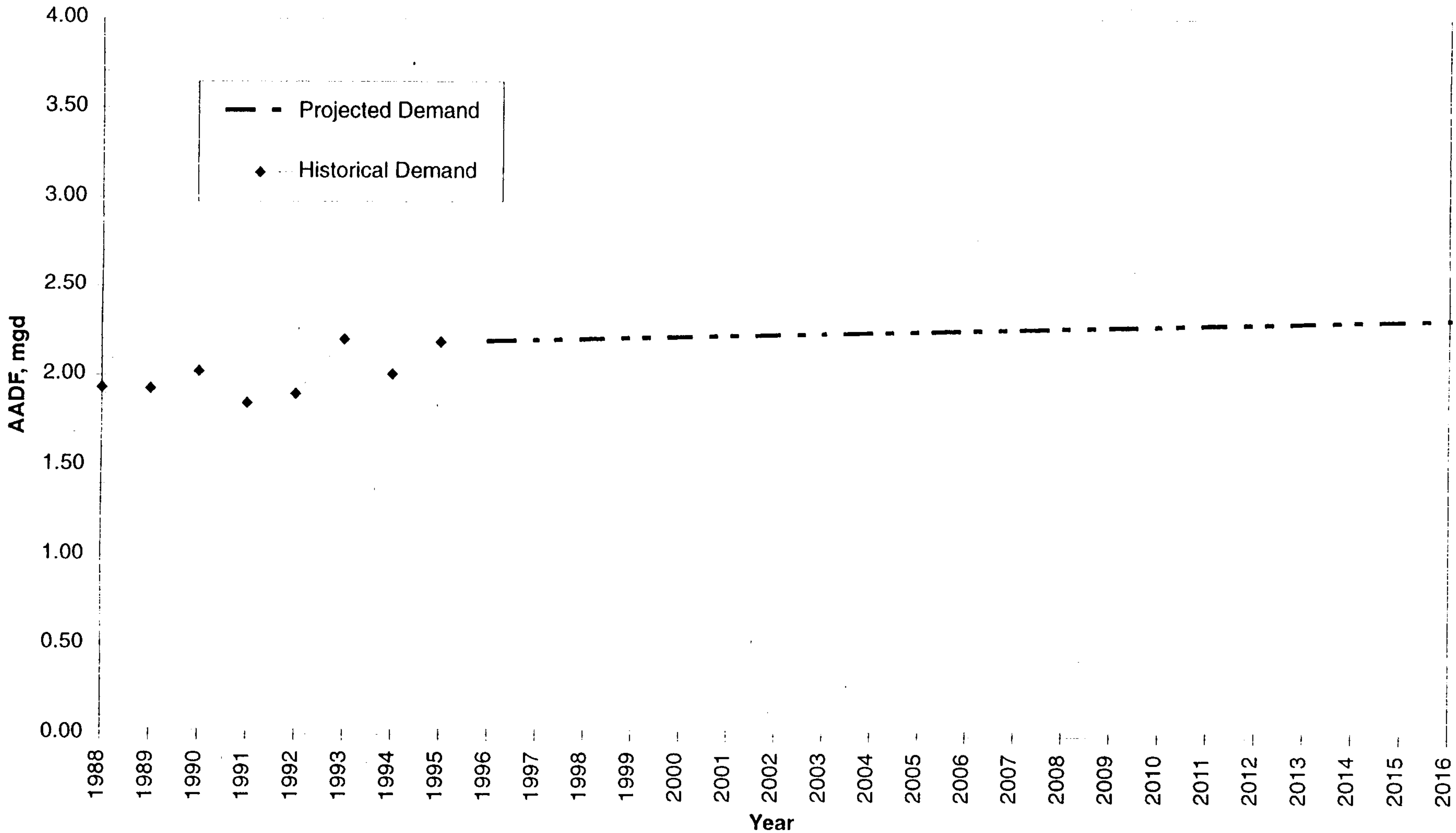

Exhibit 3-18. San Jose WTF Historical and Projected Water Demand.

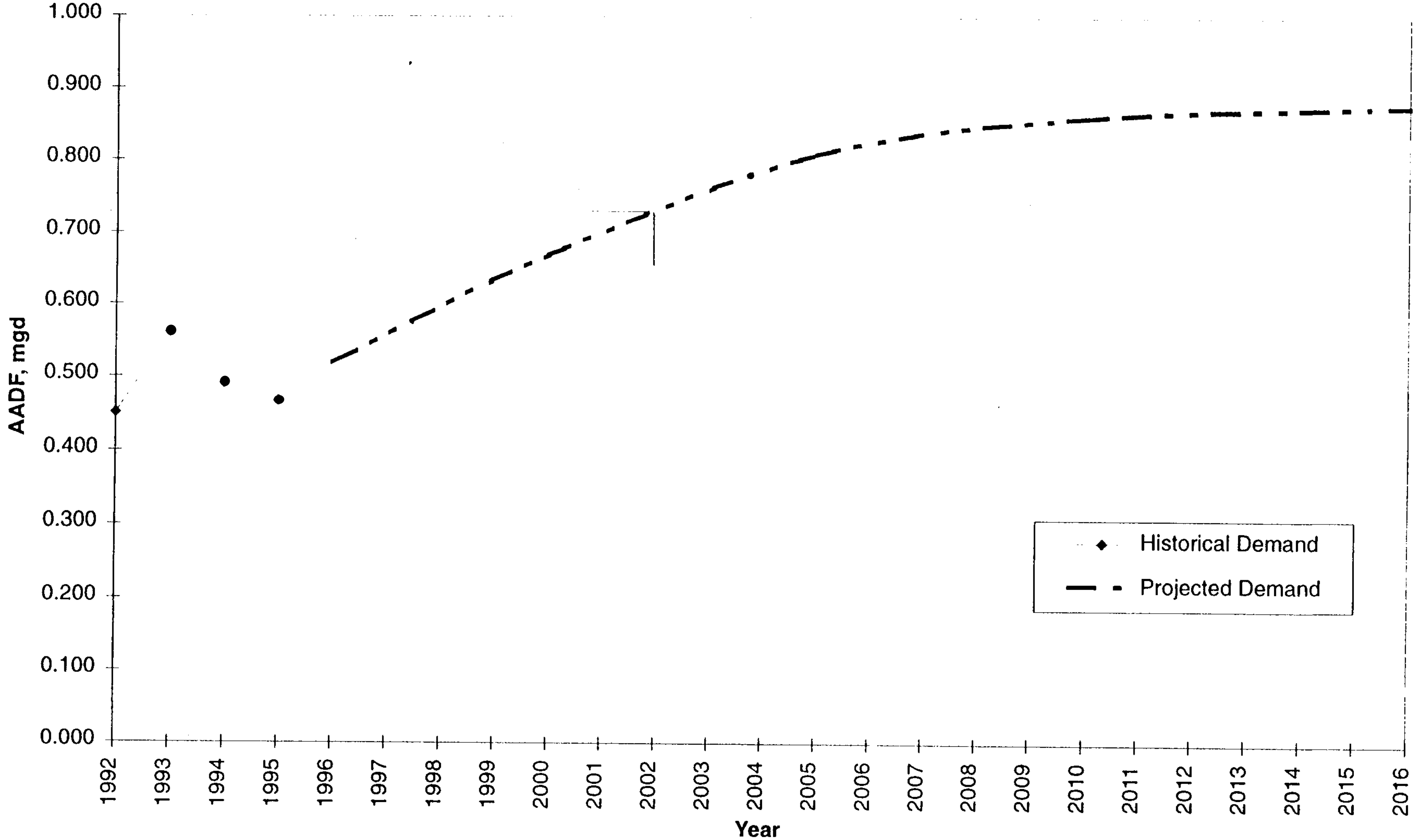

Exhibit 3-19. Marshview WTP (San Pablo Service Area) Historical and Projected Water Demand.

St. Johns North

Demand Projections

Exhibit 3-20 summarizes projected average daily water usage for the 20-year study period for the St. Johns North Grid. This projected water usage was developed by applying the same growth rate used for the wastewater flow projections to the 1995 annual average daily water demand.

Sources of Water

The current CUP for the St. Johns North system limits withdrawals to 0.245 mgd (annual average daily) and 0.580 (maximum daily). In 2016, the projected annual average daily demand is 1.1 mgd. Therefore, UWFL will need to apply for increased allocation from the Floridan Aquifer and possibly install additional wells to meet projected demands. This will require a 0.86 mgd increase in the CUP.

Yulee

Demand Projections

Exhibit 3-21 summarizes projected average daily water usage for the 20-year study period for the Yulee Grid. This projected water usage was developed by applying the same growth rate used for the wastewater flow projections to the 1995 annual average daily water demand.

Sources of Water

Raw water supply for all of the Yulee service area is obtained from wells drilled into the Floridan aquifer. One supply well is located at each of the three WTFs operated by UWFL (Lofton Oaks, Amoco, and the detention center). However, the only well which is regulated by a CUP is the Lofton Oaks well which is limited to 0.801 mgd (annual average daily) and 1.280 (maximum daily). Additional water supply capacity will be necessary to sustain the projected growth for the Yulee service area over the next 20 years. UWFL is currently evaluating alternatives for providing regionalized water service for the Yulee area.

Potential Reuse Options

This section identifies and screens potential reuse methods, identifies potential users, and provides projections of potentially-feasible reclaimed water use.

Screening of Potential Reuse Methods

The following reuse options, which are listed in Chapter 62-610 of the Florida Administrative Code (FAC) as reuse for beneficial purposes, were reviewed for potential implementation in the study area:

- Landscape irrigation
- Agricultural irrigation

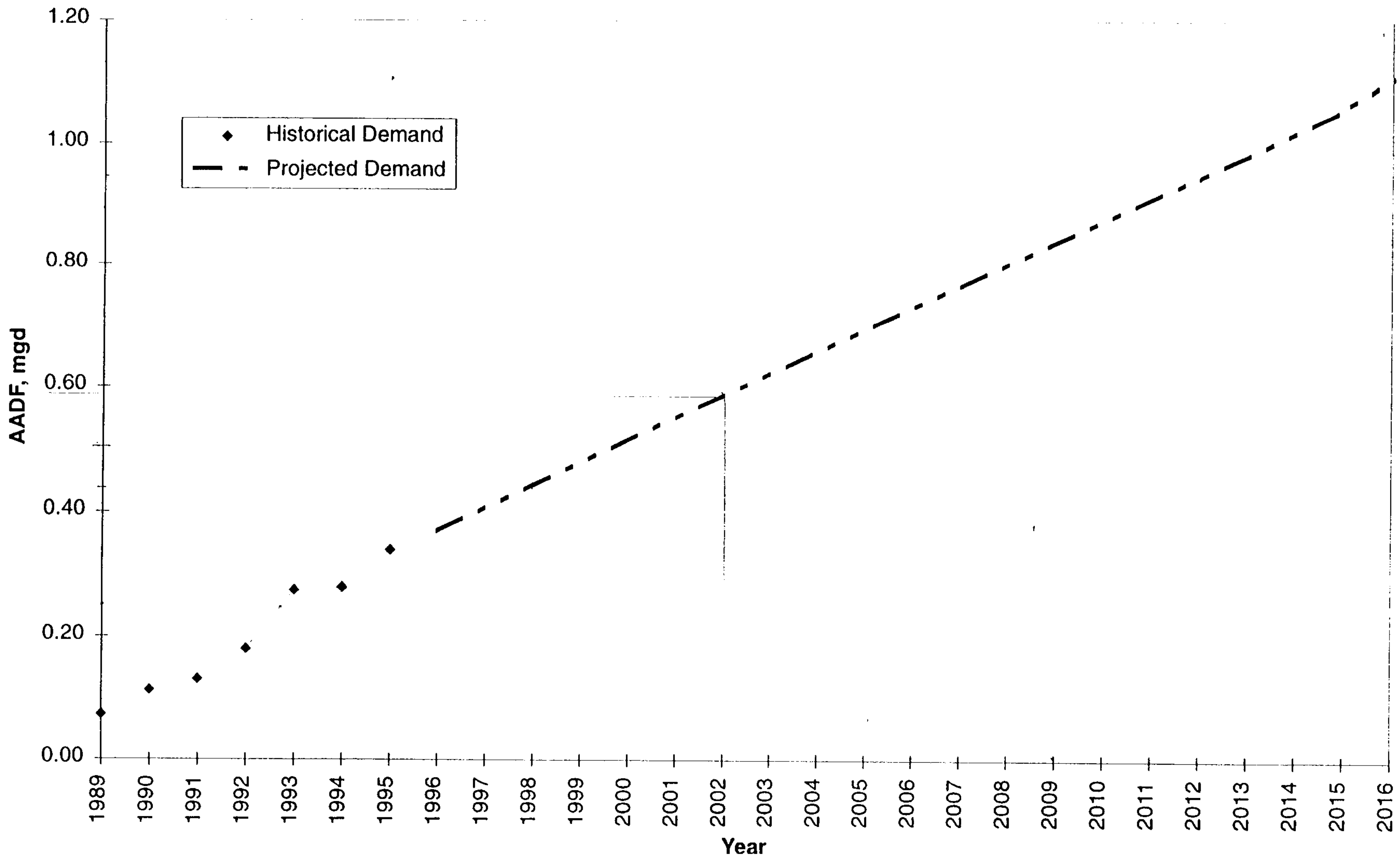

Exhibit 3-20. St. Johns North WTF Historical and Projected Water Demand.

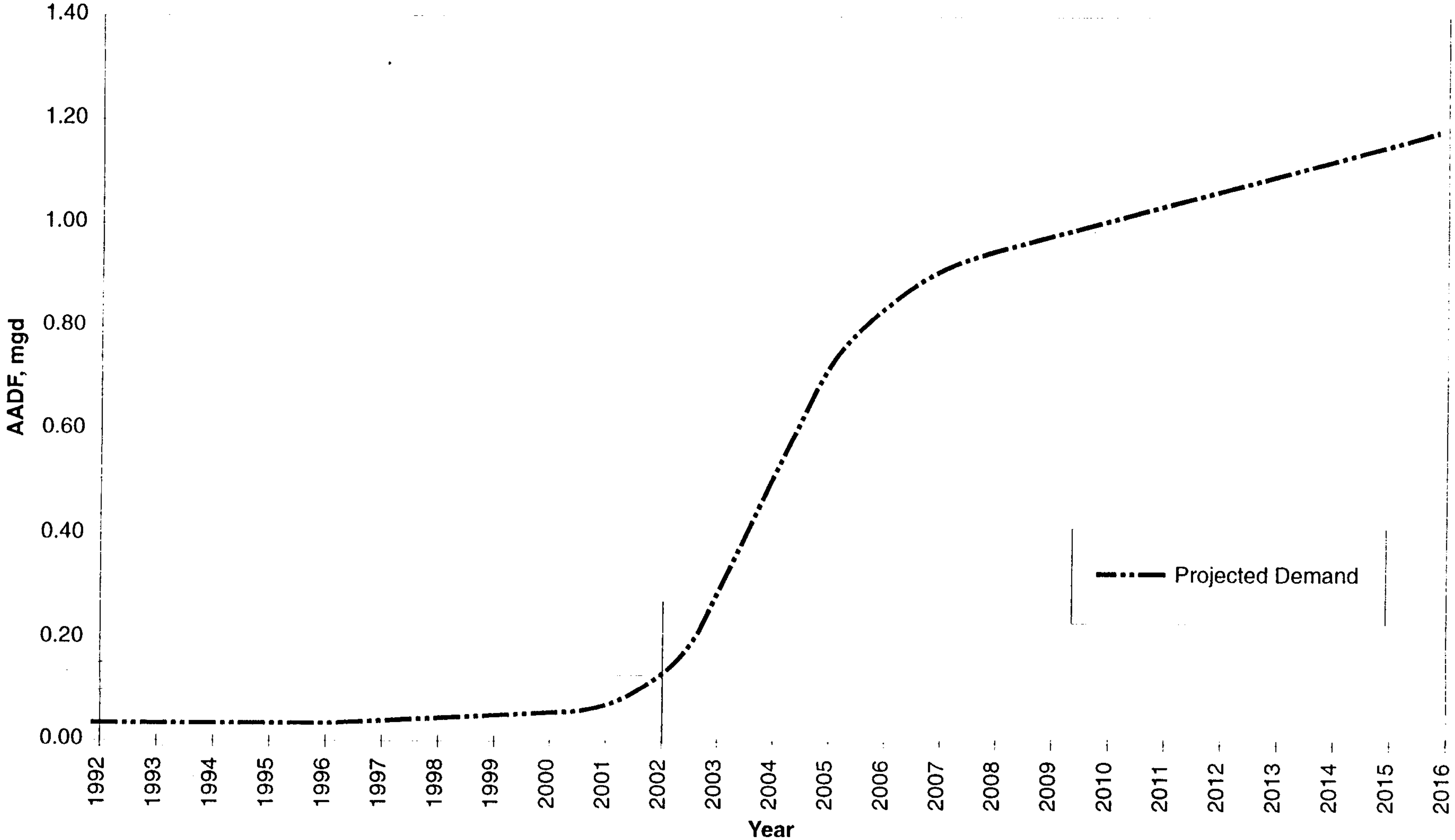

Exhibit 3-21. Yulee Service Area Historical and Projected Water Demand.

- Groundwater recharge
- Industrial uses
- Environmental enhancement of surface water
- Other uses

Landscape Irrigation

Landscape irrigation is categorized as public access reuse and is the primary method of reuse in Florida. It includes irrigation of public access areas such as golf courses, cemeteries, parks, playgrounds, school yards, retail nurseries, and residential lawns.

There are a number of sites within the UWFL service areas which fall into this category. However, with the exception of golf courses, the potential demand on these sites is relatively small. Additionally, many of the sites do not currently practice irrigation; and thus, implementation of reuse at these sites would require creation of a new demand rather than replacing an existing potable water demand.

Landscape irrigation represents the most likely potential reuse option for the UWFL service areas. For this study, emphasis will be placed on irrigation that would offset current or future demands on the potable system or aquifer.

Because landscape irrigation involves applying reclaimed water to areas accessible to the public, FDEP has identified treatment requirements and restrictions for reuse in these areas. The primary treatment requirements involve providing secondary treatment with filtration and high-level disinfection.

Agricultural Irrigation

Agricultural irrigation includes irrigation of agricultural crops with controlled public access. Typically, wholesale nurseries, sod farms, or any other crop requiring irrigation fall into this category. Since there are no agricultural sites within the UWFL service areas this option will not be considered as a viable reuse alternative.

Groundwater Recharge

The groundwater recharge option includes the application of reclaimed water to a recharge area for an aquifer that provides water for beneficial purposes. It can also include the direct injection of reclaimed water into a selected aquifer by means of a well. There are no known direct recharge areas located within the UWFL service areas. Consequently, this alternative will not be considered as a viable option for evaluation.

Industrial Uses

Reuse for industrial areas is typically limited to industrial process water such as boiler feed, cooling and washdown water. The level of treatment required for industrial uses is somewhat dependent on the nature of the industrial operation. For example, boiler feed water supply for a power plant may require an extremely high level of treatment. Cooling water typically would require the same level of treatment as landscape irrigation. Some industrial cooling systems discharge the blow down from the cooling towers to surface water and thus would not qualify as beneficial reuse candidates.

No significant industrial uses which would qualify as beneficial reuse were identified within the study areas. Consequently, this option will not be considered any further.

Environmental Enhancement of Surface Water

Enhancement of wetlands is an example of environmental enhancement of surface water through reuse. Reclaimed water is often used to help mitigate wetland damage from development. Wetlands restoration is the only application of reclaimed water to wetlands that is considered beneficial reuse. No candidate sites for wetlands restoration were identified in the UWFL services. Therefore this option was eliminated from further consideration.

Other Uses

Reclaimed water is suitable for a variety of other activities that use potable water but could feasibly use a lower grade of water. These uses include car and fleet wash facilities, fire protection, construction dust control, and aesthetic uses such as supply to decorative fountains. The nature of these uses is typically very small demands and in many cases are complicated by other factors related to the ultimate disposition of the water (for example surface runoff, and discharge to surface waters, etc.). No significant candidates for other uses were identified in the UWFL service areas.

Potential Future Users

Potential future landscape irrigation users were identified by reviewing land use maps, conducting windshield surveys, and meeting with UWFL representatives. The location of these potential users is shown on *Exhibits 2-4* through *2-13*. Because the number of potential public access irrigation sites were many, the sites were first categorized according to their use (school, park, cemetery, golf course, etc.).

Projections of Reclaimed Water Use

Where available, actual water use data from CUPs were used for large users, such as golf courses. For other, smaller sites, such as schools, parks, cemeteries, etc., typical irrigation values were developed by analyzing approximately 30 sites covering all of the categories. These typical values were then applied to sites of the same category throughout the service area. Typical irrigation values are summarized in *Exhibit 3-22*. These values are based on an annual average daily usage of 0.6 inches per week for irrigation. This application rate represents the net irrigation requirement for grasses based on recommendations of the University of Florida Institute for Food and Agricultural Science (IFAS) for the Jacksonville area.

Potential reclaimed water use within the study area was estimated by applying the typical irrigation values to the user sites. A summary of the findings by service areas is presented in *Exhibit 3-23*, and the estimates for each site are presented in *Exhibit 3-24*. As can be seen in *Exhibit 3-23*, if reuse to all of the sites were implemented, only 15 % of the total design year wastewater flow would be reused.

EXHIBIT 3-22
Typical Reuse Site Characteristics

Type of Site	Total Area[1] (Ac)	% of Total[2] Area Irrig.	Irrigated Area (Ac)	Est. Demand[3] (gpd)
Elementary Schools	9.87	40	3.95	9,187
Middle Schools	21.18	40	8.47	19,713
Senior High Schools	26.99	40	10.79	25,123
Parks	6.12	80	4.90	11,400
Cemeteries	1.25	80	1.00	2,327
Ballfield Parks	17.72	80	14.18	32,993
Church	4.78	25	1.20	2,783

Notes:
[1]Total area as measured from aerial photographs and property ownership maps for the Monterey Service Area.
[2]Based on visual estimate of grass/landscape areas on aerial photographs and experience on similar projects.
[3]Estimated demand is based on irrigated area times an application rate of 0.6 in/week (2,327 gpd/ac)

EXHIBIT 3-23
Summary of Estimated Potential Large User Reuse Demands

Service Area	Projected Design Year Flow (mgd)	Estimated Reuse[1] Demand (gpd)	Percent of Design Year Flow (%)
Holly Oaks	1.36	505,029	37%
Jacksonville Heights	1.25	132,478	11%
Monterey	3.92	302,113	8%
Royal Lakes	2.98	411,550	14%
San Jose	2.11	390,597	19%
San Pablo	0.75	0	0%
Ponce de Leon	0.40	0	0%
Ponte Vedra	0.55	591,000	107%
St. Johns North	0.89	0	0%
Yulee	0.95	0	0%
TOTAL:	15.16	2,332,767	15%

Notes:

[1]Based on sum of estimated irrigated area of potential reuse sites within each service area times an application rate of 0.6 in/week (2,327 gpd/ac).

EXHIBIT 3-24
Detailed Summary of Potential Large User Reuse Sites and Estimated Demands

Service Area	Site Name	Site No. on Figure	Site Type	Estimated Annual[1] Average Reuse Demand (gpd)
Holly Oaks	Palm Springs Cemetery	HO-A	Cemetery	2,327
	The Dunes Park	HO-B	Park	210,000
	Sunny Acres Park	HO-D	Park	18,619
	Cosmo Cemetery	HO-E	Cemetery	2,327
	Buck Park	HO-F	Park	11,446
	Mill Cove Golf Course	HO-G	Golf Course	188,000
	Lone Star Elem. School	HO-I	Elem. School	9,187
	Lone Star Park	HO-J	Park	11,446
	Craig Municipal Airport	HO-K	Commercial	0
	Chapel Hill Memory Gardens	HO-L	Cemetery	39,178
	Cornerstone Church	HO-M	Church	2,783
	Ft. Caroline Baptist Church	HO-N	Church	2,783
	Craig Field Industrial Park	HO-X1	Commercial	0
	Merrill Crossing Shopping Center	HO-X2	Commercial	0
	UWF Office Complex		Office	6,933
Subtotal:				**505,029**
Jacksonville Heights	Gregory Comm. Park	JH-B	Park	11,446
	Gregory Drive Elem. School	JH-C	Elem. School	9,187
	Cedar Hills Elem. School	JH-E	Elem. School	9,187
	Cedar Hills Baptist School	JH-I	Middle School	19,713
	Park	JH-J	Park	11,446
	Oak Hill Elem. School	JH-K	Elem. School	9,187
	Daniels Cemetery	JH-M	Cemetery	2,327
	Nathan B. Forrest Sr. High School	JH-N	High School	25,123
	Jacksonville Heights Elem. School	JH-O	Elem. School	9,187
	Park	JH-P	Park	11,446
	Oak Crest Church	JH-Q	Church	2,783
	Westwood Playground	JH-R	Park	11,446
Subtotal:				**132,478**
Monterey	Cemetery	A-U	Cemetery	2,164
	Arlington Alliance Church	A-S	Church	1,583
	Parker Church	A-T	Church	3,887
	St. Andrew's Episcopal Church	A-V	Church	2,770
	Christ the King Catholic Church	A-AA	Church	2,909
	Justina Road Elem. School	A-A	Elem. School	9,728
	Lake Lucina Elem. School	A-B	Elem. School	14,965
	Merrill Road Elem. School	A-C	Elem. School	7,587
	Parkwood Heights Elem School	A-G	Elem. School	16,827
	Arlington Elem. School	A-I	Elem. School	1,536
	Resurrection Catholic School	A-N	Elem. School	8,658
	Harvest Christian Academy	A-AB	Middle School	18,619
	Terry Parker Sr. High School	A-E	High School	25,112
	Cesery Playground	A-D	Park	3,119
	Parkwood Heights Park	A-F	Park	11,916
	Park	A-J	Park	11,171
	Arlington Park	A-K	Park	18,619
	Blackwood Park	A-M	Park	11,334
	Bruce Park	A-Z	Park	12,219

EXHIBIT 3-24
Detailed Summary of Potential Large User Reuse Sites and Estimated Demands

Service Area	Site Name	Site No. on Figure	Site Type	Estimated Annual[1] Average Reuse Demand (gpd)
	Jacksonville University	A-X	University	94,025
	Boy's Home	A-Y		23,367
Subtotal:				**302,113**
Royal Lakes	Baymeadows Country Club	RL-A	Golf Course	312,329
	Deer Meadows Church	RL-C	Church	2,783
	Deerwood Center Industrial Park	RL-X1	Commercial	0
	The Avenues Shopping Center	RL-X2	Commercial	0
	Barnett Office Park	RL-X3	Commercial	96,438
	Southside Square Shopping Center	RL-X4	Commercial	0
	The Grande Blvd. Mall	RL-X5	Commercial	0
Subtotal:				**411,550**
San Jose	Alfred I. Dupont Middle School	SJ-E	Middle School	19,713
	Park	SJ-F	Park	11,446
	Samuel W. Wolfson Sr. High	SJ-G	High	25,123
	Ball field	SJ-H	Park	32,993
	Verona Park	SJ-I	Park	11,446
	Kings Trail Elem. School	SJ-J	Elem. School	9,187
	Bolles School	SJ-K	High School	25,123
	San Jose Country Club	SJ-L	Golf Course	250,000
	Church	SJ-M	Church	2,783
	Church	SJ-N	Church	2,783
Subtotal:				**390,597**
San Pablo	None	--	--	--
Ponce de Leon	None	--	--	--
Ponte Vedra	Ponte Vedra Golf and Country Club	PV-A	Golf Course	591,000
Subtotal:				**591,000**
St. Johns North	None	--	--	--
Yulee	None	--	--	--
GRAND TOTAL:				**2,332,767**

Notes:
[1]Estimated reuse demand based on irrigated area times an application rate of 0.6 in/week (2,327 gpd/ac).

Current Reuse Implementation/Expansion Plans

UWFL is currently in discussion with the Ponte Vedra Inn and Club regarding use of up to 0.6 mgd of high level disinfected effluent from the Ponte Vedra WWTF. New filtration and disinfection facilities are being designed for the Ponte Vedra WWTF.

CHAPTER 4

Description of Alternatives Considered

This chapter will describe the reuse alternatives to be evaluated for the UWFL service areas. The evaluation of alternatives is presented in *Chapter 5*.

No Action Alternative

According to the FDEP guidelines, the no action alternative will involve provision of water supply and wastewater management without implementation of additional reuse. For this report, a single baseline no action alternative will be defined based on meeting growth needs and on-going maintenance, repair, and replacement without provision for reuse. The following general assumptions will apply for the no action alternative:

1. Wastewater treatment capacity will be expanded as needed to meet projected growth in wastewater flows presented in *Chapter 3*.
2. With the exception of Ponte Vedra, St. Johns North, and Yulee, existing levels of treatment will be adequate for continuing current effluent management methods (i.e., discharge to surface waters and groundwater).

Exhibit 4-1 presents an overview of the wastewater treatment facility capacity expansions which will be required based on the projected wastewater flows developed in *Chapter 3*. Also included in this exhibit are the assumed future effluent management methods and levels of treatment for each facility.

It should be noted that all of the elements of the no action alternative are driven by capacity needs to meet growth in the service areas and would be necessary regardless of whether or not reuse were implemented. Any public access reuse system would have to have sufficient storage and alternative disposal methods to provide for periods of wet weather when users are not irrigating and for emergency backup. Consequently, full backup capacity via surface discharge or some other method would still be required at all of the facilities. In addition, the majority of potential users are not currently using potable water for irrigation. Thus, implementation of reuse does not replace a potable demand and no true water supply savings would be realized.

For these reasons, the evaluation of reuse alternatives will be presented from the perspective of incremental effects over and above no action

Public Access Reuse Alternatives

The FDEP guidelines group public access reuse options into three categories:

1. minimum level (up to 40 percent of design year average daily flow)
2. medium (40-75 percent of design year average daily flow)

EXHIBIT 4-1
Summary of Wastewater Facility Capacity Expansions for the No Action Alternative

Wastewater Treatment Facility	Existing Capacity, AADF (mgd)	Projected Design Year Capacity, AADF (mgd)	Proposed Expansion Phasing Plan	Anticipated Method of Effluent Management	Anticipated Treatment Level (Annual Average Limits)	Future Treatment Capacity, AADF (mgd)
Holly Oaks	1.00	1.36	0.5 mgd expansion in 2005	Surface Water/Cowhead Creek	6 mg/L CBOD, 20 mg/L TSS, 2 mg/L TKN	1.50
Jacksonville Heights	2.50	1.25	None	Surface Water/Fishing Creek	8 mg/L CBOD, 20 mg/L TSS, 1.6 mg/L NH3+NH4, 0.02 mg/L NH3	2.50
Monterey	3.00	3.92	0.2 mgd expansion in 1996	Surface Water/St Johns River	20 mg/L CBOD, 20 mg/L TSS	3.20
			0.4 mgd expansion in 2001	Surface Water/St Johns River	20 mg/L CBOD, 20 mg/L TSS	3.60
			0.4 mgd expansion in 2009	Surface Water/St Johns River	20 mg/L CBOD, 20 mg/L TSS	4.00
Royal Lakes	3.25	2.98	None	Surface Water/St Johns River	10 mg/L CBOD, 10 mg/L TSS	3.25
San Jose	2.25	2.11	None	Surface Water/St Johns River	10 mg/L CBOD, 10 mg/L TSS	2.25
San Pablo	0.499	0.75	Re-rate to 0.75 mgd in 1997	Surface Water/Intracoastal Waterway	10 mg/L CBOD, 20 mg/L TSS, 4 mg/L TKN	0.75
Ponce De Leon	0.09	0.40	Re-rate to original 0.4 mgd capacity in 1999	Groundwater/Percolation Ponds	20 mg/L CBOD, 20 mg/L TSS, 12 mg/L NO3-N	0.40
Ponte Vedra	0.50	0.55	Build new 0.6 mgd WWTF in 2000	Surface Water (golf course lake system)	5 mg/L TSS, 5 mg/L BOD, 3 mg/L TN	0.60
St. Johns North	0.23	0.89	Re-rate to 0.3 mgd in 1997	Groundwater/Percolation Ponds to Surface Water/Big Lige Branch	20 mg/L CBOD, 5 mg/L TSS, 12 mg/L N03-N, 2.2 mg/L NH4-N	0.30
			0.3 mgd expansion in 1999	Surface Water/Wetlands	5 mg/L TSS, 5 mg/L BOD, 3 mg/L TN, 1 mg/L TP	0.60
			0.4 mgd expansion in 2008	Surface Water/Wetlands	5 mg/L TSS, 5 mg/L BOD, 3 mg/L TN, 1 mg/L TP	1.00
Yulee	0.053	0.95	Build new regional AWT WWTF:			
			Phase I (2001-2003) - 0.5 mgd	Surface Water (Nassau River) via Receiving Wetland	5 mg/L TSS, 5 mg/L BOD, 3 mg/L TN, 1 mg/L TP	0.50
			Phase 2 (2004-2016) - 0.5 mgd	Surface Water (Nassau River) via Receiving Wetland	5 mg/L TSS, 5 mg/L BOD, 3 mg/L TN, 1 mg/L TP	1.00

3. Maximum (over 75 percent of design year average daily flow)

A summary of the resulting reuse thresholds based on the FDEP criteria for each of the UWFL service areas and for the entire system is provided below in *Exhibit 4-2*:

EXHIBIT 4-2
Summary of Reuse Level Thresholds

Wastewater Facility	Existing Capacity (mgd)	Projected Year 2016 Capacity (mgd)	Minimum Reuse Capacity (mgd) [<40%]	Medium Reuse Capacity (mgd) [≥40%≤75%]	Maximum Reuse Capacity (mgd) [>75%]
Holly Oaks	1.00	1.36	<0.54	≥0.54≤1.02	>1.02
Jacksonville Heights	2.50	1.25	<0.50	≥0.50≤0.94	>0.94
Monterey	3.00	3.92	<1.57	≥1.57≤2.94	>2.94
Royal Lakes	3.25	2.98	<1.19	≥1.19≤2.24	>2.24
San Jose	2.25	2.11	<0.84	≥0.84≤1.58	>1.58
San Pablo	0.499	0..75	<0.30	≥0.30≤0.56	>0.56
Ponce De Leon	0.09	0.40	<0.16	≥0.16≤0.30	>0.30
Ponte Vedra	0.50	0.545	<0.22	≥0.22≤0.41	>0.41
St. Johns North	0.225	0.89	<0.36	≥0.36≤0.67	>0.67
Yulee	0.053	0.95	<0.38	≥0.38≤0.71	>0.71
Total	**13.37**	**15.16**	**<6.06**	**≥6.06≤11.37**	**>11.37**

Note: All capacities are annual average daily

Based upon the review of the potential public access reuse sites and estimated reclaimed water demands for each service area presented in *Chapter 3*, the following observations can be made:

- In most of the service areas (Monterey, Holly Oaks, Jacksonville Heights, Ponce De Leon, Ponte Vedra, and St. Johns North), the wastewater treatment facility is located near a boundary of the respective service area rather than near the center.
- In several cases (Ponce De Leon, San Pablo, and St. Johns North), there are no potential sites located within the service area.

- With the exception of Ponte Vedra and Holly Oaks, the potential public access (non-residential) reuse demand in the remaining service areas is very low (0 to 19 percent of design year flow). This level is on the low end of the minimum reuse category which is defined as less than 40 percent of the design year flow. The only way to get beyond a minimum level would be to add residential reuse.
- Only four of the service areas have golf courses located within the boundaries of the service area: Holly Oaks, Ponte Vedra, San Jose, and Royal Lakes.
- Excluding golf courses, the potential non-residential public access reuse sites (parks, schools, cemeteries, churches) have very small estimated demands and are scattered throughout the service areas.
- Many of these sites do not currently irrigate and consequently, implementation of reuse for irrigation on these sites would require creation of a new demand which does not presently exist. This does not meet the intent of beneficial reuse which actually replaces an existing use of potable water.
- Additionally, many of these sites do not have existing onsite irrigation systems. Even within residential developments throughout the service areas many homes do not have irrigation systems. While in-ground irrigation systems are not mandatory for reuse, they do help to optimize the use of reclaimed water from both the utility's and the users perspective. Costs to install these systems would have to be borne by the users and could cost $2,000 to $2,500 for a typical residential lot.

These issues were discussed with FDEP staff in Jacksonville during a workshop held on August 2, 1996. Based on these observations, it was agreed that the most practical approach to accomplishing reuse would be to focus on those service areas with golf courses. This option is described in detail below (see Alternative 3) and will be the primary public access reuse alternative evaluated in this report.

A limited analysis of two additional public access reuse alternatives will be included to document the limitations of extending service to other institutional/public users (i.e., parks, schools, cemeteries, and churches) and residential customers. Due to the similarity of the technical, environmental, and economic issues related to providing this type of public access reuse within each individual service area, only one representative service area is considered for the evaluation of institutional/public (non-residential, non-golf course) users (i.e., parks, schools, cemeteries, and churches) and residential reuse.

The Monterey service area is used as the prototype service area for these evaluations. Monterey was chosen as being representative of a typical mature urban area with relatively little growth potential. This characterizes the majority of the UWFL service areas. The evaluations conducted for these two alternatives will focus on demonstrating the cost impacts of reuse within the prototype service area. In other words, the analysis will only consider application of reuse costs to those customers within the service area. The results of this analysis will be interpreted to be representative of all the service areas. The underlying assumption is that if it were feasible to serve these types of customers in the Monterey service area, it would be feasible to extend service to all of the service areas. Conversely, if determined infeasible in the Monterey service area, it would not be feasible to consider in other service areas.

Following is a description of the three public access reuse alternatives which will be evaluated.

Alternative 1 - Institutional/Public Users (Monterey Service Area)

This alternative will serve as a representative analysis for providing reclaimed water service to the non-residential public access users such as parks, schools, cemeteries, and churches. The potential sites within the Monterey service area were identified in *Chapter 3* (refer to *Exhibit 3-4 and 3-24*). The estimated reclaimed water demand (AADF) for irrigation on these sites totals approximately 0.28 mgd which represents only about 7 percent of the design year flow of 3.92 mgd. Therefore this represents a minimum level alternative according to the FDEP guidelines.

The following criteria were used to develop the hydraulic requirements necessary to estimate pipe sizes and pumping requirements for this alternative:

- Pumping rates were based on providing the annual average daily irrigation demand times a seasonal peaking factor of 1.5 over a 6 hour period for parks, schools, cemeteries, and churches
- Minimum delivery pressure of 50 psi at the point of connection to onsite systems

A conceptual transmission pipeline system to serve the sites is shown on *Exhibit 4-3*. Using the criteria stated above, a basic hydraulic analysis was performed to confirm pipe sizes and pumping requirements. The resulting transmission pipeline system would include approximately 50,000 linear feet (lf) of pipes ranging from 4 inches to 12 inches in diameter. Much of this pipe would have to be installed in existing heavily congested and built up areas. The distribution and length of pipe sizes is summarized below in *Exhibit 4-4*:

EXHIBIT 4-4
Summary of Transmission Pipeline System - Alternative 1 Institutional/Public Users (Monterey Service Area)

Pipe Size (in)	Length (lf)
4	7,800
6	10,050
12	30,550
Total	**48,400**

The total pumping requirements for delivering reclaimed water to all of the sites identified at a minimum pressure of 50 psi would be approximately 1,200 gpm (1.7 mgd) at 85 psi. It is assumed that firm pumping capacity will be provided with the largest pump out of service for each phase. Typically, this requires a duplex or triplex pump station arrangement.

Additionally, operational storage would be required to balance the diurnal and seasonal fluctuations in wastewater flows and irrigation demands. For this analysis, a minimum volume of 0.5 million gallons of storage was provided. It is questionable whether or not

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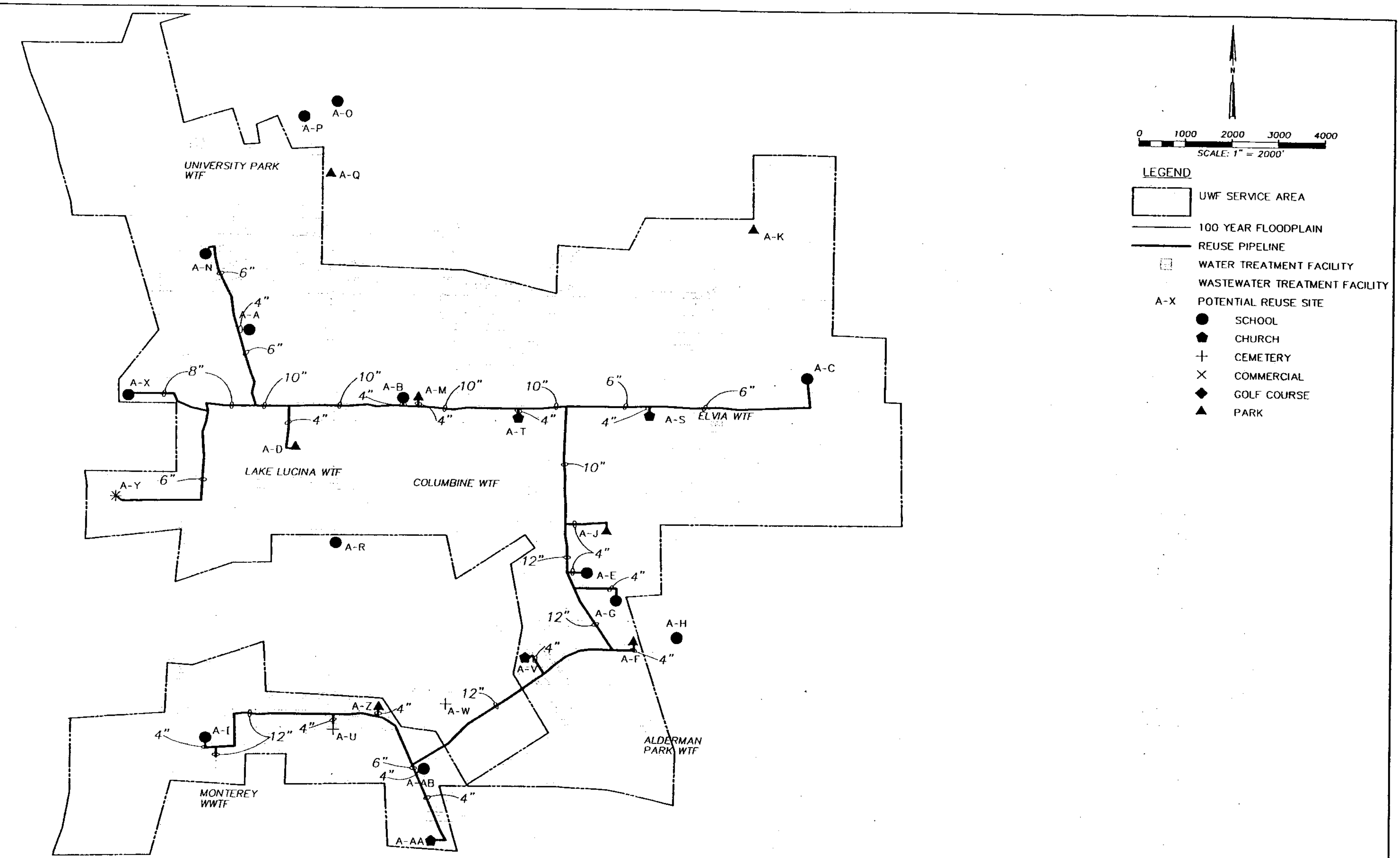

Exhibit 4-3

ALTERNATIVE 1 - INSTITUTIONAL/PUBLIC USERS (MONTEREY SERVICE AREA)
CONCEPTUAL TRANSMISSION PIPELINE SYSTEM

CH2MHILL

EXH4-3.DWG

there is adequate space on the site to accommodate this volume of storage. If space were not available, UWFL would have to purchase additional land to accommodate this storage. These costs are not included in this analysis. It is further assumed that no storage for reject water would be necessary and that reclaimed water would be diverted to the surface water discharge during periods of wet weather.

Each customer on the reclaimed water system would require a service connection. In addition, according to FDEP rules, any site which receives both potable water and reclaimed water must have an approved backflow prevention device located on the potable water line. For this study a typical reclaimed water service connection would include a shut off valve, a flow meter, service pipe, and a double check valve backflow prevention device on the potable water line.

Alternative 2 - Residential Reuse (Monterey Service Area)

Alternative 2 represents a typical scenario in which reclaimed water would be provided to existing residential customers. A detailed review of aerial photographs and property ownership maps for the Monterey service area was performed to identify the total potential residential area. The total residential area was based on summation of lot counts and approximate lot sizes. Estimated reclaimed water demands were based on a factor of 40 percent of the total residential lot area being irrigable and an annual average application rate of 0.6 inches per week (in/wk). This application rate represents the recommended average annual net irrigation requirement for grasses in the Jacksonville area based on the University of Florida Institute of Food and Agricultural Sciences (IFAS). The potential reclaimed water demand for irrigation of existing residential areas was approximately 1.7 mgd (annual average). This represents approximately 43 percent of the design year flow and thus, would qualify as a medium level alternative according to FDEP guidelines.

The following criteria were used to develop the hydraulic requirements necessary to estimate pipe sizes and pumping requirements for this alternative:

- Pumping rates were based on providing the annual average daily irrigation demand times a seasonal peaking factor of 1.5 over a 12 hour irrigation period for residential customers (50 percent of customers during a six hour period)
- Minimum delivery pressure of 60 psi at the point of service to a development (This delivery pressure was chosen to allow additional pressure loss within the development distribution systems such that available pressure at each residential connection would be at least 35 psi)

It should be noted that there is a fundamental difference in the hydraulic characteristics and corresponding pipe sizing between a potable water distribution system and a reclaimed water distribution system. In a typical water system, piping systems are looped and have multiple sources of water input (WTFs) and remote booster pumping stations located throughout the system. This type of arrangement allows for a more uniform pressure distribution throughout the system with lower pumping requirements.

On the other hand, as illustrated in *Exhibit 4-5*, the reclaimed water system described in this alternative has only one source of supply which is located in a remote corner of the service area. The location of the plant and the shape of the service area itself dictate a linear system. In order to meet the minimum pressure requirements at the far end of the system,

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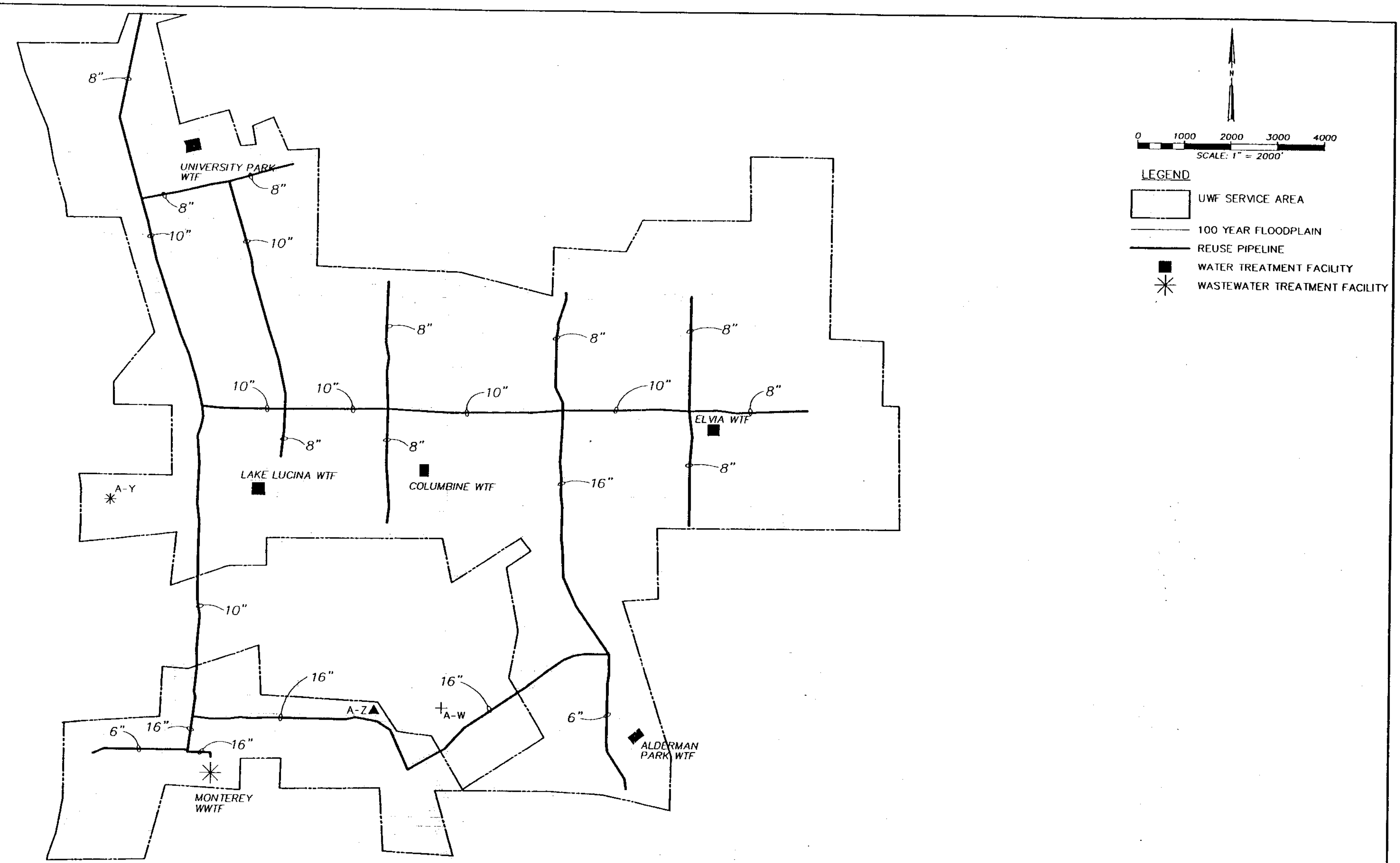

Exhibit 4-5
ALTERNATIVE 2 - RESIDENTIAL REUSE (MONTEREY SERVICE AREA)
CONCEPTUAL TRANSMISSION PIPELINE SYSTEM

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pipes must be larger and the pumping requirements must be higher than for a typical water distribution system.

A conceptual transmission pipeline system to serve the existing residential developments within the Monterey service area is shown on *Exhibit 4-5.* Note that this exhibit only shows the main transmission pipeline system which would make reclaimed water available to be distributed to individual residential developments. Additional distribution systems would be required within the developments to bring reclaimed water to the homes. In addition, individual service connections, meters, and backflow prevention devices would be required for each connection.

Using the assumptions stated above, a basic hydraulic analysis was performed to confirm transmission pipeline sizes and pumping requirements. The resulting transmission pipeline system would include approximately 73,000 linear feet (lf) of pipes ranging from 6 inches to 16 inches in diameter. Much of this pipe would have to be installed in existing heavily congested areas. The distribution and length of pipe sizes is summarized below in *Exhibit 4-6:*

EXHIBIT 4-6
Summary of Transmission Pipeline System - Alternative 2 Residential Reuse (Monterey Service Area)

Pipe Size (in)	Length (lf)
6	4,850
8	21,800
10	28,250
16	17,950
Total	**72,850**

In addition to the major transmission pipelines from the WWTF throughout the service area, distribution pipelines would be necessary to deliver reclaimed water to each home within the respective residential neighborhoods. Due to the maturity of development within the service area, this would require installation of pipes within existing developments involving restoration of streets, sidewalks, driveways, and lawns. Consequently, the costs would be much higher than for a new development where reuse lines could be installed at the same time as other utilities. In addition to the extra cost associated with installation and restoration, these activities would cause disruption and congestion within the communities.

It is important to note that the demographics of the areas considered may not support an aggressive residential lawn irrigation routine. Many people can not afford to spend $20 to $30 dollars per month for irrigation using potable water. In fact, many homeowners do not have in ground irrigation systems and may only irrigate during extremely dry periods using garden hoses and portable sprinklers.

The total pumping requirements for delivering reclaimed water to all of the sites identified at a minimum pressure of 60 psi at the point of connection to a neighborhood would be approximately 3,750 gpm (5.4 mgd) at approximately 95 psi. It is assumed that firm pumping capacity will be provided with the largest pump out of service for each phase. Typically, this requires a duplex or triplex pump station arrangement.

Additionally, operational storage would be required to balance the diurnal and seasonal fluctuations in wastewater flows and irrigation demands. Peak demands on a residential reuse system can be quite high. A minimum of one day of storage would be advisable. For this analysis, 2.5 million gallons of storage was used. It is questionable whether or not there is adequate space on the site to accommodate this volume of storage. If sufficient land is not available, additional land would have to be purchased. These costs are not included in the analysis. It is further assumed that no storage for reject water would be necessary and that reclaimed water would be diverted to the surface water discharge during periods of wet weather.

A service connection to each customer would have to be provided. In addition, according to FDEP rules, any site which receives both potable water and reclaimed water must have an approved backflow prevention device located on the potable water line. For this study a reclaimed water service connection is assumed to include a shut off valve, meter, service pipe, and a double check valve backflow prevention device on the potable water line.

Alternative 3 - Golf Course Reuse

The third public access reuse alternative to be evaluated involves providing reclaimed water to golf courses located within UWFL service areas. Four of the ten service areas have a golf course located within the service area boundaries. Individual reclaimed water demands for the four golf courses are summarized in *Exhibit 4-7*:

EXHIBIT 4-7.
Summary of Golf Course Demands

Service Area	Golf Course Name	Estimated Annual Average Reclaimed Water Demand (gpd)
Holly Oaks	Mill Cove Golf Club	188,000
Royal Lakes	Baymeadows Country Club	312,329
San Jose	San Jose Country Club	250,000
Ponte Vedra	Ponte Vedra Golf & Country Club	591,000
Total		**1,341,329**

The estimated reclaimed water demand for this scenario is approximately 1.34 mgd or approximately 9 percent of the total UWFL wastewater system design year flow.

Conceptual transmission pipeline layouts for the four cases are shown in *Exhibits 4-8 through 4-11*. A 6-inch transmission pipeline from the WWTFs to the respective golf courses would be required for Holly Oaks, Royal Lakes, and San Jose service areas. A 8-inch line

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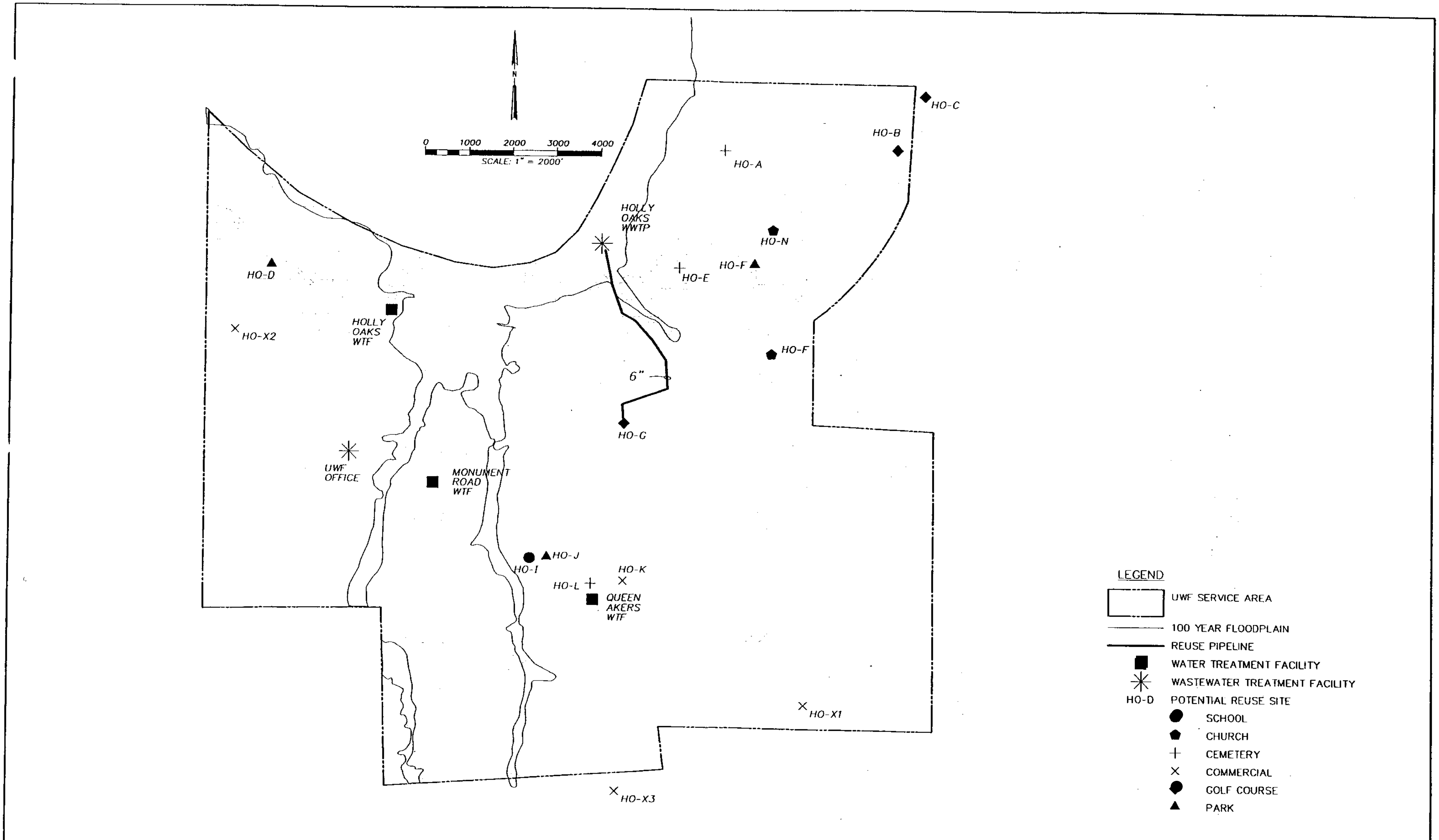

Exhibit 4-8
ALTERNATIVE 3 - GOLF COURSE REUSE (HOLLY OAKS)
CONCEPTUAL TRANSMISSION PIPELINE SYSTEM

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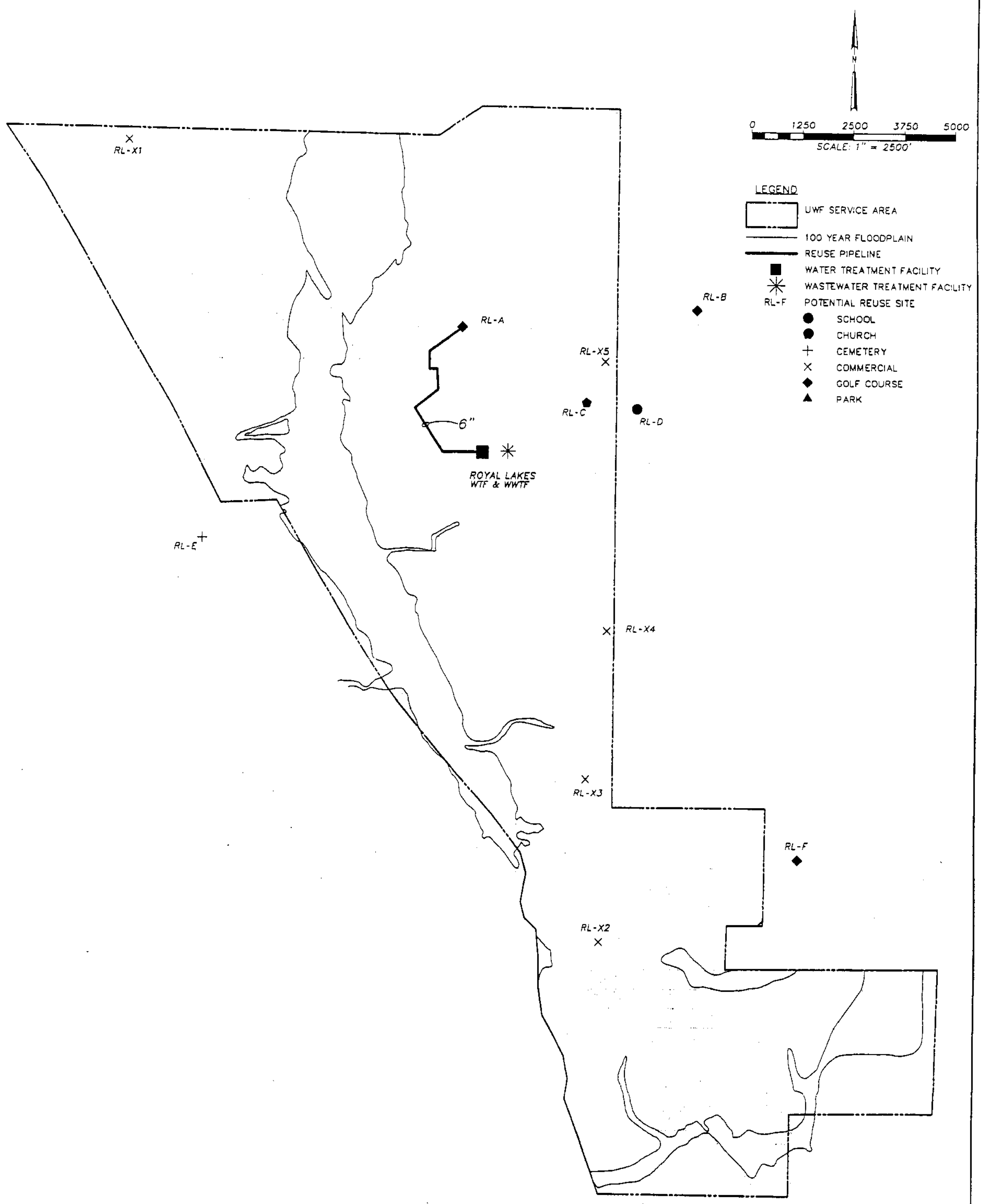

Exhibit 4-9
ALTERNATIVE 3 - GOLF COURSE REUSE (ROYAL LAKES)
CONCEPTUAL TRANSMISSION PIPELINE SYSTEM

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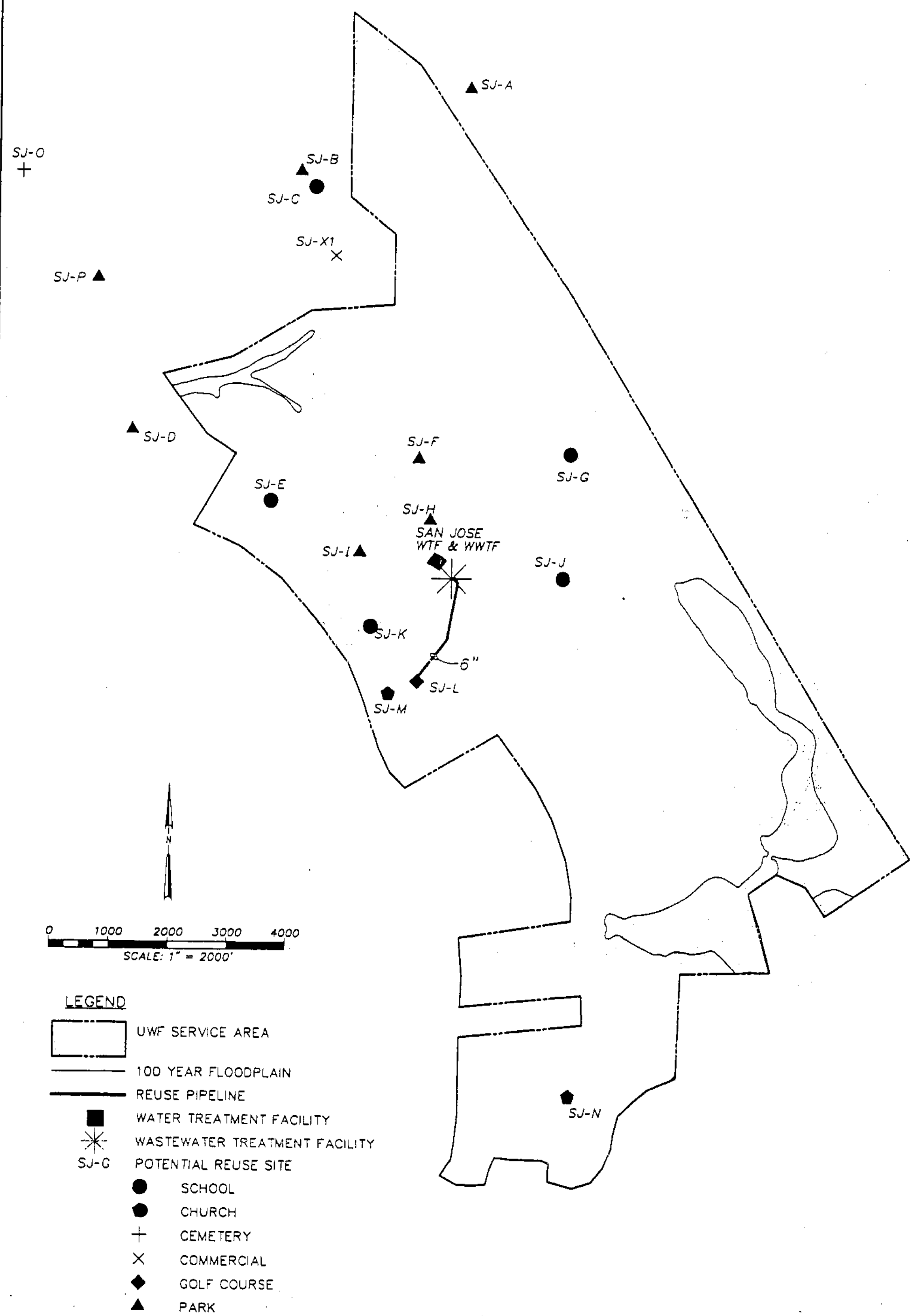

Exhibit 4-10
ALTERNATIVE 3 - GOLF COURSE REUSE (SAN JOSE)
CONCEPTUAL TRANSMISSION PIPELINE SYSTEM

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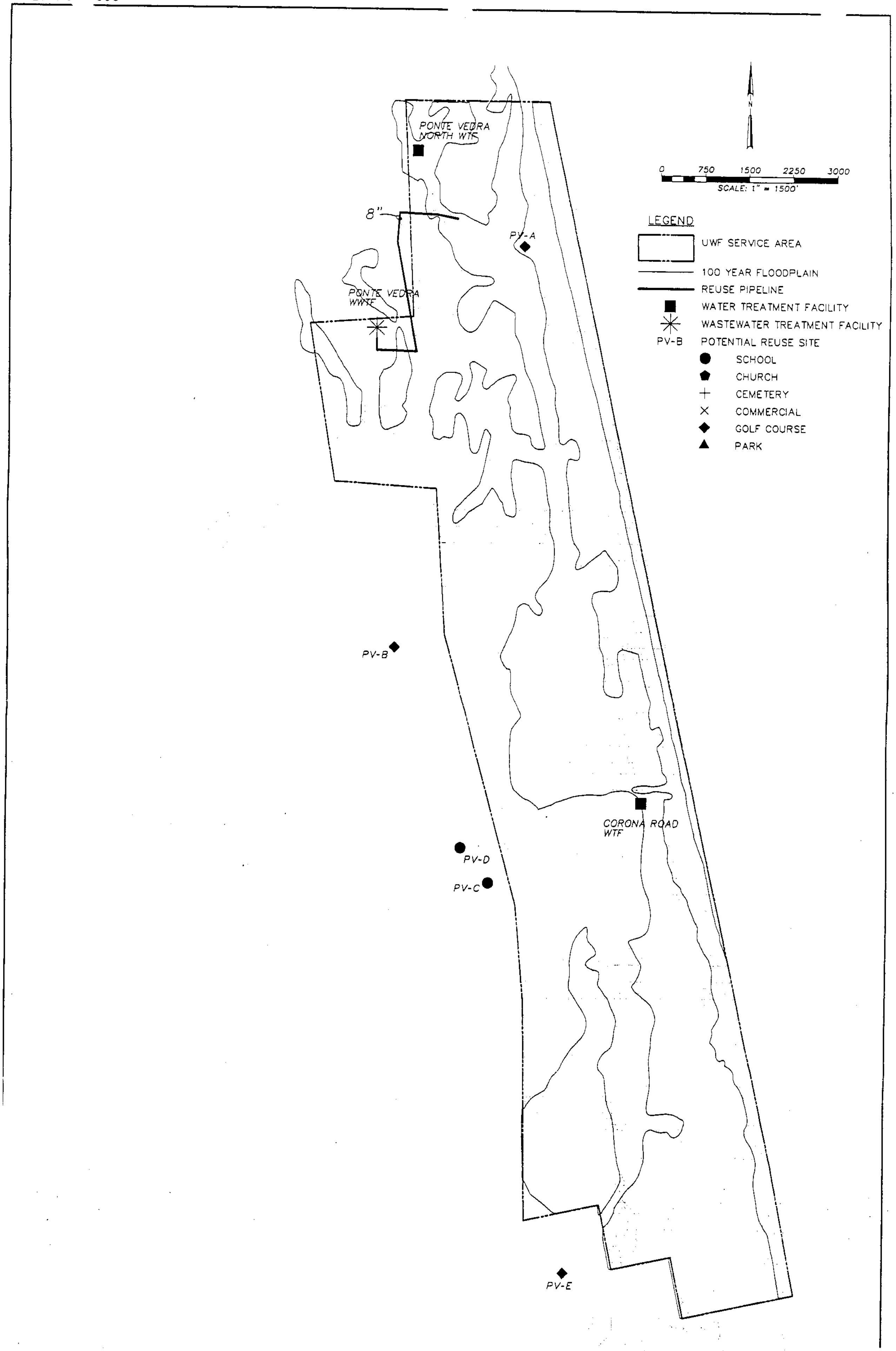

Exhibit 4-11
ALTERNATIVE 3 - GOLF COURSE REUSE (PONTE VEDRA)
CONCEPTUAL TRANSMISSION PIPELINE SYSTEM

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Rainfall is heaviest in summer. In an average year, about 65 percent of the annual total rain falls from June to October. Maximum rainfall occurs during the highest evapotranspiration periods, which typically exceed the available rainfall, resulting in periods of peak irrigation demand. For the remainder of the year, rainfall is more or less evenly distributed. *Exhibit* 2-2 presents average rainfall and evapotranspiration data for the Jacksonville area.

EXHIBIT 2-2
Monthly Average Rainfall and Evaporation Data for the Jacksonville Area

Month	Average Rainfall[a] (inches)	Lake Evaporation[b] (inches)
January	3.57	2.10
February	3.86	2.61
March	4.05	3.92
April	3.12	5.00
May	3.88	5.54
June	5.74	5.18
July	6.07	4.99
August	7.61	4.73
September	6.97	4.04
October	3.22	3.60
November	2.08	2.53
December	2.55	1.96
Annual	52.72	46.20

[a]Taken from U.S. Department of Commerce, National Oceanic and Atmospheric Administration [NOAA], 1982-92, 1985, and January and February 1993.
[b]Estimated from Jacksonville Class A pan evaporation data.

In the summer, rainfall occurs as afternoon and evening showers and thunderstorms. Tropical storms can affect the area any time from early in June through mid-November. The chance of winds reaching hurricane force (74 miles per hour or greater) is about 1 in 14, according to the Environmental Data Service.

Extended dry periods, which can dramatically affect potable water demand, can occur in any season but are most common in spring and fall. Dry periods in April and May are generally shorter than those in the fall but tend to be more serious because temperatures are higher and the need for irrigation is greater.

Maximum temperatures vary only slightly during the summer months, with daily temperatures reaching 96 degrees Fahrenheit (°F) a minimum of one day per month. During the cooler winter months, particularly near the water, temperatures seldom drop below freezing. During a typical year, temperatures will drop below freezing 12 times.

Prevailing winds are generally northeasterly in fall and winter and southwesterly in spring and summer. Wind speed averages slightly less than 9 miles per hour and is slightly higher in the spring than in other seasons.

Population

The Jacksonville Metropolitan Area, which includes Duval, Clay, St. Johns, and Nassau Counties, recently celebrated passing the 1,000,000 mark for population. For the region, this represents about a 2 percent annual growth rate since the 1990 census. Specific population data within each UWFL service area was not readily available. The following discussion relates overall population information for each of the three counties in which the UWFL service areas are located. Where available, specific data are reported within individual service areas based on sub-categories such as planning districts or census tracts.

Duval County

The 1995 population estimate for Duval County is 732,064 persons, an increase of 59,063 persons since the 1990 Census population of 672,971 (1995 Annual Statistical Package). The average annual growth rate of 1.76 percent for the period 1990 - 1995 falls short of the 1980's annual average growth rate of 1.79 percent and is less than last year's annual average growth rate of 2.22 percent. In general, Jacksonville's population growth appears to continue to fluctuate with the economy.

The six UWFL service areas located in Duval County fall within three municipal planning districts as follows:

Arlington Planning District

- Holly Oaks
- Monterey

Southwest Planning District

- Jacksonville Heights

Southeast Planning District

- Royal Lakes
- San Jose
- San Pablo

Population estimates since the 1990 census indicate annual growth rates of approximately 2.7, 1.5, and 2.9 percent for the Arlington, Southwest, and Southeast Planning Districts, respectively.

Available census tract data were correlated to the individual UWFL service areas in Duval County. This information reveals some variations in the population trends at the census tract level relative to the planning district level. For example, the data for the census tracts which contain the Holly Oaks service area indicate an average annual growth rate of approximately 7.9 percent between 1990 and 1995. This is nearly three times higher than the growth rate for the Arlington Planning District. On the other hand, census tract data for the Monterey service area, which is also in the Arlington Planning District, indicate a low rate of growth over the same period (approximately 0.3 percent per year).

Census tract data for the Jacksonville Heights service area indicate an annual growth rate of approximately 1.4 percent which matches closely to the Southwest Planning District growth of approximately 1.5 percent per year.

The UWFL service areas located within the Southeast Planning District include Royal Lakes, San Jose, and San Pablo. The census tract data for these areas also vary from the overall planning district data. For Royal Lakes, the annual growth based on census tract data between 1990 and 1995 has averaged approximately 1.7 percent. Similarly, the San Jose census tract data indicate an annual growth rate of around 0.3 percent. On the other end of the spectrum, the San Pablo service area has experienced growth at a higher rate than the overall planning district at approximately 12 percent per year.

Based on UWFL customer data (see *Appendix 1*), the highest growth in the number of sewer and water customers in the six Duval County service areas occurred between 1985 and 1990. During this period the average growth in customers for these service areas was approximately 7.7 percent per year. The service areas with the highest growth in number of customers during this period were Holly Oaks and Royal Lakes. Since 1990, the average customer growth in the Duval County service areas has slowed to approximately 2.9 percent per year as the areas have reached development maturity. From 1994 to 1995, the average growth in the number of customers was approximately 1.3 percent.

St. Johns County

The population of St. Johns County has, like the rest of the region, been increasing. However, in the past ten years, growth has been dynamic in the unincorporated areas. The population in the unincorporated area, increased from 37,370 persons in 1980 to 67,885 persons in 1990. This represents an annual growth of approximate 8 percent over the ten year period. Since 1990, the annual growth rate in the unincorporated areas has been relatively steady at around 3 or 4 percent. The 1995 population estimate for St. Johns County (including municipalities and unincorporated areas) was 98,188 persons. The estimate for the unincorporated areas alone was 81,419.

Since 1989, when UWFL started provided services in St. Johns County, customer growth in the three UWFL service areas in St. Johns County has also been strong as development has occurred in the unincorporated areas. This is especially true for St. Johns North and Ponce De Leon which have seen annual increases in excess of 40 percent over the last five years. Over the last year, customer growth for the Ponce De Leon and Ponte Vedra service areas was around 5 percent. In St. Johns North customer growth was slightly higher at approximately 8.7 percent.

Nassau County

Since 1960, the annual growth rate for Nassau County has averaged approximately 5 percent, with the highest growth occurring between 1970 and 1980. Between 1980 and 1990, the annual growth rate was approximately 3.4 percent. Since 1990, the annual growth in the population of the unincorporated area has been approximately 2 percent.

The Yulee service area is a relatively new franchise located in an unincorporated area in Nassau County. Since its acquisition in 1992, the Yulee service area has shown strong growth in the number of sewer and water customers. This would be expected in the early years of development in a new area.

Existing Land Use

Generalized land use maps from the Comprehensive Plans for Duval and St. Johns Counties and the Yulee area were obtained and reviewed as part of this study. In general, land use within the ten UWFL service areas included in this study is predominantly residential and commercial.

Soils Information

Generalized soils information from the Soil Conservation Service Soil Surveys for each County was obtained and reviewed for this study. The following is a summary of pertinent information obtained from the review of these documents for each County.

Duval County

Sandy soils predominate in Duval County. These soils are characterized by rapid infiltration and low fertility. Because the sands have low water-holding capacity, they must be irrigated frequently, especially on sand ridges and areas that have been drained to maintain plant growth. Because reclaimed water contains low levels of nutrients, it is ideal for irrigation on these soils. With frequent irrigation, the nutrients in the water are less likely to be lost to leaching and, therefore, are available to nourish plant life.

Duval County contains eight soil associations mapped by the U.S. Department of Agriculture Soil Conservation Service (SCS, 1978). *Soil associations* are areas that have been delineated on soil survey maps and comprise two or more soil series. The soil associations in Duval County can be categorized in two broad groups, soils that have developed on sand ridges and soils that have formed on flatwoods.

The soils on the sand ridges consist of excessively drained to somewhat poorly drained soil on nearly level to moderately steep land that is sandy to a depth of 80 inches or more Because of their good drainage and decreased likelihood of flooding, these soils are suitable for residential and industrial development. When landscaped or used for agriculture, however, these soils require irrigation and are good candidates for reclaimed water. These soils compose about 9 percent of the land mass of Duval County.

On the flatwoods, with nearly level to gently sloping land, the soils are moderately well-drained to very poorly drained. Most of these soils contain a dark-colored, weakly cemented sandy layer that is underlain by sandy or loamy material. These soils cover more than 80 percent of the county and are well-distributed throughout the area. Also, most of the soils on the flatwoods have seasonal high water tables. Many of them have water tables within 1 foot of the ground surface during wet seasons. These soils are typically drained when used for residential or commercial development or for agricultural crops. Because most of these soils are sandy, they must be irrigated when drained to ensure good plant growth.

Many of the soils mapped by SCS in these associations are classified as hydric. Hydric soils are sufficiently saturated, flooded, or ponded during the growing season to develop anaerobic conditions in their upper layers. If these hydric soils also support wetland plants, they could be considered wetlands and would be restricted from certain types of activities and development. Over 25 percent of the soils SCS mapped in Duval County are considered hydric.

St. Johns County

The major portion of the county is composed of sandy and strongly acidic soils. Most are only moderately well to poorly drained. Eleven general soil association series have been identified in the county. Three of the eleven soil series have very low ratings for septic tank absorption fields. These soils are generally coterminous with the presence of wetlands, floodplains and marshes. Four of the eleven soils have high ratings for septic tank absorption fields and the remaining four are moderately rated.

Nassau County

Soils in the Yulee service area are comprised of five general soil mappings found in the *Soil Survey of Nassau County* (Soil Conservation Services [SCS], 1991). These mappings generally include sandy soils which are poorly drained and found on nearly level and gently sloping areas. There are a great deal of wetland areas comprised of hydric soils within the Yulee service area

For specific mappings within the general soil groups, SCS summarizes various features in areas such as recreational development, irrigation features, septic tank and absorption fields limitations, groundwater levels, and hydraulic conductivity.

1. All soils have severe limitations for recreational development, specifically golf course fairways. Because golf courses are frequent reuse sites, this indicates that a golf course in this area may not be realistic.

2. All but two soil groups found in the service area have severe problems with septic tank absorption fields, which means there may be problems with existing on-site disposal systems.

3. The predominant hydrologic soil group within the Yulee Service Area is D. In some cases a B/D grouping is listed, which indicates drained versus undrained condition. Soils were considered to be undrained, which is typical of undeveloped land and areas adjacent to wetlands or watercourses in Florida. The limited A soil groups are typically in the residential and commercial areas and are already developed.

4. Limiting hydraulic conductivities in the soil profile vary from 0.6 inches per hour (in./hour) for some D soils to 6.0 to 20.0 in./hour for A soils. Dominant soil group D indicates a limitation in finding a site that can provide adequate infiltration for reuse systems.

5. Almost all soils have wetness and ponding as a feature affecting irrigation. This feature is probably because of the high groundwater level or the low hydraulic conductivity of the soil. This is also a limiting factor in selecting appropriate reuse sites.

Surface Water Classification

Surface water classifications for each County are presented in the following. As a general rule, surface waters within the study areas are not impacted by groundwater or surface water withdrawals. Most of the UWFL wastewater facilities currently discharge directly or indirectly to surface waters, and are in compliance with FDEP regulations. Flood plains within the study area are depicted on *Exhibits 2-4* through *2-13* later in this chapter.

Duval County

The primary surface waters within and in the immediate vicinity of Duval County include the St. Johns River, the Intracoastal Waterway, and their tributaries. These surface waters are classified as Class III, defined by Chapter 62-302, Florida Administrative Code (FAC), as suitable for recreation and the propagation and maintenance of a healthy, well-balanced population of fish and wildlife.

St. Johns County

The primary surface waters within and in the immediate vicinity of St. Johns County include the St. Johns River, the Intracoastal Waterway, and their tributaries. The Tolomato, Matanzas, Guana, San Sebastian and North rivers, and Moultrie and Pellicer creeks are all in the coastal zone. Julington, Six Mil, Tocoi, and Deep creeks and the Bowen and Flora Branch are located in the St. Johns River Basin.

Nassau County

The primary surface water within and in the immediate vicinity of Nassau County include the St. Marys and Nassau Rivers and their tributaries. The Lofton and Plummer creeks are the east and west service area boundaries, respectively. The Amelia, Bells, and Jolly rivers are all located in the coastal zone.

Hydrogeology

All of the UWFL service areas included in this study are located within the boundaries of the SJRWMD. The predominant water supply source in this part of the district is ground water. The following overview of ground water resources is provided in the 1994 Water Supply Needs and Sources Assessment prepared by the SJRWMD (Technical Publication SJ94-7).

Three aquifer systems supply ground water in SJRWMD: the surficial, the intermediate, and the Floridan. The hydrogeologic nature of these aquifers is described by Southeastern Geological Society (1986).

Surficial Aquifer System

The surficial aquifer system is composed primarily of sand and sandy clay and is located from land surface downward to the top of the confining unit of the intermediate aquifer system, where present, or to the top of the confining unit of the Floridan aquifer system where there is no confining unit. The surficial aquifer system contains the water table, which is the top of the saturated zone within the aquifer. Water within the surficial aquifer system occurs mainly under unconfined conditions, but beds of low permeability cause semiconfined or locally confined conditions to prevail in its deeper parts.

Water quality in the surficial aquifer system is generally good. Chloride, sulfate, and total dissolved solids (TDS) concentrations are generally below the secondary drinking water standards of 250, 250, and 500 milligrams per liter (mg/L), respectively (Subsection 62-550.320(1), *FAC*). Iron concentrations, however, are generally high and in many places exceed the secondary drinking water standard of 0.3 mg/L (Subsection 62-550.320(1), *FAC*). In coastal areas, such as the barrier islands, this aquifer is prone to saltwater intrusion.

The surficial aquifer system is a source of water for public supply in St. Johns, Flagler, Brevard, and Indian River counties. It is also used as a source of water for individual domestic self-supply, mainly along the coastal portions of SJRWMD but also inland areas scattered throughout SJRWMD.

Intermediate Aquifer System

The intermediate aquifer system is composed of thin water-bearing zones of sand, shell, and limestone, which lie within or between less permeable units of clayey sand to clay. In places, poorly yielding to non-water yielding strata occur, and there the term "intermediate confining unit" applies. This intermediate confining unit is geologically referred to as the Hawthorn Group. In other places, one or more low-to-moderate yielding aquifers may be inter-layered with relatively impermeable confining beds. The aquifers within this aquifer system contain water under confined conditions. Within the intermediate aquifer system, confining units are generally more extensive than water-bearing units.

The top of the intermediate aquifer system or intermediate confining unit coincides with the base of the surficial aquifer system. The base of the intermediate aquifer system or intermediate confining unit lies immediately above the Floridan aquifer system.

Water quality in the intermediate aquifer system is generally good in the northern part of SJRWMD where chloride, sulfate, and TDS concentrations are below the secondary drinking water standards. Water quality in the southern part of SJRWMD approaches or exceeds the secondary drinking water standards for chloride and TDS concentrations.

The intermediate aquifer system is used as a source of water for individual domestic self-supply in Duval and Clay counties.

Floridan Aquifer System

The Floridan aquifer system is one of the world's most productive aquifers. The sediments that comprise the aquifer system underlie the entire state, although this aquifer does not contain potable water at all locations. The Floridan aquifer system is generally composed of limestone and dolomite. Water in the Floridan aquifer system occurs under confined conditions throughout most of SJRWMD. Unconfined conditions occur in parts of Alachua and Marion counties.

The Floridan aquifer system is subregionally divided on the basis of the vertical occurrence of two zones of relatively high permeability (Miller 1986). These zones are called the "Upper Floridan" and "Lower Floridan" aquifers. A less permeable limestone and dolomitic limestone sequence generally separates the Upper Floridan and Lower Floridan aquifers. It is referred to as the "middle semiconfining unit." Throughout much of Baker, Union, Bradford, western Alachua, and northwestern Marion counties, the middle semiconfining unit is missing and the Lower Floridan aquifer does not occur (Miller 1986).

Water quality in the Upper Floridan aquifer varies depending on its location in SJRWMD. Water quality in this aquifer is generally good in the northern and western portions of SJRWMD where chloride, sulfate, and TDS concentrations are below the secondary drinking water standards. Chloride and TDS concentrations in the Upper Floridan aquifer generally exceed the secondary drinking water standards throughout Brevard and Indian River counties, in southern St. Johns and most of Flagler counties, in areas bordering the St. Johns River south of Clay County, (in parts of Putnam, Marion, Lake, Volusia, Seminole, Orange, and Osceola counties), and in eastern Volusia County. Sulfate concentrations also often exceed the secondary drinking water standards.

Water quality in the Lower Floridan aquifer also varies depending on its location in SJRWMD. Water quality in this aquifer is generally good in the northern and western portions of SJRWMD where chloride and TDS concentrations are below the secondary drinking water standards. Chloride concentrations in the Lower Floridan aquifer generally exceed the secondary drinking water standards throughout all of Flagler, Brevard, and Indian River counties, in eastern Nassau and Volusia counties, and in areas bordering the St. Johns River in Putnam, Marion, Lake, Volusia, Seminole, Orange, and Osceola counties (Sprinkle 1989). TDS concentrations in the Lower Floridan aquifer generally exceed the secondary drinking water standards throughout all of St. Johns, Flagler, Brevard, and Indian River counties, in most of Nassau and Duval counties, in eastern Clay and Volusia counties, and in areas bordering the St. Johns River in Putnam, Marion, Lake, Volusia, Seminole, Orange, and Osceola counties (Sprinkle 1989).

The Upper Floridan aquifer is the primary source of water for public supply water use in SJRWMD. This aquifer is a source of water for public supply in the northern and central portions of SJRWMD where the aquifer contains water that generally meets primary and secondary drinking water standards. The Upper Floridan aquifer is also a source of water for public supply in the southern portion of SJRWMD where water withdrawn from the aquifer is treated by reverse osmosis. Portions of the Lower Floridan aquifer are also tapped as a source of water for public supply in Duval, central and western Orange, and southern and southwestern Seminole counties. The Floridan aquifer system in the southern portion of SJRWMD, where the aquifer generally contains water that exceeds secondary drinking water standards for chloride, sulfate, and TDS, is widely used as a source of irrigation water.

Existing Wastewater Management Facilities

The study area consists of ten individual service areas each served by its own wastewater collection, treatment, and disposal system. The following is a summary of the existing wastewater management facilities for each of the ten specific service areas. Historical flow trends for each service area are presented on exhibits contained in *Chapter 3*. A summary of FDEP operating permit status for each WWTF is contained in *Exhibit 2-3*. A summary of FDEP WWTF permit effluent requirements and historical effluent quality data is contained in *Appendix 1*.

EXHIBIT 2-3
Summary of FDEP Operating Permits for UWFL WWTFs

Facility Name	FDEP Permit No.	FDEP Permit Expiration Date	Permitted Flow, AADF (mgd)
Holly Oaks	DO16-229843	6/30/98	1.0
Jacksonville Heights	DO16-22480	4/1/98	2.5
Monterey	FL0023604	4/2/01	3.2
Royal Lakes	DO16-230626	4/15/98	3.25
San Jose	DO16-246674	4/15/99	2.25
San Pablo	FL0024767	Draft	0.499
Ponce De Leon	DO55-253570	8/23/99	0.095
Ponte Vedra	FL0117951	11/12/01	0.6
St. Johns N.	FL0117668	Draft	0.225
Amoco Service Sta.	FLA011675	6/12/01	0.00336
Lofton Oaks	DO45-260422	12/1/99	0.050
Yulee Regional	FL0167258	5/8/01	0.5

Holly Oaks

The Holly Oaks WWTF is located at 10797 Fort Caroline Road, Jacksonville Florida. *Exhibit 2-4* shows the Holly Oaks wastewater and water service areas along with flood plain information, water and wastewater treatment plant locations, and potential reuse sites.

The Holly Oaks WWTF is a 1.0 mgd conventional activated sludge facility which discharges treated effluent to Cowhead Creek. Existing liquid treatment processes include influent screening, aeration, clarification, chlorination and dechlorination. Domestic wastewater residuals are aerobically digested and disposed of by land application.

The facility is operated by UWFL under FDEP Operating Permit No. DO16-229843 (expires June 30, 1998). In the past, chronic whole effluent toxicity limits have been exceeded at the WWTF, and UWFL is under an Administrative Order to resolve this issue. UWFL has completed a Toxicity Identification Evaluation and is currently negotiating with FDEP for revised NPDES permit conditions.

The 1995 annual average daily flow (AADF) was 0.664 mgd. *Exhibit 3-2* presents the historical AADF for the Holly Oaks WWTF.

Jacksonville Heights

The Jacksonville Heights WWTF is located in the west area of Duval County at 5957 Tampico Road. *Exhibit 2-5* shows the Jacksonville Heights wastewater and water service area along with floodplain information, water and wastewater treatment plant locations, and potential reuse sites.

The Jacksonville Heights WWTF is a 2.5 mgd conventional activated sludge facility which discharges treated effluent to Fishing Creek . Existing liquid treatment processes include two 1.25 mgd Sanitaire Units operated in parallel. Influent flows through a common vortex grit remover prior to being split between the two Sanitaire Units. Following separate clarification, effluent flows into a common microstraining system, followed by chlorination, sulfur dioxide dechlorination and discharge into a channel that flows into Fishing Creek. A portion of the chlorinated effluent is reused by recycling back into the gas chlorination system. Domestic wastewater residuals are aerobically digested on site and disposed of by land application.

The facility is operated by UWFL under FDEP Permit No. DO16-222480, which expires on April 1, 1998. Whole effluent toxicity limits have been exceeded at the Jacksonville Heights WWTF in the past, and UWFL is under an Administrative Order to resolve this issue. UWFL has completed a Toxicity Identification Evaluation and is currently negotiating for revised NPDES permit conditions. In 1995, UWFL installed a sand filtration and UV disinfection at the facility. No toxicity violations have occurred since installation of these facilities.

The 1995 AADF was 1.033 mgd as presented in *Exhibit 3-3*.

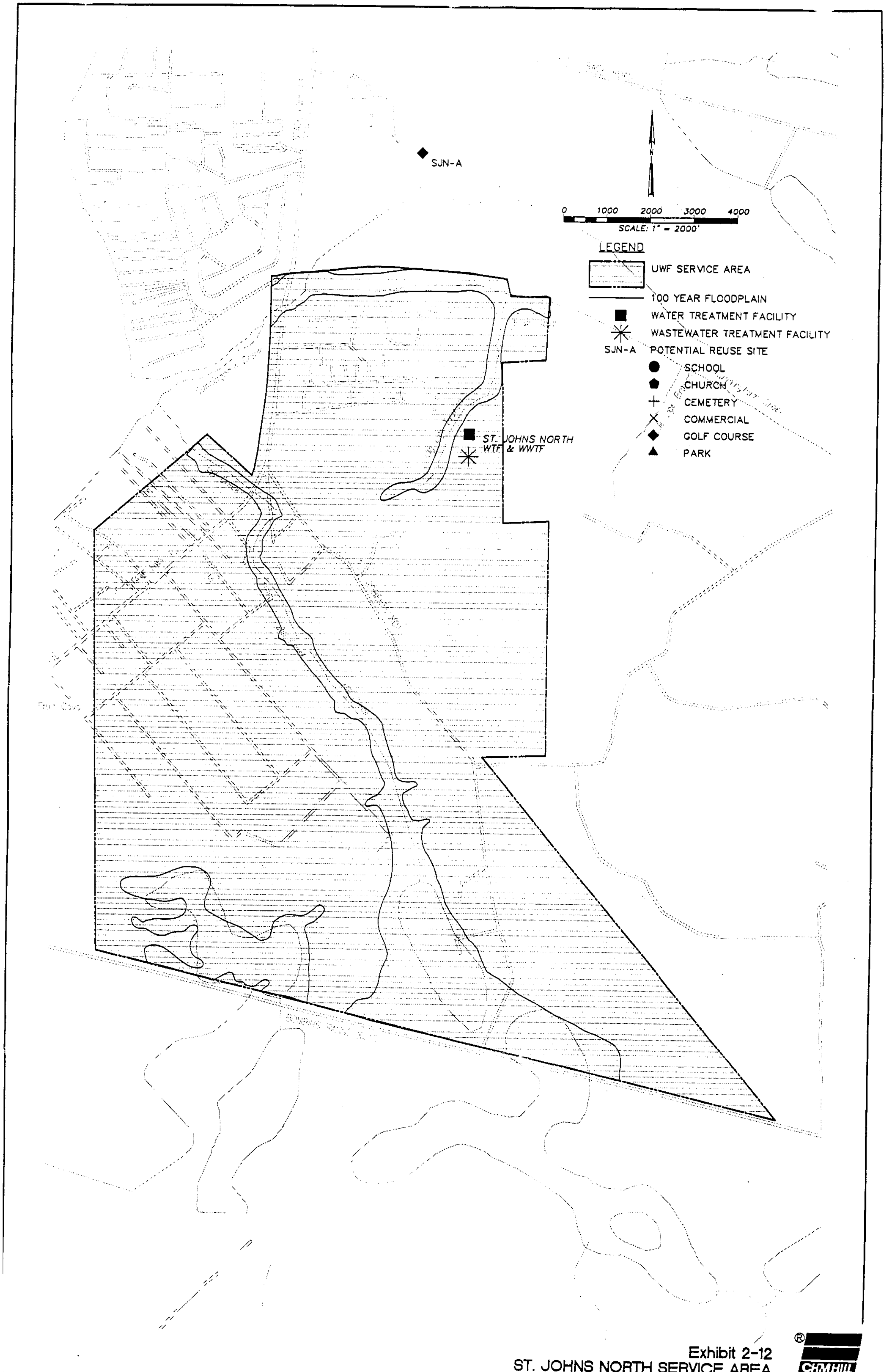

Exhibit 2-12
ST. JOHNS NORTH SERVICE AREA

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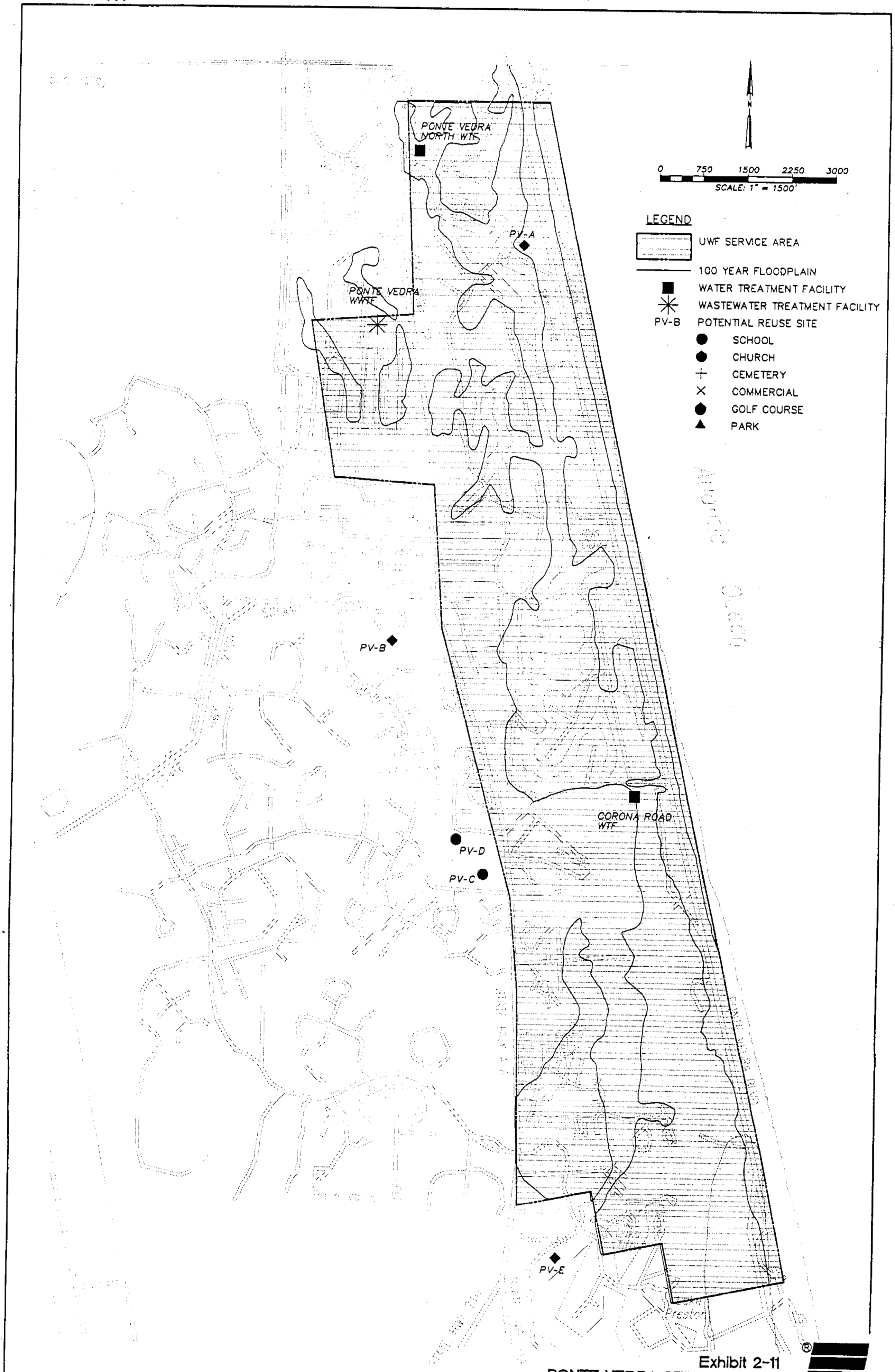

Exhibit 2-11
PONTE VEDRA SERVICE AREA

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Ponte Vedra

The Ponte Vedra WWTF is located in Northeast St. Johns County at 200 State Road A1A in Ponte Vedra Beach, Florida. This facility was constructed in 1975 and purchased by UWFL in 1993. *Exhibit 2-11* shows the Ponte Vedra wastewater and water service area along with floodplain information, water and wastewater treatment plant locations, and potential reuse sites. This facility serves an area characterized by low to medium density, single family residential land uses, with some condominiums and minor commercial areas.

Onsite treatment facilities with the Ponte Vedra WWTF include a 0.5 mgd General Environmental Equipment (GEE) activated sludge package plant consisting of an 187,000 gallon aeration basin, a 1,150 sf secondary clarifier (38.33 ft diameter), chlorination, 18,800 gallon chlorine contact chamber discharging to two holding ponds (for dechlorination) followed by two percolation ponds which partially drain to adjacent perimeter ditches and ultimately discharge to surface waters. After aerobic digestion, residuals are trucked to an off-site land application area.

The Ponte Vedra WWTF operates under FDEP Permit No. FL0117951, which was issued on November 12, 1996 and expires on November 12, 2001. The new permit includes construction of a new 0.6 mgd advanced wastewater treatment plant with high level disinfection to replace the existing WWTF. The new permit stipulates that the discharge from the new facility will be to public access reuse within the service area and/or the Ponte Vedra Lake System (Class III waters) . The schedule dictates that UWFL begin construction by February 28, 1998 and complete construction of the new facilities by March 31, 2000. The new permit also requires that UWFL make public access quality reclaimed water available to the Ponte Vedra Inn and Club Golf Course by March 31, 2000.

The WWTF had an AADF of 0.45 mgd for 1995 as shown in *Exhibit 3-9* with the historical wastewater flow.

St. Johns North

The St. Johns North WWTF is located at 2369 Hawkcrest Drive East, Fruit Cove, Florida. *Exhibit 2-12* shows the St. Johns North wastewater and water service area along with floodplain information, water and wastewater treatment plant locations, and potential reuse sites.

The St. Johns North WWTF is a 0.225 mgd conventional activated sludge wastewater treatment facility consisting of an influent pump station with bar screen, dual aeration basins, a single secondary clarifier, two chlorine contact basins, and an emergency generator. Treated effluent is discharged to percolation ponds. Wastewater residuals are aerobically treated to meet Class B stabilization requirements and hauled to an approved land application site.

The St. Johns North WWTF is operated by UWFL under FDEP Permit No. D055-194157. which expired on August 30, 1996. A new draft permit (Permit No. FL0117668) has been issued which includes an Administrative Order (AO 024 NE) that allows for the temporary discharge of 0.225 mgd of treated effluent to Big Lige Branch via one existing and one proposed new outfall. The temporary discharge is being allowed during an interim period

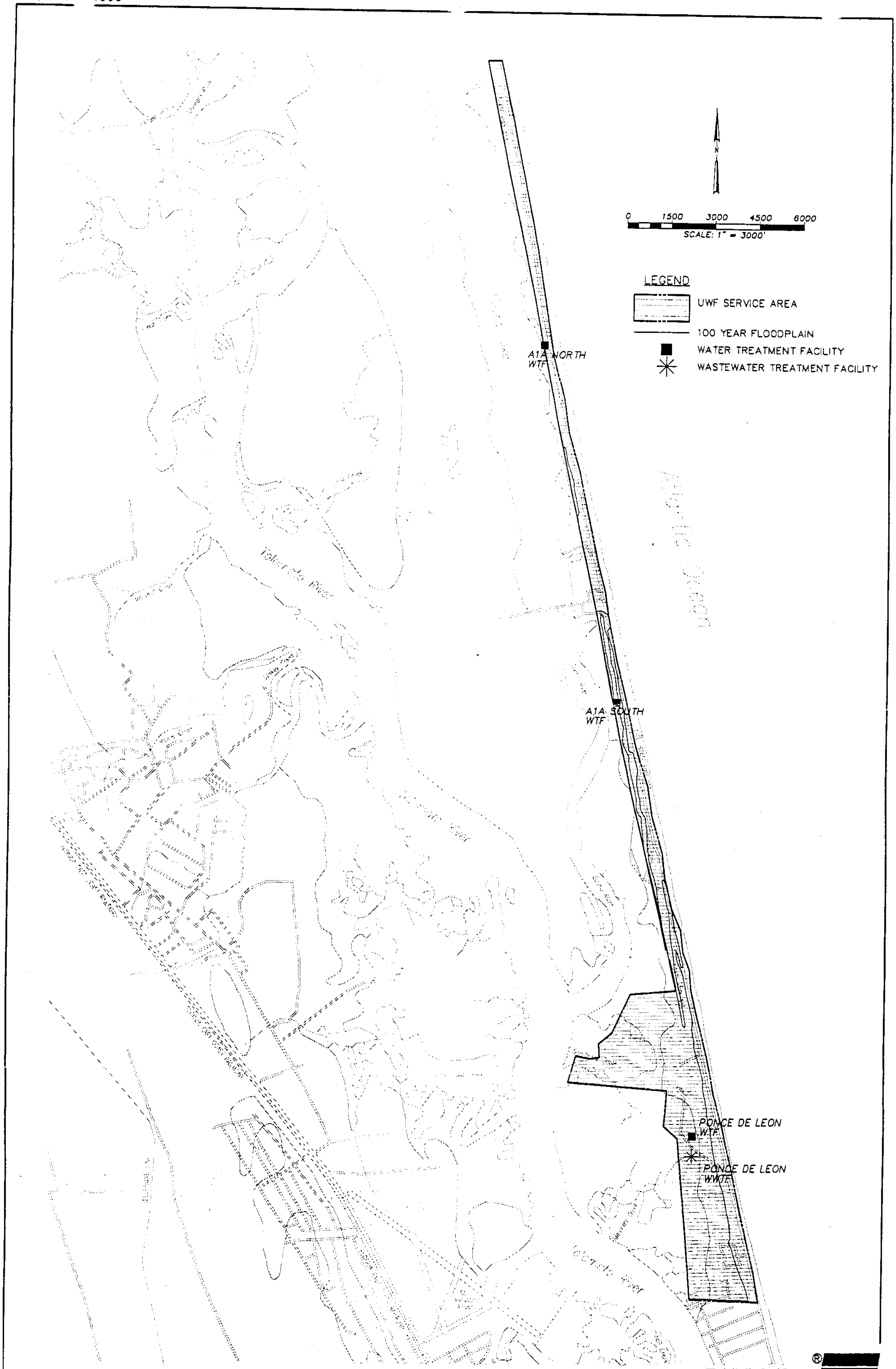

Exhibit 2-10
PONCE DE LEON SERVICE AREA

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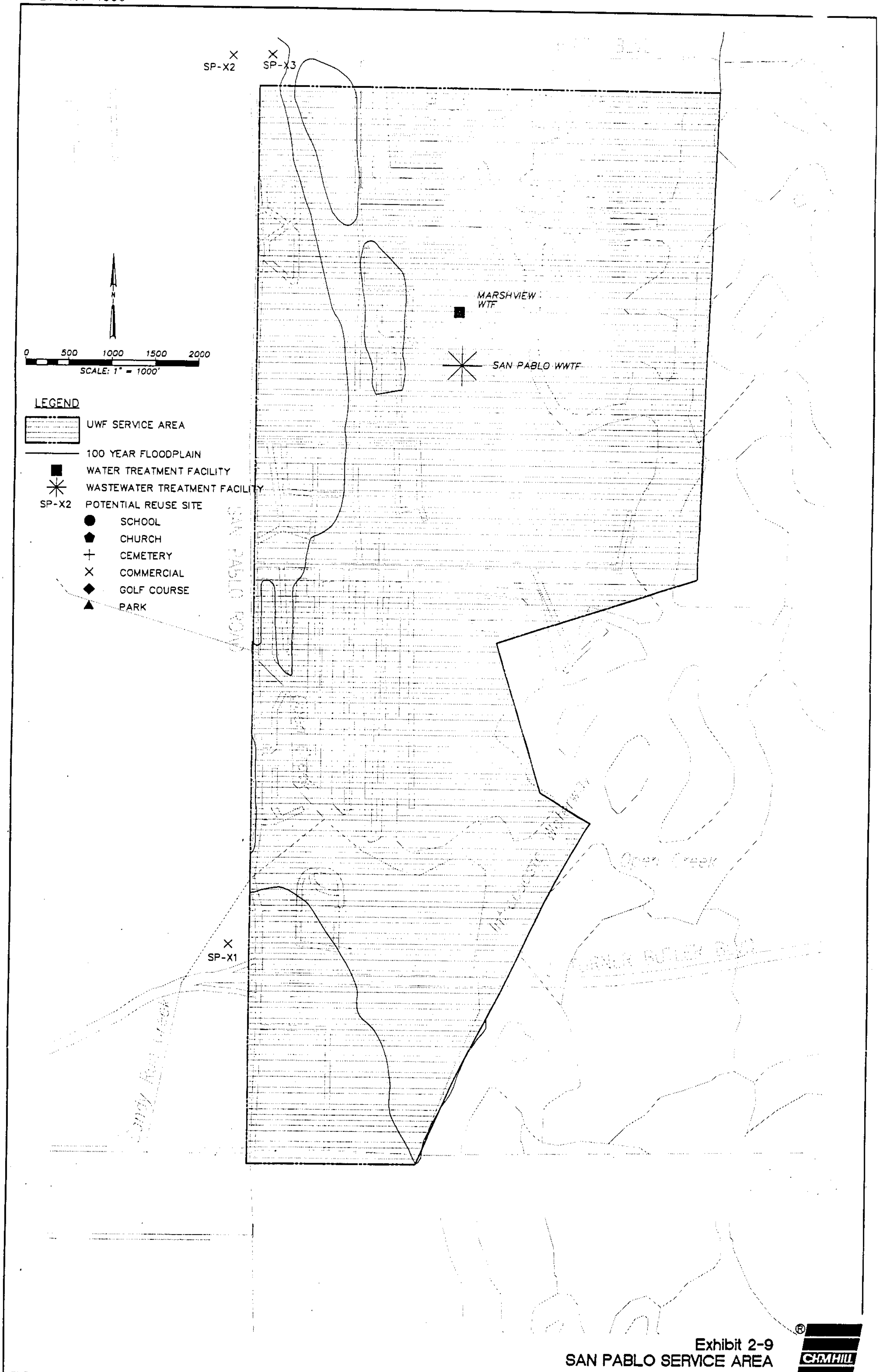

Exhibit 2-9
SAN PABLO SERVICE AREA

The San Jose WWTF is a 2.25 mgd complete mix wastewater facility with an influent screen, gravity grit removal system, aeration basins, secondary clarification, chlorination and sulfur dioxide dechlorination. Dechlorinated effluent is discharged directly into the St. Johns River through a gravity pipe and through a force main. Domestic wastewater residuals are stabilized by aeration, gravity thickening and aerobic digestion and are disposed of by land application at an agricultural site. Chlorinated reclaimed water is reused on site for nonpotable water demands.

This facility is operated by UWFL under FDEP Permit No. D016-246674, which expires April 15, 1999.

The WWTF had an AADF of 2.0 mgd for 1995 as shown in *Exhibit 3-6* with the historical wastewater flow.

San Pablo

The San Pablo WWTF is located near the Duval and Clay County border at 14738 Marshview Drive in Duval County. *Exhibit 2-9* shows the San Pablo wastewater and water service area along with floodplain information, water and wastewater treatment plant locations, and potential reuse sites.

The San Pablo WWTF is a 0.499 mgd extended aeration wastewater facility with grit removal, chlorination and sulfur dioxide dechlorination. Dechlorinated effluent is discharged into a sixteen inch diameter ductile iron pipe and thence into the Intracoastal Waterway. Sludge is treated on-site using the Micronair process.

The FDEP Operating Permit for this facility (DO16-162840) expired on May 31, 1995. UWFL currently has a new draft permit (Permit No. FL0024767) and is awaiting final issuance.

The 1995 AADF for San Pablo WWTF was 0.4 mgd as presented in the historical AADF *Exhibit 3-7*.

Ponce de Leon

The Ponce de Leon WWTF is located on Highway A1A at 3152 South Ponte Vedra Boulevard, Goodwin Beach, in St. Johns County. *Exhibit 2-10* shows the Ponce de Leon wastewater and water service area along with floodplain information, water and wastewater treatment plant locations, and potential reuse sites.

The Ponce de Leon WWTF is permitted as a 0.095 mgd extended aeration wastewater treatment plant with chlorinated reclaimed water disposal to two on-site percolation/evaporation ponds. The design capacity of the wastewater treatment plant is 0.400 mgd. However, the permitted capacity of the plant has been derated due to low flow to the plant. The permitted capacity may change when the flows increase.

The WWTF is operated by UWFL under FDEP Permit No. D055-253570, which expires on August 23, 1999.

The current AADF is 0.02 mgd. *Exhibit 3-8* presents the historical AADF data.

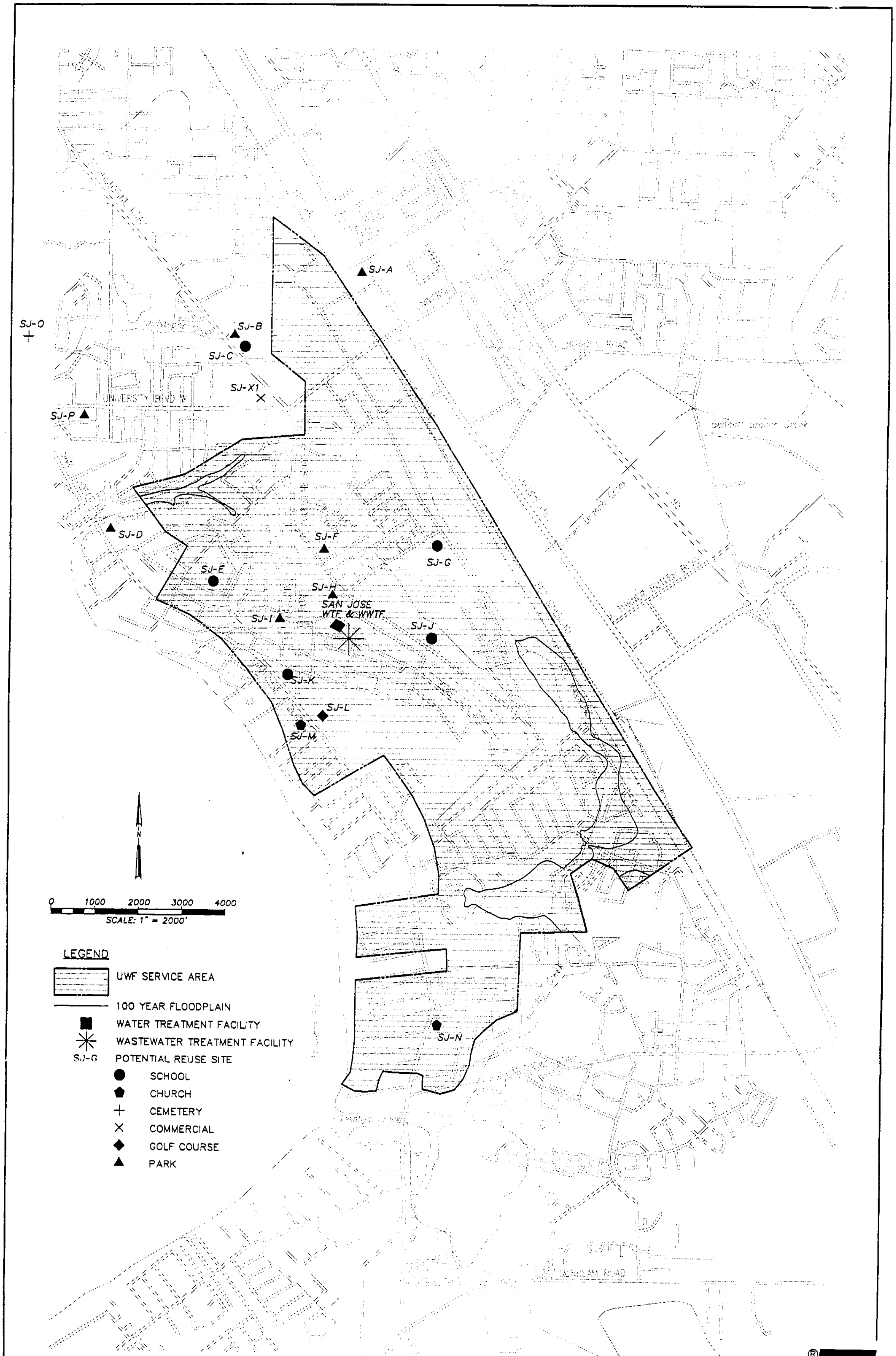

Exhibit 2-8
SAN JOSE SERVICE AREA

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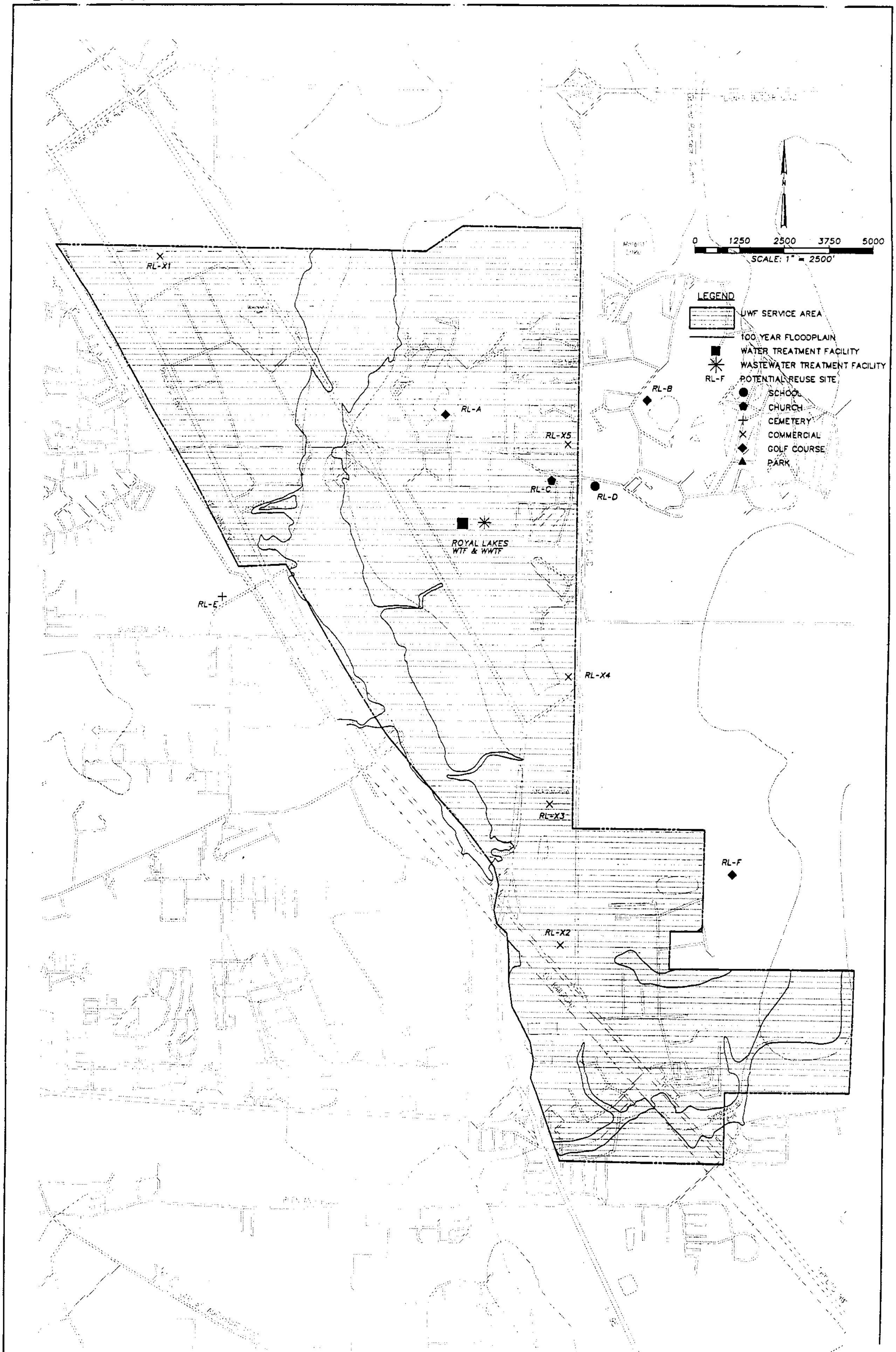

Exhibit 2-7
ROYAL LAKES SERVICE AREA

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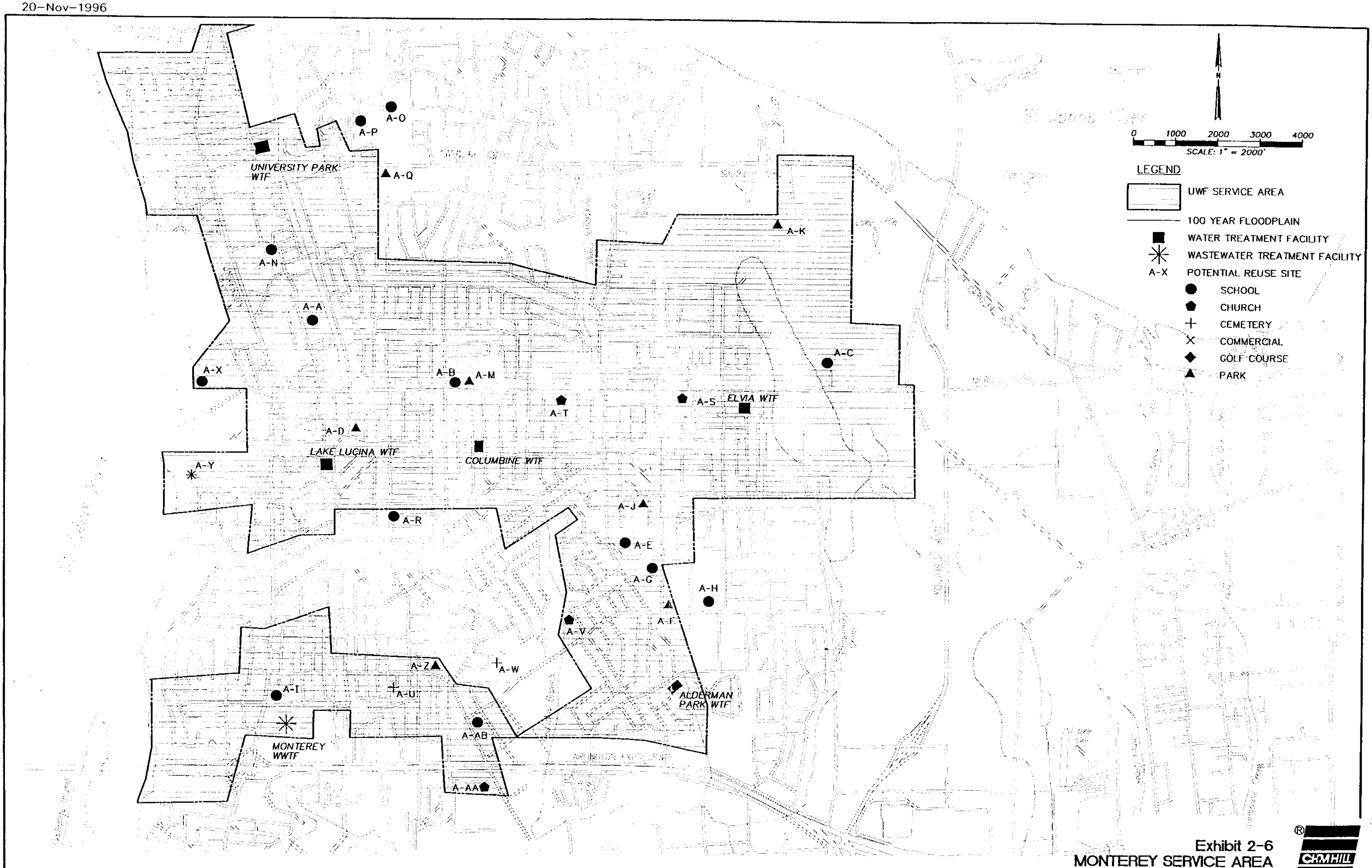

Exhibit 2-6
MONTEREY SERVICE AREA

CH2M HILL

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Monterey

The Monterey WWTF is located at 5802 Harris Street, Jacksonville, Florida. *Exhibit 2-6* shows the Monterey wastewater and water service area along with floodplain information, water and wastewater treatment plant locations, and potential reuse sites.

The Monterey WWTF was originally designed as a 3.0 mgd conventional activated sludge wastewater facility with comminution with dual 1.5 mgd conventional activated sludge unit processes operated in parallel with final disinfected and dechlorinated effluent discharged to the St. Johns River. Sludge treatment includes aerobic digestion, thickening, and temporary storage onsite followed by hauling to a land application site.

Construction is underway on an expansion of the Monterey WWTF to a total capacity of 3.2 mgd. New facilities include a sequencing batch reactor (SBR) type wastewater treatment facility comprised of four cells, a ultraviolet (UV) disinfection system, and a sludge centrifuge solids handling facility. The UV disinfection system is already online and the remaining facilities should be completed early in 1997.

The facility is operated under FDEP Permit No. FL0023604, which was recently issued and has an expiration date of April 2, 2001. This permit includes a requirement to submit a reuse feasibility study by July 1, 1997.

The WWTF had an AADF of 2.9 mgd for 1995 as shown in *Exhibit 3-4.*

Royal Lakes

The Royal Lakes WWTF is located at 8509 Western Way in Duval County. *Exhibit 2-7* shows the Royal Lakes wastewater and water service area along with floodplain information, water and wastewater treatment plant locations, and potential reuse sites.

The Royal Lakes WWTF is a 3.25 mgd conventional/plug flow wastewater facility consisting of 1.75 mgd and 1.5 mgd Sanitaire units operated in parallel. Influent flows through a common vortex grit remover prior to being split between the two Sanitaire units. Following separate clarification, effluent flows into a common chlorination system followed by dechlorination and discharge into the St. Johns River via a 24-inch diameter, 22,250 foot force main. A portion of the chlorinated effluent is reused for on-site, nonpotable water demands. Domestic wastewater residuals are wasted to a gravity thickening system, stabilized by aerobic digestion and disposed of by land application.

The facility is operated by UWFL under FDEP Permit No. D016-230626, which expires August 15, 1998.

The 1995 AADF for the Royal Lakes WWTF was 2.7 mgd. *Exhibit 3-5* presents the historical AADF data.

San Jose

The San Jose WWTF is located at 7128 Balboa Road in Duval County. *Exhibit 2-8* shows the San Jose wastewater and water service area along with floodplain information, water and wastewater treatment plant locations, and potential reuse sites.

20-Nov-1996

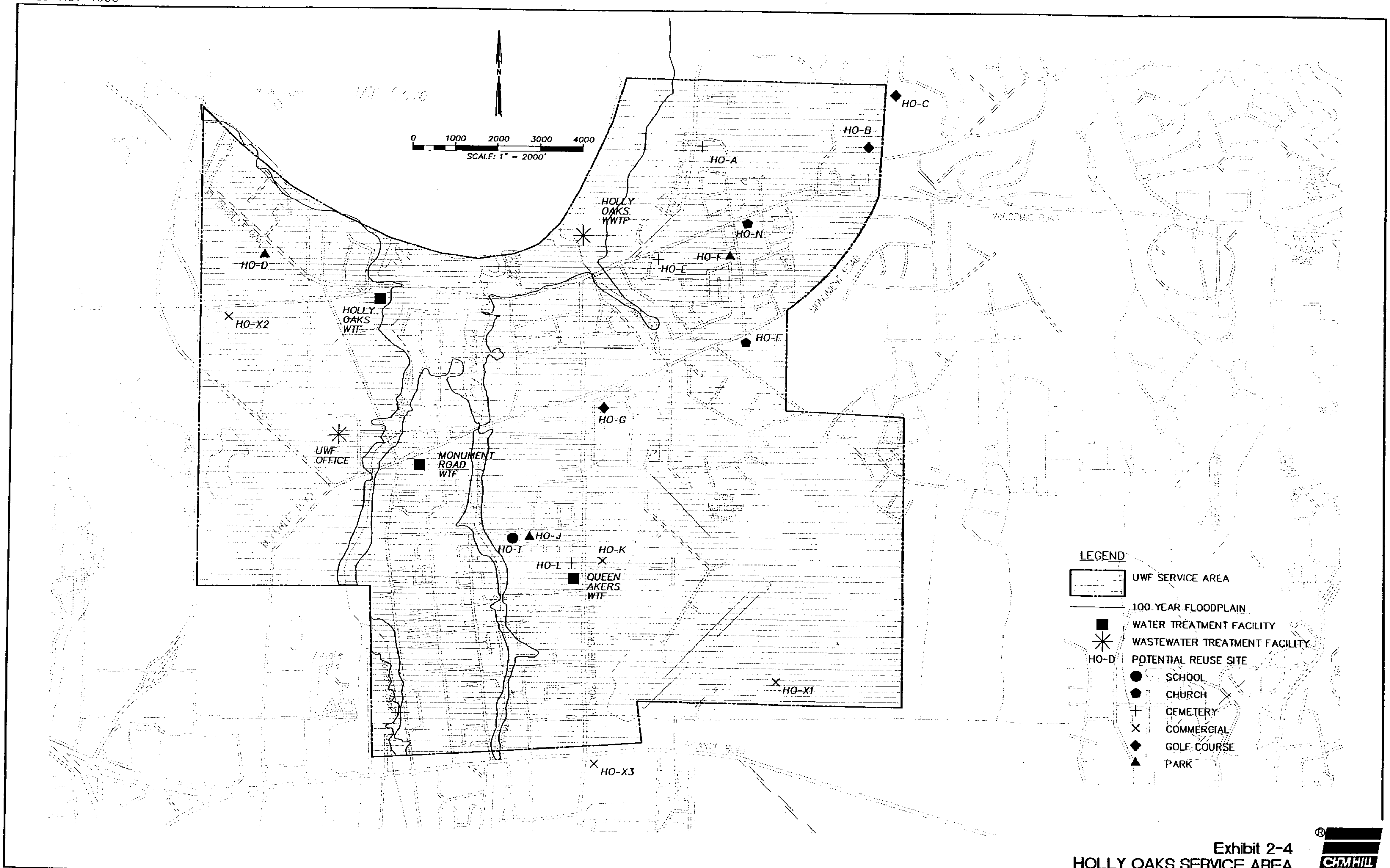

Exhibit 2-4
HOLLY OAKS SERVICE AREA

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20-Nov-1996

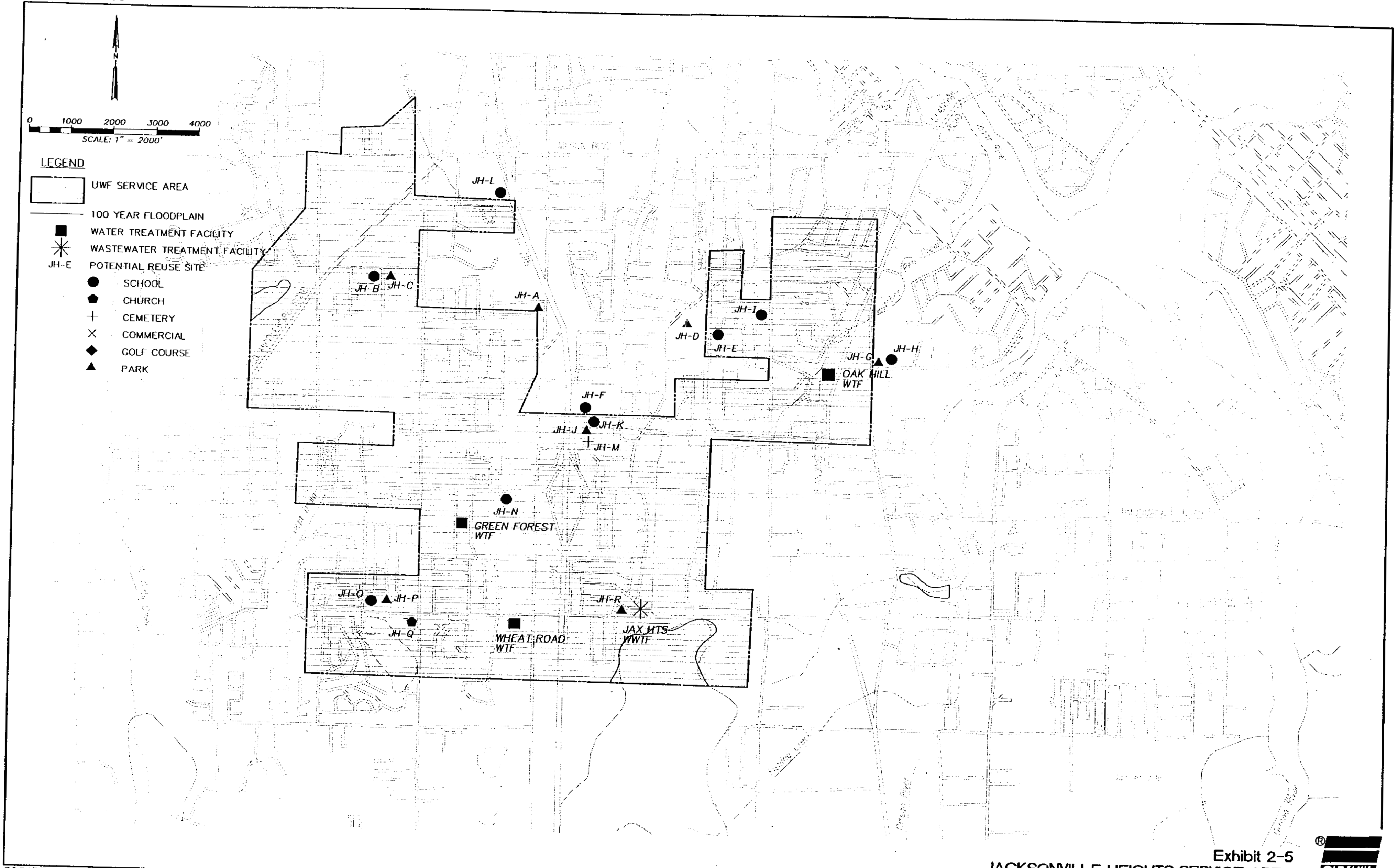

Exhibit 2-5
JACKSONVILLE HEIGHTS SERVICE AREA

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would be necessary for the Ponte Vedra system. The length of pipe for each course is summarized below in *Exhibit 4-12*:

EXHIBIT 4-12
Summary of Transmission Pipeline Lengths for Alternative 3 Golf Course Reuse

Service Area	Site	Size (in)	Length (lf)
Holly Oaks	Mill Cove GC	6	4,200
Royal Lakes	Baymeadows CC	6	5,250
San Jose	San Jose CC	6	3,800
Ponte Vedra	Ponte Vedra G&CC	8	3,750

Pipe sizes were based on providing the annual average daily reclaimed water demand times a peaking factor of 1.5 times AADF over a 24-hour period. It is assumed that reclaimed water will be delivered into existing ponds on the golf courses at nearly atmospheric pressure. The golf courses will pump out of the storage ponds through existing onsite irrigation systems. Any onsite modifications to accommodate storage and irrigation system modifications will be the responsibility of the golf course.

The pumping requirements resulting from this analysis for each of the four scenarios is summarized below in *Exhibit 4-13*:

EXHIBIT 4-13
Summary of Pumping requirements for Alternative 3 - Golf Course Reuse

Service Area	Golf Course	Pumping Rate (gpm)	Head (psi)
Holly Oaks	Mill Cove G.C.	196	20
Royal Lakes	Baymeadows CC	326	35
San Jose	San Jose CC	261	20
Ponte Vedra	Ponte Vedra CC	616	20

Additionally, some operational storage would be desirable to balance the diurnal and seasonal fluctuations in wastewater flows and irrigation demands. For this analysis, it is assumed that 0.5 million gallons of storage would be sufficient and would be located on the WWTF sites. It is questionable whether or not there is adequate space on the site for a 0.5 million gallon tank on all four of the WWTF sites. The costs for additional land have not been included in this analysis. It is further assumed that no storage for reject water would be necessary and that reclaimed water would be diverted to the surface water discharge during periods of wet weather.A service connection to each customer would have to be provided. In addition, according to FDEP rules, any site which receives both potable water and reclaimed water must have an approved backflow prevention device located on the potable water line. For this study a reclaimed water service connection is assumed to include a shut off valve, meter and a reduced-pressure double check valve backflow prevention device on the potable water line.

The option described above represents a minimum level alternative (less than 40 percent of design year flow). It will not be possible to identify an alternative beyond the minimum level. Consequently, there will not be an evaluation of a medium (between 40 and 75 percent of design year flow) or a maximum (greater than 75 percent of design year flow) level alternative in the report.

Other Alternatives

On the basis of the screening of reuse alternatives included in *Chapter 3,* there are no other alternatives for reuse.

CHAPTER 5

Evaluation of Alternatives

This chapter summarizes the evaluation of reuse alternatives described in *Chapter 4*. According to the FDEP guidelines, the evaluation of alternatives must include the following elements:

- Assessment of Present Value Analysis
- Evaluation of Rates and Fees
- Technical Feasibility
- Environmental Assessment

Assessment of Present Value Analysis

In accordance with the FDEP guidelines, a present value analysis was conducted for each alternative to compare the total costs on an equivalent basis. The present value analysis is a method that is used to compare alternatives that have components that occur at different times. Calculation of a present value for each alternative enables the costs to be compared on an equivalent basis (the present value). All costs anticipated during the planning period were converted to an equivalent present value in 1996 dollars. Key parameters used to conduct the present value analysis are summarized in *Exhibit 5-1*.

To perform the present value analysis in accordance with the FDEP guidelines, estimates of all of the costs and revenues are needed for each alternative. Pertinent costs include the capital and annual costs associated with implementation of the alternatives and must include applicable markups and allowances for contingency, engineering, legal and administrative costs. In addition, replacement costs and salvage values for facilities must also be included in the analysis. Revenues for the sale of reclaimed water must also be included.

In accordance with the FDEP guidelines, two present values must be calculated for each alternative evaluated. First the total net present value will be calculated based on the costs and revenues described above. Second, an adjusted present value will be calculated that includes the present value of water savings by implementing the reuse alternatives. Each of the key elements associated with the present value analysis is described in more detail in the following sections.

Phasing Plan

Prior to calculating the present value of each alternative, a phasing plan is necessary. The phasing plan for this evaluation is based on 5-year increments for a 20-year period as follows:

Phase 1	1998 through 2002
Phase 2	2003 through 2007

EXHIBIT 5-1
Parameters for the Present Value Analysis

Parameter	Value
Period of Analysis	20 years
	1998-2017
Design Year	2017
Discount Rate[a]	7.63%
Percentages Used for Indirect Costs:	
Contingency	15%
Mobilization/Bond/Insurance	5%
Contractor's Overhead and Profit	15%
Engineering/Legal/Administration	30%
Useful Life for Salvage Value and Replacement:[b]	
Piping	50 years
Structures and Concrete/Steel Tankage	30 years
Process Equipment & Pumps	15 years
Auxiliary Equipment	10 years
Land	Permanent
Depreciation Method	Straight Line

[a]Based on USBR discount rate for fiscal year 1996.
[b]From Guidelines for Preparation of Reuse Feasibility Studies for Applicants Having Responsibility for Wastewater Management (FDEP, November 1991).

MOB = Mobilization
OH = Overhead
USBR = U.S. Bureau of Reclamation
FDEP = Florida Department of Environmental Protection

Phase 3	2008 through 2012
Phase 4	2013 through 2017

For the analysis, it is assumed that construction is completed in 1 year; Therefore, Phase 1 is constructed in year 0 (1997) and operational in year 1 (1998). Phase 2 is constructed in year 5 (2002) and operational in year 6 (2003). Phase 3 is constructed in year 10 (2007) and operational in year 11 (2008). Phase 4 is constructed in year 15 (2012) and is operational in year 16 (2013).

Capital Cost Estimates

Wastewater system capital costs for each phase were developed from general estimating information, information provided by UWFL, experience on previous projects of similar scope, and quantity takeoffs from conceptual layouts using unit costs. It should be noted that the scope of this study does not include analysis of the water supply system and no capital or annual water supply system costs are included.

The costs are order of magnitude, planning level estimates prepared without detailed engineering data. An order of magnitude estimate, as defined by the American Association of Cost Engineers, implies a level of accuracy of +50 to -30 percent. Actual costs will depend on the final project scope and implementation schedule, labor and material costs, competitive market conditions at the time of construction, and other variable factors.

In accordance with the FDEP guidelines, all capital and annual costs are expressed in current (1996) dollars. For reference, the current Handy-Whitman general building construction cost index is 284.5. Inflation during the 20-year planning period was not included in the present value analysis. The assumptions used to prepare the capital cost estimates are summarized in *Appendix 3*.

Salvage Value

In accordance with the FDEP guidelines, salvage value for facilities is included in the present value analysis based on the type of equipment and the useful lives defined in *Exhibit 5-1*. It should be noted that salvage value for items such as piping represents a significant amount on paper. However, in reality, it is unlikely that a utility would actually receive any salvage value for piping which has been in place for 20 years. Consequently, the present value of those alternatives which involve substantial pipeline facilities would appear more favorable than those options which do not involve extensive pipeline systems.

Reuse Revenues

In accordance with the FDEP guidelines, revenues from sales of reclaimed water to the customers are included in the present value analysis. In this context, the rates used should represent realistic values based on actual market conditions. To assist in establishing a meaningful rate for use in this analysis, a survey of actual reuse rates charged by approximately 20 public utilities was conducted. No private utility information was readily available. A summary of the results of this survey is provided in *Appendix 3*. Based on this information, the following observations were made:

- For commercial customers, only three out of sixteen systems charge a flat rate with no volume charge. For these cases, the average flat rate is $7.67 per month. Conversely, eight of the sixteen systems have a rate which is comprised entirely of a volume charge. For these, the average volume charge is $0.39 per 1,000 gallons. For the five cases where both a flat rate and a volume charge are applied, the average rates are $6.33 and $0.21, respectively.
- For residential customers, half of the systems charge a rate which includes both a fixed portion and a volume charge. For these cases, the average rates are $2.66 and $0.43, respectively. For the systems which charge a flat rate only, the average rate is $7.29. Only two residential systems charge a volume charge alone. The average of these is $0.75 per 1,000 gallons.

Based on this information, the following rates were chosen to use in the present value analysis:

Commercial Users (golf courses, parks, schools, churches, cemeteries)

$0.39 per 1,000 gallons (average of commercial rates with volume charge only)

Residential Users

$0.75 per 1,000 gallons (average of residential rates with volume charge only)

It should be noted that all of the reuse rate information obtained in the survey is for systems implemented by public utilities where it is common to subsidize the costs of reuse systems through water and sewer rates.

These rates are used only for comparative purposes in the present value analysis and do not represent recovery of the actual costs to provide reclaimed water service to these customers. The actual impacts of the costs of the various reuse alternatives evaluated in this report are discussed in more detail in the rate and fee evaluation section of this chapter.

Water Savings Calculation

As required in the FDEP guidelines, the present value analysis was conducted without and with consideration of the benefits of water savings associated with implementation of reuse.

Water savings were estimated based on the projected public access reuse capacity for each alternative. Water use that is currently served by the UWFL potable supply and could be substituted with reclaimed water is included as water savings in the analysis. However, many of the potential users (including the four golf courses) currently use either groundwater or surface water as a supply source for irrigation. Consequently, substitution with reclaimed water does not directly save any potable water. From a regional perspective, however, it could be argued that replacement of these withdrawals indirectly benefits the water supply by reducing demand on the groundwater supply. For this analysis, a factor of 25 percent of the estimated annual average reclaimed water demand for Alternative 3 (Golf Course Reuse) was used as an estimate of the quantity of water savings associated with reuse. In accordance with the FDEP guidelines, this value was multiplied by the current potable water rate of $1.35 per 1,000 gallons and was treated as a revenue (savings) in the present value analysis.

Additionally, many of the smaller commercial and residential users currently have shallow supply wells for irrigation and do not use potable water. For these cases (alternative 1 and 2) it was assumed that 50 percent of the estimated annual average reuse capacity would result in water savings to the potable system. This value was multiplied by the current potable water rate of $1.35 per 1,000 gallons and was treated as a revenue (savings) in the present value analysis.

For a private utility, this concept of water savings is somewhat flawed. UWFL has a significant investment in water treatment and transmission/distribution facilities already in place. In reality, replacement of potable water with reclaimed water would actually result in a net decrease in revenue. As a private utility, UWFL would be faced with a situation requiring a rate increase to offset the reduced revenue on the water side. This would be in addition to the rate increase associated with implementation of the reuse system. For this reason, the concept of water savings is not considered a viable factor in this analysis.

No Action Alternative

The no action alternative, as described in *Chapter 4*, represents the wastewater facility expansion requirements to meet the projected growth and to provide for ongoing maintenance and replacement over the 20-year planning period. As discussed earlier, the underlying assumption with the no action alternative is that all of the facilities would have to continue to rely on other effluent disposal options as the primary method regardless of whether or not any reuse were implemented. Consequently, the impact of reuse is purely an incremental cost over and above the no action scenario. The actual value of the no action alternative is not relevant. Therefore, it is not necessary to include the no action alternative in the present value analysis.

Public Access Reuse Alternatives

As discussed in *Chapter 4*, three public access reuse alternatives will be included in the present value analysis:

- Alternative 1 - Institutional/Public Users (Monterey Service Area)
- Alternative 2- Residential Reuse (Monterey Service Area)
- Alternative 3 - Golf Course Reuse

Because the treatment requirements would be the same for all three alternatives, there are similarities with respect to the primary capital and annual cost components for these alternatives. Following is a discussion of the common elements which are pertinent to the analysis.

Capital Costs

In order to provide reclaimed water service to public access sites, the following capital cost components would be required:

- Wastewater Treatment Facility Modifications (all alternatives)
- High Service Pumping and Storage (all alternatives)
- Transmission Pipelines (all alternatives)
- Neighborhood Distribution System (alternative 2 only)

- Service Connections/Backflow Prevention (all alternatives)
- Onsite Irrigation Systems (alternative 1 & 2 only)

Following is a discussion of some of the pertinent issues which are common to all of the alternatives. Specifics details relative to quantities and sizes used in the cost estimates are presented in *Chapter 4* as part of the description of alternatives.

Wastewater Treatment Facility Modifications

None of the UWFL WWTFs currently produce effluent which meets public access reuse standards of secondary treatment with filtration and high level disinfection. In order to meet this criteria, sand filters would have to be provided for the reuse flow to consistently achieve a level of 5 mg/L of TSS. Additional appurtenances associated with the filters would include filter feed pumps, turbidity meter, and a standby polymer system .

It is assumed that a separate chlorine-based disinfection system using either chlorine gas or sodium hypochlorite solution would be required to meet high level disinfection requirements. If a chlorine gas system were used, containment and treatment of air in the chlorine storage areas would be required to comply with the 1991 Standard Building Code. Consequently, capital costs for chlorine storage, transfer, and feed equipment as well as a contact basin must be included. A chlorine building would be constructed for storage and containment and a packed tower scrubber will be provided for treatment.

A sodium hypochlorite system would not require the same high level of containment and treatment as a chlorine gas system, and thus, the need for a building and a scrubber would be eliminated. However, the annual costs of operating a sodium hypochlorite system are significantly higher than a chlorine gas system. For this analysis, it is assumed that the total cost of disinfection would be the same for either system.

Neighborhood Distribution Systems

Development of the capital costs for Alternative 2 Residential Reuse (Monterey Service Area) requires an additional consideration of costs to install distribution piping systems within existing neighborhoods. Based on experience with other projects and information from UWFL, the estimated construction cost to retrofit an existing residential development would range from $1,400 to $1,600 per connection (including distribution piping, service connections, meters, and backflow protection devices). This does not include transmission facilities required outside of the subdivisions nor does it include the costs of installing the onsite irrigation systems on the homeowners' property.

Onsite Irrigation Systems

A basic assumption for the large user and residential reuse alternatives is that all of the sites currently irrigate and already have onsite irrigation system in place. In reality, many of the sites identified do not currently irrigate. Consequently, onsite irrigation systems may not exist. Implementation of reuse at these sites would effectively require creation of a new irrigation demand which does not currently exist. Cost for installation of onsite commercial irrigation systems for the large users could range from $2,000 to $4,000 per acre for the types of sites identified. The cost of a typical residential irrigation system on a typical lot (0.25 to 0.5 acre) would range from $1,500 to $2,500.

It is assumed that these costs would be borne by the user and they are not included in this analysis. It should be recognized that this would represent a significant cost to the user and that UWFL would have no legal authority to impose such a requirement.

Annual Costs

There would be some incremental additional annual costs associated with the operation and maintenance of a large user reclaimed water system over and above a no action scenario. These costs would include the following:

- Power costs for high service pumps, and filtration and chlorination systems (based on $0.076/kw-hr)
- Maintenance of reuse equipment and pipelines (based on a percentage of capital cost)
- Additional labor associated with operating and maintaining the reuse treatment/pumping facilities; and administration of meter reading and cross connection and backflow protection programs

The additional labor costs are assumed to be minor because of the relatively small capacities and number of customers involved relative to the entire water and wastewater operations.

Following is a summary of the results of the present value analysis for each of the three public access reuse alternatives.

Alternative 1 - Institutional/Public Users (Monterey Service Area)

As described in *Chapter 4*, Alternative 1 involves the provision of reclaimed water for irrigation to institutional/public users such as parks, schools, churches, and cemeteries within the Monterey service area. The system was assumed to be developed over a twenty-year period in four approximately equal capital phases of five years each. The total estimated reuse demand for these users is 0.28 mgd which represents approximately 7 percent of the design year flow for the Monterey WWTF. According to FDEP guidelines, this would qualify as a minimum level reuse alternative.

A summary of the estimated capital costs for this alternative is provided in *Exhibit 5-2*. The total estimated capital cost was $5,600,200. The buildout annual O&M costs for this alternative were approximately $41,000. A summary of the present value analysis for Alternative 1 is provided in *Exhibit 5-3*. The net present value for this alternative was $3,263,000 (without water savings).

Alternative 2 - Residential Reuse (Monterey Service Area)

As discussed in *Chapter 4*, Alternative 2 involves provision of reclaimed water for irrigation to existing residential areas in the Monterey service area. The system was assumed to be developed over a twenty-year period in four approximately equal capital phases of five years each. The estimated reuse demand for this alternative is 1.7 mgd (AADF) which represents approximately 43 percent of the design year flow for the Monterey WWTF. According to FDEP guidelines, this would qualify as a medium level reuse alternative.

A summary of the estimated capital costs for this alternative is provided in *Exhibit 5-4*. The total estimated capital cost was $24,938,400. Estimated buildout annual O&M costs for this alternative were approximately $138,000. A summary of the present value analysis for Alternative 2 is provided in *Exhibit 5-5*. The net present value for this alternative was

Exhibit 5-2

Summary of Capital Costs for Alternative 1 - Institutional /Public Users (Monterey Service Area)

Item	Phase I, 1998 Qty.		Size		,Life	Unit Cost	Capital Cost	Phase II, 2003 Qty.		Size		Capital Cost
WWTF Facilities:												
Filtration	1		0.07	(mgd)	15	$0.70	$49,000	1		0.07	(mgd)	$49,000
High-level Disinfection (Mech. Equip.)	1		0.07	(mgd)	15	$0.10	$7,000	1		0.07	(mgd)	$7,000
High-level Disinfection (Structures)	1		0.07	(mgd)	30	$0.94	$65,800	1		0.07	(mgd)	$65,800
Irrigation Pumps	2		300	(gpm)	15	$15,000	$30,000	0		300	(gpm)	$0
	0		600	(gpm)	15	$15,000	$0	1		600	(gpm)	$15,000
Storage Tanks	1		0.25	(mg)	30	$100,000	$100,000	0		0	(mg)	$0
	Subtotal						**$251,800**					**$136,800**
Reuse Pipelines:												
Transmission Pipelines	0	(ft)	16	(in)	50	$48	$0	0	(ft)	16	(in)	$0
	7,637	(ft)	12	(in)	50	$36	$274,900	7,637	(ft)	12	(in)	$274,900
	0	(ft)	10	(in)	50	$30	$0	0	(ft)	10	(in)	$0
	0	(ft)	8	(in)	50	$24	$0	0	(ft)	8	(in)	$0
	2,512	(ft)	6	(in)	50	$18	$45,200	2,512	(ft)	6	(in)	$45,200
	1,950	(ft)	4	(in)	50	$12	$23,400	1,950	(ft)	4	(in)	$23,400
Service Connections & BFP	5	ea			50	$1,000	$5,000	5	ea			$5,000
Valves and Appurt. (5% pipe costs)	1				15		$17,200					$17,200
Jack & Bore Road Crossings	2	ea			30	$20,000	$40,000	2	ea			$40,000
	Subtotal						**$405,700**					**$405,700**
Reuse System Capital Cost Subtotal							**$657,500**					**$542,500**
Allowances for WWTF Facilities												
Sitework	5.0%						$21,300	5.0%				$11,600
Yard Piping	10%						$42,700	10%				$23,200
Finishes	2.0%						$8,500	2.0%				$4,600
Mechanical	10%						$42,700	10%				$23,200
Electrical & I&C	14%						$59,700	14%				$32,500
	Subtotal						**$174,900**					**$95,100**
Allowances for Reuse Pipelines												
Sitework	3.0%						$14,200	3.0%				$14,200
Finishes	1.0%						$4,700	1.0%				$4,700
Mechanical	3%						$14,200	3%				$14,200
Electrical & I&C	7%						$33,000	7%				$33,000
	Subtotal						**$66,100**					**$66,100**
Reuse System Allowance Subtotal							**$241,000**					**$161,200**
Subtotal All Construction Costs							**$898,500**					**$703,700**
Mob/Bond/Insurance	5%						$44,900	5%				$35,200
Contingency	15%						$134,800	15%				$105,600
Contractor's OH & Profit	15%						$139,268	15%				$109,074
Total Construction Cost							**$1,217,500**					**$953,574**
Engineering/Legal/Admin	30%						$365,300	30%				$286,100
Total Capital Cost							**$1,582,800**					**$1,239,674**

Item	Phase III, 2008 Qty.		Size		Capital Cost	Phase IV, 2013 Qty.		Size		Capital Cost	Total
WWTF Facilities:											
Filtration	1		0.07	(mgd)	$49,000	1		0.07	(mgd)	$49,000	
High-level Disinfection (Mech. Equip.)	1		0.07	(mgd)	$7,000	1		0.07	(mgd)	$7,000	
High-level Disinfection (Structures)	1		0.07	(mgd)	$65,800	1		0.07	(mgd)	$65,800	
Irrigation Pumps	1		300	(gpm)	$15,000	0		300	(gpm)	$0	
	0		600	(gpm)	$0	1		600	(gpm)	$15,000	
Storage Tanks	1		0.25	(mg)	$100,000	0		0	(mg)	$0	
Subtotal					**$236,800**					**$136,800**	**$762,200**
Reuse Pipelines:											
Transmission Pipelines	0	(ft)	16	(in)	$0	0	(ft)	16	(in)	$0	
	7,637	(ft)	12	(in)	$274,900	7,637	(ft)	12	(in)	$274,900	
	0	(ft)	10	(in)	$0	0	(ft)	10	(in)	$0	
	0	(ft)	8	(in)	$0	0	(ft)	8	(in)	$0	
	2,512	(ft)	6	(in)	$45,200	2,512	(ft)	6	(in)	$45,200	
	1,950	(ft)	4	(in)	$23,400	1,950	(ft)	4	(in)	$23,400	
Service Connections & BFP	5	ea			$5,000	5	ea			$5,000	
Valves and Appurt. (5% pipe costs)					$17,200					$17,200	
Jack & Bore Road Crossings	2	ea			$40,000	2	ea			$40,000	
Subtotal					**$405,700**					**$405,700**	**$1,622,800**
Reuse System Capital Cost Subtotal					**$642,500**					**$542,500**	**$2,385,000**
Allowances for WWTF Facilities											
Sitework	5.0%				$20,100	5.0%				$11,600	
Yard Piping	10%				$40,100	10%				$23,200	
Finishes	2.0%				$8,000	2.0%				$4,600	
Mechanical	10%				$40,100	10%				$23,200	
Electrical & I&C	14%				$56,200	14%				$32,500	
Subtotal					**$164,500**					**$95,100**	
Allowances for Reuse Pipelines											
Sitework	3.0%				$14,200	3.0%				$14,200	
Finishes	1.0%				$4,700	1.0%				$4,700	
Mechanical	3%				$14,200	3%				$14,200	
Electrical & I&C	7%				$33,000	7%				$33,000	
Subtotal					**$66,100**					**$66,100**	
Reuse System Allowance Subtotal					**$230,600**					**$161,200**	**$794,000**
Subtotal All Construction Costs					**$873,100**					**$703,700**	**$3,179,000**
Mob/Bond/Insurance	5%				$43,700	5%				$35,200	
Contingency	15%				$131,000	15%				$105,600	
Contractor's OH & Profit	15%				$135,331	15%				$109,074	
Total Construction Cost					**$1,183,131**					**$953,574**	**$4,307,778**
Engineering/Legal/Admin	30%				$354,900	30%				$286,100	
Total Capital Cost					**$1,538,031**					**$1,239,674**	**$5,600,178**

Notes:

All costs are expressed in 1996 dollars (Handy-Whitman Construction Cost Index = 284.50.)

Exhibit 5-3

Summary of Present Value Analysis for Alternative 1 - Institutional/Public Users (Monterey Service Area)

PRESENT WORTH (BASED ON ANNUAL CAPITAL COST) ANALYSIS

PROJECT: **United Water Florida Reuse Feasibility Study**

ALTERNATIVE: **Alternative 1 - Large Users (Montery Service Area)**

Number of Sewer Customers in Service Area	5300
Number of Customers Served (large users)	20
Estimated Reuse Demand (AADF)	0.28 MGD

Yr.	Capital Cost	O&M Cost	Reuse Revenue	Water Savings	Dis. Rate 7.63%	Present Worth	Adjusted P/W
0	**$1,583,000**				1.0000	$1,583,000	$1,583,000
1		$11,550	$9,965	$8,623	0.9292	$1,473	($6,539)
2		$11,550	$9,965	$8,623	0.8633	$1,369	($6,076)
3		$11,550	$9,965	$8,623	0.8022	$1,272	($5,645)
4		$11,550	$9,965	$8,623	0.7453	$1,182	($5,245)
5	**$1,240,000**	$11,550	$9,965	$8,623	0.6925	$859,827	$853,855
6		$22,000	$19,929	$17,246	0.6435	$1,333	($9,765)
7		$22,000	$19,929	$17,246	0.5979	$1,238	($9,073)
8		$22,000	$19,929	$17,246	0.5555	$1,151	($8,430)
9		$22,000	$19,929	$17,246	0.5162	$1,069	($7,833)
10	**$1,538,000**	$22,000	$19,929	$17,246	0.4796	$738,600	$730,329
11		$30,398	$29,894	$25,869	0.4456	$225	($11,303)
12		$30,398	$29,894	$25,869	0.4140	$209	($10,502)
13		$30,398	$29,894	$25,869	0.3847	$194	($9,758)
14		$30,398	$29,894	$25,869	0.3575	$180	($9,067)
15	**$1,333,674**	$30,398	$29,894	$25,869	0.3321	$443,115	$434,523
16		$40,848	$40,285	$34,862	0.3086	$174	($10,584)
17		$40,848	$40,285	$34,862	0.2867	$161	($9,835)
18		$40,848	$40,285	$34,862	0.2664	$150	($9,138)
19		$40,848	$40,285	$34,862	0.2475	$139	($8,490)
20	**($1,622,000)**	$40,848	$40,285	$34,862	0.2300	($372,938)	($380,957)
TOTAL PRESENT WORTH						**$3,263,000**	**$3,083,000**

<u>Notes:</u>

All costs and revenues are expressed in 1996 dollars.

Reuse revenues are based on $0.39 per 1,000 gallons for large users. This represents a typical rate for commercial customers based on a survey of reuse systems in Florida. The actual revenue requirement which would have to be recovered by UWFL is presented in the Rate and Fee Evaluation section of Chapter 5 of this report.

Adjusted P/W includes water savings.

Water savings is treated as a revenue based on 25 % of total reuse demand times the current potable water rate of $1.35 per 1,000 gallons.

Discount rate is the current U.S. Bureau of Reclamation discount rate.

Exhibit 5-4

Summary of Capital Costs for Alternative 2 - Residential Reuse (Monterey Service Area)

Item	Phase I, 1998 Qty.	Phase I Size	Phase I Life	Phase I Unit Cost	Phase I Capital Cost	Phase II, 2003 Qty.	Phase II Size	Phase II Capital Cost	Phase III, 2008 Qty.	Phase III Size	Phase III Capital Cost	Phase IV, 2013 Qty.	Phase IV Size	Phase IV Capital Cost	Total
WWTF Facilities:															
Filtration	1	0.43 (mgd)	15	$0.52	$223,600	1	0.43 (mgd)	$223,600	1	0.43 (mgd)	$223,600	1	0.43 (mgd)	$223,600	
High-level Disinfection (Mech. Equip.)	1	0.43 (mgd)	15	$0.08	$34,400	1	0.43 (mgd)	$34,400	1	0.43 (mgd)	$34,400	1	0.43 (mgd)	$34,400	
High-level Disinfection (Structures)	1	0.43 (mgd)	30	$0.71	$305,300	1	0.43 (mgd)	$305,300	1	0.43 (mgd)	$305,300	1	0.43 (mgd)	$305,300	
Irrigation Pumps	2	450 (gpm)	15	$15,000	$30,000	0	450 (gpm)	$0	1	450 (gpm)	$15,000	0	450 (gpm)	$0	
	1	900 (gpm)	15	$15,000	$15,000	1	900 (gpm)	$15,000	0	900 (gpm)	$0	1	900 (gpm)	$15,000	
Storage Tanks	1	1.25 (MG)	30	$425,000	$425,000	0	1.25 (MG)	$0	1	1.25 (MG)	$425,000	0	1.25 (MG)	$0	
Subtotal					$1,033,300			$578,300			$1,003,300			$578,300	$3,193,200
Reuse Pipelines:															
Transmission Pipelines	0 (ft)	20 (in)	50	$60	$0	0 (ft)	20 (in)	$0	0 (ft)	20 (in)	$0	0 (ft)	20 (in)	$0	
	4,487 (ft)	16 (in)	50	$48	$215,400	4488 (ft)	16 (in)	$215,400	4,487 (ft)	16 (in)	$215,400	4488 (ft)	16 (in)	$215,400	
	0 (ft)	12 (in)	50	$36	$0	0 (ft)	12 (in)	$0	0 (ft)	12 (in)	$0	0 (ft)	12 (in)	$0	
	7,062 (ft)	10 (in)	50	$30	$211,900	7063 (ft)	10 (in)	$211,900	7,062 (ft)	10 (in)	$211,900	7063 (ft)	10 (in)	$211,900	
	5,450 (ft)	8 (in)	50	$24	$130,800	5,450 (ft)	8 (in)	$130,800	5,450 (ft)	8 (in)	$130,800	5,450 (ft)	8 (in)	$130,800	
	1,212 (ft)	6 (in)	50	$18	$21,800	1,213 (ft)	6 (in)	$21,800	1,212 (ft)	6 (in)	$21,800	1,213 (ft)	6 (in)	$21,800	
Retrofit Neighborhood Distribution Piping	1,062 ea		50	$800	$849,600	1,063 ea		$850,400	1,062 ea		$849,600	1,063 ea		$850,400	
Service Connections & BFP	1,062 ea		50	$300	$318,600	1,063 ea		$318,900	1,062 ea		$318,600	1,063 ea		$318,900	
Valves and Appurt. (5% pipe costs)	1		15		$71,500	1		$71,500	1		$71,500	1		$71,500	
Jack & Bore Road Crossings	3		30	$20,000	$60,000	3		$60,000	3		$60,000	3		$60,000	
Subtotal					$1,879,600			$1,880,700			$1,879,600			$1,880,700	$7,520,600
Reuse System Capital Cost Subtotal					$2,912,900			$2,459,000			$2,882,900			$2,459,000	$10,713,800
Allowances for WWTF Facilities															
Sitework	5.0%				$87,600	5.0%		$49,000	5.0%		$85,000	5.0%		$49,000	
Yard Piping	10%				$175,100	10%		$98,000	10%		$170,100	10%		$98,000	
Finishes	2.0%				$35,000	2.0%		$19,600	2.0%		$34,000	2.0%		$19,600	
Mechanical	10%				$175,100	10%		$98,000	10%		$170,100	10%		$98,000	
Electrical & I&C	14%				$245,200	14%		$137,200	14%		$238,100	14%		$137,200	
Subtotal					$718,000			$401,800			$697,300			$401,800	
Allowances for Reuse Pipelines															
Sitework	3.0%				$65,600	3.0%		$65,600	3.0%		$65,600	3.0%		$65,600	
Finishes	1.0%				$21,900	1.0%		$21,900	1.0%		$21,900	1.0%		$21,900	
Mechanical	3%				$65,600	3%		$65,600	3%		$65,600	3%		$65,600	
Electrical & I&C	7%				$153,000	7%		$153,100	7%		$153,000	7%		$153,100	
Subtotal					$306,100			$306,200			$306,100			$306,200	
Reuse System Allowance Subtotal					$1,024,100			$708,000			$1,003,400			$708,000	$3,443,500
Subtotal All Construction Costs					$3,937,000			$3,167,000			$3,886,300			$3,167,000	$14,157,300
Mob/Bond/Insurance	5%				$196,900	5%		$158,400	5%		$194,300	5%		$158,400	
Contingency	15%				$590,600	15%		$475,100	15%		$582,900	15%		$475,100	
Contractor's OH & Profit	15%				$610,215	15%		$490,885	15%		$602,377	15%		$490,885	
Total Construction Cost					$5,334,700			$4,291,400			$5,265,900			$4,291,400	$19,183,400
Engineering/Legal/Admin	30%				$1,600,400	30%		$1,287,400	30%		$1,579,800	30%		$1,287,400	
Total Capital Cost					$6,935,100			$5,578,800			$6,845,700			$5,578,800	$24,938,400

Notes:

All costs are expressed in 1996 dollars (Handy-Whitman Construction Cost Index = 284.50.)

Exhibit 5-5

Summary of Present Value Analysis for Alternative 2 - Residential Reuse (Monterey Service Area)

PRESENT WORTH (BASED ON ANNUAL CAPITAL COST) ANALYSIS

PROJECT: **United Water Florida Reuse Feasibility Study**

ALTERNATIVE: **Alternative 2 - Residential Reuse (Montery Service Area)**

Number of Sewer Customers in Service Area 5300
Number of Customers Served (residential users 4250
Estimated Reuse Demand (AADF) 1.70 MGD

Yr.	Capital Cost	O&M Cost	Reuse Revenue	Water Savings	Dis. Rate 7.63%	Present Worth	Adjusted P/W
0	$6,935,000				1.0000	$6,935,000	$6,935,000
1		$45,210	$117,713	$105,941	0.9292	($67,366)	($165,801)
2		$45,210	$117,713	$105,941	0.8633	($62,593)	($154,054)
3		$45,210	$117,713	$105,941	0.8022	($58,158)	($143,140)
4		$45,210	$117,713	$105,941	0.7453	($54,038)	($132,999)
5	$5,579,000	$45,210	$117,713	$105,941	0.6925	$3,813,376	$3,740,009
6		$76,021	$235,425	$211,883	0.6435	($102,570)	($238,908)
7		$76,021	$235,425	$211,883	0.5979	($95,303)	($221,982)
8		$76,021	$235,425	$211,883	0.5555	($88,551)	($206,255)
9		$76,021	$235,425	$211,883	0.5162	($82,278)	($191,642)
10	$6,846,000	$76,021	$235,425	$211,883	0.4796	$3,206,811	$3,105,195
11		$106,946	$353,138	$317,824	0.4456	($109,706)	($251,331)
12		$106,946	$353,138	$317,824	0.4140	($101,933)	($233,525)
13		$106,946	$353,138	$317,824	0.3847	($94,711)	($216,980)
14		$106,946	$353,138	$317,824	0.3575	($88,001)	($201,608)
15	$5,956,000	$106,946	$353,138	$317,824	0.3321	$1,896,374	$1,790,817
16		$137,756	$465,375	$418,838	0.3086	($101,102)	($230,353)
17		$137,756	$465,375	$418,838	0.2867	($93,939)	($214,033)
18		$137,756	$465,375	$418,838	0.2664	($87,283)	($198,869)
19		$137,756	$465,375	$418,838	0.2475	($81,100)	($184,780)
20	($7,109,000)	$137,756	$465,375	$418,838	0.2300	($1,710,457)	($1,806,792)
TOTAL PRESENT WORTH						**$12,772,000**	**$10,578,000**

Notes:
All costs and revenues are expressed in 1996 dollars.
Reuse revenues are based on $0.75 per 1,000 gallons for residential users. This represents a typical rate for residential customers bas reuse systems in Florida. The actual revenue requirement which would have to be recovered by UWFL is presented in the Rate and Evaluation section of Chapter 5 of this report.
Adjusted P/W includes water savings.
Water savings is treated as a revenue based on 50 % of total reuse demand times the current potable water rate of $1.35 per 1,000 gal
Discount rate is the current U.S. Bureau of Reclamation discount rate.

$12,772,000 (without water savings).

Alternative 3 - Golf Course Reuse

As described *in Chapter 4,* this alternative focuses on implementation of a reclaimed water system for irrigation on golf courses. There are four golf courses within UWFL certificated franchise areas. The estimated reclaimed water demands for the four sites are summarized below in *Exhibit 5-6*:

EXHIBIT 5-6.
Summary of Golf Course Demands

Service Area	Golf Course Name	Estimated Reclaimed Water Demand (gpd)
Holly Oaks	Mill Cove Golf Club	188,000
Royal Lakes	Baymeadows Country Club	312,329
San Jose	San Jose Country Club	250,000
Ponte Vedra	Ponte Vedra Golf & Country Club	591,000
Total		1,341,329

The total reuse demand of 1.34 mgd represents approximately 9 percent of the total UWFL design year wastewater flow and thus only qualifies as a minimum level alternative.

A summary of the estimated capital costs for this alternative is provided in *Exhibit 5-7*. The estimated total capital cost for the entire system was $9,650,000. Annual O&M costs at buildout would be approximately $67,000. A summary of the present value analysis for Alternative 2 is provided in *Exhibit 5-8*. The net present value without consideration of water savings for this alternative was $7,404,000.

An overall summary of the results of the present value analysis comparing all of the alternatives is provided in *Exhibit 5-9*. Based on this analysis, the alternative with the lowest total present value was Alternative 1 - Institutional/Public Users (Monterey Service Area). However, this alternative had the highest cost per unit of capacity. Alternative 2 - Residential reuse (Monterey Service Area) had the highest total present value while the golf course reuse option (Alternative 3) had the lowest cost per unit of capacity.

Evaluation of Rates and Fees

An evaluation of the relative impact on rates and fees associated with each reuse alternative included in the present value analysis was conducted. The FDEP guidelines provide a structured worksheet which is to be used for evaluating the impact of the various reuse alternatives on the overall system. However, this worksheet was not felt to be appropriate for use on alternatives 1 and 2, which represent a focused analysis in which only a portion

Exhibit 5-7

Summary of Capital Costs for Alternative 3 - Golf Course Reuse

Item	Phase I, 1998						Phase II, 2003				Phase III, 2008				Phase IV, 2013				Total
	Qty.	Size		Life	Unit Cost	Capital Cost	Qty.	Size		Capital Cost	Qty.	Size		Capital Cost	Qty.	Size		Capital Cost	
WWTF Facilities:																			
Holly Oaks WWTF:																			
Filtration	1	0.188	(mgd)	15	$0.70	$131,600	0	NA	(mgd)	$0	0	NA	(mgd)	$0	0	NA	(mgd)	$0	
Disinfection (mech. equip.)	1	0.188	(mgd)	15	$0.10	$18,800	0	NA	(mgd)	$0	0	NA	(mgd)	$0	0	NA	(mgd)	$0	
Disinfection (structure)	1	0.188	(mgd)	30	$0.94	$176,700	0	NA	(mgd)	$0	0	NA	(mgd)	$0	0	NA	(mgd)	$0	
Irrigation Pumps	1	200	(gpm)	15	$15,000	$15,000	0	NA	(gpm)	$0	0	NA	(gpm)	$0	0	NA	(gpm)	$0	
	0		(gpm)	15	$15,000	$0	0	NA	(gpm)	$0	0	NA	(gpm)	$0	0	NA	(gpm)	$0	
Storage	1	0.5	(MG)	30	$200,000	$200,000	0	NA	(MG)	$0	0	NA	(MG)	$0	0	NA	(MG)	$0	
Holly Oaks WWTF Subtotal						***$542,100***				***$0***				***$0***				***$0***	**$542,100**
Royal Lakes WWTF:																			
Filtration	0		(mgd)	15	$0.70	$0	1	0.312	(mgd)	$218,400	0	NA	(mgd)	$0	0	NA	(mgd)	$0	
Disinfection (mech. equip.)	0		(mgd)	15	$0.10	$0	1	0.312	(mgd)	$31,200	0	NA	(mgd)	$0	0	NA	(mgd)	$0	
Disinfection (structure)	0		(mgd)	30	$0.94	$0	1	0.312	(mgd)	$293,280	0	NA	(mgd)	$0	0	NA	(mgd)	$0	
Irrigation Pumps	0		(gpm)	15	$15,000	$0	1	325	(gpm)	$15,000	0	NA	(gpm)	$0	0	NA	(gpm)	$0	
	0		(gpm)	15	$15,000	$0	0		(gpm)	$0	0	NA	(gpm)	$0	0	NA	(gpm)	$0	
Storage	0		(MG)	30	$200,000	$0	1	0.5	(MG)	$200,000	0	NA	(MG)	$0	0	NA	(MG)	$0	
Royal Lakes WWTF Subtotal						***$0***				***$757,880***				***$0***				***$0***	**$757,880**
San Jose WWTF:																			
Filtration	0		(mgd)	15	$0.70	$0	0		(mgd)	$0	1	0.25	(mgd)	$175,000	0	NA	(mgd)	$0	
Disinfection (mech. equip.)	0		(mgd)	15	$0.10	$0	0		(mgd)	$0	1	0.25	(mgd)	$25,000	0	NA	(mgd)	$0	
Disinfection (structure)	0		(mgd)	30	$0.94	$0	0		(mgd)	$0	1	0.25	(mgd)	$235,000	0	NA	(mgd)	$0	
Irrigation Pumps	0		(gpm)	15	$15,000	$0	0		(gpm)	$0	1	260	(gpm)	$15,000	0	NA	(gpm)	$0	
	0		(gpm)	15	$15,000	$0	0		(gpm)	$0	0		(gpm)	$0	0	NA	(gpm)	$0	
Storage	0		(MG	30	$200,000	$0	0		(MG)	$0	1	0.5	(MG)	$200,000	0	NA	(MG)	$0	
San Jose WWTF Subtotal						***$0***				***$0***				***$650,000***				***$0***	**$650,000**
Ponte Vedra WWTF:																			
Filtration	1	0.59	(mgd)	15	$0.52	$306,800	0	NA	(mgd)	$0	0	NA	(mgd)	$0	0	NA	(mgd)	$0	
Disinfection (mech. equip.)	1	0.59	(mgd)	15	$0.08	$47,200	0	NA	(mgd)	$0	0	NA	(mgd)	$0	0	NA	(mgd)	$0	
Disinfection (structure)	1	0.59	(mgd)	30	$0.71	$418,900	0	NA	(mgd)	$0	0	NA	(mgd)	$0	0	NA	(mgd)	$0	
Irrigation Pumps	1	616	(gpm)	15	$15,000	$15,000	0	NA	(gpm)	$0	0	NA	(gpm)	$0	0	NA	(gpm)	$0	
	0		(gpm)	15	$15,000	$0	0	NA	(gpm)	$0	0	NA	(gpm)	$0	0	NA	(gpm)	$0	
Storage	1	0.5	(MG)	30	$200,000	$200,000	0	NA	(MG)	$0	0	NA	(MG)	$0	0	NA	(MG)	$0	
Ponte Vedra WWTF Subtotal						$987,900				$0				$0				$0	
WWTF Facilities Subtotal						**$1,530,000**				**$757,880**				**$650,000**				**$0**	**$2,937,880**

Exhibit 5-7

Summary of Capital Costs for Alternative 3 - Golf Course Reuse

Item	Phase I, 1998 Qty.	Size	Life	Unit Cost	Capital Cost	Phase II, 2003 Qty.	Size	Capital Cost	Phase III, 2008 Qty.	Size	Capital Cost	Phase IV, 2013 Qty.	Size	Capital Cost	Total
Reuse Pipelines:															
Transmission Pipelines:															
Holly Oaks WWTF (Mill Cove GC)	4,200 (ft)	6 (in)	50	$18	$75,600	0 (ft)	6 (in)	$0	0 (ft)	6 (in)	$0	0 (ft)	6 (in)	$0	
Royal Lakes WWTF (Baymeadows	0 (ft)	6 (in)	50	$18	$0	5250 (ft)	6 (in)	$94,500	0 (ft)	6 (in)	$0	0 (ft)	6 (in)	$0	
San Jose WWTF (San Jose CC)	0 (ft)	6 (in)	50	$18	$0	0 (ft)	6 (in)	$0	3,800 (ft)	6 (in)	$68,400	0 (ft)	6 (in)	$0	
Ponte Vedra WWTF (Ponte Vedra C	3,750 (ft)	8 (in)	50	$24	$90,000	0 (ft)	8 (in)	$0	0 (ft)	8 (in)	$0	0 (ft)	8 (in)	$0	
Service Connections & BFP	2 EA		50	$1,000	$2,000	1 EA		$1,000	1 EA		$1,000	0 EA		$0	
Valves and Appurt. (5% pipe costs)	1		15		$8,300	1		$4,700	1		$3,400	0		$0	
Jack & Bore Road Crossings	2		30	$20,000	$40,000	1		$20,000	1		$20,000	0		$0	
	Subtotal				**$215,900**			**$120,200**			**$92,800**			**$0**	
Reuse System Capital Cost Subtotal					**$1,745,900**			**$878,080**			**$742,800**			**$0**	**$3,366,780**
Allowances for WWTF Facilities															
Sitework	5%				$129,700	5%		$64,200	5%		$55,100	5%		$0	
Yard Piping	10%				$259,300	10%		$128,500	10%		$110,200	10%		$0	
Finishes	2%				$51,900	2%		$25,700	2%		$22,000	2%		$0	
Mechanical	10%				$259,300	10%		$128,500	10%		$110,200	10%		$0	
Electrical & I&C	14%				$363,100	14%		$179,800	14%		$154,200	14%		$0	
	Subtotal				**$1,063,300**			**$526,700**			**$451,700**			**$0**	
Allowances for Reuse Pipelines															
Sitework	3%				$7,500	3%		$4,200	3%		$3,200	3%		$0	
Finishes	1%				$2,500	1%		$1,400	1%		$1,100	1%		$0	
Mechanical	3%				$7,500	3%		$4,200	3%		$3,200	3%		$0	
Electrical & I&C	7%				$17,600	7%		$9,800	7%		$7,600	7%		$0	
	Subtotal				**$35,100**			**$19,600**			**$15,100**			**$0**	
Reuse System Allowances Subtotal					**$1,098,400**			**$546,300**			**$466,800**			**$0**	**$2,111,500**
Subtotal All Construction Costs					**$2,844,300**			**$1,424,380**			**$1,209,600**			**$0**	**$5,478,280**
Mob/Bond/Insurance	5%				$142,200	5%		$71,200	5%		$60,500	5%		$0	
Contingency	15%				$426,600	15%		$213,700	15%		$181,400	15%		$0	
Contractor's OH & Profit	15%				$440,867	15%		$220,779	15%		$187,488	15%		$0	
Total Construction Cost					**$3,854,000**			**$1,930,100**			**$1,639,000**			**$0**	**$7,423,100**
Engineering/Legal/Admin	30%				$1,156,200	30%		$579,000	30%		$491,700	30%		$0	
Total Capital Cost					**$5,010,200**			**$2,509,100**			**$2,130,700**			**$0**	**$9,650,000**

Notes:

All costs are expressed in 1996 dollars (Handy-Whitman Construction Cost Index = 284.50.)

Exhibit 5-8

Summary of Present Value Analysis for Alternative 3 - Golf Course Reuse

PRESENT WORTH (BASED ON ANNUAL CAPITAL COST) ANALYSIS

PROJECT: **United Water Florida Reuse Feasibility Study**

ALTERNATIVE: **Alternative 3 - Golf Course Reuse**

Number of Sewer Customers (system-wide)	**20000**
Number of Users (Golf Courses)	**4**
Estimated Reuse Demand (AADF)	**1.34 MGD**

Yr.	Capital Cost	O&M Cost	Reuse Revenue	Water Savings	Dis. Rate 7.63%	Present Worth	Adjusted P/W
0	**$5,010,200**				1.0000	$5,010,200	$5,010,200
1		$35,700	$110,891	$71,084	0.9292	($69,864)	($135,911)
2		$35,700	$110,891	$71,084	0.8633	($64,914)	($126,282)
3		$35,700	$110,891	$71,084	0.8022	($60,315)	($117,335)
4		$35,700	$110,891	$71,084	0.7453	($56,042)	($109,022)
5	**$2,509,100**	$35,700	$110,891	$71,084	0.6925	$1,685,538	$1,636,311
6		$52,700	$155,190	$134,299	0.6435	($65,948)	($152,364)
7		$52,700	$155,190	$134,299	0.5979	($61,276)	($141,569)
8		$52,700	$155,190	$134,299	0.5555	($56,935)	($131,539)
9		$52,700	$155,190	$134,299	0.5162	($52,901)	($122,220)
10	**$2,130,700**	$52,700	$155,190	$134,299	0.4796	$972,705	$908,297
11		$66,600	$190,749	$165,071	0.4456	($55,322)	($128,880)
12		$66,600	$190,749	$165,071	0.4140	($51,403)	($119,749)
13		$66,600	$190,749	$165,071	0.3847	($47,761)	($111,265)
14		$66,600	$190,749	$165,071	0.3575	($44,377)	($103,382)
15	**$724,132**	$66,600	$190,749	$165,071	0.3321	$199,270	$144,445
16		$66,600	$190,749	$165,071	0.3086	($38,312)	($89,252)
17		$66,600	$190,749	$165,071	0.2867	($35,597)	($82,929)
18		$66,600	$190,749	$165,071	0.2664	($33,075)	($77,053)
19		$66,600	$190,749	$165,071	0.2475	($30,732)	($71,594)
20	**$1,693,736**	$66,600	$190,749	$165,071	0.2300	$361,012	$323,045
TOTAL PRESENT WORTH						**$7,404,000**	**$6,202,000**

Notes:

All costs and revenues are expressed in 1996 dollars.

Reuse revenues are based on $0.39 per 1,000 gallons for large users. This represents a typical rate for commercial customers based on a survey of reuse systems in Florida. The actual revenue requirement which would have to be recovered by UWFL is presented in the Rate and Fee Evaluation section of Chapter 5 of this report.

Adjusted P/W includes water savings.

Water savings based on 25 % of total reuse demand times the current potable water rate of $1.35 per 1,000 gallons.

Discount rate is the current U.S. Bureau of Reclamation discount rate.

Exhibit 5-9

Summary of Present Value Analysis Results for all Alternatives

Alternative	Component	Phase 1	Phase 2	Phase 3	Phase 4	Total
Institutional/Public Users (Monterey Service Area)	Capital Cost	$1,582,800	$1,239,700	$1,538,000	$1,239,700	$5,600,200
	Replacement Costs	$0	$0	$0	$94,000	$94,000
	O&M Cost	$11,550	$10,450	$8,398	$10,450	$40,848
	Salvage Value	$0	$0	$0	($1,622,000)	($1,622,000)
	No. of Customers	5	5	5	5	20
	Reuse Demand (mgd)	0.07	0.07	0.07	0.07	0.28
	Total Present Value (without water savings)					$3,263,000
	Total Present Value (with water savings)					$3,083,000
Residential Reuse (Monterey Service Area)	Capital Cost:	$6,935,100	$5,578,800	$6,845,700	$5,578,800	$24,938,400
	Replacement Costs	$0	$0	$0	$377,000	$377,000
	O&M Cost	$45,210	$30,810	$30,925	$30,810	$137,755
	Salvage Value	$0	$0	$0	($7,109,000)	($7,109,000)
	No. of Customers	1062	1063	1062	1063	4250
	Reuse Demand (mgd)	0.43	0.43	0.43	0.43	1.72
	Total Present Value (without water savings)					$12,772,000
	Total Present Value (with water savings)[1]					$10,578,000
Golf Course Reuse	Capital Cost:	$5,010,200	$2,509,100	$2,130,700	$0	$9,650,000
	Replacement Costs	$0	$0	$0	$724,100	$724,100
	O&M Cost	$35,700	$17,000	$13,900	$0	$66,600
	Salvage Value	$0	$0	$0	($1,693,700)	($1,693,700)
	No. of Customers	2	1	1	0	4
	Reuse Demand (mgd)	0.78	0.31	0.25	0	1.34
	Total Present Value (without water savings)					$7,404,000
	Total Present Value (with water savings)[2]					$6,202,000

Notes:

[1]Water savings is treated as a revenue based on 50 % of total reuse demand times the current potable water rate of $1.35 per 1,000 gallons.

[2]Water savings is treated as a revenue based on 25 % of total reuse demand times the current potable water rate of $1.35 per 1,000 gallons.

of the system is considered. In addition, due to the nature of UWFL's organizational structure within its parent company, some of the information requested on the FDEP worksheets is not available.

As discussed previously, the impact of reuse alternatives would be purely incremental to the no action alternative. That is, implementation of reuse would not change the facility needs to support growth over the study period. This is due to the fact that any of the reuse alternatives identified would require full backup disposal capacity for periods of wet weather or low demands. In addition, the majority of potential reuse customers are not currently using potable water for irrigation. Thus implementation of reuse does not directly replace a potable demand and no true water savings would be realized.

Consequently, a different approach was used to evaluate the incremental impact of reuse costs relative to current costs. UWFL is a regulated investor owned utility whose rates are governed by the Florida Public Services Commission (PSC). For each alternative, an initial revenue requirement for the first five-year phase was calculated based upon PSC standard methodologies. A rate of return was incorporated that compares with the rate in the latest filing recently approved by the PSC. In addition, operating and maintenance expenses, depreciation, property and income taxes were estimated.

A summary of the results of this analysis is provided in *Exhibit 5-10*. It should be noted that these values would only apply for the first five-year phase which represents approximately one-fourth of the total capital program costs. Subsequent phases would result in additional incremental revenue requirements.

Using this approach, the initial annual revenue requirement to provide reclaimed water for Phase 1 of Alternative 1 (Institutional/Public Users [Monterey Service Area]) was determined to be $296,904. Based on an annual average reuse demand of 0.07 mgd for the five institutional customers assumed to be connected in Phase 1, this translates to a unit revenue rate requirement of $11.62 per 1,000 gallons. For Phase 1 of Alternative 2 (Residential Reuse [Monterey Service Area]), the initial annual revenue requirement was $1,291,374. Based on the projected Phase 1 annual average reuse demand of 0.43 mgd, the initial unit revenue rate requirement associated with serving approximately 1,062 residential reuse customers would be $8.23 per 1,000 gallons. For Alternative 3 (Golf Course Reuse), the initial Phase 1 annual revenue requirement was $983,560. Based on the projected Phase 1 annual average reuse demand of 0.78 mgd, this translates to a unit revenue rate requirement for golf course reuse of $3.46 per 1,000 gallons.

These values represent the utility's cost to provide reclaimed water to the various types of customers; and, the utility would need to recover these costs through user charges. The impact of these costs would vary significantly depending upon how they were recovered.

One cost recovery approach would be to allocate the cost of the service only to those customers using the reclaimed water. Under this scenario, the initial rates would be equal to the revenue requirements discussed above. However, when compared to typical subsidized reuse rates or representative costs of other sources (groundwater or potable water), these rates are exorbitant as discussed below.

Based on a survey of reuse rates across the state, the average reuse rate for commercial customers is approximately $0.39 per 1,000 gallons and $0.75 per 1,000 gallons for residential customers. These represent market rates which typically include an incentive to

Exhibit 5-10

Summary of Phase 1 Annual Revenue Requirements for all Alternatives

Component	Alternative 1 Institutional/Public Users	Alternative 2 Residential Reuse	Alternative 3 Golf Course Reuse
Capital Cost ($)	$1,582,800	$6,935,100	$5,010,200
Adjusted Rate Base Costs[a]	$1,513,643	$6,636,779	$4,741,852
Rate of Return Allowance[b]	9.57%	9.57%	9.57%
Rate of Return on Rate Base[b]	**$144,856**	**$635,140**	**$453,795**
Operating Costs:			
Depreciation[c]	$69,157	$298,321	$268,348
Property Taxes[d]	$19,318	$84,646	$61,152
Annual O&M	$11,550	$45,210	$35,700
Income Taxes	$52,023	$228,057	$164,565
Total Operating Expenses	**$152,048**	**$656,234**	**$529,765**
Total Annual Revenue Requirement	**$296,904**	**$1,291,374**	**$983,560**
Annual Average Reuse Demand (mgd)	0.07	0.43	0.78
Unit Annual Revenue Requirement ($/kgal)[e]	$11.62	$8.23	$3.46

Costs shown are for Phase 1 only.

[a]Capital costs less depreciation.

[b]Based on 9.57 % rate of return allowance times adjusted rate base costs. ROR allowance taken from current rate order.

[c]Depreciation based on percentage of capital costs (3.30 % for pipelines; 5.56 % for WWTF). Rates taken from current rate order.

[d]Property taxes based on 2.15 % of the total rate base.

[e]Total annual revenue requirement divided by the total annual amount of reclaimed water produced.

the customer to use reclaimed water and would not provide full recovery of costs to the utility. In most cases, public utilities subsidize the cost of reuse systems through water and wastewater rates. The calculated rates required by UWFL exceed these typical market reuse rates by a factor of approximately 9 and 11, respectively.

When compared against the current cost of water supply for these customers (assuming they are currently irrigating), the rates are excessive. A user with a shallow well might pay somewhere in the range of $0.05 to $0.15 per 1,000 gallons. The required reuse rate exceeds these costs by an average factor of nearly 35 (assuming an average groundwater cost of $0.10 per 1,000 gallons). On the opposite extreme, the current UWFL potable water rate is only $1.35 per 1,000 gallons. If applied only to the customers using the reclaimed water, the required rates range from nearly 3 to 6 times the cost of potable water.

Unless there were some other driving forces operating on these users, there would be no incentive for the customers to pay these rates when they have a less costly alternative available to them. UWFL, as an investor owned utility, does not have the legal authority to mandate that its customers connect to and utilize reclaimed water. On the basis of this analysis, the impact of each of the three reuse alternatives identified would be excessive if applied only to the customers using the reclaimed water.

In accordance with the agreements reached at a meeting with FDEP on August 2, 1996, the rate and fee analysis includes an assessment of the impact of applying the revenue requirements associated with implementing the golf course reuse system described in Alternative 3 to the entire UWFL customer base.

Currently, UWFL serves approximately 21,264 wastewater customers and 27,697 water customers (including residential and commercial). For this analysis the following distribution of the total revenue requirement was assumed:

- 10 percent of the total revenue requirement would be distributed to the actual customers using the reclaimed water
- 90 percent of the total revenue requirement would be applied to all the remaining water and wastewater customers

In addition, it was further assumed that the portion of the total revenue requirement applied to the remaining water and wastewater customers would be distributed as follows:

- 34 percent to water customers
- 66 percent to wastewater customers

As described above, the initial Phase 1 annual revenue requirement for this alternative (Alternative 3 Golf Course Reuse) is $983,560 . Based on the assumptions stated above, the portion of the total annual revenue requirement applied to the two Phase 1 golf courses would be $98,356 which translates to a unit cost of approximately $0.35 per 1,000 gallons. This means that the cost to each golf course would be approximately $49,178 per year or $4,098 per month. Considering that the current cost of a typical golf course using groundwater or surface water is in the range of $0.05 to $0.15 per 1,000 gallons, this represents in excess of a two- to seven-fold increase over their current costs. Even though the reuse customer is only bearing 10 percent of the total cost, this is still a significant impact.

Additionally, the portion of the total annual revenue requirement applied to the remaining water and wastewater customers would be $865,203 which translates to a unit cost of $3.11 per 1,000 gallons. Based on the assumed distribution of this cost between water and wastewater customers, the additional annual cost per customer would be $10.87 for water and $27.48 for wastewater. For a typical residential customer with water and sewer service, this means an increase of $3.20 per month. Based on the current rate schedule, a typical monthly bill for a residential customer with water and wastewater service would be approximately $55 per month. This indicates that in addition to the burden placed on the actual reuse customers, the initial impact of spreading the revenue requirements for a reuse system involving two golf courses in two different service areas across the remaining UWFL customer base would be about a 6 percent increase in each customer's monthly bill. While this does not appear to be a significant impact, such an increase would likely meet resistance from customers throughout the system. In the absence of some kind of regulatory mandate, it would be difficult to demonstrate that there is a discrete benefit to all customers associated with this project.

A summary of the calculated reuse rates based on the initial Phase 1 annual revenue requirements for each alternative under the two cost recovery scenarios discussed above is presented in *Exhibit 5-11*. For comparison, the representative costs for other sources (potable water or groundwater) are included along with the average "subsidized" reuse rates based on survey information.

A modified rate and fee worksheet per the FDEP guidelines was completed for Phase 1 of Alternative 3- Golf Course Reuse and is provided in *Appendix 4*. On the basis of the previous discussions, this worksheet summarizes the incremental impact of the reuse alternative relative to a no action scenario. Only expenses and revenues associated with the first phase of the reuse alternative are included in the worksheet. No other expenses and revenues associated with existing water or wastewater systems are included.

In essence, the worksheet summarizes total expenses (revenue requirements) and projected revenues associated with the alternative. The difference between expenses and revenues is reported as a surplus (revenues exceed expenses) or a deficit (expenses exceed revenue). The results are consistent with the previous discussions. Total expenses represent the revenue requirement described above. For purposes of the worksheet, projected revenues from the sale of reclaimed water were based on the calculated rate of $0.35 per 1,000 gallons based on previous analysis where 10 percent of the total revenue requirement is applied to the reuse customer. The resulting deficits indicate the amount of shortfall which would have to be made up from some other source (i.e., subsidies). In this case, the deficit would be subsidized by the remaining water and wastewater customers.

Technical Feasibility

The technical feasibility of the alternative reuse systems was evaluated and compared according to the following criteria:

1. **Engineering.** Is the system physically capable of performing its intended function?

2. **Economic.** Do the system's benefits exceed its costs, and is the system the least costly alternative?

Exhibit 5-11

Summary of Rate and Fee Analysis

No.	Alternative	Initial (Phase 1) Annual Revenue Requirement	Initial (Phase 1) Unit Cost (per 1,000 gal.)	Rate Based on Full Recovery From Reuse Customers (per 1,000 gal.)		Rate based on 90 % Subsidy From General Customers (per 1,000 gal.)		Comparative Rates (per 1,000 gal.)		
				Reuse Customers (100 %)	General Customers (0 %)	Reuse Customers (10 %)	General Customers (90 %)	Current UWFL Potable Water Rate	Estimated Cost For Groundwater	Typical Subsidized Reuse Rate
1	Institutional Users (Monterey Service Area)	$296,904	$11.62	$11.62	$0.00	NA	NA	$1.35	$0.10	$0.39
2	Residential Customers (Monterey Service Area)	$1,291,374	$8.23	$8.23	$0.00	NA	NA	$1.35	$0.10	$0.75
3	Golf Course Reuse	$983,560	$3.46	$3.46	$0.00	$0.35	$3.11	$1.35	$0.10	$0.39

Notes:

Annual revenue requirements and associated reuse rates are based on Phase 1 costs only.

Estimated cost for groundwater based on average of $0.05 to $0.15 per 1,000 gallons.

Typical subsidized reuse rates based on survey of approximately 20 reuse projects in Florida.

3. **Regulatory.** Would the system meet legal and regulatory requirements?
4. **Social.** Would potential users and the general public be in favor of the system?

Engineering Feasibility

All of the irrigation options are considered feasible from an engineering standpoint in that the processes and equipment needed for the respective reclaimed water systems, including the various treatment processes, pumping, piping, telemetry, and control system, are commonly employed in the water and wastewater industry and do not present any unusual technical difficulty.

Economic Feasibility

Economic feasibility as defined herein requires that the benefits resulting from the project exceed the costs and that no other project could accomplish similar results at a lower cost.

Reuse has been shown to be more costly than the no action alternative, and the costs of the various reuse alternatives suggest that economic feasibility is difficult to demonstrate because no cost saving benefits to the wastewater systems can be attributed to reuse. This is due primarily to two main factors.

First, sufficient storage and alternative disposal methods must be provided for reuse systems for extended wet weather periods when users are not irrigating and for emergency backup. As a result, implementation of reuse does not add any economic value to the no action scenario. In reality, implementation of reuse would result in a reduction in revenues on the potable water side. This is due to the fact that the utility already has an investment in capital to provide potable water to its customers and an established rate for charging those customers for usage. Approximately 90 to 95 percent of the rate charged for water service is determined by fixed costs. Significant new capital investment would be required for reuse. In addition the rate charged by the utility for reclaimed water would have to be set below the potable water rate in order to satisfy the market condition and provide an incentive to the customer.

Secondly, the current market will not allow for full recovery of the costs associated with providing reclaimed water to customers. All of the golf courses identified in this study currently withdraw irrigation water from groundwater or from surface water sources. Consequently, the only expense they have now is associated with power costs for pumping the water into their irrigation systems. It is estimated that this cost is in the range of approximately $0.05 to $0.15 per 1,000 gallons. This represents only a fraction of the utility's cost to produce and distribute reclaimed water. Based on the results of the rate and fee analysis, this cost would be approximately $3.46 per 1,000 gallons. Under the current rate structure, the cost for potable water from UWFL would be $1.35 per 1,000 gallons for commercial customers.

A significant issue is the fact that the UWFL rate structure for water and sewer is based on a uniform charge for all service areas. In theory, this implies that reuse costs could be spread across all UWFL customers. An analysis was performed in which 10 percent of the total annual revenue requirement was distributed to the actual customers using the reclaimed water and 90 percent of the total revenue requirement was subsidized by all remaining UWFL water and wastewater customers. The results of this analysis indicated a significant financial impact on the actual reuse customers as well as modest increased costs to the general water and wastewater customers. In the absence of regulatory mandate, the potential reuse customers have no incentive to switch to a more costly source of irrigation water. Also, it is likely that the general water and wastewater customers would object to subsidizing 90 percent of the cost to serve reclaimed water to a few select customers. It is not known how the PSC would view this concept.

Finally, UWFL, as an investor owned utility, does not have the legal authority to require customers to connect to, use, and pay for reclaimed water service. It would not be sound business practice to commit the significant capital funds required to implement reuse without reasonable assurances that a demand exists and that costs could be recovered.

Regulatory Feasibility

All of the options considered would be permittable under current regulations. Any expansion of surface water discharge under the no action alternative would require performance of an Antidegradation Analysis.

Social Feasibility

The concept of wastewater reuse is generally perceived by the public as a positive step with respect to conserving potable water and decreasing negative impacts of discharging treated wastewater to surface waters. However, there will always be a group of people who will be concerned about health and safety issues associated with utilizing "dirty water" in public access situations. These concerns are heightened when contemplating using reclaimed water at schools and residential areas. However, these types of systems have been successfully operating in Florida and other parts of the country for many years. One of the key factors in the success of these programs is involvement and education of the general public.

A common sentiment expressed by prospective reclaimed water users is that the concept sounds good as long as it does not cost them any more than what they are currently paying. In the absence of other driving forces such as regulatory requirements, this represents a strong market condition which limits what utilities can charge the users for reclaimed water service. Unfortunately, this market price does not cover the costs of providing the service and reclaimed water systems must often be subsidized by the water and wastewater systems. Consequently, users who are not directly benefiting from the system are forced to help pay for it.

Environmental Assessment

All of the alternatives would have short-term environmental impacts associated with construction activities. These would include traffic disturbances and increased noise and dust levels. All of the options involve extensive pipeline construction on major city streets. The environmental impacts would cease when construction activities were completed.

There would be an increased health risk, although small, in using reclaimed water. Reclaimed water is treated to be bacteriologically safe but not to replace potable water requirements. The potential exists for cross connections with the potable water or wastewater systems, or for other misuses of the reclaimed water system.

All of the irrigation alternatives would have long-term positive impacts, including:

- A decrease in the net withdrawal of water from the Floridan aquifer
- A reduction of wastewater effluent disposal via surface water discharge to the St. Johns River

CHAPTER 6

Summary and Conclusions

This chapter presents a summary of the evaluations completed in *Chapter 5* including advantages and disadvantages of each reuse alternative considered.

Summary

An overall summary of the present value analysis conducted in *Chapter 5* is provided in *Exhibit 6-1*. As discussed earlier, the underlying assumption associated with the evaluation of alternatives is that all of the facilities would have to continue to rely on other effluent disposal options as the primary method regardless of whether or not any reuse were implemented. Consequently, the actual value of the no action alternative is not relevant to this analysis and was not included. The impact of reuse is purely an incremental cost over and above the no action scenario.

Based on the present value analysis, the alternative with the lowest total present value was Alternative 1 - Institutional/Public Users (Monterey Service Area). However, this alternative had the highest cost per unit of capacity. Residential reuse (Alternative 2) had the highest total present value while the golf course reuse option (Alternative 3) had the lowest cost per unit of capacity.

All of the reuse alternatives evaluated have relatively high capital costs because of the need for extensive treatment and/or transmission/distribution system facilities. None of the alternatives are economically feasible in the sense that they would each be more costly to the utility than the no-action alternative.

Annual revenue requirements for the first phase of each alternative were calculated based on UWFL and PSC standard methodologies. Percentages for a rate of return, depreciation, and property taxes were taken from the recent filing approved by the PSC. A summary of the results of the revenue requirement calculations is provided in *Exhibit 6-2*. Based on this analysis, the initial annual revenue requirement to provide reclaimed water for Alternative 1 (Institutional/Public Users [Monterey Service Area]) was determined to be $296,904, or $11.62 per 1,000 gallons. For Alternative 2 (Residential Reuse [Monterey Service Area]), the initial annual revenue requirement associated with providing residential reuse was determined to be $1,291,374, which equates to a unit cost of $8.23 per 1,000 gallons. For Alternative 3 (Golf Course Reuse), the initial annual revenue requirement was determined to be $983,560, or $3.46 per 1,000 gallons.

Two cost recovery strategies were discussed in *Chapter 5*. The first involves recovering all of the revenue requirements from the actual customers using the reclaimed water. In this case, the required rate would have to be set equal to the values indicated above. However, as presented in *Chapter 5*, these rates exceed typical market-driven reuse rates for commercial and residential customers by a factor of approximately 9 and 11, respectively. Similarly, when compared with the current cost of water supply for these customers (assuming they are currently irrigating), the rates are still excessive. A user with a shallow

Exhibit 6-1

Summary of Present Value Analysis Results for all Alternatives

Alternative	Component	Phase 1	Phase 2	Phase 3	Phase 4	Total
Institutional/Public Users (Monterey Service Area)	Capital Cost	$1,582,800	$1,239,700	$1,538,000	$1,239,700	$5,600,200
	Replacement Costs	$0	$0	$0	$94,000	$94,000
	O&M Cost	$11,550	$10,450	$8,398	$10,450	$40,848
	Salvage Value	$0	$0	$0	($1,622,000)	($1,622,000)
	No. of Customers	5	5	5	5	20
	Reuse Demand (mgd)	0.07	0.07	0.07	0.07	0.28
	Total Present Value (without water savings)					$3,263,000
	Total Present Value (with water savings)					$3,083,000
Residential Reuse (Monterey Service Area)	Capital Cost:	$6,935,100	$5,578,800	$6,845,700	$5,578,800	$24,938,400
	Replacement Costs	$0	$0	$0	$377,000	$377,000
	O&M Cost	$45,210	$30,810	$30,925	$30,810	$137,755
	Salvage Value	$0	$0	$0	($7,109,000)	($7,109,000)
	No. of Customers	1062	1063	1062	1063	4250
	Reuse Demand (mgd)	0.43	0.43	0.43	0.43	1.72
	Total Present Value (without water savings)					$12,772,000
	Total Present Value (with water savings)[1]					$10,578,000
Golf Course Reuse	Capital Cost:	$5,010,200	$2,509,100	$2,130,700	$0	$9,650,000
	Replacement Costs	$0	$0	$0	$724,100	$724,100
	O&M Cost	$35,700	$17,000	$13,900	$0	$66,600
	Salvage Value	$0	$0	$0	($1,693,700)	($1,693,700)
	No. of Customers	2	1	1	0	4
	Reuse Demand (mgd)	0.78	0.31	0.25	0	1.34
	Total Present Value (without water savings)					$7,404,000
	Total Present Value (with water savings)[2]					$6,202,000

Notes:

[1]Water savings is treated as a revenue based on 50 % of total reuse demand times the current potable water rate of $1.35 per 1,000 gallons.

[2]Water savings is treated as a revenue based on 25 % of total reuse demand times the current potable water rate of $1.35 per 1,000 gallons.

Exhibit 6-2

Summary of Phase 1 Annual Revenue Requirements for all Alternatives

Component	Alternative 1 Institutional/Public Users	Alternative 2 Residential Reuse	Alternative 3 Golf Course Reuse
Capital Cost ($)	$1,582,800	$6,935,100	$5,010,200
Adjusted Rate Base Costs[a]	$1,513,643	$6,636,779	$4,741,852
Rate of Return Allowance[b]	9.57%	9.57%	9.57%
Rate of Return on Rate Base[b]	**$144,856**	**$635,140**	**$453,795**
Operating Costs:			
Depreciation[c]	$69,157	$298,321	$268,348
Property Taxes[d]	$19,318	$84,646	$61,152
Annual O&M	$11,550	$45,210	$35,700
Income Taxes	$52,023	$228,057	$164,565
Total Operating Expenses	**$152,048**	**$656,234**	**$529,765**
Total Annual Revenue Requirement	**$296,904**	**$1,291,374**	**$983,560**
Annual Average Reuse Demand (mgd)	0.07	0.43	0.78
Unit Annual Revenue Requirement ($/kgal)[e]	$11.62	$8.23	$3.46

Costs shown are for Phase 1 only.

[a]Capital costs less depreciation.

[b]Based on 9.57 % rate of return allowance times adjusted rate base costs. ROR allowance taken from current rate order.

[c]Depreciation based on percentage of capital costs (3.30 % for pipelines; 5.56 % for WWTF). Rates taken from current rate order.

[d]Property taxes based on 2.15 % of the total rate base.

[e]Total annual revenue requirement divided by the total annual amount of reclaimed water produced.

well might pay somewhere in the range of $0.05 to $0.15 per 1,000 gallons. On the opposite extreme, the current UWFL potable water rate is only $1.35 per 1,000 gallons. If applied only to the customers using the reclaimed water, the required rates range from approximately 3 to 6 times the cost of potable water.

The second cost recovery scenario discussed in *Chapter 5* involves spreading the revenue requirements of the golf course reuse option (Alternative 3) across the entire UWFL customer base. This is in accordance with agreements reached at a meeting with FDEP on August 2, 1996. For this analysis the following distribution of the total revenue requirement was assumed:

- 10 percent of the total revenue requirement would be distributed to the actual customers using the reclaimed water
- 90 percent of the total revenue requirement would be applied to all the remaining water and wastewater customers

In addition, it was further assumed that the portion of the total revenue requirement applied to the remaining water and wastewater customers would be distributed as follows:

- 34 percent to water customers
- 66 percent to wastewater customers

Based on the assumptions stated above, the resulting cost to each golf course would be approximately $49,178 per year or $4,098 per month. This represents in excess of a two- to seven-fold increase over their current costs. Even though the reuse customer is only bearing 10 percent of the total cost, this is still a significant impact.

Additionally, under this cost recovery scenario, the resulting cost to the remaining water and wastewater customers for providing reclaimed water to two golf courses would be $10.87 and $27.48 per year, respectively. For a typical residential customer with water and wastewater service, this represents about a 6 percent increase in the monthly bill. In effect, this increase would be subsidizing 90 percent of the cost to serve two golf courses. This would likely meet resistance from customers throughout the system. In the absence of some kind of regulatory mandate, it would be difficult to demonstrate that there is a discrete benefit to all customers associated with this project.

A summary of the calculated reuse rates based on the initial Phase 1 annual revenue requirements for each alternative under the two cost recovery scenarios discussed above is presented in *Exhibit 6-3*. For comparison, the representative costs for other sources (potable water or groundwater) are included along with the average "subsidized" reuse rates based on survey information. The rate and fee analysis indicates that rate impacts of reuse on customers under either cost recovery strategy would be significant relative to current costs. Unless there were some other driving forces (i.e., regulatory or governmental mandate) operating on these users, it is doubtful that they would be willing to pay more than what they are currently paying for water.

In addition, UWFL has no legal mechanism to require customers to connect to and use reclaimed water. Prior to investing capital dollars, the utility would have to be assured that it could recover the costs. In the absence of some kind of regulatory or governmental

Exhibit 6-3
Summary of Rate and Fee Analysis

No.	Alternative	Initial (Phase 1) Annual Revenue Requirement	Initial (Phase 1) Unit Cost (per 1,000 gal.)	Rate Based on Full Recovery From Reuse Customers (per 1,000 gal.)		Rate based on 90 % Subsidy From General Customers (per 1,000 gal.)		Comparative Rates (per 1,000 gal.)		
				Reuse Customers (100 %)	General Customers (0 %)	Reuse Customers (10 %)	General Customers (90 %)	Current UWFL Potable Water Rate	Estimated Cost For Groundwater	Typical Subsidized Reuse Rate
1	Institutional Users (Monterey Service Area)	$296,904	$11.62	$11.62	$0.00	NA	NA	$1.35	$0.10	$0.39
2	Residential Customers (Monterey Service Area)	$1,291,374	$8.23	$8.23	$0.00	NA	NA	$1.35	$0.10	$0.75
3	Golf Course Reuse	$983,560	$3.46	$3.46	$0.00	$0.35	$3.11	$1.35	$0.10	$0.39

Notes:
Annual revenue requirements and associated reuse rates are based on Phase 1 costs only.
Estimated cost for groundwater based on average of $0.05 to $0.15 per 1,000 gallons.
Typical subsidized reuse rates based on survey of approximately 20 reuse projects in Florida.

mandate requiring customers to use the reclaimed water, there are currently no such assurances

It is important to recognize that there are some fundamental differences between public and investor owned utilities. An investor owned utility must provide a return on capital investment to remain viable. As an investor owned utility, UWFL's rates are regulated by the Florida Public Services Commission (PSC). Any rate increase must be sustained on the basis of demonstrated need and benefit to the customers. In most cases, reuse projects are implemented by public utilities and the full cost of reuse is not recovered in the reuse rate. It is common, in these cases, to subsidize the difference between the actual costs and what the users are willing to pay through general increases in water and/sewer rates for all customers or other sources of income such as general revenues. Subsidies are not well received by the PSC nor by the general water and sewer customer who is impacted by them and feels that no benefit is received.

There are a number of additional non-technical constraints which severely impact a private utility's ability to implement a public access reuse system. These are summarized below:

Many potential customers, such as golf courses, have Consumptive Use Permits (CUPs) from the St. Johns River Water Management District (SJRWMD) allowing them to withdraw groundwater or surface water for their respective uses. In negotiating with these prospective reuse customers, UWFL does not have the authority to revoke or modify CUP conditions. Consequently, these customers have little incentive to participate.

It is important to note that the demographics of the areas considered may not support an aggressive residential lawn irrigation routine. Many people can not afford to spend $20 to $30 dollars per month for irrigation using potable water. In fact, many homeowners do not have in ground irrigation systems and may only irrigate during extremely dry periods using garden hoses and portable sprinklers. The intent of reuse should not be on creating new demands, but rather on replacing existing potable demands.

Following is a brief summary of the primary advantages and disadvantages of each of the reuse alternatives considered in this report.

No Action Alternative

As described in Chapter 4, the no action alternative involves providing water supply and wastewater management without implementing reuse. Under this alternative, UWFL would continue surface water discharge from each of the ten wastewater facilities. In order to do this, it is recognized that at least three of the facilities (St. Johns North, Ponte Vedra, and Yulee) would have to provide higher levels of treatment than currently in place. However, implementation of reuse would not affect the need to expand these facilities or the level of treatment nor would it reduce the cost of effluent disposal. This is due to the need of any irrigation-based reuse alternative for alternate disposal methods during periods of wet weather.

Advantages

The primary advantage associated with the no action alternative is that it represents the lowest system-wide cost to UWFL. As stated previously, implementation of reuse would be an incremental cost to the no action scenario.

In addition, it offers a safe and reliable means to provide for disposal of 100 percent of wastewater effluent independent of weather conditions and it meets current regulatory requirements.

Disadvantages

The primary disadvantage of the no action alternative is that it does not meet statewide regulatory objectives regarding reuse of reclaimed wastewater. Any expanded or new discharges would require that UWFL go through the Antidegradation analysis process to demonstrate that the discharge is in the best interests of the public and the environment.

Public Access Reuse Alternatives

The public access reuse alternatives, as described in *Chapter 4*, involve implementing public access reuse systems to provide irrigation water to golf courses, parks, schools, churches, cemeteries, and residential developments. The system would provide service to property boundaries; the land owner or site manager would be responsible for the application system and its operation.

Advantages

The advantages for implementing a public access reuse program include providing a water supply to the public which is less subject to restrictions during droughts or high-use periods than the potable system. The system may reduce the demand on the potable system and assist the utility in extending existing supplies and facilities. Public access reuse is a proven and reliable technology that is used throughout the state.

Disadvantages

The disadvantages of public access reuse include the requirement of an alternate disposal method to provide capacity during wet weather and other low demand periods. In addition, the replacement of potable water with reclaimed water would likely result in a loss of revenue to the utility due to existing investment in water system infrastructure and the market conditions.

Conclusions

The results of the evaluations completed in this study lead to a conclusion that reuse is not economically feasible within UWFL service areas under current conditions. These conditions relate to the following key issues:

The most likely candidate users for reclaimed water are golf courses. Targeting any other public access users potentially involves artificially creating a demand which does not currently exist. This is due to the demographics of the areas relative to the ability of customers to afford aggressive irrigation routines and whether or not in-ground irrigation systems are present on the sites.

However, golf courses typically have existing CUPs allowing them to withdraw groundwater and/or surface water for irrigation. While there is a requirement within these CUPs for consideration of reuse when it becomes available, the determination of economic feasibility is still left to the user.

The revenue requirements associated with providing reclaimed water to the golf courses would result in a significant financial impact on the users. Unless something changes, none of the golf courses in the UWFL service areas is likely to be willing to pay any more than its current costs for pumping water. This has been shown to be significantly less than the utility's cost to provide reclaimed water. Subsidization of reuse costs through general water and sewer rates would have to be approved by the PSC. Even if applied to the entire UWFL customer base, the costs have been shown to be significant.

These factors severely limit the utility's ability to negotiate mutually beneficial contracts with users. It would not be sound business practice to invest millions of dollars in capital to provide reuse infrastructure without having assurances ahead of time about the ability to have customers on line and cost recovery.

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Appendix 1

Summary of FDEP WWTF Permit Effluent Requirements and Historical Effluent Quality Data

HISTORICAL WATER AND SEWER CUSTOMER COUNT BY SYSTEM

EFFLUENT REUSE FEASIBILITY STUDY

CEA 96105

	1995		1994		1993		1992		1991		1990		1989		1988		1987		1986		1985	
FACILITY	WATER	SEWER	WATER	SEWER	WATER	SEWER	WATER	SEWER	WATER	SEWER	WATER	SEWER	WATER	SEWER	WATER	SEWER	WATER	SEWER	WATER	SEWER	WATER	SEWER
ARL (M)	6375	5275	6358	5248	6338	5236	6285	5211	6263	5196	6234	5138	6218	5137	5218	4135	5168	3974	3412	3881	5110	3856
HO	3094	2267	3036	2210	2924	2118	2833	2058	2734	1980	2665	1911	2559	1828	2443	1727	2315	1630	2002	1354	1664	1045
JH	3614	3463	3579	3438	3542	3409	3461	3327	3370	3248	3284	3167	3239	3127	3146	3042	3068	2976	2632	2813	2750	2665
PDL	425	141	413	135	153	104	123	72	88	42	89	39										
PV	1664	917	1598	870																		
RL	2136	1800	2077	1751	2038	1734	2022	1722	1947	1658	1565	1328	1491	1249	1381	1149	1303	1068	1152	972	955	786
SJ	4071	3651	4052	3641	4007	3614	3920	3585	3837	3522	3804	3428	3719	3388	3626	3328	3553	3270	3441	3208	3407	3195
SJN	786	625	724	575	642	518	456	365	320	257	245	198	215	170								
SP	912	724	900	720	892	715	866	693	849	746												
YUL	65	66	16	16	1	1	2	1														

ARL(M): ARLINGTON(MONTEREY)

HO: HOLLY OAKS

JH: JAX HTS.

PDL: PONCE De LEON

PV: PONTE VEDRA

RL: ROYAL LAKES

SJ: SAN JOSE

SJN: ST. JOHNS NORTH

YUL: YULEE

UWF Reuse Feasibility Study
Historical Sewer Customer Data
(No. of Customers)

Year	Arlington (Monterey)	Holly Oaks	Jax Heights	Royal Lakes	San Jose	San Pablo	Ponce de Leon	Ponte Vedra	St. Johns North	Yulee
1985	3856	1045	2665	786	3195					
1986	3881	1354	2813	972	3208					
1987	3974	1630	2976	1068	3270					
1988	4135	1727	3042	1149	3328					
1989	5137	1828	3127	1249	3388				170	
1990	5138	1911	3167	1328	3428		39		198	
1991	5196	1980	3248	1658	3522	746	42		257	
1992	5211	2058	3327	1722	3585	693	72		365	1
1993	5236	2118	3409	1734	3614	715	104		518	1
1994	5248	2210	3438	1751	3641	720	135	870	575	16
1995	5275	2267	3463	1800	3651	724	141	917	625	66
Avg Annual Rate of Growth (10 year)	3.7%	11.7%	3.0%	12.9%	1.4%	NA	NA	NA	NA	NA
Avg Annual Rate of Growth (1985-1990)	6.6%	16.6%	3.8%	13.8%	1.5%	NA	NA	NA	NA	NA
Avg Annual Rate of Growth (1990-1995)	0.5%	3.7%	1.9%	7.1%	1.3%	NA	52.3%	NA	43.1%	NA
Avg Annual Rate of Growth (1 year)	0.5%	2.6%	0.7%	2.8%	0.3%	0.6%	4.4%	5.4%	8.7%	312.5%

Source: United Water Florida Data

UWF Reuse Feasibility Study
Historical Water Customer Data
No. Customers)

Year	Arlington (Monterey)	Holly Oaks	Jax Heights	Royal Lakes	San Jose	San Pablo	Ponce de Leon	Ponte Vedra	St. Johns North	Yulee
1985	5110	1664	2750	955	3407					
1986	3412	2002	2632	1152	3441					
1987	5168	2315	3068	1303	3553					
1988	5218	2443	3146	1381	3626					
1989	6218	2559	3239	1491	3719				215	
1990	6234	2665	3284	1565	3804		89		245	
1991	6263	2734	3370	1947	3837	849	88		320	
1992	6285	2833	3461	2022	3920	866	123		456	8
1993	6338	2924	3542	2038	4007	892	153		642	1
1994	6358	3036	3579	2077	4052	900	413	1598	724	16
1995	6375	3094	3614	2136	4071	912	425	1664	786	65
Avg Annual Rate of Growth (10 year)	2.5%	8.6%	3.1%	12.4%	1.9%	NA	NA	NA	NA	NA
Avg Annual Rate of Growth (1985-1990)	4.4%	12.0%	3.9%	12.8%	2.3%	NA	NA	NA	NA	NA
Avg Annual Rate of Growth (1990-1995)	0.5%	3.2%	2.0%	7.3%	1.4%	NA	75.5%	NA	44.2%	NA
Avg Annual Rate of Growth (1 year)	0.3%	1.9%	1.0%	2.8%	0.5%	1.3%	2.9%	4.1%	8.6%	306.3%

Source: United Water Florida Data.

FDEP Permit limits
Holly Oaks WWTF

	Permit Effluent Limitations (mg/l)				
Parameter	Annual Average	Monthly Average	Weekly Average	One Time Grab Min.	One Time Grab Max
$CBOD_5$	6	7.5	9		12
TSS	20	30	45		60
TKN	2	2.5	3		4
Fecal Coliform			200/100 ml		800/100 ml
Cl_2 Residual				0.5	0.01
pH				6	8.5

Source: FDEP Permit No. DO16-229843

FDEP Permit limits
Jacksonville Heights WWTF

Permit Effluent Limitations (mg/l)					
Parameter	Annual Average	Monthly Average	Weekly Average	One Time Grab Min.	One Time Grab Max
$CBOD_5$	8	10	12		16
TSS	20	30	45		60
$NH_3 + NH_4^+$	1.6	2	2.4		3.2
NH_3	0.02	0.02	0.02		0.02
DO				6	
Fecal Coliform			$\leq$200/100 ml		800/100 ml
Cl_2 Residual				0.5	0.01
pH				6	8.5

Source: FDEP Permit No. DO16-222480

FDEP Permit limits
Monterey WWTF

Interim Limits:

Permit Effluent Limitations (mg/l)					
Parameter	Annual Average	Monthly Average	Weekly Average	Single Sample Min.	Single Sample Max
$CBOD_5$	20	25	40		60
TSS	20	30	45		60
DO				1.5	
Fecal Coliform			≤200/100 ml		800/100 ml
Cl_2 Residual				0.5	0.01
pH				6.5	8.5

Final Limits:

Permit Effluent Limitations (mg/l)					
Parameter	Annual Average	Monthly Average	Weekly Average	Single Sample Min.	Single Sample Max
$CBOD_5$	20	25	40		60
TSS	20	30	45		60
DO				1.5	
Fecal Coliform			≤200/100 ml		800/100 ml
pH				6.5	8.5

Source: FDEP Permit No. FL0023604

FDEP Permit limits
Royal Lakes WWTF

Permit Effluent Limitations (mg/l)					
Parameter	**Annual Average**	**Monthly Average**	**Weekly Average**	**One Time Grab Min.**	**One Time Grab Max**
$CBOD_5$	10	12.5	15		20
TSS	10	12.5	15		20
Fecal Coliform			$\leq$200/100 ml		800/100 ml
Cl_2 Residual				0.5	0.01
pH				6	8.5

Source: FDEP Permit No. DO16-230626

FDEP Permit limits
San Jose WWTF

Parameter	Permit Effluent Limitations (mg/l) Annual Average	Monthly Average	Weekly Average	One Time Grab Min.	One Time Grab Max
$CBOD_5$	10	12.5	15		20
TSS	10	12.5	15		20
Fecal Coliform			$\leq$200/100 ml		800/100 ml
Cl_2 Residual				0.5	0.01
pH				6.5	8.5

Source: FDEP Permit No. DO16-246674

FDEP Permit limits
San Pablo WWTF

	Permit Effluent Limitations (mg/l)				
Parameter	Annual Average	Monthly Average	Weekly Average	One Time Grab Min.	One Time Grab Max
$CBOD_5$	10	12.5	15		20
TSS	20	30	45		60
TKN	4	5	6		8
Fecal Coliform			≤200/100 ml		800/100 ml
Cl_2 Residual				0.5	0.01
pH				6	8.5

Source: FDEP Permit No. DO16-162840

FDEP Permit limits
Ponce De Leon WWTF

Permit Effluent Limitations (mg/l)					
Parameter	Annual Average	Monthly Average	Weekly Average	One Time Grab Min.	One Time Grab Max
$CBOD_5$	20	30	45		60
TSS	20	30	45		60
NO_3-N	12	12	12		12
Fecal Coliform			≤200/100 ml		800/100 ml
Cl_2 Residual				0.5	0.01
pH				6	8.5

Source: FDEP Permit No. DO16-253570

FDEP Permit limits
Ponte Vedra WWTF

Interim Limits:

Permit Effluent Limitations (mg/l)					
Parameter	Annual Average	Monthly Average	Weekly Average	Single Sample Min.	Single Sample Max
$CBOD_5$	20	25	40		60
TSS	20	30	45		60
NO_3-N					12
NH_4-N	1	1	1.5		2
Fecal Coliform			$\leq$200/100 ml		800/100 ml
Cl_2 Residual				0.5	0.01
pH				6	8.5

Final Limits:

Permit Effluent Limitations (mg/l)					
Parameter	Annual Average	Monthly Average	Weekly Average	One Time Grab Min.	One Time Grab Max
$CBOD_5$	5	5	7.5		10
TSS					5
TN	3	3	4.5		6
DO				5	
Fecal Coliform			$\leq$200/100 ml		800/100 ml
Cl_2 Residual				1	0.01
pH				6	8.5

Source: FDEP Permit No. FL0117951

FDEP Permit limits
St. Johns North WWTF

Interim Limits:

Permit Effluent Limitations (mg/l)					
Parameter	Annual Average	Monthly Average	Weekly Average	Single Sample Min.	Single Sample Max
$CBOD_5$	20	20	30		40
TSS					5
NO_3-N					12
TN	2.2	2.75	3.3		4.4
DO				5	
Fecal Coliform		bdl			25/100 ml
Cl_2 Residual				1	0.01
pH				6	7.5

Final Limits:

Permit Effluent Limitations (mg/l)					
Parameter	Annual Average	Monthly Average	Weekly Average	Single Sample Min.	Single Sample Max
$CBOD_5$	5	6.3	7.5		10
TSS					5
NH_3-N	1.2	1.5	1.8		2.4
NO_3-N					12
DO				5	
Fecal Coliform		bdl			25/100 ml
Cl_2 Residual				1	0.01
pH				6	7.5

Source: FDEP Permit No. FL0117668

FDEP Permit limits
Amoco WWTF

Permit Effluent Limitations (mg/l)					
Parameter	Annual Average	Monthly Average	Weekly Average	One Time Grab Min.	One Time Grab Max
$CBOD_5$	20	30	45		60
TSS	20	30	45		60
NO_3-N	12	12	12		12
Fecal Coliform			≤200/100 ml		800/100 ml
Cl_2 Residual				0.5	0.01
pH				6	8.5

Source: FDEP Permit No. FLA011675

FDEP Permit limits
Lofton Oaks WWTF

Permit Effluent Limitations (mg/l)					
Parameter	**Annual Average**	**Monthly Average**	**Weekly Average**	**One Time Grab Min.**	**One Time Grab Max**
$CBOD_5$	20	30	45		60
TSS	20	30	45		60
NO_3-N	12	12	12		12
Fecal Coliform			$\leq$200/100 ml		800/100 ml
Cl_2 Residual				0.5	
pH				6	8.5

Source: FDEP Permit No. DO45-260422

FDEP Permit limits
Yulee Regional WWTF

	Permit Effluent Limitations (mg/l)				
Parameter	Annual Average	Monthly Average	Weekly Average	One Time Grab Min.	One Time Grab Max
$CBOD_5$	5	6.25	7.5		10
TSS	5	6.25	7.5		10
TN	3	3.75	4.5		6
NH_3-N		2			
TP	1	1.25	1.5		2
DO				5	
Fecal Coliform			$\leq$200/100 ml		800/100 ml
Cl_2 Residual				1	0.01
pH				6	8.5

Source: FDEP Permit No. FL0167258

Historical Effluent Quality Data
Holly Oaks WWTF

YEAR	AADF (mgd)	CBOD (mg/l)	TSS (mg/l)	TKN (mg/l)	Cl2 Res. (mg/l)	Fecal Coliform	NO3-N (mg/l)
1988	0.37	36.7	-	-		-	
1989	0.38	21.2	5.5	-		7.7	
1990	0.43	5.2	4.6	1.8		81.0	
1991	0.55	5.7	2.6	1.8		14.5	
1992	0.53	4.6	3.5	1.7		28.5	
1993	0.55	-	-	-		-	
1994	0.64	3.7	4.7	0.7		25.7	
1995	0.66	4.4	6.8	1.5		17.1	
1996	0.54	5.0	5.5	0.8		12.4	
Source: United Water Florida Data Files							

Historical Effluent Quality Data
Jacksonville Heights WWTF

YEAR	AADF (mgd)	CBOD (mg/l)	TSS (mg/l)	TKN (mg/l)	Cl2 Res. (mg/l)	Fecal Coliform	NO3-N (mg/l)
1988	1.48	3.2	2.6	0.9		0.6	0.0
1989							
1990	1.29	4.6	2.4	1.7		39.6	0.0
1991	1.20	3.2	1.6	1.7		46.8	
1992	1.19	2.1	1.3	1.9		64.5	
1993	0.94	2.0	2.2	1.0		107.5	
1994	1.07	2.0	4.6	0.5		152.7	7.1
1995	1.03	1.3	1.4	1.2		23.6	9.9
1996	1.07	1.2	0.8	0.7		4.8	10.4
Source: United Water Florida Data Files							

Historical Effluent Quality Data
Monterey WWTF

YEAR	AADF (mgd)	CBOD (mg/l)	TSS (mg/l)	TKN (mg/l)	Cl2 Res. (mg/l)	Fecal Coliform	NO3-N (mg/l)
1987	1.59	0.0	0.0	0.0		0.0	
1988	1.71	1.4	1.5	0.7		10.0	
1989	1.79	6.3	6.1	3.9		35.3	
1990	2.20	6.2	8.0	2.9		59.4	
1991	2.51	5.9	7.9	2.0		77.1	
1992	2.61	5.8	8.2	1.9		72.9	
1993	2.59	4.0	6.2	0.8		70.7	
1994	2.97	2.4	4.8	0.5		74.9	
1995	2.87	1.8	3.1	1.8		59.9	
1996	2.89	1.6	1.8	0.6		16.0	
Source: United Water Florida Data Files							

Historical Effluent Quality Data
Royal Lakes WWTF

YEAR	AADF (mgd)	CBOD (mg/l)	TSS (mg/l)	TKN (mg/l)	Cl2 Res. (mg/l)	Fecal Coliform	NO3-N (mg/l)
1988	1.84	0.6	0.6			0.0	
1989	1.86	7.6	7.0	0.0		168.6	
1990	1.91	9.7	7.7	0.0		120.4	
1991	2.03						
1992	2.07	7.8	6.0	3.5		86.5	
1993	2.35	5.0	6.0	1.1		72.5	
1994	2.71	2.6	5.4	1.2		44.9	
1995	2.47	2.7	4.4	2.4		83.5	
1996	2.37	4.8	8.8	1.7		62.2	
Source: United Water Florida Data Files							

Historical Effluent Quality Data
San Jose WWTF

YEAR	AADF (mgd)	CBOD (mg/l)	TSS (mg/l)	TKN (mg/l)	Cl2 Res. (mg/l)	Fecal Coliform	NO3-N (mg/l)
1990	1.57	38.2	66.4		8.9	550.3	
1991	1.97	5.9	8.8		0.5	123.1	
1992	2.12	5.8	7.1		0.5	100.4	
1993	2.11	3.6	7.0		0.6	86.8	
1994	2.03	2.5	6.7		0.6	18.9	
1995	1.99	2.6	6.1		0.7	36.5	
1996	1.50	4.0	6.2		0.6	30.3	
Source: United Water Florida Data Files							

Historical Effluent Quality Data
San Pablo WWTF

YEAR	AADF (mgd)	CBOD (mg/l)	TSS (mg/l)	TKN (mg/l)	Cl2 Res. (mg/l)	Fecal Coliform	NO3-N (mg/l)
1991	0.29	1.5	2.0	2.2		89.9	
1992	0.29	1.4	2.2	1.9		27.2	
1993	0.34	1.7	3.3	0.4		29.8	
1994	0.35	1.8	3.5	0.5		45.8	
1995	0.40						
1996	0.38	1.1	3.2	0.4		40.6	
Source: United Water Florida Data Files							

Historical Effluent Quality Data
Ponce De Leon WWTF

YEAR	AADF (mgd)	CBOD (mg/l)	TSS (mg/l)	TKN (mg/l)	Cl2 Res. (mg/l)	Fecal Coliform	NO3-N (mg/l)
1994	0.02	3.0	7.6		15.5	47.0	3.5
1995	0.02	4.5	7.4		1.0	85.1	7.6
Source: United Water Florida Data Files							

Historical Effluent Quality Data
Ponte Vedra WWTF

YEAR	AADF (mgd)	CBOD (mg/l)	TSS (mg/l)	TKN (mg/l)	Cl2 Res. (mg/l)	Fecal Coliform	NO3-N (mg/l)
1994	0.34	3.1	3.4		0.8	19.1	4.5
1995	0.45	3.2	3.0		0.8	21.2	3.3
1996	0.37	6.1	4.1		0.9	168.0	5.3
d Water Florida Data Files							

Historical Effluent Quality Data
St. Johns North (Cunningham Creek) WWTF

YEAR	AADF (mgd)	CBOD (mg/l)	TSS (mg/l)	TKN (mg/l)	Cl2 Res. (mg/l)	Fecal Coliform	NO3-N (mg/l)
1994	0.10	5.1	19.2		0.8	163.6	1.2
1995	0.14	5.5	11.5		0.8	53.6	8.6
d Water Florida Data Files							

Historical Effluent Quality Data
Amoco WWTF

YEAR	AADF (mgd)	CBOD (mg/l)	TSS (mg/l)	TKN (mg/l)	Cl2 Res. (mg/l)	Fecal Coliform	NO3-N (mg/l)
1994	0.000964	7.7	21.3		0.3	141.0	22.9
1995	0.000533	12.1	30.2		0.4	59.7	21.2
1996	0.000672	20.1	13.2		0.5	1.0	0.3
d Water Florida Data Files							

Historical Effluent Quality Data
Lofton Oaks WWTF

YEAR	AADF (mgd)	CBOD (mg/l)	TSS (mg/l)	TKN (mg/l)	Cl2 Res. (mg/l)	Fecal Coliform	NO3-N (mg/l)
1994	0.01	9.4	10.9		1.3	1.3	5.5
1995	0.01	7.2	10.7		2.0	2.6	6.5
1996	0.02	12.0	14.9		3.2	7.3	5.4
d Water Florida Data Files							

Appendix 2

UWFL Water & Sewer Rates

WATER SERVICE RATES

Residential Service (Quarterly Rates)

Meter Size	Prior Rates Base Facility Charges	Commission Approved Interim Rates Base Facility Charges	Utility Proposed Final Rates Base Facility Charges	Commission Approved Final Rates Base Facility Charges
5/8"	$ 14.62	$ 15.93	$ 20.52	$ 17.38
3/4"	$ 20.60	$ 22.33	$ 28.78	$ 25.[illegible]5
1"	$ 3[illegible].[illegible]2	$ 35.10	$ 45.23	$ 44.61
1 ½"	$ 7[illegible].[illegible]6	$ 79.81	$ 102.35	$ 100.37
2"	$ 14[illegible].68	$ 156.51	$ 201.71	$ [illegible]79.43
Gallonage Charge				
per 1,000 Gallons	$ 1.03	$ 1.11	$ 1.45	$ 1.35
per 100 cubic feet	$ 0.77	$ 0.83	$ 1.08	$ 1.01

General Service (Monthly Rates)

Meter Size	Prior Rates Base Facility Charges	Commission Approved Interim Rates Base Facility Charges	Utility Proposed Final Rates Base Facility Charges	Commission Approved Final Rates Base Facility Charges
5/8"	$ 6.79	$ 7.40	$ 9.53	$ 8.00
3/4"	$ 8.75	$ 9.53	$ 13.79	$ 11.68
1"	$ 12.65	$ 13.73	$ 24.45	$ 20.72
1 ½"	$ 26.36	$ 28.71	$ 55.03	$ 46.63
2"	$ 49.82	$ 54.27	$ 97.88	$ 82.89
3"	$ 131.93	$ 143.72	$ 220.19	$ 166.55
4"	$ 339.26	$ 369.55	$ 39[illegible].35	$ 331.53
6"	$ 382.27	$ 4,104.3	$ 880.75	$ 746.15
8"	$ 4,258.31	$ 4,638.54	$ 1,565.43	$ 1,326.20
10"	n/a	n/a	n/a	$ 2,072.88
12"	n/a	n/a	n/a	$ 2,984.58
Gallonage Charge				
per 1,000 Gallons	$ 1.03	$ 1.11	$ 1.45	$ 1.35
per 100 cubic feet	$ 0.77	$ 0.83	$ 1.08	$ 1.01

Private Fire Protection (Monthly Rates)

Size of Service Connection	Prior Rates Monthly Rate Per Connection	Commission Approved Proposed Interim Rates Monthly Rate Per Connection	Utility Proposed Final Rates Monthly Rate Per Connection	Commission Approved Final Rates Monthly Rate Per Connection
2"	$ 13.31	$ 14.50	$ 6.87	$ 6.91
3"	$ 23.74	$ 25.86	$ 15.4[illegible]	$ 15.55
4"	$ 35.42	$ 38.58	$ 27.47	$ 27.83
6"	$ 67.99	$ 74.06	$ 61.87	$ 82.18
8"	$ 107.05	$ 118.65	$ 109.9[illegible]	$ 110.52
10"	$ 152.54	$ 166.2[illegible]	$ 171.79	$ 172.74
12"	$ 217.57	$ 236.99	$ 247.35	$ 248.72

WASTEWATER SERVICE RATES

Residential Service (Quarterly Rates)

Water Meter Size	Prior Rates Base Facility Charges	Commission Approved Proposed Interim Rates Base Facility Charges	Utility Proposed Final Rates Base Facility Charges	Commission Approved Final Rates Base Facility Charges
5/8"	$ 27.57	$ 27.75	$ 35.62	$ 33.91
3/4"	$ 27.57	$ 27.75	$ 35.62	$ 33.91
1"	$ 27.57	$ 27.75	$ 36.52	$ 33.91
1 ½"	$ 27.57	$ 27.75	$ 36.52	$ 33.91
Unmetered accounts (No quantity charge)	$ 86.07	$ 88.64	$ 116.99	$ 108.55
Quantity Charge				
per 1,000 gallons	$ 3.00	$ 3.02	$ 3.98	$ 3.34
per 100 cubic feet	$ 2.24	$ 2.26	$ 2.98	$ 2.50
(Previous Maximum gallonage charge 30,000 gallons of water or 4,000 cubic feet of water per quarter)				(New Maximum gallonage charge 27,000 gallons of water or 3,600 cubic feet of water per quarter)

General Service - Standard (Monthly Rates)

Water Meter Size	Prior Rates Base Facility Charges	Commission Approved Proposed Interim Rates Base Facility Charges	Utility Proposed Final Rates Base Facility Charges	Commission Approved Final Rates Base Facility Charges
5/8"	$ 10.48	$ 10.55	$ 11.82	$ 12.91
3/4"	$ 14.50	$ 14.59	$ 23.14	$ 18.68
1"	$ 23.29	$ 23.44	$ 35.72	$ 33.14
1 ½"	$ 53.19	$ 53.54	$ 80.58	$ 74.56
2"	$ 104.45	$ 105.14	$ 142.89	$ 132.55
3"	$ 233.94	$ 235.80	$ 321.58	$ 298.32
4"	$ 736.83	$ 741.66	$ 571.54	$ 530.23
6"	$ 830.84	$ 836.28	$ 1,286.16	$ 1,193.12
8"	$ 5,239.45	$ 5,350.3[illegible]	$ 2,206.01	$ 2,120.65
Unmetered Accounts (No quantity charges)	$ 30.61	$ 30.81	$ 40.25	$ 37.73
Quantity Charge per 1,000 Gallons of water	$ 3.00	$ 3.02	$ 3.98	$ 4.0[illegible]
per 100 cubic feet of water	$ 2.24	$ 2.26	$ 2.90	$ 3.00

General Service - Jacksonville University (Monthly)

Wastewater Meter Size	Prior Rates Base Facility Charges	Commission Approved Proposed Interim Rates Base Facility Charges	Utility Proposed Final Rates Base Facility Charges	Commission Approved Final Rates Base Facility Charges
3	$ 233.94	$ 235.80	$ 377.17	$ 298.32
4	$ 736.83	$ 741.66	$ 978.76	$ 530.20
6	$ 830.84	$ 836.28	$ 1,103.64	$ 1,193.12
Quantity Charge				
per 1,000 Gallons of wastewater flows	$ 3.73	$ 3.75	$ 4.95	$ 4.13
per 100 cubic feet of wastewater flows	$ 2.80	$ 2.82	$ 3.72	$ 3.09

Appendix 3

Detailed Cost Information

Basis for Unit Costs for Wastewater Treatment Facilities

Filtration - Assume steel package automatic backwash traveling bridge filter with feed pumps, turbidity meter, and standby polymer system

Disinfection - Due to uncertainty about using UV disinfection for reuse applications, assume a chlorine-based system (either chlorine gas or sodium hypochlorite) will be used. If chlorine gas system is used, must provide containment and treatment (building, scrubber, etc.)

High Service Pumping - For rates under 1 mgd, use 1 pump. For rates over 1 mgd, use a 3 pump configuration.

Baseline capital costs for filtration, disinfection and pumping were taken from cost estimates developed for the Fort Lauderdale Reuse Feasibility Study (CH2M HILL, 1993). Subtotal capital costs prior to any markups for installation, general conditions, contingency, and engineering for a 2 mgd system were as follows:

Filtration	$310,000	$0.16/gal	(40 %)
Disinfection	$470,000	$0.24/gal	(60 %)
	$780,000	$0.40/gal	

Further breakdown of the disinfection cost result in a 90 %/10% ratio of the $0.24/gal number between mechanical equipment and structural components:

Disinfection (structural) = $0.24x0.9 = $0.22/gal
Disinfection (mech. equip.) $0.24x0.1 = $0.02/gal

These costs were inflated by 3 % per year for three years to bring them up to 1996 dollars.

Since most of the alternatives for UWFL involve much smaller capacities than the baseline system (0.2 to 0.6 mgd), scale factors were developed by extracting ratios of unit costs for 2 mgd systems to smaller systems from established cost curves. The following factors were developed for capacities in the range of the various UWFL scenarios:

0.25 mgd = 4 times baseline (2 mgd)
0.50 mgd = 3 times baseline (2 mgd)

Applying these factors yields the following range of unit costs for use in the analysis:

	Capacity Category		
Component	Baseline (2 mgd)	Low (0.25 mgd)	Medium (0.5 mgd)
Filtration	$0.17	$0.70	$0.52
Disinfection (mech. equip)	$0.03	$0.10	$0.08
Disinfection (structure)	$0.24	$0.94	$0.71

WASTEWATER REUSE FEASIBILITY STUDY

Prepared for

CITY OF FORT LAUDERDALE

Prepared by

CH2M HILL

January 1994

Table 5-9
Cost Estimates for 4-mgd Coral Ridge WWTP
Irrigation Alternative

Component	Value
Phase 2 O&M Costs	296,000
Annual Cost	1,961,000
Present Value	
Phase 2 Present Value (Capital and O&M Costs)	$9,580,000
Replacement Equipment Costs	
Headworks	$ 134,000
Aeration Basin	106,000
Odor Control System	288,000
RAS/WAS Pump Station	109,000
Secondary Clarifiers	157,000
Effluent Filtration	220,000
Disinfection and Effluent Pumping	227,000
Electrical and I&C	202,000
Mob/Bond/Ins	72,000
Contingency	217,000
Contractor OH/Profit	217,000
Engineering/Legal/Administration	487,000
Total Replacement Equipment Costs	$2,437,000
Present Value	742,000
Total Present Value	$27,574,000
Present Value of Salvage Value	$1,866,000
Total Adjusted Present Value	$25,708,000

Table 5-9
Cost Estimates for 4-mgd Coral Ridge WWTP
Irrigation Alternative

Component	Value
Phase 1 Capital Costs	
Headworks	$ 173,000
Aeration Basin	403,000
Odor Control	318,000
RAS/WAS Pump Station	157,000
Secondary Clarifiers	269,000
Effluent Filtration	310,000
Disinfection and Effluent Pumping	471,000
Reclaimed Water Storage and Recycle Pumping	1,095,000
Effluent Reuse System	2,000,000
Sitework	261,000
Finishes	188,000
Mechanical	452,000
Electrical and I&C	781,000
Yard Piping	458,000
Mob/Bond/Ins	367,000
Contingency	1,100,000
Contractor OH/Profit	1,100,000
Engineering/Legal/Administration	2,480,000
Total Estimated Phase 1 Capital Costs	12,385,000
Phase 1 O&M Costs	
Annual Cost	505,000
Present Value	4,867,000
Phase 1 Present Value (Capital and O&M costs)	$17,252,000
Phase 2 Capital Costs	
Headworks	$ 104,000
Aeration Basin	367,000
RAS/WAS Pump Station	32,000
Secondary Clarifiers	269,000
Effluent Filtration	310,000
Disinfection and Effluent Pumping	148,000
Effluent Reuse System	8,049,000
Sitework	295,000
Finishes	181,000
Mechanical	406,000
Electrical and I&C	953,000
Yard Piping	268,000
Mob/Bond/Ins	569,000
Contingency	1,710,000
Contractor OH/Profit	1,710,000
Engineering/Legal/Administration	3,800,000
Total Phase 2 Capital Costs	19,205,000

.16/941
.24/941

Present Value Analysis and Annual Costs for Coral Ridge WWTP Irrigation Alternative
Equipment Purchased in 1993
(2 mgd expanded to 4 mgd)

Present Value Analysis for Purchase Year 1993

EQUIPMENT ITEM	TYPE	UNITS	SIZE/ CAPACITY PER UNIT	LIFE	UNIT COST	INSTALLED CAPITAL COST
HEADWORKS						
Mechanical Bar Screen	Parkson	1		15	$103,500	$103,500
Manual Bar Screen		1		15	$3,000	$3,000
Slide Gates		6		15	$4,400	$26,400
Prefab. Fiberglass Building	Plasti-Fab	1		30	$25,000	$25,000
Screening Hopper/Chute		1		15	$1,500	$1,500
Concrete (18" Slab on Grade)		14 CY		30	$140	$2,000
Concrete (10" Slab at Elevation)		8 CY		30	$300	$2,400
Concrete (14" Walls)		30 CY		30	$290	$8,700
HEADWORKS SUBTOTAL						$172,500
AERATION BASIN (COVERED)						
Fine-Bubble Aeration	Sanitaire	6250 Sq. Ft.		15	$8	$50,000
Blowers	Hoffman	2	200 HP	15	$28,000	$56,000
Aeration Equip. Building		800 Sq. Ft.		30	$45	$36,000
Concrete (24" Slab)		460 CY		30	$140	$64,400
Concrete (18" Walls)		360 CY		30	$250	$90,000
Concrete (12" Walls)		165 CY		30	$300	$49,500
Concrete (10" Cover Slab)		190 CY		30	$300	$57,000
AERATION BASIN SUBTOTAL						$402,900
ODOR CONTROL SYSTEM						
Scrubber System (8 Ft. Diameter by 24 Ft. Heigh Tower)	Jacobs Group	2		15	$140,000	$280,000
Concrete Containment		120 CY		30	$250	$30,000
NaOH Chemical Storage Tank		1	2,000 gallon	15	$3,500	$3,500
NaOCl Chemical Storage Tank		1	3,000 gallon	15	$4,600	$4,600
ODOR CONTROL SYSTEM SUBTOTAL						$318,100
RAS/WAS PUMP STATION						
WAS Pumps	Flygt	2	100 gpm	15	$9,500	$19,000
RAS Pumps	Flygt	3	1,400 gpm	15	$22,425	$67,300
RAS Pump VFD		1		15	$23,000	$23,000
Concrete (12" Slab)		35 CY		30	$140	$4,900
Pump Building		940 Sq. Ft.		30	$45	$42,300
PUMP STATION SUBTOTAL						$156,500

Present Value Analysis and Annual Costs for Coral Ridge WWTP Irrigation Alternative
Equipment Purchased in 1993 (Continued)
(2 mgd expanded to 4 mgd)

Present Value Analysis for Purchase Year 1993

EQUIPMENT ITEM	TYPE	UNITS	SIZE/ CAPACITY PER UNIT	LIFE	UNIT COST	INITIAL CAPITAL COST
SECONDARY CLARIFIERS						
Clarifier (60 ft. Diameter) - Structure	EIMCO	2		30	$56,000	$112,000
Clarifier (60 ft. Diameter) - Mechanical	EIMCO	2		15	$24,000	$48,000
Fiberglass Clarifier Dome	Syntechnics	2		15	$50,300	$100,600
Scum Pump (Double Diaphragm)	Penn Valley	1		15	$8,500	$8,500
SECONDARY CLARIFIER SUBTOTAL						$269,100
EFFLUENT FILTRATION						
Effluent Filters	Aqua-Aerobics	2		15	$110,000	$220,000
Filter Building		2000 Sq. Ft.		30	$45	$90,000
EFFLUENT FILTRATION SUBTOTAL						$310,000
DISINFECTION AND EFFLUENT PUMPING						
Chlorine Contact Basin/Eff. Pumping		2		30	$63,800	$127,600
Effluent Pumps	Flygt	3	850 gpm	15	$10,000	$30,000
Chlorine Equipment Building	Fisher & Porter	1910 Sq. Ft.		30	$45	$86,000
Chlorination Equipment (Includes Chlorinators, Ejectors, Switchover System, and Alarm)		1	> 384 lb/d	15	$77,000	$77,000
Emergency Scrubber	EST	1		15	$120,000	$120,000
Scrubber Containment		120 CY		30	$250	$30,000
DISINFECTION SUBTOTAL						$470,600
PROCESS EQUIPMENT CAPITAL COST SUBTOTAL (1993)						$2,099,700

MISCELLANEOUS CONSTRUCTION COSTS		
ALLOWANCES		
SITEWORK	5%	$190,900
FINISHES	4%	$152,700
MECHANICAL	10%	$381,800
ELECTRICAL & I&C	14%	$534,500
YARD PIPING	12%	$458,100
PROCESS ALLOWANCES SUBTOTAL		$1,718,000
PROCESS EQUIPMENT SUBTOTAL (1993)		$3,817,700

Present Value Analysis and Annual Costs for Coral Ridge WWTP Irrigation Alternative
Equipment Purchased in 1993 (Continued)
(2 mgd expanded to 4 mgd)

Present Value Analysis for Purchase Year 1993

EQUIPMENT ITEM	TYPE	UNITS	SIZE/ CAPACITY PER UNIT	LIFE	UNIT COST	INITIAL CAPITAL COST
EFFLUENT REUSE SYSTEM						
Storage Tanks	CROM	2	3.6 Mgal	30	$540,000	$1,080,000
Recycle Pump	Cornell	1	1400 gpm	15	$15,000	$15,000
Reuse System						
Pipeline (to Golf Course Storage Pond)		1,000 ft.	10 in. diam.	50	$40	$40,000
Transmission Pipeline		2,700 ft.	16 in. diam.	50	$64	$172,800
Transmission Pipeline		2,280 ft.	12 in. diam.	50	$48	$109,400
Transmission Pipeline		6,226 ft.	10 in. diam.	50	$40	$249,000
Fittings & Valves (15% of Pipe Cost)						$85,700
Jack & Bore Road Crossings		2		30	$40,000	$80,000
Sub-Distribution Piping Systems (Residential)		1,100 Lots		30	$1,152	$1,267,200
REUSE SYSTEM CAPITAL COST SUBTOTAL (1993)						$3,099,100
MISCELLANEOUS CONSTRUCTION COSTS						
ALLOWANCES						
SITEWORK	2%					$70,400
FINISHES	1%					$35,200
MECHANICAL	2%					$70,400
ELECTRICAL & I&C	7%					$246,500
REUSE ALLOWANCES SUBTOTAL						$422,500
REUSE SYSTEM SUBTOTAL (1993)						$3,521,600
SUBTOTAL ALL CONSTRUCTION COSTS (1993)						$7,339,300
MOBILIZATION/BOND/INSURANCE	5%					$367,000
CONTINGENCY	15%					$1,100,900
CONTRACTOR'S OH&PROFIT	15%					$1,100,900
TOTAL CONSTRUCTION COST (1993)						$9,908,100
ENGINEERING/LEGAL/ADMIN	25%					$2,477,000
TOTAL CAPITAL COST (1993)						$12,385,100

Present Value Analysis and Annual Costs for Coral Ridge WWTP
Equipment Purchased in 1993 (Continued)
(2 mgd expanded to 4 mgd)

Annual Power Costs for Equipment Purchased in 1993

ITEM	Total Number of Units	Unit Horsepower	Number of Units Operating	Daily Hrs. of Use per Unit	Total Power (KWH)	TOTAL ANNUAL POWER COST (at $0.09/KWH)
Mechanical Bar Screen	1	1.5	1	24	26.85	$880
Odor Control Blower	2	25	2	24	894.84	$29,400
NaOH Solution Recirculation Pumps	2	0.2	2	24	7.16	$240
NaOCl Solution Recirculation Pump	2	0.5	2	24	17.90	$590
Aeration Blowers	2	200	1	24	3579.36	$117,580
Secondary Clarifier Drive	2	2	2	24	71.59	$2,350
Scum Pump	1	10	1	12	89.48	$2,940
RAS Pumps	3	30	2	24	1073.81	$35,270
WAS Pumps	2	2	1	10	14.91	$490
Effluent Pumps	3	30	2	24	1073.81	$35,270
Effluent Filter	2	20	2	2	59.66	$1,960
Misc. Site Lighting	N/A	N/A	N/A	12	211.00	$6,930
POWER COST SUBTOTAL						$233,900

Annual Chemical Costs for Equipment Purchased in 1993

CHEMICAL	Dosage (mg/L)	Consumption (lbs/Day)	Unit Cost ($/lb)	TOTAL ANNUAL CHEMICAL COSTS
Chlorine (Effluent)	10	300	$0.10	$10,950
CHEMICAL COST SUBTOTAL				$10,950

Annual Labor Costs for Equipment Purchased in 1993

JOB	Number of Employees	Annual Salary	TOTAL ANNUAL SALARY COSTS
Operators (4 - Shift 1, 1ea - Shift 2 & 3)	4	$33,000	$132,000
Laborers (1 - Shift 1, 0.5 ea Shift 2 & 3)	0	$29,000	$0
Mechanics (1 - Shift 1, 0.5 ea Shift 2 & 3)	1	$34,000	$34,000
LABOR COST SUBTOTAL			$166,000
EQUIPMENT REPLACEMENT MATERIALS AND MAINTENANCE (5% OF EQUIPMENT COST)			$57,300
PIPE REPLACEMENT MATERIALS AND MAINTENANCE (2% OF PIPE COST)			$36,800
TOTAL ANNUAL OPERATION, MATERIALS, AND MAINTENANCE COST			$504,950
PRESENT WORTH OF ANNUAL COSTS			
PRESENT WORTH YEAR		20	
DISCOUNT RATE		8.25	
PRESENT WORTH FACTOR		9.6381	
PRESENT VALUE ANNUAL COSTS (1993)			$4,866,800
TOTAL PRESENT VALUE (CAPITAL AND O&M) FOR EQUIPMENT PURCHASED IN 1993			$17,251,900

Present Value Analysis and Annual Costs for Coral Ridge WWTP Irrigation Alternative
Equipment Purchased in 2003
(2 mgd expanded to 4 mgd)

Present Value Analysis for Purchase Year 2003

EQUIPMENT ITEM	TYPE	UNITS	SIZE/ CAPACITY PER UNIT	LIFE	UNIT COST	INSTALLED CAPITAL COST
HEADWORKS						
Mechanical Bar Screen	Parkson	1		15	$103,500	$103,500
HEADWORKS SUBTOTAL						$103,500
AERATION BASIN (COVERED)						
Fine-Bubble Aeration	Sanitaire	6250 Sq. Ft.		15	$8	$50,000
Blowers	Hoffman	2	200 HP	15	$28,000	$56,000
Concrete (24" Slab)		460 CY		30	$140	$64,400
Concrete (18" Walls)		360 CY		30	$250	$90,000
Concrete (12" Walls)		165 CY		30	$300	$49,500
Concrete (10" Cover Slab)		190 CY		30	$300	$57,000
AERATION BASIN SUBTOTAL						$366,900
RAS/WAS PUMP STATION						
WAS Pumps	Flygt	1	100 gpm	15	$9,500	$9,500
RAS Pumps	Flygt	1	1,400 gpm	15	$22,425	$22,400
PUMP STATION SUBTOTAL						$31,900
SECONDARY CLARIFIERS						
Clarifier (60 ft. Diameter) - Structure		2		30	$56,000	$112,000
Clarifier (60 ft. Diameter) - Mechanical		2		15	$24,000	$48,000
Fiberglass Clarifier Dome	Syntechnics	2		15	$50,300	$100,600
Scum Pump (Double Diaphragm)	Penn Valley	1		15	$8,500	$8,500
SECONDARY CLARIFIER SUBTOTAL						$269,100
EFFLUENT FILTRATION						
Effluent Filters (Covered)	Aqua-Aerobics	2		15	$110,000	$220,000
Filter Building		2000 Sq. Ft.		30	$45	$90,000
EFFLUENT FILTRATION SUBTOTAL						$310,000
DISINFECTION AND EFFLUENT PUMPING						
Chlorine Contact Basin/Effl. Pumping		2		30	$63,800	$127,600
Effluent Pumps		2	850 gpm	15	$10,000	$20,000
DISINFECTION SUBTOTAL						$147,600
PROCESS EQUIPMENT CAPITAL COST SUBTOTAL (2003)						$1,229,000

Present Value Analysis and Annual Costs for Coral Ridge WWTP Irrigation Alternative
Equipment Purchased in 2003
(2 mgd expanded to 4 mgd)

Present Value Analysis for Purchase Year 2003

MISCELLANEOUS CONSTRUCTION COSTS		
ALLOWANCES		
SITEWORK	5%	$111,700
FINISHES	4%	$89,400
MECHANICAL	10%	$223,500
ELECTRICAL & I&C	14%	$312,800
YARD PIPING	12%	$268,100
PROCESS ALLOWANCES SUBTOTAL		$1,005,500
PROCESS EQUIPMENT SUBTOTAL (2003)		$2,234,500

EQUIPMENT ITEM	TYPE	UNITS	SIZE/ CAPACITY PER UNIT	LIFE	UNIT COST	INSTALLED CAPITAL COST
EFFLUENT REUSE SYSTEM						
Storage Tanks	CROM	2	3.6 Mgal	30	$540,000	$1,080,000
Reuse System						$0
Transmission Pipeline		7,541 ft.	10 in. diam.	50	$40	$301,600
Transmission Pipeline		8,613 ft.	8 in. diam.	50	$32	$275,600
Transmission Pipeline		9,646 ft.	6 in. diam.	50	$24	$231,500
Fittings & Valves (15% of Pipe Cost)						$121,300
Jack & Bore Road Crossings		8		30	$40,000	$320,000
Water Crossings		3		30	$20,000	$60,000
Sub-Distribution Piping Systems (Residential)		4,912 Lots		30	$1,152	$5,658,600
REUSE SYSTEM CAPITAL COST SUBTOTAL (2003)						$8,048,600
MISCELLANEOUS CONSTRUCTION COSTS						
ALLOWANCES						
SITEWORK	2%					$182,900
FINISHES	1%					$91,500
MECHANICAL	2%					$182,900
ELECTRICAL & I&C	7%					$640,200
REUSE ALLOWANCES SUBTOTAL						$1,097,500
REUSE SYSTEM SUBTOTAL (2003)						$9,146,100
SUBTOTAL ALL CONSTRUCTION COSTS (2003)						$11,380,600
MOBILIZATION/BOND/INSURANCE	5%					$569,000
CONTINGENCY	15%					$1,707,100
CONTRACTOR'S OH&PROFIT	15%					$1,707,100
TOTAL CONSTRUCTION COST (2003)						$15,363,800
ENGINEERING/LEGAL/ADMIN	25%					$3,841,000
TOTAL CAPITAL COST (2003)						$19,204,800

Present Value Analysis and Annual Costs for Coral Ridge WWTP Irrigation Alternative
Equipment Purchased in 2003 (Continued)
(2 mgd expanded to 4 mgd)

Annual Power Costs for Equipment Purchased in 2003

ITEM	Total Number of Units	Motor Horsepower	Number of Units Operating	Daily Hrs. of Use per Unit	Total Power (KWH)	TOTAL ANNUAL POWER COST (at $0.09/KWH)
Aeration Blowers	2	200	1	24	3579.36	$117,580
Secondary Clarifier Drive	2	2	2	24	71.59	$2,350
Scum Pump	1	10	1	18	134.23	$4,410
RAS Pumps	1	30	1	24	536.90	$17,640
WAS Pumps	1	2	1	10	14.91	$490
Effluent Pumps	2	30	2	4	178.97	$5,880
Misc. Site Lighting	N/A	N/A	N/A	12	211.00	$6,930
POWER COST SUBTOTAL						$155,280

Annual Chemical Costs for Equipment Purchased in 2003

CHEMICAL	Dosage (mg/L)	Consumption (lbs/Day)	Unit Cost ($/lb)	TOTAL ANNUAL CHEMICAL COSTS
Chlorine (Effluent)	10	300	$0.10	$10,950
CHEMICAL COST SUBTOTAL				$10,950

Annual Labor Costs for Equipment Purchased in 2003

JOB	Number of New Employees	Annual Salary	TOTAL ANNUAL SALARY COSTS
No Additional Staff Needed	0	$33,000	$0
LABOR COST SUBTOTAL			$0
EQUIPMENT REPLACEMENT MATERIALS AND MAINTENANCE (5% OF EQUIPMENT COST)			$22,400
PIPE REPLACEMENT MATERIALS AND MAINTENANCE (2% OF PIPE COST)			$129,300
TOTAL ANNUAL OPERATION, MATERIALS, AND MAINTENANCE COST			$295,530

PRESENT WORTH OF ANNUAL COSTS		
PRESENT WORTH YEAR	10	
DISCOUNT RATE	8.25	
PRESENT WORTH FACTOR	6.6351	
PRESENT VALUE ANNUAL COSTS FOR EQUIPMENT PURCHASED IN 2003		$1,960,900
TOTAL PRESENT VALUE (CAPITAL AND O&M) (2003)		$21,165,700
PRESENT WORTH YEAR	10	
DISCOUNT RATE	8.25	
PRESENT WORTH FACTOR	0.4526	
1993 PRESENT VALUE OF TOTAL CAPITAL AND O&M COSTS FOR 2003 EQUIPMENT		$9,579,700
TOTAL PRESENT VALUE OF ALL CAPITAL AND O&M COSTS (1993 AND 2003)		$26,831,600

Present Value Analysis and Annual Costs for Coral Ridge WWTP Irrigation Alternative
Replacement Equipment Purchased in 2008
(2 mgd expanded to 4 mgd)

Present Value Analysis for Replacement Equipment Purchased in 2008

EQUIPMENT ITEM	TYPE	UNITS	SIZE/ CAPACITY PER UNIT	LIFE	UNIT COST	INSTALLED CAPITAL COST
HEADWORKS						
Mechanical Bar Screen	Parkson	1		15	$103,500	$103,500
Manual Bar Screen		1		15	$3,000	$3,000
Slide Gates		6		15	$4,400	$26,400
Screening Hopper/Chute		1		15	$1,500	$1,500
HEADWORKS SUBTOTAL						$134,400
AERATION BASIN (COVERED)						
Fine-Bubble Aeration	Sanitaire	6250 Sq. Ft.		15	$8	$50,000
Blowers	Hoffman	2	200 HP	15	$28,000	$56,000
AERATION BASIN SUBTOTAL						$106,000
ODOR CONTROL SYSTEM						
Scrubber System (8 Ft. Diameter by 24 Ft. Heigh Tower)	Jacobs Group	2		15	$140,000	$280,000
NaOH Chemical Storage Tank		1	2,000 gallon	15	$3,500	$3,500
NaOCl Chemical Storage Tank		1	3,000 gallon	15	$4,600	$4,600
ODOR CONTROL SYSTEM SUBTOTAL						$288,100
RAS/WAS PUMP STATION						
WAS Pumps	Flygt	2	100 gpm	15	$9,500	$19,000
RAS Pumps	Flygt	3	1,400 gpm	15	$22,425	$67,280
RAS Pump VFD		1		15	$23,000	$23,000
PUMP STATION SUBTOTAL						$109,280
SECONDARY CLARIFIERS						
Clarifier (60 ft. Diameter) - Mechanical		2		15	$24,000	$48,000
Fiberglass Clarifier Dome	Syntechnics	2		30	$50,300	$100,600
Scum Pump (Double Diaphragm)	Penn Valley	1		15	$8,500	$8,500
SECONDARY CLARIFIER SUBTOTAL						$157,100

Note: Replacement equipment purchassed in 2008 are assumed to be identical to 1993 equipment. Consequently, O&M costs for the replacement equipment have been included in the present value calculation for 1993 to simplify calculation.

Present Value Analysis and Annual Costs for Coral Ridge WWTP Irrigation Alternative
Replacement Equipment Purchased in 2008 (Continued)
(2 mgd expanded to 4 mgd)

Present Value Analysis for Purchase Year 2008

EQUIPMENT ITEM	TYPE	UNITS	SIZE/ CAPACITY PER UNIT	LIFE	UNIT COST	INITIAL CAPITAL COST
EFFLUENT FILTRATION						
Effluent Filters	Aqua-Aerobics	2		15	$110,000	$220,000
EFFLUENT FILTRATION SUBTOTAL						$220,000
DISINFECTION AND EFFLUENT PUMPING						
Effluent Pumps	Flygt	3	850 gpm	15	$10,000	$30,000
Chlorination Equipment (Includes Chlorinators, Ejectors, Switchover System, and Alarm)		1	> 384 lb/d	15	$77,000	$77,000
Emergency Scrubber	EST	1		15	$120,000	$120,000
DISINFECTION SUBTOTAL						$227,000
PROCESS EQUIPMENT REPLACEMENT COST SUBTOTAL (2008)						$1,241,880

Present Value Analysis for Purchase Year 2008

MISCELLANEOUS CONSTRUCTION COSTS		
ALLOWANCES		
ELECTRICAL & I&C	14%	$202,200
SUBTOTAL CONSTRUCTION COST		$1,444,080
MOBILIZATION/BOND/INSURANCE	5%	$72,200
CONTINGENCY	15%	$216,600
CONTRACTOR'S OH&PROFIT	15%	$216,600
TOTAL CONSTRUCTION COST (2008)		$1,949,480
ENGINEERING/LEGAL/ADMIN	25%	$487,400
TOTAL CAPITAL COST (2008)		$2,436,880
PRESENT WORTH YEAR	15	
DISCOUNT RATE	8.25	
PRESENT WORTH FACTOR	0.3045	
1993 PRESENT VALUE OF REPLACEMENT EQUIPMENT COSTS FOR 2008		$742,000

TOTAL NET PRESENT VALUE	$27,573,600

Present Value Analysis and Annual Costs for Coral Ridge WWTP Irrigation Alternative
Equipment Salvage Values
(2 mgd expanded to 4 mgd)

ITEM	Total Number of Units Purchased 1993	2003	2008	Life (Years)	Original Cost	TOTAL SALVAGE VALUE
HEADWORKS						
Mechanical Bar Screen	1	1	1	15	$103,500	$103,500
Manual Bar Screen	1	0	1	15	$3,000	$2,000
Slide Gates	6	0	6	15	$4,400	$17,600
Prefab. Fiberglass Building	1	0	0	30	$25,000	$8,300
Screening Hopper/Chute	1	0	1	15	$1,500	$1,000
AERATION BASIN						
Fine-Bubble Aeration	6250 Sq. Ft.	6250 Sq. Ft.	6250 Sq. Ft.	15	$8	$50,000
Blowers	2	2	2	15	$28,000	$56,000
Aeration Equip. Building	800 Sq. Ft.	0	0	30	$45	$12,000
ODOR CONTROL SYSTEM						
Scrubber System	2	0	2	15	$140,000	$186,700
NaOH Storage Tank	1	0	1	15	$3,500	$2,300
NaOCl Storage Tank	1	0	1	15	$4,600	$3,100
RAS/WAS PUMP STATION						
WAS Pumps	2	1	2	15	$9,500	$15,800
RAS Pumps	3	1	3	15	$22,425	$52,300
RAS Pumps VFD	1	0	1	15	$23,000	$15,300
Pump Building	940 Sq. Ft.	0	0	30	$45	$14,100
SECONDARY CLARIFIERS						
Clarifiers - Structure	2	2	0	30	$56,000	$112,000
Clarifiers - Mechanical	2	2	2	15	$24,000	$48,000
Fiberglass Clarifier Dome	2	2	2	15	$50,300	$100,600
Scum Pumps	1	1	1	15	$8,500	$8,500
EFFLUENT FILTRATION						
Effluent Filters (Covered)	2	2	2	15	$110,000	$220,000
Filter Building	2000 Sq. Ft.	2000 Sq. Ft.	0	30	$45	$90,000
DISINFECTION						
Chlorine Contact Basins	2	2	0	30	$63,800	$127,600
Effluent Pumps	3	2	3	15	$10,000	$26,700
Disinfection Building	1910 Sq. Ft.	0	0	30	$45	$86,000
Chlorine Equipment	1	0	1	15	$77,000	$51,300
Emergency Scrubber	1	0	1	15	$120,000	$80,000

Present Value Analysis and Annual Costs for Coral Ridge WWTP Irrigation Alternative
Equipment Salvage Values
(2 mgd expanded to 4 mgd)

ITEM	Total Number of Units Purchased 1993	2003	2008	Life (Years)	Original Cost	TOTAL SALVAGE VALUE
RECLAIMED WATER STORAGE						
Storage Tanks	2	2	0	30	$540,000	$1,080,000
Recycle Pumps	1	0	1	15	$15,000	$17,500
Pipeline (to Golf Course Storage Pond)	1,000 ft.	0	0	50	$40	$24,000
Transmission Pipeline (16 in. diam.)	2,700 ft.	0	0	50	$64	$103,700
Transmission Pipeline (12 in. diam.)	2,280 ft.	0	0	50	$48	$77,800
Transmission Pipeline (10 in. diam.)	6,226 ft.	7,541 ft.	0	50	$40	$306,100
Transmission Pipeline (8 in. diam.)	0	8,613 ft.	0	50	$32	$220,500
Transmission Pipeline (6 in. diam.)	0	9,646 ft.	0	50	$24	$185,200
Jack & Bore Road Crossings	2	8	0	30	$40,000	$256,000
Water Crossings	0	3	0	30	$20,000	$60,000
Sub-Distribution Piping Systems (Residential)	1,100 Lots	4,912 Lots	0	30	$1,152	$5,287,200

TOTAL SALVAGE VALUE	$9,108,700
PRESENT VALUE OF SALVAGE VALUE	$1,866,373

ADJUSTED PRESENT VALUE	$25,707,227

Alternative 1 - Large Users (Montery Service Area)

Present Value Analysis for Phase 1, Year 1998

CAPITAL COST

Phase I, 1998

ITEM	QUANTITY		SIZE		LIFE	UNIT COST	CAPITAL COST
WASTEWATER TREATMENT FACILITIES							
Filtration	*1*		*0.07*	(mgd)	15	*$0.70*	*$49,000*
High-level Disinfection (Mech. Equi	*1*		*0.07*	(mgd)	15	*$0.10*	*$7,000*
High-level Disinfection (Structures)	*1*		*0.07*	(mgd)	30	*$0.94*	*$65,800*
Irrigation Pumps	*2*		*300*	(gpm)	15	*$15,000*	*$30,000*
	0		*600*	(gpm)	15	*$15,000*	*$0*
Storage Tanks	*1*		*0.25*	(mg)	30	$100,000	*$100,000*
SUBTOTAL							$251,800
REUSE PIPELINES							
Transmission Pipelines	*0*	(ft)	16	(in)	50	$48	$0
	7,637	(ft)	12	(in)	50	$36	$274,900
	0	(ft)	10	(in)	50	$30	$0
	0	(ft)	8	(in)	50	$24	$0
	2,512	(ft)	6	(in)	50	$18	$45,200
	1,950	(ft)	4	(in)	50	$12	$23,400
Service Connections & BFP	*5*	EA			50	$1,000	$5,000
Valves and Appurt. (5% pipe costs)					15		$17,200
Jack & Bore Road Crossings	*2*				30	$20,000	$40,000
SUBTOTAL							$405,700
REUSE SYSTEM CAPITAL COST SUBTOTAL							$657,500

Phase II, 2003 / Phase III, 2008

ITEM	Phase II QUANTITY		SIZE		CAPITAL COST	Phase III QUANTITY		SIZE		CAPITAL COST
WASTEWATER TREATMENT FACILITIES										
Filtration	*1*		*0.07*	(mgd)	*$49,000*	*1*		*0.07*	(mgd)	*$49,000*
High-level Disinfection (Mech. Equi	*1*		*0.07*	(mgd)	*$7,000*	*1*		*0.07*	(mgd)	*$7,000*
High-level Disinfection (Structures)	*1*		*0.07*	(mgd)	*$65,800*	*1*		*0.07*	(mgd)	*$65,800*
Irrigation Pumps	*0*		*300*	(gpm)	$0	*1*		*300*	(gpm)	*$15,000*
	1		*600*	(gpm)	$15,000	*0*		*600*	(gpm)	*$0*
Storage Tanks	*0*		*0*	(mg)	$0	*1*		*0.25*	(mg)	*$100,000*
SUBTOTAL					$136,800					$236,800
REUSE PIPELINES										
Transmission Pipelines	*0*	(ft)	16	(in)	$0	*0*	(ft)	16	(in)	$0
	7,637	(ft)	12	(in)	$274,900	*7,637*	(ft)	12	(in)	$274,900
	0	(ft)	10	(in)	$0	*0*	(ft)	10	(in)	$0
	0	(ft)	8	(in)	$0	*0*	(ft)	8	(in)	$0
	2,512	(ft)	6	(in)	$45,200	*2,512*	(ft)	6	(in)	$45,200
	1,950	(ft)	4	(in)	$23,400	*1,950*	(ft)	4	(in)	$23,400
Service Connections & BFP	*5*	EA			$5,000	*5*	EA			$5,000
Valves and Appurt. (5% pipe costs)					$17,200					$17,200
Jack & Bore Road Crossings	*2*				$40,000	*2*				$40,000
SUBTOTAL					$405,700					$405,700
REUSE SYSTEM CAPITAL COST SUBTOTAL					$542,500					$642,500

Phase IV, 2013

ITEM	QUANTITY		SIZE		CAPITAL COST
WASTEWATER TREATMENT FACILITIES					
Filtration	*1*		*0.07*	(mgd)	*$49,000*
High-level Disinfection (Mech. Equi	*1*		*0.07*	(mgd)	*$7,000*
High-level Disinfection (Structures)	*1*		*0.07*	(mgd)	*$65,800*
Irrigation Pumps	*0*		*300*	(gpm)	*$0*
	1		*600*	(gpm)	*$15,000*
Storage Tanks	*0*		*0*	(mg)	*$0*
SUBTOTAL					$136,800
REUSE PIPELINES					
Transmission Pipelines	*0*	(ft)	16	(in)	$0
	7,637	(ft)	12	(in)	$274,900
	0	(ft)	10	(in)	$0
	0	(ft)	8	(in)	$0
	2,512	(ft)	6	(in)	$45,200
	1,950	(ft)	4	(in)	$23,400
Service Connections & BFP	*5*	EA			$5,000
Valves and Appurt. (5% pipe costs)					$17,200
Jack & Bore Road Crossings	*2*				$40,000
SUBTOTAL					$405,700
REUSE SYSTEM CAPITAL COST SUBTOTAL					$542,500

CAPITAL COST (CONTINUED)

ITEM	Phase I 1998					Phase II 2003			Phase III 2008			Phase IV 2013		
	QUANTITY	SIZE	LIFE	UNIT COST	CAPITAL COST	QUANTITY	SIZE	CAPITAL COST	QUANTITY	SIZE	CAPITAL COST	QUANTITY	SIZE	CAPITAL COST
MISCELLANEOUS CONSTRUCTION COSTS														
ALLOWANCES FOR WASTEWATER TREATMENT FACILITIES														
SITEWORK	5.0%				$21,300	5.0%		$11,600	5.0%		$20,100	5.0%		$11,600
YARD PIPING	10%				$42,700	10%		$23,200	10%		$40,100	10%		$23,200
FINISHES	2.0%				$8,500	2.0%		$4,600	2.0%		$8,000	2.0%		$4,600
MECHANICAL	10%				$42,700	10%		$23,200	10%		$40,100	10%		$23,200
ELECTRICAL & I&C	14%				$59,700	14%		$32,500	14%		$56,200	14%		$32,500
SUBTOTAL					**$174,900**			**$95,100**			**$164,500**			**$95,100**
ALLOWANCES FOR REUSE PIPELINE FACILITIES														
SITEWORK	3.0%				$14,200	3.0%		$14,200	3.0%		$14,200	3.0%		$14,200
FINISHES	1.0%				$4,700	1.0%		$4,700	1.0%		$4,700	1.0%		$4,700
MECHANICAL	3%				$14,200	3%		$14,200	3%		$14,200	3%		$14,200
ELECTRICAL & I&C	7%				$33,000	7%		$33,000	7%		$33,000	7%		$33,000
SUBTOTAL					**$66,100**			**$66,100**			**$66,100**			**$66,100**
REUSE SYSTEM ALLOWANCE SUBTOTAL					**$241,000**			**$161,200**			**$230,600**			**$161,200**
SUBTOTAL ALL CONSTRUCTION COSTS					**$898,500**			**$703,700**			**$873,100**			**$703,700**
MOB/BOND/INSURANCE	5%				$44,900	5%		$35,200	5%		$43,700	5%		$35,200
CONTINGENCY	15%				$134,800	15%		$105,600	15%		$131,000	15%		$105,600
CONTRACTOR'S OH&PROFIT	15%				$139,268	15%		$109,074	15%		$135,331	15%		$109,074
TOTAL CONSTRUCTION COST					**$1,217,500**			**$953,574**			**$1,183,131**			**$953,574**
ENGINEERING/LEGAL/ADMIN	30%				$365,300	30%		$286,100	30%		$354,900	30%		$286,100
TOTAL CAPITAL COST					**$1,582,800**			**$1,239,674**			**$1,538,031**			**$1,239,674**

OPERATION AND MAINTENANCE COST														
	Phase I, 1998					Phase II, 2003			Phase III, 2008			Phase IV, 2013		
ITEM	QUANTITY	SIZE	(%)		O&M COST	QUANTITY	SIZE	ADDED O&M COST	QUANTITY	SIZE	ADDED O&M COST	QUANTITY	SIZE	ADDED O&M COST
WASTEWATER TREATMENT FACILITIES														
Filtration		*0.07* (mgd)	2%		*$980*		*0.07* (mgd)	*$980*		*0.07* (mgd)	*$980*		*0.07* (mgd)	*$980*
High-level Disinfection (Mech. Equip.)		*0.07* (mgd)	2%		*$140*		*0.07* (mgd)	*$140*		*0.07* (mgd)	*$140*		*0.07* (mgd)	*$140*
High-level Disinfection (Structures)		*0.07* (mgd)	1%		*$658*		*0.07* (mgd)	*$658*		*0.07* (mgd)	*$658*		*0.07* (mgd)	*$658*
Irrigation Pumps		*600* (gpm)	0.076	$/kw-hr	*$5,505*		*600* (gpm)	*$5,505*		*300* (gpm)	*$2,752*		*600* (gpm)	*$5,505*
Storage Tanks		*0.25* (MG)	1%		*$1,000*		*0* (MG)	*$0*		*0.25* (MG)	*$1,000*		*0* (MG)	*$0*
SUBTOTAL					$8,283			$7,283			$5,530			$7,283
REUSE PIPELINE FACILITIES														
Transmission Pipelines	12,099	(ft)	0.5%		$1,718	12,099	(ft)	$1,718	12,099	(ft)	$1,718	12,099	(ft)	$1,718
Service Connections & BFP	5	EA	1.0%		$50	5	EA	$50	5	EA	$50	5	EA	$50
SUBTOTAL					$1,768			$1,768			$1,768			$1,768
Contingency	15%				$1,500			$1,400			$1,100			$1,400
TOTAL OPERATIONS AND MAINTENANCE COST					$11,550			$10,450			$8,398			$10,450

SALVAGE VALUES

ITEM	Phase I, 1998 QUANTITY	SIZE	LIFE (YRS)	YEAR 20 SALVAGE VALUE	Phase II, 2003 QUANTITY	SIZE	YEAR 20 SALVAGE VALUE	Phase III, 2008 QUANTITY	SIZE	YEAR 20 SALVAGE VALUE	Phase IV, 2013 QUANTITY	SIZE	YEAR 20 SALVAGE VALUE
WASTEWATER TREATMENT FACILITIES													
Filtration		0.07 (mgd)	15	$0		0.07 (mgd)	$0		0.07 (mgd)	$18,783		0.07 (mgd)	$37,567
High-level Disinfection (Mech. Equip.)		0.07 (mgd)	15	$0		0.07 (mgd)	$0		0.07 (mgd)	$2,683		0.07 (mgd)	$5,367
High-level Disinfection (Structures)		0.07 (mgd)	30	$25,223		0.07 (mgd)	$37,835		0.07 (mgd)	$50,447		0.07 (mgd)	$63,058
Irrigation Pumps		600 gpm	15	$0		600 gpm	$0		300 gpm	$5,750		600 gpm	$11,500
Storage Tanks		0.25 (mg)	30	$38,333		0 (mg)	$0		0.25 (mg)	$76,667		0 (mg)	$0
SUBTOTAL				$63,557			$37,835			$154,330			$117,492
REUSE PIPELINE FACILITIES													
Transmission Pipelines	12,099 (ft)		50	$237,015	12,099 (ft)		$276,518	12,099 (ft)		$316,020	12,099 (ft)		$355,523
Service Connections & BFP	5 EA		50	$3,450	5 EA		$4,025	5 EA		$4,600	5 EA		$5,175
SUBTOTAL				$240,465			$280,543			$320,620			$360,698
Equipment Replacement				$0			$0			$0			$46,333
TOTAL SALVAGE VALUE, YEAR 20				$304,022			$318,378			$474,950			$524,523

EQUIPMENT REPLACEMENT

ITEM	Phase I, 1998 QUANTITY	SIZE	LIFE (YRS)	CAPITAL COST	Phase II, 2003 QUANTITY	SIZE	CAPITAL COST	Phase III, 2008 QUANTITY	SIZE	CAPITAL COST	Phase IV, 2013 QUANTITY	SIZE	CAPITAL COST
Filtration		0 mgd	15	$0		0 mgd	$0		0 mgd	$0		0.07 mgd	$49,000
Disinfection (mech. equip.)		0 mgd	15	$0		0 mgd	$0		0 mgd	$0		0.07 mgd	$7,000
Irrigation Pumps		0 gpm	15	$0		0 gpm	$0		0 gpm	$0		600 gpm	$13,500
SUBTOTAL REPLACEMENT COSTS				$0			$0			$0			$69,500
MOB/BOND/INSURANCE	5%			$0	5%		$0	5%		$0	5%		$3,500
CONTINGENCY	15%			$0	15%		$0	15%		$0	15%		$10,400
CONTRACTOR'S OH&PROFIT	15%			$0	15%		$0	15%		$0	15%		$10,773
TOTAL REPLACEMENT COST				$0			$0			$0			$94,173

PRESENT WORTH (BASED ON ANNUAL CAPITAL COST) ANALYSIS

PROJECT: **United Water Florida Reuse Feasibility Study**

ALTERNATIVE: **Alternative 1 - Large Users (Montery Service Area)**

Number of Sewer Customers in Service Area	5300
Number of Customers Served (large users)	20
Estimated Reuse Demand (AADF)	0.28 MGD

YR.	CAPITAL COST	O&M COST $	REUSE REVENUE	WATER SAVINGS	DIS.RATE 7.63%	PRESENT WORTH	ADJUSTED P/W
0	**$1,583,000**				1.0000	$1,583,000	$1,583,000
1		$11,550	$9,965	$8,623	0.9292	$1,473	($6,539)
2		$11,550	$9,965	$8,623	0.8633	$1,369	($6,076)
3		$11,550	$9,965	$8,623	0.8022	$1,272	($5,645)
4		$11,550	$9,965	$8,623	0.7453	$1,182	($5,245)
5	**$1,240,000**	$11,550	$9,965	$8,623	0.6925	$859,827	$853,855
6		$22,000	$19,929	$17,246	0.6435	$1,333	($9,765)
7		$22,000	$19,929	$17,246	0.5979	$1,238	($9,073)
8		$22,000	$19,929	$17,246	0.5555	$1,151	($8,430)
9		$22,000	$19,929	$17,246	0.5162	$1,069	($7,833)
10	**$1,538,000**	$22,000	$19,929	$17,246	0.4796	$738,600	$730,329
11		$30,398	$29,894	$25,869	0.4456	$225	($11,303)
12		$30,398	$29,894	$25,869	0.4140	$209	($10,502)
13		$30,398	$29,894	$25,869	0.3847	$194	($9,758)
14		$30,398	$29,894	$25,869	0.3575	$180	($9,067)
15	**$1,333,674**	$30,398	$29,894	$25,869	0.3321	$443,115	$434,523
16		$40,848	$40,285	$34,862	0.3086	$174	($10,584)
17		$40,848	$40,285	$34,862	0.2867	$161	($9,835)
18		$40,848	$40,285	$34,862	0.2664	$150	($9,138)
19		$40,848	$40,285	$34,862	0.2475	$139	($8,490)
20	**($1,622,000)**	$40,848	$40,285	$34,862	0.2300	($372,938)	($380,957)
TOTAL PRESENT WORTH						**$3,263,000**	**$3,083,000**

Alternative 2 - Residential Reuse (Montery Service Area)

Present Value Analysis for Phase 1, Year 1997

CAPITAL COST														
	Phase I, 1998					Phase II, 2003			Phase III, 2008			Phase IV, 2013		
ITEM	QUANTITY	SIZE	LIFE	UNIT COST	CAPITAL COST	QUANTITY	SIZE	CAPITAL COST	QUANTITY	SIZE	CAPITAL COST	QUANTITY	SIZE	CAPITAL COST
WASTEWATER TREATMENT FACILITIES														
Filtration	1	0.43 (mgd)	15	$0.52	$223,600	1	0.43 (mgd)	$223,600	1	0.43 (mgd)	$223,600	1	0.43 (mgd)	$223,600
High-level Disinfection (Mech. Equip	1	0.43 (mgd)	15	$0.08	$34,400	1	0.43 (mgd)	$34,400	1	0.43 (mgd)	$34,400	1	0.43 (mgd)	$34,400
High-level Disinfection (Structures)	1	0.43 (mgd)	30	$0.71	$305,300	1	0.43 (mgd)	$305,300	1	0.43 (mgd)	$305,300	1	0.43 (mgd)	$305,300
Irrigation Pumps	2	450 (gpm)	15	$15,000	$30,000	0	450 (gpm)	$0	1	450 (gpm)	$15,000	0	450 (gpm)	$0
	1	900 (gpm)	15	$15,000	$15,000	1	900 (gpm)	$15,000	0	900 (gpm)	$0	1	900 (gpm)	$15,000
Storage Tanks	1	1.25 (mg)	30	$425,000	$425,000	0	0 (mg)	$0	1	1.25 (mg)	$425,000	0	0 (mg)	$0
SUBTOTAL					$1,033,300			$578,300			$1,003,300			$578,300
REUSE PIPELINES														
Transmission Pipelines	0 (ft)	20 (in)	50	$60	$0	0 (ft)	20 (in)	$0	0 (ft)	20 (in)	$0	0 (ft)	20 (in)	$0
	4,487 (ft)	16 (in)	50	$48	$215,400	4488 (ft)	16 (in)	$215,400	4487 (ft)	16 (in)	$215,400	4488 (ft)	16 (in)	$215,400
	0 (ft)	12 (in)	50	$36	$0	0 (ft)	12 (in)	$0	0 (ft)	12 (in)	$0	0 (ft)	12 (in)	$0
	7,062 (ft)	10 (in)	50	$30	$211,900	7063 (ft)	10 (in)	$211,900	7062 (ft)	10 (in)	$211,900	7063 (ft)	10 (in)	$211,900
	5,450 (ft)	8 (in)	50	$24	$130,800	5,450 (ft)	8 (in)	$130,800	5,450 (ft)	8 (in)	$130,800	5,450 (ft)	8 (in)	$130,800
	1,212 (ft)	6 (in)	50	$18	$21,800	1,213 (ft)	6 (in)	$21,800	1,212 (ft)	6 (in)	$21,800	1,213 (ft)	6 (in)	$21,800
Retrofit Neighborhood Distribution Piping	1,062 ea		50	$800	$849,600	1,063		$850,400	1,062		$849,600	1,063		$850,400
Service Connections & BFP	1,062 ea		50	$300	$318,600	1,063 (HH)		$318,900	1,062 (HH)		$318,600	1,063 (HH)		$318,900
Valves and Appurt. (5% pipe costs)			15		$71,500			$71,500			$71,500			$71,500
Jack & Bore Road Crossings	3		30	$20,000	$60,000	3		$60,000	3		$60,000	3		$60,000
SUBTOTAL					$1,879,600			$1,880,700			$1,879,600			$1,880,700
REUSE SYSTEM CAPITAL COST SUBTOTAL					$2,912,900			$2,459,000			$2,882,900			$2,459,000

CAPITAL COST (CONTINUED)

ITEM	Phase I, 1998 QUANTITY	SIZE	LIFE	UNIT COST	CAPITAL COST	Phase II, 2003 QUANTITY	SIZE	CAPITAL COST	Phase III, 2008 QUANTITY	SIZE	CAPITAL COST	Phase IV, 2013 QUANTITY	SIZE	CAPITAL COST
MISCELLANEOUS CONSTRUCTION COSTS														
ALLOWANCES FOR WASTEWATER TREATMENT FACILITIES														
SITEWORK	5.0%				$87,600	5.0%		$49,000	5.0%		$85,000	5.0%		$49,000
YARD PIPING	10%				$175,100	10%		$98,000	10%		$170,100	10%		$98,000
FINISHES	2.0%				$35,000	2.0%		$19,600	2.0%		$34,000	2.0%		$19,600
MECHANICAL	10%				$175,100	10%		$98,000	10%		$170,100	10%		$98,000
ELECTRICAL & I&C	14%				$245,200	14%		$137,200	14%		$238,100	14%		$137,200
SUBTOTAL					**$718,000**			**$401,800**			**$697,300**			**$401,800**
ALLOWANCES FOR REUSE PIPELINE FACILITIES														
SITEWORK	3.0%				$65,600	3.0%		$65,600	3.0%		$65,600	3.0%		$65,600
FINISHES	1.0%				$21,900	1.0%		$21,900	1.0%		$21,900	1.0%		$21,900
MECHANICAL	3%				$65,600	3%		$65,600	3%		$65,600	3%		$65,600
ELECTRICAL & I&C	7%				$153,000	7%		$153,100	7%		$153,000	7%		$153,100
SUBTOTAL					**$306,100**			**$306,200**			**$306,100**			**$306,200**
REUSE SYSTEM ALLOWANCE SUBTOTAL					**$1,024,100**			**$708,000**			**$1,003,400**			**$708,000**

ITEM	Phase I QUANTITY				CAPITAL COST	Phase II QUANTITY		CAPITAL COST	Phase III QUANTITY		CAPITAL COST	Phase IV QUANTITY		CAPITAL COST
SUBTOTAL ALL CONSTRUCTION COSTS					**$3,937,000**			**$3,167,000**			**$3,886,300**			**$3,167,000**
MOB/BOND/INSURANCE	5%				$196,900	5%		$158,400	5%		$194,300	5%		$158,400
CONTINGENCY	15%				$590,600	15%		$475,100	15%		$582,900	15%		$475,100
CONTRACTOR'S OH&PROFIT	15%				$610,235	15%		$490,885	15%		$602,377	15%		$490,885
TOTAL CONSTRUCTION COST					**$5,334,735**			**$4,291,385**			**$5,265,877**			**$4,291,385**
ENGINEERING/LEGAL/ADMIN	30%				$1,600,400	30%		$1,287,400	30%		$1,579,800	30%		$1,287,400
TOTAL CAPITAL COST					**$6,935,100**			**$5,578,785**			**$6,845,677**			**$5,578,785**

OPERATION AND MAINTENANCE COST													
	Phase I, 1998				Phase II, 2003			Phase III, 2008			Phase IV, 2013		
ITEM	QUANTITY	SIZE	(%)	O&M COST	QUANTITY	SIZE	ADDED O&M COST	QUANTITY	SIZE	ADDED O&M COST	QUANTITY	SIZE	ADDED O&M COST
WASTEWATER TREATMENT FACILITIES													
Filtration		*0.43* (mgd)	2%	*$4,472*		*0.43* (mgd)	*$4,472*		*0.43* (mgd)	*$4,472*		*0.43* (mgd)	*$4,472*
High-level Disinfection (Mech. Equip.)		*0.43* (mgd)	2%	*$688*		*0.43* (mgd)	*$688*		*0.43* (mgd)	*$688*		*0.43* (mgd)	*$688*
High-level Disinfection (Structures)		*0.43* (mgd)	1%	*$3,053*		*0.43* (mgd)	*$3,053*		*0.43* (mgd)	*$3,053*		*0.43* (mgd)	*$3,053*
Irrigation Pumps		*1800* (gpm)	0.076 $/kw-hr	*$16,514*		*900* (gpm)	*$8,257*		*450* (gpm)	*$4,128*		*900* (gpm)	*$8,257*
Storage Tanks		*1.25* (MG)	1%	*$4,250*		*0* (MG)	*$0*		*1.25* (MG)	*$4,250*		*0* (MG)	*$0*
SUBTOTAL				**$28,977**			**$16,470**			**$16,591**			**$16,470**
REUSE PIPELINE FACILITIES													
Transmission Pipelines	18,211 (ft)		0.5%	$2,900	18,214 (ft)		$2,900	18,211 (ft)		$2,900	18,214 (ft)		$2,900
Retrofit Neighborhood Piping			0.5%	$4,248			$4,252			$4,248			$4,252
Service Connections & BFP	1062 ea		1.0%	$3,186	1063 (HH)		$3,189	1062 (HH)		$3,186	1063 (HH)		$3,189
SUBTOTAL				**$10,334**			**$10,341**			**$10,334**			**$10,341**
Contingency	15%			$5,900			$4,000			$4,000			$4,000
TOTAL OPERATIONS AND MAINTENANCE COST				**$45,210**			**$30,810**			**$30,925**			**$30,810**

SALVAGE VALUES

ITEM	Phase I, 1998 QUANTITY	SIZE	LIFE (YRS)	YEAR 20 SALVAGE VALUE	Phase II, 2003 QUANTITY	SIZE	YEAR 20 SALVAGE VALUE	Phase III, 2008 QUANTITY	SIZE	YEAR 20 SALVAGE VALUE	Phase IV, 2013 QUANTITY	SIZE	YEAR 20 SALVAGE VALUE
WASTEWATER TREATMENT FACILITIES													
Filtration		0.43 (mgd)	15	$0		0.43 (mgd)	$0		0.43 (mgd)	$85,713		0.43 (mgd)	$171,427
High-level Disinfection (Mech Equip.)		0.43 (mgd)	15	$0		0.43 (mgd)	$0		0.43 (mgd)	$13,187		0.43 (mgd)	$26,373
High-level Disinfection (Structures)		0.43 (mgd)	30	$117,032		0.43 (mgd)	$175,548		0.43 (mgd)	$234,063		0.43 (mgd)	$292,579
Irrigation Pumps		1800 gpm	15	$0		900 gpm	$0		450 gpm	$5,750		900 gpm	$11,500
Storage Tanks		1.25 (mg)	30	$162,917		0 (mg)	$0		1.25 (mg)	$325,833		0 (mg)	$0
SUBTOTAL				**$279,948**			**$175,548**			**$664,547**			**$501,879**
REUSE PIPELINE FACILITIES													
Transmission Pipelines	18,211 (ft)		50	$253,920	18,214 (ft)		$296,240	18,211 (ft)		$338,560	18,214 (ft)		$380,880
Retrofit Neighborhood Piping	1,062 ea		50	$586,224	1,063 ea		$684,572	1,062 ea		$781,632	1,063 ea		$880,164
Service Connections & BFP	1062 ea		50	$219,834	1063 ea		$256,715	1062 ea		$293,112	1063 ea		$330,062
SUBTOTAL				**$1,059,978**			**$1,237,527**			**$1,413,304**			**$1,591,106**
Equipment Replacement													**$185,500**
TOTAL SALVAGE VALUE, YEAR 20				**$1,339,926**			**$1,413,074**			**$2,077,851**			**$2,278,485**

EQUIPMENT REPLACEMENT

ITEM	Phase I, 1998 QUANTITY	SIZE	LIFE (YRS)	CAPITAL COST	Phase II, 2003 QUANTITY	SIZE	CAPITAL COST	Phase III, 2008 QUANTITY	SIZE	CAPITAL COST	Phase IV, 2013 QUANTITY	SIZE	CAPITAL COST
Filtration		0 mgd	15	$0		0 mgd	$0		0 mgd	$0		0.43 mgd	$223,600
Disinfection (mech. equip.)		0 mgd	15	$0		0 mgd	$0		0 mgd	$0		0.43 mgd	$34,400
Irrigation Pumps		0 gpm	15	$0		0 gpm	$0		0 gpm	$0		1800 gpm	$20,250
SUBTOTAL REPLACEMENT COSTS				**$0**			**$0**			**$0**			**$278,250**
MOB/BOND/INSURANCE	5%			$0	5%		$0	5%		$0	5%		$13,900
CONTINGENCY	15%			$0	15%		$0	15%		$0	15%		$41,700
CONTRACTOR'S OH&PROFIT	15%			$0	15%		$0	15%		$0	15%		$43,129
TOTAL REPLACEMENT COST				**$0**			**$0**			**$0**			**$376,979**

PRESENT WORTH (BASED ON ANNUAL CAPITAL COST) ANALYSIS

PROJECT: **United Water Florida Reuse Feasibility Study**

ALTERNATIVE: **Alternative 2 - Residential Reuse (Montery Service Area)**

Number of Sewer Customers in Service Area	5300
Number of Customers Served (residential users)	4250
Estimated Reuse Demand (AADF)	1.70 MGD

YR.	CAPITAL COST	O&M COST $	REUSE REVENUE	WATER SAVINGS	DIS.RATE 7.63%	PRESENT WORTH	ADJUSTED P/W
0	**$6,935,000**				1.0000	$6,935,000	$6,935,000
1		$45,210	$117,713	$105,941	0.9292	($67,366)	($165,801)
2		$45,210	$117,713	$105,941	0.8633	($62,593)	($154,054)
3		$45,210	$117,713	$105,941	0.8022	($58,158)	($143,140)
4		$45,210	$117,713	$105,941	0.7453	($54,038)	($132,999)
5	**$5,579,000**	$45,210	$117,713	$105,941	0.6925	$3,813,376	$3,740,009
6		$76,021	$235,425	$211,883	0.6435	($102,570)	($238,908)
7		$76,021	$235,425	$211,883	0.5979	($95,303)	($221,982)
8		$76,021	$235,425	$211,883	0.5555	($88,551)	($206,255)
9		$76,021	$235,425	$211,883	0.5162	($82,278)	($191,642)
10	**$6,846,000**	$76,021	$235,425	$211,883	0.4796	$3,206,811	$3,105,195
11		$106,946	$353,138	$317,824	0.4456	($109,706)	($251,331)
12		$106,946	$353,138	$317,824	0.4140	($101,933)	($233,525)
13		$106,946	$353,138	$317,824	0.3847	($94,711)	($216,980)
14		$106,946	$353,138	$317,824	0.3575	($88,001)	($201,608)
15	**$5,956,000**	$106,946	$353,138	$317,824	0.3321	$1,896,374	$1,790,817
16		$137,756	$465,375	$418,838	0.3086	($101,102)	($230,353)
17		$137,756	$465,375	$418,838	0.2867	($93,939)	($214,033)
18		$137,756	$465,375	$418,838	0.2664	($87,283)	($198,869)
19		$137,756	$465,375	$418,838	0.2475	($81,100)	($184,780)
20	**($7,109,000)**	$137,756	$465,375	$418,838	0.2300	($1,710,457)	($1,806,792)
TOTAL PRESENT WORTH						**$12,772,000**	**$10,578,000**
					COST PER GALLON OF REUSE	**$7.51**	**$6.22**
					ANNUAL COST PER CUSTOMER SERVED	**$150**	**$124**
					ANNUAL COST PER SERVICE AREA SEWER CUSTOMER	**$120**	**$100**

Alternative 3 - Golf Course Reuse

Present Value Analysis for Phase 1, Year 1997

CAPITAL COST														
	Phase I, 1998					Phase II, 2003			Phase III, 2008			Phase IV, 2013		
ITEM	QUANTITY	SIZE	LIFE	UNIT COST	CAPITAL COST	QUANTITY	SIZE	CAPITAL COST	QUANTITY	SIZE	CAPITAL COST	QUANTITY	SIZE	CAPITAL COST
WASTEWATER TREATMENT FACILITIES														
Holly Oaks WWTF:														
Filtration	1	0.188 (mgd)	15	$0.70	$131,600	0	NA (mgd)	$0	0	NA (mgd)	$0	0	NA (mgd)	$0
Disinfection (mech. equip.)	1	0.188 (mgd)	15	$0.10	$18,800	0	NA (mgd)	$0	0	NA (mgd)	$0	0	NA (mgd)	$0
Disinfection (structure)	1	0.188 (mgd)	30	$0.94	$176,700	0	NA (mgd)	$0	0	NA (mgd)	$0	0	NA (mgd)	$0
Irrigation Pumps	1	200 (gpm)	15	$15,000	$15,000	0	NA (gpm)	$0	0	NA (gpm)	$0	0	NA (gpm)	$0
	0	(gpm)	15	$15,000	$0	0	NA (gpm)	$0	0	NA (gpm)	$0	0	NA (gpm)	$0
Storage	1	0.5 (MG)	30	$200,000	$200,000	0	NA (MG)	$0	0	NA (MG)	$0	0	NA (MG)	$0
Holly Oaks WWTF Subtotal					$542,100			$0			$0			$0
Royal Lakes WWTF:														
Filtration	0	(mgd)	15	$0.70	$0	1	0.312 (mgd)	$218,400	0	NA (mgd)	$0	0	NA (mgd)	$0
Disinfection (mech. equip.)	0	(mgd)	15	$0.10	$0	1	0.312 (mgd)	$31,200	0	NA (mgd)	$0	0	NA (mgd)	$0
Disinfection (structure)	0	(mgd)	30	$0.94	$0	1	0.312 (mgd)	$293,280	0	NA (mgd)	$0	0	NA (mgd)	$0
Irrigation Pumps	0	(gpm)	15	$15,000	$0	1	325 (gpm)	$15,000	0	NA (gpm)	$0	0	NA (gpm)	$0
	0	(gpm)	15	$15,000	$0	0	(gpm)	$0	0	NA (gpm)	$0	0	NA (gpm)	$0
Storage	0	(MG)	30	$200,000	$0	1	0.5 (MG)	$200,000	0	NA (MG)	$0	0	NA (MG)	$0
Royal Lakes WWTF Subtotal					$0			$757,880			$0			$0
San Jose WWTF:														
Filtration	0	(mgd)	15	$0.70	$0	0	(mgd)	$0	1	0.25 (mgd)	$175,000	0	NA (mgd)	$0
Disinfection (mech. equip.)	0	(mgd)	15	$0.10	$0	0	(mgd)	$0	1	0.25 (mgd)	$25,000	0	NA (mgd)	$0
Disinfection (structure)	0	(mgd)	30	$0.94	$0	0	(mgd)	$0	1	0.25 (mgd)	$235,000	0	NA (mgd)	$0
Irrigation Pumps	0	(gpm)	15	$15,000	$0	0	(gpm)	$0	1	260 (gpm)	$15,000	0	NA (gpm)	$0
	0	(gpm)	15	$15,000	$0	0	(gpm)	$0	0	(gpm)	$0	0	NA (gpm)	$0
Storage	0	(MG	30	$200,000	$0	0	(MG)	$0	1	0.5 (MG)	$200,000	0	NA (MG)	$0
San Jose WWTF Subtotal					$0			$0			$650,000			$0
Ponte Vedra WWTF:														
Filtration	1	0.59 (mgd)	15	$0.52	$306,800	0	NA (mgd)	$0	0	NA (mgd)	$0	0	NA (mgd)	$0
Disinfection (mech. equip.)	1	0.59 (mgd)	15	$0.08	$47,200	0	NA (mgd)	$0	0	NA (mgd)	$0	0	NA (mgd)	$0
Disinfection (structure)	1	0.59 (mgd)	30	$0.71	$418,900	0	NA (mgd)	$0	0	NA (mgd)	$0	0	NA (mgd)	$0
Irrigation Pumps	1	620 (gpm)	15	$15,000	$15,000	0	NA (gpm)	$0	0	NA (gpm)	$0	0	NA (gpm)	$0
	0	(gpm)	15	$15,000	$0	0	NA (gpm)	$0	0	NA (gpm)	$0	0	NA (gpm)	$0
Storage	1	0.5 (MG)	30	$200,000	$200,000	0	NA (MG)	$0	0	NA (MG)	$0	0	NA (MG)	$0
Ponte Vedra WWTF Subtotal					$987,900			$0			$0			$0
WASTEWATER FACILITY SUBTOTAL					$1,530,000			$757,880			$650,000			$0

REUSE PIPELINES																						
Transmission Pipelines:																						
Holly Oaks WWTF (Mill Cove GC)	*4,200*	(ft)	6	(in)	50	$18	$75,600	*0*	(ft)	6	(in)	$0	*0*	(ft)	6	(in)	$0	*0*	(ft)	6	(in)	$0
Royal Lakes WWTF (Baymeadows CC)		(ft)	6	(in)	50	$18	$0	*5250*	(ft)	6	(in)	$94,500	*0*	(ft)	6	(in)	$0	*0*	(ft)	6	(in)	$0
San Jose WWTF (San Jose CC)		(ft)	6	(in)	50	$18	$0	*0*	(ft)	6	(in)	$0	*3,800*	(ft)	6	(in)	$68,400	*0*	(ft)	6	(in)	$0
Ponte Vedra WWTF (Ponte Vedra CC)	*3,750*	(ft)	8	(in)	50	$24	$90,000	*0*	(ft)	8	(in)	$0	*0*	(ft)	8	(in)	$0	*0*	(ft)	8	(in)	$0
Service Connections & BFP	*2*	EA			50	$1,000	$2,000	*1*	EA			$1,000	*1*	EA			$1,000	*0*	EA			$0
Valves and Appurt. (5% pipe costs)					15		$8,300					$4,700					$3,400					$0
Jack & Bore Road Crossings	*2*				30	$20,000	$40,000	*1*				$20,000	*1*				$20,000	*0*				$0
SUBTOTAL							**$215,900**					**$120,200**					**$92,800**					**$0**
REUSE SYSTEM CAPITAL COST SUBTOTAL							**$1,745,900**					**$878,080**					**$742,800**					**$0**

CAPITAL COST (CONTINUED)

ITEM	Phase I, 1998					Phase II, 2003			Phase III, 2008			Phase IV, 2013		
	QUANTITY	SIZE	LIFE	UNIT COST	CAPITAL COST	QUANTITY	SIZE	CAPITAL COST	QUANTITY	SIZE	CAPITAL COST	QUANTITY	SIZE	CAPITAL COST
MISCELLANEOUS CONSTRUCTION COSTS														
ALLOWANCES FOR WASTEWATER TREATMENT FACILITIES														
SITEWORK	5%				$129,700	5%		$64,200	5%		$55,100	5%		$0
YARD PIPING	10%				$259,300	10%		$128,500	10%		$110,200	10%		$0
FINISHES	2%				$51,900	2%		$25,700	2%		$22,000	2%		$0
MECHANICAL	10%				$259,300	10%		$128,500	10%		$110,200	10%		$0
ELECTRICAL & I&C	14%				$363,100	14%		$179,800	14%		$154,200	14%		$0
SUBTOTAL					**$1,063,300**			**$526,700**			**$451,700**			**$0**
ALLOWANCES FOR EFFLUENT IRRIGATION FACILITIES														
SITEWORK	3%				$7,500	3%		$4,200	3%		$3,200	3%		$0
FINISHES	1%				$2,500	1%		$1,400	1%		$1,100	1%		$0
MECHANICAL	3%				$7,500	3%		$4,200	3%		$3,200	3%		$0
ELECTRICAL & I&C	7%				$17,600	7%		$9,800	7%		$7,600	7%		$0
SUBTOTAL					**$35,100**			**$19,600**			**$15,100**			**$0**
REUSE SYSTEM ALLOWANCE SUBTOTAL					**$1,098,400**			**$546,300**			**$466,800**			**$0**

SUBTOTAL ALL CONSTRUCTION COSTS					**$2,844,300**			**$1,424,380**			**$1,209,600**			**$0**
MOB/BOND/INSURANCE	5%				$142,200	5%		$71,200	5%		$60,500	5%		$0
CONTINGENCY	15%				$426,600	15%		$213,700	15%		$181,400	15%		$0
CONTRACTOR'S OH&PROFIT	15%				$440,867	15%		$220,779	15%		$187,488	15%		$0
TOTAL CONSTRUCTION COST					**$3,854,000**			**$1,930,100**			**$1,639,000**			**$0**
ENGINEERING/LEGAL/ADMIN	30%				$1,156,200	30%		$579,000	30%		$491,700	30%		$0
TOTAL CAPITAL COST					**$5,010,200**			**$2,509,100**			**$2,130,700**			**$0**

OPERATION AND MAINTENANCE COST

ITEM	Phase I, 1998 QUANTITY	SIZE	(%)		O&M COST	Phase II, 2003 QUANTITY	SIZE	ADDED O&M COST	Phase III, 2008 QUANTITY	SIZE	ADDED O&M COST	Phase IV, 2013 QUANTITY	SIZE	ADDED O&M COST
WASTEWATER TREATMENT FACILITIES														
Holly Oaks WWTF														
Filtration		*0.188* (mgd)	2%		*$2,600*		*NA* (mgd)	*$0*		*NA* (mgd)	*$0*		*NA* (mgd)	*$0*
Disinfection		*0.188* (mgd)	2%		*$3,900*		*NA* (mgd)	*$0*		*NA* (mgd)	*$0*		*NA* (mgd)	*$0*
Irrigation Pumps		*200* (gpm)	0.076	($/kw-hr)	*$600*		*NA* (gpm)	*$0*		*NA* (gpm)	*$0*		*NA* (gpm)	*$0*
Storage		*0.5* (MG)	1%		*$2,000*		*NA* (MG)	*$0*		*NA* (MG)	*$0*		*NA* (MG)	*$0*
Holly Oaks WWTF Subtotal					*$9,100*			*$0*			*$0*			*$0*
Royal Lakes WWTF														
Filtration		*0* (mgd)	2%		*$0*		*0.312* (mgd)	*$4,400*		*0* (mgd)	*$0*		*0* (mgd)	*$0*
Disinfection		*0* (mgd)	2%		*$0*		*0.312* (mgd)	*$6,500*		*0* (mgd)	*$0*		*0* (mgd)	*$0*
Irrigation Pumps		*0* (gpm)	0.076	($/kw-hr)	*$0*		*325* (gpm)	*$1,400*		*NA* (gpm)	*$0*		*NA* (gpm)	*$0*
Storage		*0* (MG)	1%		*$0*		*0.5* (MG)	*$2,000*		*NA* (MG)	*$0*		*NA* (MG)	*$0*
Royal Lakes WWTF Subtotal					*$0*			*$14,300*			*$0*			*$0*
San Jose WWTF														
Filtration		*0* (mgd)	2%		*$0*		*0* (mgd)	*$0*		*0.25* (mgd)	*$3,500*		*0* (mgd)	*$0*
Disinfection		*0* (mgd)	2%		*$0*		*0* (mgd)	*$0*		*0.25* (mgd)	*$5,200*		*0* (mgd)	*$0*
Irrigation Pumps		*0* (gpm)	0.076	($/kw-hr)	*$0*		*NA* (gpm)	*$0*		*260* (gpm)	*$1,100*		*NA* (gpm)	*$0*
Storage		*0* (MG)	1%		*$0*		*0* (MG)	*$0*		*0.5* (MG)	*$2,000*		*NA* (MG)	*$0*
San Jose WWTF Subtotal					*$0*			*$0*			*$11,800*			*$0*
Ponte Vedra WWTF														
Filtration		*0.59* (mgd)	2%		*$6,100*		*0* (mgd)	*$0*		*0* (mgd)	*$0*		*NA* (mgd)	*$0*
Disinfection		*0.59* (mgd)	2%		*$9,300*		*0* (mgd)	*$0*		*0.5* (mgd)	*$0*		*NA* (mgd)	*$0*
Irrigation Pumps		*620* (gpm)	0.076	($/kw-hr)	*$3,600*		*NA* (gpm)	*$0*		*NA* (gpm)	*$0*		*NA* (gpm)	*$0*
Storage		*0* (MG)	1%		*$2,000*		*NA* (MG)	*$0*		*NA* (MG)	*$0*		*NA* (MG)	*$0*
Ponte Vedra WWTF Subtotal					*$21,000*			*$0*			*$0*			*$0*
SUBTOTAL					**$30,100**			**$14,300**			**$11,800**			**$0**
EFFLUENT IRRIGATION FACILITIES														
Transmission Pipelines:														
Holly Oaks WWTF	4,200	(ft)	0.5%		$400	0	(ft)	$0	0	(ft)	$0	0	(ft)	$0
Royal Lakes WWTF	0	(ft)	0.5%		$0	5,250	(ft)	$500	0	(ft)	$0	0	(ft)	$0
San Jose WWTF	0	(ft)	0.5%		$0	0	(ft)	$0	3,800	(ft)	$300	0	(ft)	$0
Ponte Vedra WWTF	3,750	(ft)	0.5%		$500	0	(ft)	$0	0	(ft)	$0	0	(ft)	$0
Service Connections & BFP	2	EA	1.0%		$20	1	EA	$10	1	EA	$10	0	EA	$0
SUBTOTAL					**$900**			**$500**			**$300**			**$0**
Contingency	15%				$4,700			$2,200			$1,800			$0
TOTAL OPERATIONS AND MAINTENANCE COST					**$35,700**			**$17,000**			**$13,900**			**$0**

ITEM	Phase I, 1998 QUANTITY	SIZE	LIFE (YRS)	YEAR 20 SALVAGE VALUE	Phase II, 2003 QUANTITY	SIZE	YEAR 20 SALVAGE VALUE	Phase III, 2008 QUANTITY	SIZE	YEAR 20 SALVAGE VALUE	Phase IV, 2013 QUANTITY	SIZE	YEAR 20 SALVAGE VALUE
SALVAGE VALUES													
WASTEWATER TREATMENT FACILITIES													
Holly Oaks WWTF:													
Filtration	0.188	(mgd)	15	$0	NA	(mgd)	$0	NA	(mgd)	$0	NA	(mgd)	$0
Disinfection (mech. equip.)	0.188	(mgd)	15	$0	NA	(mgd)	$0	NA	(mgd)	$0	NA	(mgd)	$0
Disinfection (structure)	0.188	(mgd)	30	$67,735	NA	(mgd)	$0	NA	(mgd)	$0	NA	(mgd)	$0
Irrigation Pumps	200	(gpm)	15	$0	NA	(gpm)	$0	NA	(gpm)	$0	NA	(gpm)	$0
	0	(gpm)	15	$0	NA	(gpm)	$0	NA	(gpm)	$0	NA	(gpm)	$0
Storage	0.5	(MG)	30	$76,667	NA	(MG)	$0	NA	(MG)	$0	NA	(MG)	$0
Holly Oaks WWTF Subtotal				*$144,400*			*$0*			*$0*			*$0*
Royal Lakes WWTF:													
Filtration	0	(mgd)	15	$0	0.312	(mgd)	$0	NA	(mgd)	$0	NA	(mgd)	$0
Disinfection (mech. equip.)	0	(mgd)	15	$0	0.312	(mgd)	$0	NA	(mgd)	$0	NA	(mgd)	$0
Disinfection (structure)	0	(mgd)	30	$0	0.312	(mgd)	$168,636	NA	(mgd)	$0	NA	(mgd)	$0
Irrigation Pumps	0	(gpm)	15	$0	325	(gpm)	$0	NA	(gpm)	$0	NA	(gpm)	$0
	0	(gpm)	15	$0	0	(gpm)	$0	NA	(gpm)	$0	NA	(gpm)	$0
Storage	0	(MG)	30	$0	0.5	(MG)	$115,000	NA	(MG)	$0	NA	(MG)	$0
Royal Lakes WWTF Subtotal				*$0*			*$283,600*			*$0*			*$0*
San Jose WWTF													
Filtration	0	(mgd)	15	$0	0	(mgd)	$0	0.25	(mgd)	$67,083	NA	(mgd)	$0
Disinfection (mech. equip.)	0	(mgd)	15	$0	0	(mgd)	$0	0.25	(mgd)	$9,583	NA	(mgd)	$0
Disinfection (structure)	0	(mgd)	30	$0	0	(mgd)	$0	0.25	(mgd)	$180,167	NA	(mgd)	$0
Irrigation Pumps	0	(gpm)	15	$0	0	(gpm)	$0	260	(gpm)	$5,750	NA	(gpm)	$0
	0	(gpm)	15	$0	0	(gpm)	$0	0	(gpm)	$0	NA	(gpm)	$0
Storage	0	(MG)	30	$0	0	(MG)	$0	0.5	(MG)	$153,333	NA	(MG)	$0
San Jose WWTF Subtotal				*$0*			*$0*			*$415,900*			*$0*
Ponte Vedra WWTF													
Filtration	0.59	(mgd)	15	$0	NA	(mgd)	$0	NA	(mgd)	$0	NA	(mgd)	$0
Disinfection (mech. equip.)	0.59	(mgd)	15	$0	NA	(mgd)	$0	NA	(mgd)	$0	NA	(mgd)	$0
Disinfection (structure)	0.59	(mgd)	30	$160,578	NA	(mgd)	$0	NA	(mgd)	$0	NA	(mgd)	$0
Irrigation Pumps	620	(gpm)	15	$0	NA	(gpm)	$0	NA	(gpm)	$0	NA	(gpm)	$0
	0	(gpm)	15	$0	NA	(gpm)	$0	NA	(gpm)	$0	NA	(gpm)	$0
Storage	0.5	(MG)	30	$76,667	NA	(MG)	$0	NA	(MG)	$0	NA	(MG)	$0
Ponte Vedra WWTF Subtotal				*$237,200*			*$0*			*$0*			*$0*
WATEWATER FACILITIES SUBTOTAL				**$381,600**			**$283,600**			**$415,900**			**$0**
EFFLUENT IRRIGATION FACILITIES													
Transmission Pipelines:													
Holly Oaks WWTF	4,200	(ft)	50	$52,164	0	(ft)	$0	0	(ft)	$0	0	(ft)	$0
Royal Lakes WWTF	0	(ft)	50	$0	5,250	(ft)	$76,073	0	(ft)	$0	0	(ft)	$0
San Jose WWTF	0	(ft)	50	$0	0	(ft)	$0	3,800	(ft)	$62,928	0	(ft)	$0
Ponte Vedra WWTF	3,750	(ft)	50	$62,100	0	(ft)	$0	0	(ft)	$0	0	(ft)	$0
Service Connections & BFP	2	EA	50	$1,380	1	EA	$805	1	EA	$920	0	EA	$0
SUBTOTAL				**$115,644**			**$76,878**			**$63,848**			**$0**
Equipment Replacement													**$356,267**
TOTAL SALVAGE VALUE, YEAR 20				**$497,244**			**$360,478**			**$479,748**			**$356,267**

EQUIPMENT REPLACEMENT

ITEM	Phase I, 1998 QUANTITY	SIZE	LIFE (YRS)	CAPITAL COST	Phase II, 2003 QUANTITY	SIZE	CAPITAL COST	Phase III, 2008 QUANTITY	SIZE	CAPITAL COST	Phase IV, 2013 QUANTITY	SIZE	CAPITAL COST
Holly Oaks WWTF													
Filtation		0 (mgd)	15	$0		(mgd)	$0		(mgd)	$0		0.188 (mgd)	$131,600
Disinfection (mech. equip.)		0 (mgd)	15	$0		(mgd)	$0		(mgd)	$0		0.188 (mgd)	$18,800
Irrigation Pumps		0 (gpm)	15	$0		(gpm)	$0		(gpm)	$0		200 (gpm)	$15,000
Holly Oaks WWTF Subtotal				$0			$0			$0			$165,400
Royal Lakes WWTF													
Filtation		0 (mgd)	15	$0		(mgd)	$0		(mgd)	$0		0 (mgd)	$0
Disinfection (mech. equip.)		0 (mgd)	15	$0		(mgd)	$0		(mgd)	$0		0 (mgd)	$0
Irrigation Pumps		0 (gpm)	15	$0		(gpm)	$0		(gpm)	$0		0 (gpm)	$0
Royal Lakes WWTF Subtotal				$0			$0			$0			$0
San Jose WWTF													
Filtation		0 (mgd)	15	$0		(mgd)	$0		(mgd)	$0		0 (mgd)	$0
Disinfection (mech. equip.)		0 (mgd)	15	$0		(mgd)	$0		(mgd)	$0		0 (mgd)	$0
Irrigation Pumps		0 (gpm)	15	$0		(gpm)	$0		(gpm)	$0		0 (gpm)	$0
San Jose WWTF Subtotal				$0			$0			$0			$0
Ponte Vedra WWTF													
Filtation		0 (mgd)	15	$0		(mgd)	$0		(mgd)	$0		0.59 (mgd)	$306,800
Disinfection (mech. equip.)		0 (mgd)	15	$0		(mgd)	$0		(mgd)	$0		0.59 (mgd)	$47,200
Irrigation Pumps		0 (gpm)	15	$0		(gpm)	$0		(gpm)	$0		620 (gpm)	$15,000
Ponte Vedra WWTF Subtotal				$0			$0			$0			$369,000
SUBTOTAL REPLACEMENT COSTS				$0			$0			$0			$534,400
MOB/BOND/INSURANCE	5%			$0	5%		$0	5%		$0	5%		$26,700
CONTINGENCY	15%			$0	15%		$0	15%		$0	15%		$80,200
CONTRACTOR'S OH&PROFIT	15%			$0	15%		$0	15%		$0	15%		$82,832
TOTAL REPLACEMENT COST				$0			$0			$0			$724,132

PRESENT WORTH (BASED ON ANNUAL CAPITAL COST) ANALYSIS

PROJECT: **United Water Florida Reuse Feasibility Study**

ALTERNATIVE: **Alternative 3 - Golf Course Reuse**

Number of Sewer Customers (system-wide)	20000
Number of Users (Golf Courses)	4
Estimated Reuse Demand (AADF)	1.34 MGD

YR.	CAPITAL COST	O&M COST $	REUSE REVENUE	WATER SAVINGS	DIS.RATE 7.63%	PRESENT WORTH	ADJUSTED P/W
0	$5,010,200				1.0000	$5,010,200	$5,010,200
1		$35,700	$110,891	$71,084	0.9292	($69,864)	($135,911)
2		$35,700	$110,891	$71,084	0.8633	($64,914)	($126,282)
3		$35,700	$110,891	$71,084	0.8022	($60,315)	($117,335)
4		$35,700	$110,891	$71,084	0.7453	($56,042)	($109,022)
5	$2,509,100	$35,700	$110,891	$71,084	0.6925	$1,685,538	$1,636,311
6		$52,700	$155,190	$134,299	0.6435	($65,948)	($152,364)
7		$52,700	$155,190	$134,299	0.5979	($61,276)	($141,569)
8		$52,700	$155,190	$134,299	0.5555	($56,935)	($131,539)
9		$52,700	$155,190	$134,299	0.5162	($52,901)	($122,220)
10	$2,130,700	$52,700	$155,190	$134,299	0.4796	$972,705	$908,297
11		$66,600	$190,749	$165,071	0.4456	($55,322)	($128,880)
12		$66,600	$190,749	$165,071	0.4140	($51,403)	($119,749)
13		$66,600	$190,749	$165,071	0.3847	($47,761)	($111,265)
14		$66,600	$190,749	$165,071	0.3575	($44,377)	($103,382)
15	$724,132	$66,600	$190,749	$165,071	0.3321	$199,270	$144,445
16		$66,600	$190,749	$165,071	0.3086	($38,312)	($89,252)
17		$66,600	$190,749	$165,071	0.2867	($35,597)	($82,929)
18		$66,600	$190,749	$165,071	0.2664	($33,075)	($77,053)
19		$66,600	$190,749	$165,071	0.2475	($30,732)	($71,594)
20	$1,693,736	$66,600	$190,749	$165,071	0.2300	$361,012	$323,045
TOTAL PRESENT WORTH						**$7,404,000**	**$6,202,000**
				COST PER GALLON OF REUSE		**$5.53**	**$4.63**
				ANNUAL COST PER GOLF COURSE		**$92,550**	**$77,525**
				ANNUAL COST PER SEWER CUSTOMER (SYSTEM-WIDE)		**$19**	**$16**

Appendix 4

Rate and Fee Analysis Information

Comparison of Rates for Monthly Reclaimed Water Service

Utility System	Type of Service	Flat Monthly Fee	Volume Charge $ per kgal	Comment
City of Venice	Residential	$7.00 / Service	-	NA
City of Venice	Residential	$1.25 / Service	$0.50	0-9,600 gallons
City of Venice	Residential	$1.75 / Service	$0.65	9,600-12,000 gallons
City of Venice	Residential	$1.25 / Service	$0.50	<38,400 gallons
City of Venice	Residential	$1.25 / Service	$0.65	>38,400 gallons
City of Venice	Residential	$1.75 / Service	$0.75	>12,000 gallons
City of Venice	Commercial	$3.00 / Service	NA	NA
City of Venice	Commercial	$1.75 / Service	$0.50	NA
City of Altamonte Springs	Residential	$10.00 / Service	N/A	N/A
City of Altamonte Springs	Multi-Family	$3.00 / Service	$0.78	NA
City of Altamonte Springs	Commercial	$3.00 / Service	$0.78	NA
City of Apopka	Residential	$5.00 / Acre	N/A	N/A
City of Apopka	Commercial	N/A	$0.50	NA
Broward County	Residential/Commercial	$5.40 / Service	$0.07	NA
City of Cocoa	Residential	$5.00 / 0.5 acre or Less	N/A	N/A
City of Cocoa	Commercial	$15.00 / Service	$0.20	<75,000 gallons
City of Cocoa Beach	Residential	$8.00	N/A	N/A
Collier County	Commercial	N/A	$6.00	NA
City of Deland	Commercial	N/A	$0.09	NA
City of Dunedin	Residential/Commercial	$2.00 / Service	$0.50	0-15,000 gallons
City of Dunedin	Residential/Commercial	$2.00 / Service	$0.25	15,000-250,000 gallons
City of Dunedin	Residential/Commercial	$2.00 / Service	$0.10	>250,000 gallons
Hillsborough County	Residential	$6.00 /Service	N/A	N/A
Hillsborough County	Commercial	N/A	$0.45	NA
City of Largo	Residential	$7.00 / Acre or Less	N/A	N/A
City of Largo	Commercial/Industrial	N/A	$0.20	NA
Lee County	Commercial	N/A	$0.13	NA
City of Naples	Commercial	NA	$6.00	NA
City of Port St. Lucie	Residential/Commercial	$6.26 / Service	$0.17	NA
City of New Symma Beach	Residential/Commercial	$10.00 / Service	N/A	NA
City of North Port	Commerical	N/A	$0.23	NA
City of Ormond Beach	Residential/Commercial	$10.00 / Service	N/A	N/A
City of Sanford	Residential/Commercial	$3.25 / Service	$0.10	NA
City of St. Petersburg	Residential	$10.36 / Acre or Less	N/A	N/A
City of St. Petersburg	Commercial/Industrial	10.36 (Minimum) + $5.92/half ac	$0.30	NA
City of Tarpon Springs	Residential/Commercial	N/A	$0.95	NA
City of Vero Beach	At Pressure	N/A	$0.54	NA
City of Vero Beach	Non Pressure	N/A	$0.22	NA
Loxahatchee River Environmental Conservation District (ENCON)	Golf Course	N/A	$0.27	NA
City of Boca Raton	Commerical	$5.00	NA	5/8" meter
City of Boca Raton	Commerical	$120	NA	1" meter
City of Boca Raton	Commerical	$160	NA	2" meter
City of Boca Raton	Commerical	$350	NA	3" meter
City of Boca Raton	Commerical	$1,000	NA	4" meter
City of Boca Raton	Commerical	$2,000	NA	6" meter

Source: Telephone Survey week of November 18, 1996

United Water Florida
Revenue Requirement for Reuse Alternatives
Large Users (Monterey Service Area) Alternative #1
June 5,1997

	Phase I	Phase II	Phase III	Phase IV
1. Total Estimated Construction Cost				
a. WWTF Facilities	$251,800	$136,800	$236,800	$136,800
b. WWTF Allowances	174,900	95,100	164,500	95,100
c. Reuse Pipelines	405,700	405,700	405,700	405,700
d. Reuse Pipeline Allowances	66,100	66,100	66,100	66,100
Subtotal Construction Cost	898,500	703,700	873,100	703,700
Bond, Contingency, Etc.	319,000	249,874	310,031	249,874
Engr.,Legal, Admin.	365,300	286,100	354,900	286,100
Total Capital Cost	$1,582,800	$1,239,674	$1,538,031	$1,239,674
2. Less Depreciation	69,157	50,095	66,672	50,095
3. Adjusted Rate Base Costs	1,513,643	1,189,579	1,471,359	1,189,579
4. Rate of Return Allowance	9.57%	9.57%	9.57%	9.57%
5. Rate of Return on Rate Base (4 X 3)	144,856	113,843	140,809	113,843
6. Operating Costs				
1. Depreciation				
a. Pipelines 3.30 %	27,402	27,402	27,402	27,402
b. Treat. Equip. 5.56 %	41,755	22,693	39,270	22,693
2. Property Taxes	19,318	15,130	18,772	15,130
3. Annual O & M	11,550	10,450	8,398	10,450
4. Income Taxes	52,023	40,730	50,528	40,730
Total Op Expenses	152,048	116,404	144,369	116,404
7. Total Annual Revenue Require.	296,904	230,247	285,178	230,247

** Property Taxes are based on a percentage of the entire capital investment.
A percentage of 2.15% was developed based upon the total rate base as compared to the total ad valorem taxes as presented in the current rate filing.

Note: Rate of Return and Depreciation Rates were taken from the current rate order.

United Water Florida
Revenue Requirement for Reuse Alternatives
Residential Reuse (Monterey Service Area) Alternative #2
June 5,1997

	Phase I	Phase II	Phase III	Phase IV
1. Total Estimated Construction Cost				
a. WWTF Facilities	$1,033,300	$578,300	$1,003,300	$578,300
b. WWTF Allowances	718,000	401,800	697,300	401,800
c. Reuse Pipelines	1,879,600	1,880,700	1,879,600	1,880,700
d. Reuse Pipeline Allowances	306,100	306,200	306,100	306,200
Subtotal Construction Cost	3,937,000	3,167,000	3,886,300	3,167,000
Bond, Contingency, Etc.	1,397,635	1,124,400	1,579,900	1,124,400
Engr.,Legal, Admin.	1,600,465	1,287,400	1,379,500	1,287,400
Total Capital Cost	$6,935,100	$5,578,800	$6,845,700	$5,578,800
2. Less Depreciation	298,321	222,924	293,358	222,924
3. Adjusted Rate Base Costs	6,636,779	5,356,876	6,552,341	5,355,876
4. Rate of Return Allowance	9.57%	9.57%	9.57%	9.57%
5. Rate of Return on Rate Base (4 X 3)	635,140	512,557	627,059	512,557
6. Operating Costs				
1. Depreciation				
a. Pipelines 3.30 %	126,945	127,015	126,945	127,015
b. Treat. Equip. 5.56 %	171,375	95,909	166,414	95,909
2. Property Taxes	84,646	68,091	83,555	68,091
3. Annual O & M	45,210	30,810	30,925	30,810
4. Income Taxes	228,057	183,363	225,051	183,363
Total Op Expenses	656,233	505,187	632,891	505,187
7. Total Annual Revenue Require.	**$1,291,373**	**$1,017,745**	**$1,259,950**	**$1,017,745**

** Property Taxes are based on a percentage of the entire capital investment.
A percentage of 2.15% was developed based upon the total rate base as compared to the total ad valorem taxes as presented in the current rate filing.

Note: Rate of Return and Depreciation Rates were taken from the current rate order.

United Water Florida
Revenue Requirement for Reuse Alternatives
Golf Course Reuse Alternative #3
June 5,1997

	Phase I	Phase II	Phase III	Phase IV
1. Total Estimated Construction Cost				
a. WWTF Facilities	$1,530,000	$757,880	$650,000	$0
b. WWTF Allowances	1,063,300	526,700	451,700	0
c. Reuse Pipelines	215,900	120,200	92,800	0
d. Reuse Pipeline Allowances	35,100	19,600	15,100	0
Subtotal Construction Cost	2,844,300	1,424,380	1,209,600	0
Bond, Contingency, Etc.	1,009,700	505,720	429,400	
Engr.,Legal, Admin.	1,156,200	579,000	491,700	
Total Capital Cost	$5,010,200	$2,509,100	$2,130,700	$0
2. Less Depreciation	268,348	133,823	114,075	0
3. Adjusted Rate Base Costs	4,741,852	2,375,277	2,016,625	0
4. Rate of Return Allowance	9.57%	9.57%	9.57%	9.57%
5. Rate of Return on Rate Base (4 X 3)	453,795	227,314	192,991	0
6. Operating Costs				
1. Depreciation				
a. Pipelines 3.30 %	14,578	8,120	6,267	0
b. Treat. Equip. 5.56 %	253,770	125,704	107,808	0
2. Property Taxes	61,152	30,624	26,006	0
3. Annual O & M	35,700	17,000	13,900	0
4. Income Taxes	164,564	82,468	70,075	0
Total Op Expenses	529,764	263,916	224,056	0
7. Total Annual Revenue Require.	**$983,559**	**$491,230**	**$417,047**	**$0**

** Property Taxes are based on a percentage of the entire capital investment. A percentage of 2.15% was developed based upon the total rate base as compared to the total ad valorem taxes as presented in the current rate filing.

Note: Rate of Return and Depreciation Rates were taken from the current rate order.

United Water Florida

Alternative	Component	Phase 1 **	Phase 2	Phase 3	Phase 4	Total
Large Users * (Monterey Service Area)	Capital cost	$1,582,800	$1,239,674	$1,538,031	$1,239,674	$5,600,179
	Reuse Demand (mgd)	0.07	0.07	0.07	0.07	0.28
Residential Reuse * (Monterey Service Area)	Capital cost	$6,935,100	$5,578,800	$6,845,700	$5,578,800	$24,938,400
	Reuse Demand (mgd)	0.43	0.43	0.43	0.43	1.72
Golf Course Reuse	Capital cost	$5,010,200	$2,509,100	$2,130,700	$0	$9,650,000
	Reuse Demand (mgd)	0.78	0.31	0.25	0	1.34

* Alternatives #1 & #2 relate to Monterey only, it is felt that the capital and revenue requirements would be relative to the remaining 9 systems.

** Revenue and rate impact will only be identified for the first phase of the alternatives since it is not possible to predict the effects of future rate filings.

Revenue Requirements for Phase I Improvements

Alternative #1	$296,904
Alternative #2	$1,291,373
Alternative #3	$983,559

Reuse Water Available for Irrigation - # of Customers (Phase I)

Alternative #1	5
Alternative #2	1062
Alternative #3	2

Reuse Water Not Available for Irrigation - # of Customers (Phase I)

	Water	Wastewater
Alternative #1	27692	21259
Alternative #2	0	0
Alternative #3	27695	21262

Revenue Distribution **Phase I Alternatives Only**

Impact:		
	Available	10%
	Not Available	90%

Direct **10%**	Revenue Require. ($/yr.)	Reuse Demand (mgd)	$/kgal	cost/cust/yr.
Alternative #1 (Large Users)	29690.4	0.07	1.16	5,938.08
Alternative #2 (Residential) *	$1,201,373	0.43	8.23	1,215.98
Alternative #3 (Golf Course)	98355.9	0.78	0.35	49,177.95

* The revenue requirement for the Monterey residential customers is wholly distributed to the affected residential customers in the Monterey service area

Indirect **90%**	Revenue Require. ($/yr.)	Reuse Demand (mgd)	$/kgal	cost/cust/yr. Water (34%)	Wastewater (66%)
Alternative #1	267,213.60	0.07	10.46	3.28	8.30
Alternative #2	0.00	0	0.00	0.00	0.00
Alternative #3	865,203.10	0.78	3.11	10.87	27.48

WORKSHEET FOR EVALUATION OF RATES AND FEES
FOR PRIVATE UTILITIES

Applicant: United Water Florida

Date: 6/16/97

Alternative: Alternative 3 - Golf Course Reuse [This worksheet summarizes the incremental impact of this reuse alternative. Only expenses and revenues associated with this alternative are included. No other utility system costs or revenues are considered.]

This form provides for complete evaluation of costs to be incurred and revenues generated by the wastewater management system. This form is to be completed for each alternative and subalternative evaluated.

A. Household Median Annual Income, Average Household Size, Number in the Service Area, and Population to be Served.

Population to be served is determined by the number of households multiplied by the household size. This data should be consistent with local comprehensive plan projections.

		Year 1	Year 5	Year 10	Year 15	Year 20
1.	Enter calendar year that corresponds with Years 1, 5, 10, 15, and 20 of the analysis	(1998)	(2002)	(2007)	(2012)	(2017)
2.	Median household income ($/year)	$35,495	$40,052	$47,984	$54,390	$61,017
3.	Average household size (people/household)	2.53	2.53	2.53	2.53	2.53
4.	Number of households served by the sewerage system	38,611	41,886	47,611	51,189	54,843
5.	Serviced population (people) (multiply Line 3 by Line 4)	97,686	105,972	120,456	129,508	138,753
6.	Total number of homes served by reclaimed water	0	0	0	0	0

B. Existing Assets and Accumulated Depreciation [Not Applicable]

Identify all existing assets and the associated accumulated depreciation. Assets may be grouped by account type. An explanation of the system of accounts should be included in the appendix.

	Description	Amount ($)	Accumulated Depreciation ($)
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	Totals ($)	$0	$0

C. Existing Contributions in Aid of Construction (CIAC) and Accumulated Amortization [Not Applicable]

1. What is the current balance of CIAC? ______________

2. What is the current accumulated amortization? ______________

D. Existing Debt and Equity [Not available - UWFL's capital structure draws from one parent company where numerous debts exist as well as shared equity]

1. Provide current balances of all existing long and short term debt, the year debt was incurred, the interest rate, and the maturity date.

[Not Applicable]

	Debt	Amount ($)	Origination Date	Maturity Date	Annual Interest Rate (%)
a.					
b.					
c.					
d.					
e.					
	Total ($)	$0			

2. Provide current balances of equity, the last authorized rate of return on equity (if available), and the source of the authorization.

[Not Applicable]

	Equity	Amount ($)	Authorized Return on Equity (%)	Source of Authorization
1.				
2.				
3.				
	Total ($)	$0		

E. Proposed Capital Construction Costs and Financing

In this block, list all capital construction costs to be incurred by wastewater system/utility. This should correspond directly to the cost included in the net present value analysis as described in another section of this document. Indicate what type of financing will be used (revenue bonds, general obligation bonds, etc.). The interest rate and term (bonding period or loan period) should reflect the type of financing to be used.

					Financing		
	Year	Description	Total Capital Construction Costs ($)	Capital Construction Costs ($) to be financed	Type	Annual Interest Rate (%)	Term (yrs)
1.	1998	Phase 1	$5,010,200	$5,010,200			20
2.	2002	Phase 2	$2,509,100	$2,509,100			20
3.	2007	Phase 3	$2,130,700	$2,130,700			20
4.							
5.							
6.							
7.							
8.							
9.							
10.							
Totals ($)			$9,650,000	$9,650,000			

F. Other Anticipated Debt which will be Repaid from Operations of the Wastewater System/Utility.

[Not Applicable]

	Description	Debt Amount ($)	Annual Interest Rate (%)	Term (yrs)
1.				
2.				
3.				
4.				
	Total ($)	$0		

G. Identify the projected annual expenses for the wastewater system/utility. All increases (or decreases) should be described in a narrative and attached as an appendix.

1. Existing facilities
[Not Applicable]

Expense Category	Expenses ($/yr) Year 1	Year 5	Year 10	Year 15	Year 20
Operating and Maintenance					
Depreciation and Amortization					
Taxes Other than Income					
Income Taxes					
Totals ($)	$0	$0	$0	$0	$0

2. Proposed facilities associated with this alternative

Expense Category	Expenses ($/yr) Year 1	Year 5	Year 10	Year 15	Year 20
Rate of Return on Rate Base*	$453,795				
Operating and Maintenance	$35,700				
Depreciation and Amortization	$268,348				
Taxes Other than Income	$61,152				
Income Taxes	$164,564				
Totals ($)	$983,559	$0	$0	$0	$0

* Added to FDEP Worksheet to conform with UWFL/PSC methodology

3. All existing and planned facilities (Total of 1 and 2 above)

Expense Category	Expenses ($/yr) Year 1	Year 5	Year 10	Year 15	Year 20
Rate of Return on Rate Base*	$453,795	$0	$0	$0	$0
Operating and Maintenance	$35,700	$0	$0	$0	$0
Depreciation and Amortization	$268,348	$0	$0	$0	$0
Taxes Other than Income	$61,152	$0	$0	$0	$0
Income Taxes	$164,564	$0	$0	$0	$0
Totals ($)	$983,559	$0	$0	$0	$0

H. Other Expenses

[Not Applicable]

Please list any other expenses to be incurred by the wastewater system/utility during this 20-year period.

	Description	Expenses ($/yr) Year 1	Year 5	Year 10	Year 15	Year 20
1.						
2.						
3.						
4.						
5.						
	Totals ($)	$0	$0	$0	$0	$0

* Added to FDEP Worksheet to conform with UWFL/PSC methodology

I. Total Expenses

Total expenses shown in Blocks G and H.

	Year 1	Year 5	Year 10	Year 15	Year 20
Total Expenses ($)	$983,559	$0	$0	$0	$0

J. Reclaimed Water Connection Fees and Property Contributions

Include in this block connection fees or impact fees and property contributions to be obtained as major users and residential customers are added to the reclaimed water system.

	Description	Year 1	Year 5	Year 10	Year 15	Year 20
1.	Number of new equivalent residential connections (ERCs/yr)	0				
2.	Residential connection/impact fees and property contributions ($/ERC)	$0				
3.	Total residential connection fees and property contributions ($/yr) [multiply Line 1 by Line 2]	$0				
4.	Number of new major users (ERCs/yr)	2				
5.	Total connection fees and property contributions from major users ($/yr)	$2,000				
6.	Average major user connection fee and property contributions ($/ERC) [divide Line 5 by Line 4]	$1,000				
7.	Total connection fees and property contributions ($/yr) [add Line 3 and Line 5]	$2,000	$0	$0	$0	$0

K. Revenues From Sale of Reclaimed Water

Include anticipated revenues from the sale of reclaimed water in this block. Estimates should be realistic and conservative.

	Description	Year 1	Year 5	Year 10	Year 15	Year 20
1.	Sales to major users (1,000 gal/yr)	284,700				
2.	Revenue from sales to major users ($/yr)	$101,734				
3.	Average sale price to major users ($/1,000 gal) [divide Line 2 by Line 1]	$0.36				
4.	Sales to residential customers (1,000 gal/yr)	0				
5.	Revenue from sale to residential customers ($/yr)	$0				
6.	Average price for residential service ($/1,000 gal) [divide Line 5 by Line 4]	$0				
7.	Total revenue from sale of reclaimed water ($/yr) [add Line 2 and Line 5]	$101,734	$0	$0	$0	$0

L. Wastewater Connection Fees and Property Contributions [Not Applicable]

Include connection fees, impact fees, and property contributions associated with provision of wastewater management services.

	Description	Year 1	Year 5	Year 10	Year 15	Year 20
1.	Total connection/impact fees and property contributions for non-residential customers to be collected ($/yr)					
2.	Number of new non-residential connections (ERCs/yr)					
3.	Average connection/impact fees and property contributions for non-residential customers ($/ERC) [divide Line 1 by Line 2]	$0	$0	$0	$0	$0
4.	Number of new equivalent residential connections for residential customers (ERCs/yr)					
5.	Connection/impact fee and property contributions for residential customers ($/ERC)					
6.	Residential connection fees and property contributions collected ($/yr) [multiply Line 4 by Line 5]	$0	$0	$0	$0	$0
7.	Total revenues from connection fees and property contributions [add Lines 1 and 6]	$0	$0	$0	$0	$0

M. Wastewater Revenues

[Not Applicable]

	Description	Year 1	Year 5	Year 10	Year 15	Year 20
1.	Revenues from wastewater user/service charges for non-residential customers ($/yr)					
2.	Wastewater from non-residential customers that is treated (1000 gal/yr)					
3.	Average user charge for non-residential customers ($/1000 gal) [divide Line 1 by Line 2]					
4.	Numbers of households served [must agree with Line A4]					
5.	Revenue from residential user/service charges ($/yr)					
6.	Average monthly residential user/service charges ($/mo/household) [divide Line 5 by Line 4 by 12]	$0	$0	$0	$0	$0
7.	Total revenues from wastewater user/service charges ($/yr) [add Line 1 and Line 5]	$0	$0	$0	$0	$0

N. Total Revenues

Please add the totals from Blocks K and M to obtain total revenue to be received by the system.

	Year 1	Year 5	Year 10	Year 15	Year 20
Total Revenue ($/yr)	$101,734	$0	$0	$0	$0

O. Total Surplus or Deficit

The total costs shown in Block I are to be subtracted from the total revenues shown in Block N. The results for Years 1, 5, 10, 15, and 20 should be entered on Line 1 if a surplus is indicated (revenues exceed expenses) or on Line 2 if a deficit is indicated (expenses exceed revenues).

	Description	Year 1	Year 5	Year 10	Year 15	Year 20
1.	Surplus ($/yr)	$0	$0	$0	$0	$0
2.	Deficit ($/yr)	($881,825)	$0	$0	$0	$0

P. Existing Fees and Charges

Please identify existing fees and charges for connection and sale of reclaimed water, and user charges for wastewater services.

1. Wastewater user charges

a. Residential user charge $ 38.05 /month/household

b. Average residential connection fee $ 475 .

c. Average residential impact fee $ N/A .

d. Average user charge for non-residential customers $ 4.03 /1,000 gallons.

e. Non-residential customers connection/impact fees $475 .

2. Sale of reclaimed water [No existing rates for reclaimed water]

a. Residential users $ _____ /month/household or $____/1,000 gallons.

b. Initial connection fees for residential users $______ .

c. User charges for non-residential customers $______/1,000 gallons.

d. Connection fees for non-residential customers $_______ .

Q. Summary of proposed fees and charges

1. Wastewater user charges

[Not Applicable]	Year 1	Year 5	Year 10	Year 15	Year 20
a. Residential user charge ($/month/household) [from Line M6]	$0	$0	$0	$0	$0
b. Average residential connection/impact fees ($) [from Line L5]	$0	$0	$0	$0	$0
c. Average user charge for non-residential customers ($/1,000 gallons) [from Line M3]	$0.00	$0.00	$0.00	$0.00	$0.00
d. Non-residential customers connection/impact fees ($) [from Line L3]	$0	$0	$0	$0	$0

2. Sale of reclaimed water

	Year 1	Year 5	Year 10	Year 15	Year 20
a. Residential user charge ($/1,000 gallons) [from Line K6]	$0.00	$0.00	$0.00	$0.00	$0.00
b. Initial connection fees for residential users ($/ERC) [from Line J2]	$0	$0	$0	$0	$0
c. User charges for non-residential customers ($/1,000 gallons) [from Line K3]	$0.36	$0.00	$0.00	$0.00	$0.00
d. Connection fees for non-residential customers ($/ERC) [from Line J6]	$1,000	$0	$0	$0	$0