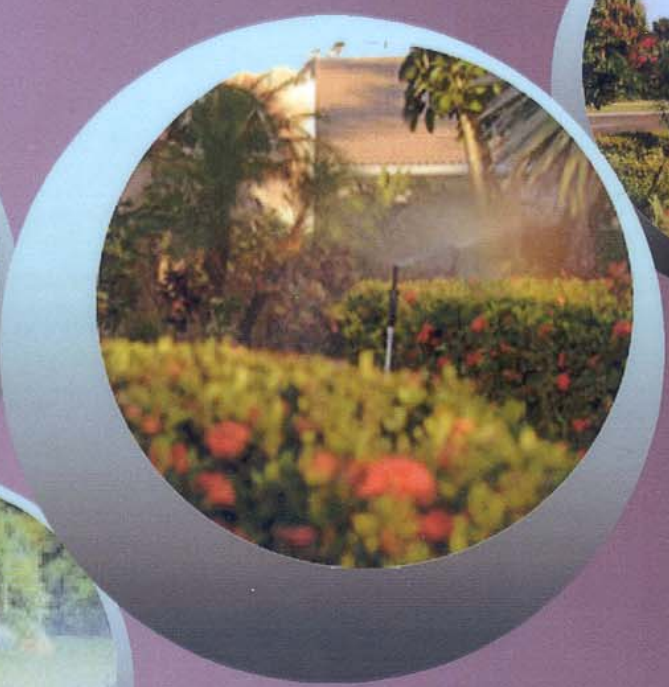
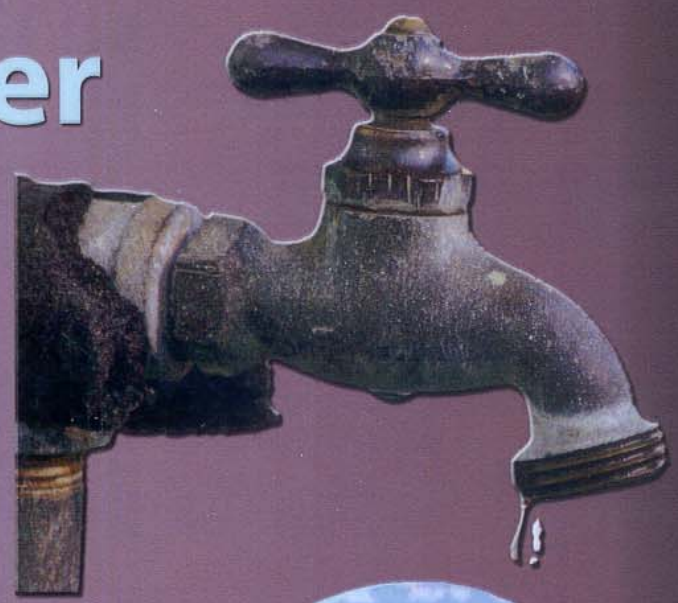




# Reclaimed Water Master Plan Re-Evaluation

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### Exhibit

- Exhibit A Master Plan Project Areas
- Exhibit B Proposed Reclaimed Water Service

## EXECUTIVE SUMMARY

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Reuse of treated wastewater is an integral part of conserving water resources and limiting environmental impacts. This is especially important in Florida as potable water supply is finite and the population is continually increasing with the City of Clearwater (City) incurring a 12% increase in population since 1990. In addition, the City resides within a “water resource caution area” as identified by the Southwest Florida Water Management District (SWFWMD or District). Essentially, SWFWMD classifies a water resource caution area as a region having inadequate traditional water sources to meet demands. In response to increasing pressure on these resources, the City has developed an Integrated Water Management Plan (IWMP) to support conservation and address resource management. Reclaimed water is an essential component in attaining these goals and is supported with a reclaimed water master plan that outlines system expansion through 2020. The Master Plan is periodically updated to ensure the plan follows the optimum course from both a water conservation and financial perspective. Recent developments during the design phase of the Morningside Reclaimed Water Project have prompted an updated approach to system expansion planning to include field verification of irrigation sources in targeted areas, review of potable consumption data to estimate project offset, modification to the City’s current ordinances, Resident-Initiated projects, City-Initiated projects, well rebate program, and wholesale delivery of excess reclaimed water to neighboring utilities.

The latest Master Plan Update, the *Report on Reclaimed Water Service Areas Ranking Re-evaluation* dated February 2006 by McKim & Creed, PA, proposed the Morningside Project as the next area in the City to receive reclaimed water based on several factors, including; potable water consumption data, field observation, SWFWMD well data, and estimated costs. The project was expected to meet all of the criteria necessary to receive funding assistance from the District. However, it was discovered during the design phase of this project that a greater number of irrigation wells were present in this area than originally estimated. Since the District maintains record of “permitted wells” only, use of this data resulted in a fraction of actual well concentrations being realized. This information, coupled with many residents using surface

water from local lakes, may jeopardize the City's ability to meet current contractual requirements with SWFWMD, which stipulate a 50% connection rate and 50% potable offset commitment. With this discovery, the City embarked on a campaign to verify alternative irrigation source users, educate the community about the project and benefits of reclaimed water, and to survey the community for interest through direct mailings and door hangers and presentations at public meetings. This exercise prompted the City to expand the irrigation source survey to the next six projects identified in the previous master plan. This was performed to ensure feasibility resulting in a new approach to system planning. In addition, projected project offset for future projects was calculated based on average potable consumption data, which significantly impacted feasibility of the projects analyzed.

The results of this new approach indicate that two of the six projects that were planned are not expected to meet District funding requirements. In addition, the two remaining projects will have to be scaled back in size by concentrating on areas of high irrigation rates with potable water sources. The findings of the study in regards to the Morningside Project and the next six proposed projects are as follows:

- ❖ At the time of this report, Morningside does appear feasible based on recent resident commitment rates and a modified service area. A request for project modification will be submitted to SWFWMD in early 2008 for approval.
- ❖ Skycrest remains a viable project as it includes storage and pumping, and serves as an interconnect between the east and west regions of the City. This project also has sufficient reclaimed water candidates and fewer well and lake withdrawals.
- ❖ Coachman Ridge service area is feasible, and was submitted to SWFWMD for funding assistance as a combined project with Chautauqua. Funding determination should occur in early 2008.
- ❖ Enterprise is not feasible due to large well concentrations.
- ❖ East Drew is not viable as much of the project area is currently served by a transmission line installed as part of the Seville/Sunset Project. The City should initiate extensions to the large users in the project area to enhance the offset values in other projects.

- ❖ Countryside South is not feasible due to the high well concentration in the project area.
- ❖ Lake Park is feasible providing the boundaries are modified and reduced to the northern portion of the project only five streets, where there is a large concentration of lawn meters. Due to the size of the feasible portion the project should move forward as a Resident Initiated project.

During the analysis of the above mentioned projects, it was discovered that other portions of the City contained many of the necessary factors that make a reclaimed water project feasible: high lawn meter concentrations and large users. This prompted the City to conduct additional field surveys of the newly identified areas that resulted in the identification of six potential reclaimed water services areas. The results are as follows:

- ❖ Chautauqua's potable use and lawn meter concentration data was very favorable, so the project was combined with the modified Coachman Ridge project previously mentioned and a funding request was submitted to SWFWMD for 2008. The Project is currently under District review for funding and a determination should be made in early 2008.
- ❖ Clearwater Harbor is feasible for the northwest section of the service area based on the lawn meter, low well concentrations, and large user concentrations with greater potential for new customers in the northwest portion of the project. Review of potable consumption data indicates that project feasibility is only possible if the project service area is modified to the northwest section.
- ❖ During the course of finalizing this report, the Palmetto-Country Club Estates, Glen Oaks-South Betty and North Greenwood-Country Club Estates project areas were modified based on irrigation survey and potable consumption data, combined, and submitted for FY 2009 funding.
- ❖ It is recommended that the City not extend reclaimed water to the YMCA area unless it is a Resident-Initiated project (described in **Section 5.2**) since field data indicates approximately 25% of the residents use wells or lakes for irrigation. Additionally, there are few large and low average potable consumption users within the project area.

- ❖ Potable consumption should be analyzed throughout the city to identify potential pockets of large users.

In addition, it is recommended that the reclaimed water planning be amended as follows:

- ❖ Where Pinellas County School facilities and cooling towers are near existing RCW mains or near future project areas, they should be connected to the RCW system as part of future projects to increase the offset of the project as a whole.
- ❖ The field survey of irrigation types should be expanded to encompass the City's entire service area.
- ❖ Projects should be developed as either City-Initiated or Resident-Initiated. Resident-Initiated projects will require a petitioned request and a minimum of 51% of the residents will need to execute a binding commitment agreement before the area is reviewed further for implementation feasibility and funding analysis. While City-Initiated projects will be identified by historical means (proximity to existing infrastructure, cost-benefit ratio, large users, lawn meter data, potable consumption data and irrigation well survey data). If feasible, these projects will be identified as high priority reclaimed water areas.
- ❖ The ordinance should be changed to disallow the construction of new deep wells anywhere in the City, construction of new irrigation wells and surface water irrigation systems within areas determined to be "high priority reclaimed water areas", require permits for new shallow irrigation wells and surface water withdrawal system outside of high priority reclaimed water areas, to assess an availability fee from everyone within a reclaimed water service area and to implement a reclaimed water conversion incentive program.
- ❖ It is recommended that the City implement a Reclaimed Water Conversion Incentive Program to transfer well irrigation consumers to reclaimed water. The proposed program would provide a financial incentive of up to \$600 to shallow well owners and

up to \$1,250 for deep well owners to abandon their well and connect to the reclaimed system.

- ❖ There is sufficient excess supply to provide the City of Dunedin wholesale reclaimed water in addition to Pinellas County through 2018. However the County contract has greater benefits due to the existing infrastructure and greater demand. Therefore, the City should explore the option of increasing and extending the existing wholesale contract with Pinellas County to reduce discharge to the outfall and maintain a return for this resource.
- ❖ The City should also explore the option of an interconnect with the City of Dunedin in the SW corner of Dunedin (as shown on **Exhibits A & B**). This interconnect could be constructed as part of the Clearwater Harbor project. However, since interconnect would represent a significant capital investment, a long term agreement may be required.

## 1.0 INTRODUCTION

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### 1.1 Purpose

The City's conservation efforts began in the 1980's with the first City reuse project delivering treated effluent to the Chi Chi Rodriguez Golf Course. Two decades later, the City's conservation strategy has evolved into an integrated approach to water resource conservation to include reclaimed water system expansion, minimal discharge to surface waters, less reliance on imported potable water supplies, and expansion of local potable water supplies. Reclaimed water is an integral part of this approach as reclaimed water provides an alternative to potable water irrigation and has the potential to supplement groundwater supplies. This is important, not only from an environmental perspective, but from a financial perspective as it is less expensive for the City to produce potable water than to purchase it from Pinellas County. Currently, the City's reclaimed water system serves residential service areas, golf courses, commercial and open space customers in portions of the City. In addition, the City generates revenue from the sale of reclaimed water, whether it is from sales to City residents or to neighboring municipalities. Conservation of the potable supply is directly related to reclaimed water system expansion; however, it is imperative that the system be expanded to areas with the greatest need to ensure the City is receiving the most benefit for their investment and eligibility for funding assistance.

Periodically, the system is re-evaluated to confirm that the investment is substantiated both from a financial and resource conservation perspective. This report represents an update to the Master Plan Update conducted in December 2000, the Report on Reclaimed Water Cost and Usage conducted in October 2004, and the Report on Reclaimed Water Service Areas Ranking Re-Evaluation completed in February 2006.

As the expansion of the City's reclaimed water system continues, the development of cost effective projects is becoming increasingly difficult. Recent field investigations have indicated that the number of existing irrigation wells within the City exceeds previous estimates derived

from SWFWMD permitting data; community support for reclaimed water projects is unclear; and the criteria to meet the requirements for cooperative funding from SWFWMD is becoming more difficult to meet. These issues have given rise to the need for the City to conduct a Re-Evaluation of the Reclaimed Water Program in order to determine how to achieve the most benefit from this valuable resource with respect to expansion of the reclaimed water system.

## **1.2 Background**

SWFWMD has historically funded up to 50 percent of the design and construction costs associated with the City's reclaimed water projects through construction grants. However, in an effort to ensure that funded projects are cost-effective, the District has increased the funding requirements primarily through potable water offset commitments, efficiency rates, and connection rates. These factors are essentially combined into a Cost-Benefit ratio, a value that the District utilizes to allocate funding to the most favorable projects. These conditions have necessitated that reclaimed water program planning evolve with the funding criteria.

The original master plan for the City's reclaimed water system was developed approximately 15 years ago with several updates occurring thereafter. A timeline showing the evolution of the City's reclaimed water program is shown in **Figure 1-1**. During the design phase of the Morningside Reclaimed Water Transmission and Distribution System (Morningside) Project, it was discovered that the number of shallow irrigation wells in this area far exceeded previous estimates that were based on SWFWMD data. In addition, many of the residents within the proposed Morningside Project area utilize water from the lakes for irrigation purposes. Historically, the City's Reclaimed Water ordinance has provided financial exemption from the reclaimed water program to homeowners with existing irrigation wells. This exemption adversely affects the ability to meet the District's funding criteria since nearly half of the proposed Morningside service area is served by shallow irrigation wells; thus the "return" or potable water offset required to make the project cost-effective may not be realized.

**Figure 1-1  
Progression of the Reclaimed Water Program**

**1980's - RCW System Implementation**

◊ RCW pumping station and low pressure transmission main were constructed at the Northeast WWTF to serve the Countryside Country Club, the Chi Chi Rodriguez golf course, and the City's soccer complex on McMullen Booth Road. This was done in part to resolve plant discharge issues at a time preceding the discharge to the East WWTF.

**1990 - RCW Master Plan**

- ◊ City-wide RCW expansion concept that divided the City into three Service Areas for implementation.
- ◊ Report states that there is no clear way to estimate well quantities since many residential wells do not require a permit.
- ◊ Irrigation demand data was based on historical data from City of St. Petersburg system, which was the first significant reclaimed water program in the State. The demand was estimated at 1"/acre/week.
- ◊ City did not implement plan due to phasing in very large increments was cost intensive.

**1992 - Initial RCW Project at Marshall Street AWWTF**

◊ Limited expansion to Clearwater Country Club and Phillip Jones Field served from the Marshall Street AWWTF.

**1997 - Island Estates Project**

- ◊ First Residential Reclaimed Water project was initiated to bring service to Island Estates, using reclaimed water from the Marshall Street AWWTF.
- ◊ SWFWMD funded pumping, storage and transmission only. Project was required to meet a 25% offset of potable and/or groundwater usage.
- ◊ SWFWMD made additional funding available so the City committed to a transmission main extending to the Beach.
- ◊ Project has a connection rate of > 90%.

**1998 - Reclaimed Water Master Plan Update**

- ◊ With initiation of residential reclaimed program and success in attracting SWFWMD grants for the Island Estates RCW Project and transmission piping to North Beach, the City authorized the review and update of the Master Plan to develop a method for prioritizing system expansion by area and developing projects that could be implemented in more manageable increments than the original plan. The Reclaimed Water Master Plan Update resulted in 25 areas identified for potential reclaimed water service.
- ◊ Prioritization for the projects was determined based on:
  - ◊ Potential offset of potable water used for irrigation
  - ◊ Cost of infrastructure
  - ◊ Large potable user accounts
  - ◊ Availability of alternative sources
  - ◊ Public acceptance (as determined by interest expressed through HOA groups to City at various meetings)
- ◊ Demands were reviewed from the original Master Plan using updated data from St Petersburg.
- ◊ Demands were calculated to determine maximum use possible. No connection estimate was developed.
- ◊ SWFWMD would fund only pumping, storage and transmission facilities at this time.
- ◊ Master Planning conducting in light of requirement of City's WUP, State goals of 75% reuse, increasing regulatory pressure on surface discharge and potential reduction in potable water required to meet current and future water demands.

**2000 - Reclaimed Water Master Plan Update**

- ◊ The 2000 MP Update was commissioned to primarily address desire to re-consider priority of northern sections of the City. Slight refinement was made in service area boundaries resulting in 30 areas considered for potential development.
- ◊ Demand estimates were re-considered and 1"/acre/week was confirmed based on evaluations of actual usage at Island Estates, Clearwater Country Club, and Countryside Country Club. Peak month reclaimed utilization reached 1.9"/acre/week.
- ◊ Connection rates were estimated based on review of land use, lawn irrigation data, and well data from the SWFWMD database. (Connection rate estimates for offset calculations ranged from 60% to 90%).
- ◊ Offset determination became a key factor for consideration for SWFWMD funding. The criterion used for projects funded up to through 2000 was the offset of 25% of potable water and/or groundwater. Three "example service areas" were evaluated for irrigation water use compared to domestic usage – Irrigation was found to be greater than 50% of total usage – thus 50% was used to estimate "offset".
- ◊ Cost/Benefit ratio used to establish project priorities for the first time following SWFWMD implementation of this measure to judge funding priorities.
- ◊ Project rankings were revised due to change in evaluation to Cost/Benefit methodology.
- ◊ SWFWMD began considering distribution piping funding with stipulations for connection rates and other ordinances.

**2001 - North Beach and South Beach Projects online**

**2003 - North Greenwood Project online**

**2004 – Report on Reclaimed Water Cost and Usage**

- ◊ SWFWMD implemented stricter policy on offset. They increased minimum offset required from 25% to 50%. The use of ground water reduction in offset calculations was no longer acceptable to the District, with the exception of wells constructed into the Upper Floridan Aquifer.
- ◊ This report provided updated capital costs on all projects for CIP planning and rate evaluation.
- ◊ Evaluated impact of metering on usage and costs. SWFWMD changed policy on funding of distribution and began requiring these to be metered to be eligible.
- ◊ Demand estimates were modified from the previous 1"/acre/week design criteria to 980 GPD/single family customers based on estimates from data from active reclaimed water service areas and SWFWMD data (Individual metering was not available). Offset was assumed at 50% due to SWFWMD changes. The track data up to that point indicated that all City projects met or exceeded the 50% offset criteria.

**2004 - Harbor Oaks Project online**

**2005 - Drew Union distribution construction complete**

**2006 – Report on Reclaimed Water Service Areas Ranking Re-Evaluation**

- ◊ City commissioned this report to determine if reclaimed water plan should be adjusted based on consideration for its planned development of additional local drinking water supplies. This was a formal step in managing the City's total water resources and recognition of the inter-relation of these systems and the environment.
- ◊ Offset estimates were changed from a basis of 1"/acre/week x "Irrigable space" to a value of 300 GPD/residential customer based on new data available from SWFWMD.
- ◊ Connection rates were re-evaluated by reviewing:
  - ◊ Lawn Meter data
  - ◊ Recharge rates
  - ◊ GIS Information
  - ◊ Irrigable acreage
  - ◊ Number of large potable users
  - ◊ Concentration of wells from SWFWMD database
- ◊ The revisions lowered the range of connection rates from the previous range to between 30% and 85% to adjust offset estimates down in light of SWFWMD definition for offset changing to exclude consideration for shallow wells and "future offsets."

**2006 - Seville/Sunset Project Area online**

**2006 - Morningside Project design phase**

**2007 - SWFWMD requires review of potable water consumption data to verify potential offset**

1980's      1990      1997      2001      2003      2004      2005      2006      2007