

40C-5 ARTIFICIAL RECHARGE
TECHNICAL STAFF REPORT
September 6, 2006
Application Number: 105846
(Legacy: 05-009-0010)

OWNER/
APPLICANT: City of Rockledge
1600 Huntington Lane
Rockledge, FL 32955
(321) 690-3978

AGENT: Jones Edmunds & Associates, Inc.
730 Waldo Road
Gainesville, FL 32641
(352)-377-5821

PROJECT NAME: City of Rockledge Reclaimed Water ASR

LOCATION: Brevard County

Section 9, Township 25 South, Range 36 East

ASSOCIATED PERMITS:

FDEP Underground Injection Control (UIC): 05-0195980-001

FDEP Wastewater: FL0021571

SJRWMD: 05-009-0006, existing Class I Injection Well

Objectors: None

AUTHORIZATION

The District authorizes, as limited by the attached permit conditions, the construction of two, (2) aquifer storage and recovery wells for underground storage of reclaimed water.

TIMEFRAMES

Date application received: September 2, 2005
RAI sent: September 28, 2005
Addition Information Received: May 31, 2006
Application complete: Yes
90th day: August 29, 2006
Chapter 120 waiver through: October 11, 2006

PROJECT DESCRIPTION:

Project Location:

The City of Rockledge Water Reclamation Facility (WRF) is shown on Figure 1 along with the locations of other ASR wells in Florida. The WRF is located on approximately 39 acres along the west side of US 1 in central Brevard County.

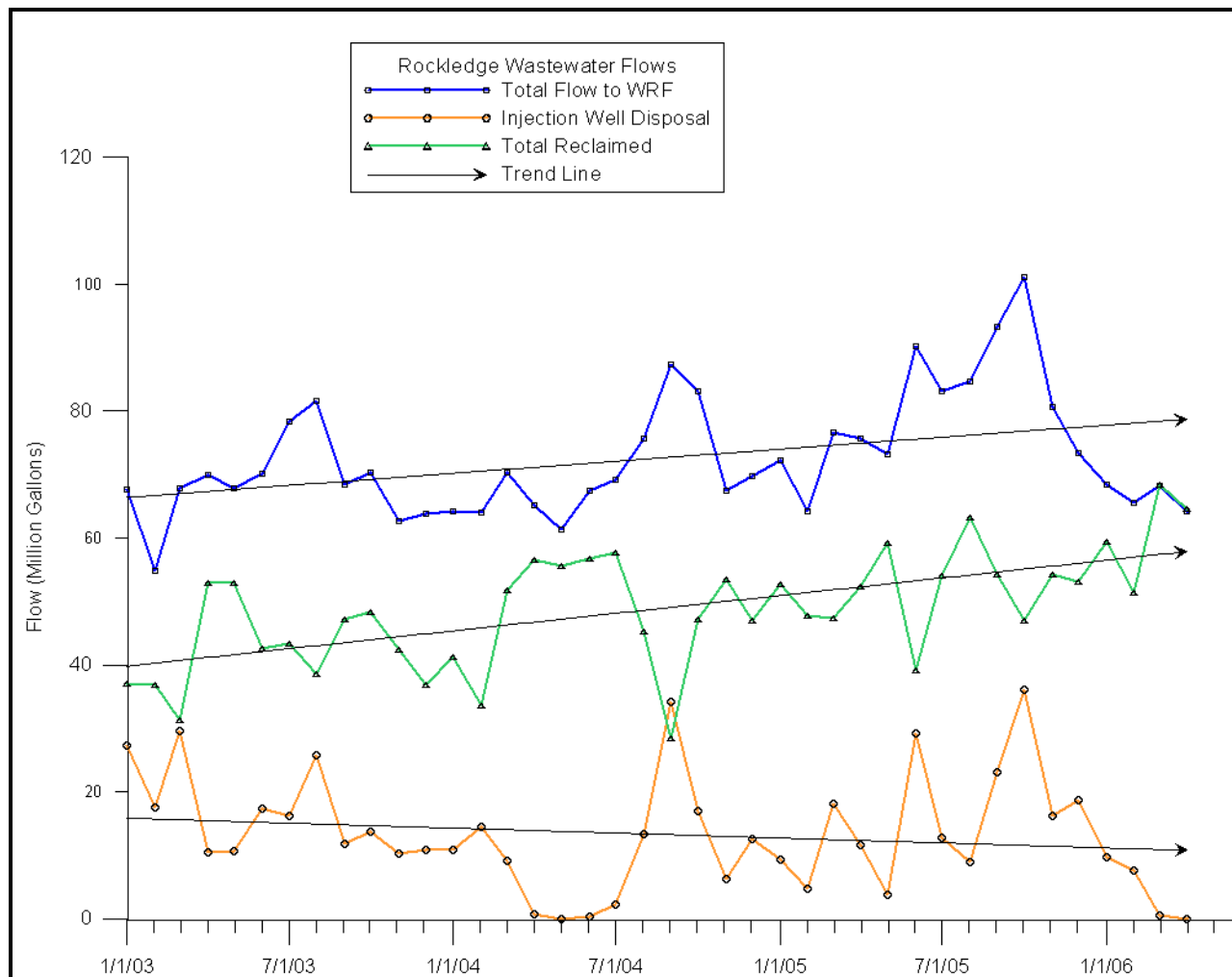
Background:

The WRF treats municipal wastewater and provides reclaimed water treated to Public Access Reuse (PAR) standards under FDEP wastewater permit No. FL0021571. The WRF includes the operation of one (1) deep injection well for the disposal of municipal waste and excess reclaimed water. The injection well was constructed in 1991 and operates under FDEP permit No. 05-0195980-001, and District permit No. 05-009-0006.

The PAR service area is comprised of approximately 1,400 customers irrigating 180 acres and the City plans to gradually expand the PAR service area to 2,000 customers irrigating 215 acres. The WRF beneficially distributes a high annual percentage of reclaimed water (65% of the average wastewater flows) through the PAR service area. The seasonal demand on reclaimed water for irrigation creates difficulty in providing a reliable supply for PAR customers. The City anticipates the beneficial reuse percentage would increase significantly with additional wet-season storage capacity. To achieve the additional volume of storage required to meet seasonal PAR demand, the City proposes to use aquifer storage and recovery (ASR) technology in association with above ground storage tanks. The additional storage will provide for seasonal supply/demand management; excess reclaimed water will be stored during wet-weather periods of low demand, and later recovered during dry-weather periods when demand is elevated. Currently, excess reclaimed water is disposed of in the deep injection well during periods of wet-weather and low demand.

Water Reclamation Facility Description:

The City of Rockledge WRF has sufficient permitted capacity for expansion. The permitted wastewater flow is 4.5 MGD and the current flows average 2.4 MGD. The permitted public access reuse is 4.36 MGD and the reuse flows have averaged 1.56 MGD. The permitted disposal in the deep injection well is 4.5 MGD, and the current wastewater and excess reclaimed water flows to the injection well average 0.47 MGD. The previous three (3) years of water flow is displayed on the following graph:



Aquifer Storage Zone Description:

The suitability of the proposed storage zone for ASR is dependant on the underlying hydrogeology. A preliminary evaluation of the underlying geologic units and native water quality was performed using historical data collected from the City’s deep injection well, the Palm Bay ASR well field, and the Cocoa ASR well field. The specific hydro-geologic conditions at the site will be determined during drilling and testing of the exploratory Storage Zone Monitor Well (SZMW-1).

The applicant proposes to use one (1) of two (2) potential storage zones. The preferred storage zone is within the Avon Park formation between 400 and 510 feet bls. If the hydrogeology within the Avon Park formation is not favorable for storage, an alternate storage zone between 145 and 300 feet bls within the Ocala formation will be evaluated for suitability. The native groundwater located in the proposed storage zones is non-potable with anticipated total dissolved solid (TDS) levels between 1,000 and 3,000 mg/L and is not, reasonably expected to be used as a public water supply. The applicant will install three (3) monitor wells to detect any horizontal or vertical migration of fluids, also for changes in native water quality.

PERMIT APPLICATION REVIEW:

Section 373.106(1), Florida Statutes (F.S.), states that “no construction may be begun on a project involving artificial recharge or the intentional introduction of water into any underground formation except as permitted in chapter 377, without the written permission of the governing board of any water management district within which the construction will take place. Such application shall contain the detailed plans and specifications for the construction of the project.”

The District entered into an Interagency Agreement with FDEP on March 30, 1984, to jointly review and permit projects involving the construction and operation of facilities for underground injection of water, which Agreement is incorporated by reference in 40C-1.106(3)(e), Florida Administrative Code (F.A.C.). Pursuant to this Agreement, the District shall apply the standards originally contained in Chapter 17-28, F.A.C., Chapter 62-40, F.A.C., and in Chapter 373, F.S., in rendering its decision on an application for underground injection of water. The District incorporated the terms of this Agreement into Chapter 40C-5, F.A.C. The pertinent permitting criteria are contained in Rules 40C-5.101 and 40C-5.301, F.A.C.

Under Rule 40C-5.101(2), F.A.C., a project must contain a plan for conservation and reuse of water, including:

- a) Descriptions of available alternative methods of wastewater disposal, and an explanation as to why the alternative methods are not utilized.
- b) Descriptions of available water reuse opportunities in the area of disposal, and an explanation of how these reuse opportunities are utilized, or will be utilized, or an explanation as to why the reuse opportunities will not be utilized.
- c) Descriptions of procedures, which have been employed to minimize water consumption in the proposed method of disposal.
- d) Descriptions of the source of original water withdrawal.
- e) Discussion of the potential for recovery and reuse of the fresh water components of the injected material.

Under Rule 40C-5.301(1), F.A.C., an applicant must demonstrate that the project does not:

- a) Adversely affect the public interest in the protection of the water resources; or
- b) Adversely affect existing beneficial uses of water; or
- c) Adversely affect public health, safety, or welfare or the water resource interests of affected users.

District staff has reviewed the City of Rockledge Reclaimed Water ASR artificial recharge application pursuant to the above-described criteria as part of the technical advisory committee to FDEP and have determined that the application meets the conditions for issuance of this permit. A summary of the staff review is provided below.

Conservation Plan:

District staff evaluated whether the proposed reclaimed water ASR project meets District criteria pursuant to Rule 40C-5.101(2), F.A.C. Staff specifically reviewed and considered the source of the original water withdrawn, the extent to which reuse water is utilized within

the area, and the water conservation procedures employed to minimize reclaimed water consumption.

Though the proposed recharge project will utilize reclaimed water, the original source of the reclaimed water is potable water from the City of Cocoa, via the Floridan and Intermediate aquifers in Brevard County and the Taylor Creek Reservoir in Orange County. These original sources of water are within a Priority Water Resource Caution Area (PWRCA), per the District Water Supply Plan 2005. The City's reuse of reclaimed water reduces the water supply demand on the City of Cocoa and, consequently, this portion of the PWRCA.

The City operates a Wastewater Reclamation Facility (WRF) that receives inflows from the area and in turn provides water treated to PAR standards to a service area of approximately 1,400 customers. The customers primarily utilize reuse for residential landscape irrigation, with some industrial uses. The facility distributes a high percentage (65%) of reuse water from the wastewater flow.

The City has developed water conservation procedures to minimize reclaimed water consumption. The City has installed flowmeters and implemented a reuse rate structure for industrial users, and plans to install flowmeters and implement a reuse rate structure for private users. The City also has a public education program that describes how and when to apply reuse water for irrigation, and has implemented an odd-even day irrigation schedule for reuse users. The following water schedule is in effect for Reclaimed Water customers based upon their numerical house number:

Even Addresses:

Tuesday -5 pm - Wednesday 8am
Thursday -5 pm - Friday 8am
Saturday -5 pm - Sunday 8am

Odd Addresses:

Wednesday - 5pm - Thursday 8am
Friday - 5pm - Saturday 8am
Sunday - 5pm - Monday 8am
Monday is a no watering day. The reclaimed water system will be down from Monday at 8am till Tuesday at 5pm.

Staff concludes that reasonable assurance has been provided that the project adequately plans to conserve and reuse water pursuant to Rule 40C-5.101, F.A.C., provided the permittee complies with the conditions recommended for this permit.

Public Interest:

Staff evaluated whether the proposed reclaimed water ASR project will adversely affect the public interest in the protection of the water resources. The 2005 District Water Supply Plan identifies the Rockledge Reclaimed Water ASR project as one that could be implemented to achieve a water resource benefit using additional reclaimed water projected to be available in 2025. The storage zone is non-potable and not reasonably expected to be used for public supply in the future. The proposed use will increase the beneficial reuse of reclaimed water, and reduce the water demand on the City of Cocoa potable water supply. Staff concludes that reasonable assurance has been provided that the project will not adversely affect the public interest in the protection of the water resources pursuant to Rule 40C-

5.301(1)(a), F.A.C., provided the permittee complies with the conditions recommended for this permit.

Interference with Existing Beneficial Uses of Water:

Staff evaluated whether the proposed reclaimed water ASR project will adversely affect existing beneficial uses of water. The applicant performed an analytical drawdown model to evaluate the potential impact to existing legal uses of water. The model showed insignificant drawdown within the surficial aquifer and minimal drawdown within the Floridan aquifer. Staff concludes that reasonable assurance has been provided that the project will not adversely affect existing beneficial uses of water pursuant to Rule 40C-5.301(1)(b), F.A.C., provided the permittee complies with the conditions recommended for this permit.

Public Health, Safety, Welfare or the Water Resource Interests of Affected Users:

Staff evaluated whether the project will adversely affect public health, safety, or welfare or the water resource interests of affected users. The reclaimed water proposed for aquifer storage will be treated to primary drinking water standards prior to injection. Potential impacts due to an upward migration into the surficial aquifer system are not anticipated as the storage zone is well confined by the Hawthorne formation. There are no nearby minimum flows and levels, springs, or other water resource interest that would adversely be affected by the proposed project. Staff concludes that reasonable assurance has been provided that the project will not adversely affect public health, safety, or welfare or the water resource interests of affected users pursuant to Rule 40C-5.301(1)(c), F.A.C., provided the permittee complies with the conditions recommended for this permit.

RECOMMENDATION:

Reasonable assurance has been provided that the proposed aquifer storage and recovery of reclaimed water, as limited by the proposed permit conditions, is consistent with District rules. Therefore, staff recommends approval of this application.

PERMIT CONDITIONS:

1. The water well contractor must notify a District field representative at least 24 hours prior to initiating construction or grouting operations.
2. A copy of this permit must be on-site during all phases of well construction.
3. The permittee must use the deepest suitable aquifer, as demonstrated by the exploratory well, for the storage of reclaimed water.
4. The permittee must construct and operate the deep injection well according to the plans received by the District on September 2, 2005, as modified by the plans received by the District on May 31, 2006.
5. After cycle testing and at least 45 days prior to operational injection of reclaimed water at well ASR-1 (39884), the Permittee must submit a written report for review and approval by the District, that shall contain sufficient information to demonstrate that the ASR well will continue to meet the conditions for the permit issuance as set forth in the District's rules. At a minimum the report must:

- a. Demonstrate the project does not adversely affect the public interest in the protection of water resources.
- b. Demonstrate the project does not adversely affect existing beneficial uses of water.
- c. Demonstrate the project does not adversely affect public health, safety, or welfare or the water resource interests of affected users.
- d. Demonstrate that upward migration of the injected fluid is not occurring.

If the District determines that the project does not meet the conditions for issuance of a permit, continued use of the wells for injection of reclaimed water will not be authorized.

6. This permit authorizes the underground aquifer storage and recovery of reclaimed water from the Rockledge Water Reclamation Facility. The use of any other fluid, other than potable water, must be authorized by the District prior to injection.
7. Disposal of drill cuttings, fluids, or any test waters to waters of the State must not cause or contribute to violation of water quality standards as set forth in Chapter 62-302, F.A.C. In the event that water quality standards are violated, the discharges must cease until such time as approval is obtained from District staff to restart.
8. The permittee must submit annually one (1) copy of the Annual Reuse Report (ARP). The ARP must be submitted on or before January 1 following the completion of each fiscal year (October through September 30).
9. The permittee must monitor daily, record monthly and report to the District every six months the total flow of water through the Water Reclamation Facility. The report must contain the total wastewater in-flow to the WRF, the total volume of flow to reuse, and the total volume of flow to deep injection.
10. All submittals made to demonstrate compliance with this permit must include the permit number 105846 plainly labeled on the submittal.
11. Once the ASR well is in operation, a minimum of 80% of the reclaimed water generated by the City of Rockledge must be beneficially utilized on an annual basis (from January 1 through December 31).

REVIEWERS:
KING/ BURKLEW

AQUIFER STORAGE AND RECOVERY FACILITIES IN FLORIDA

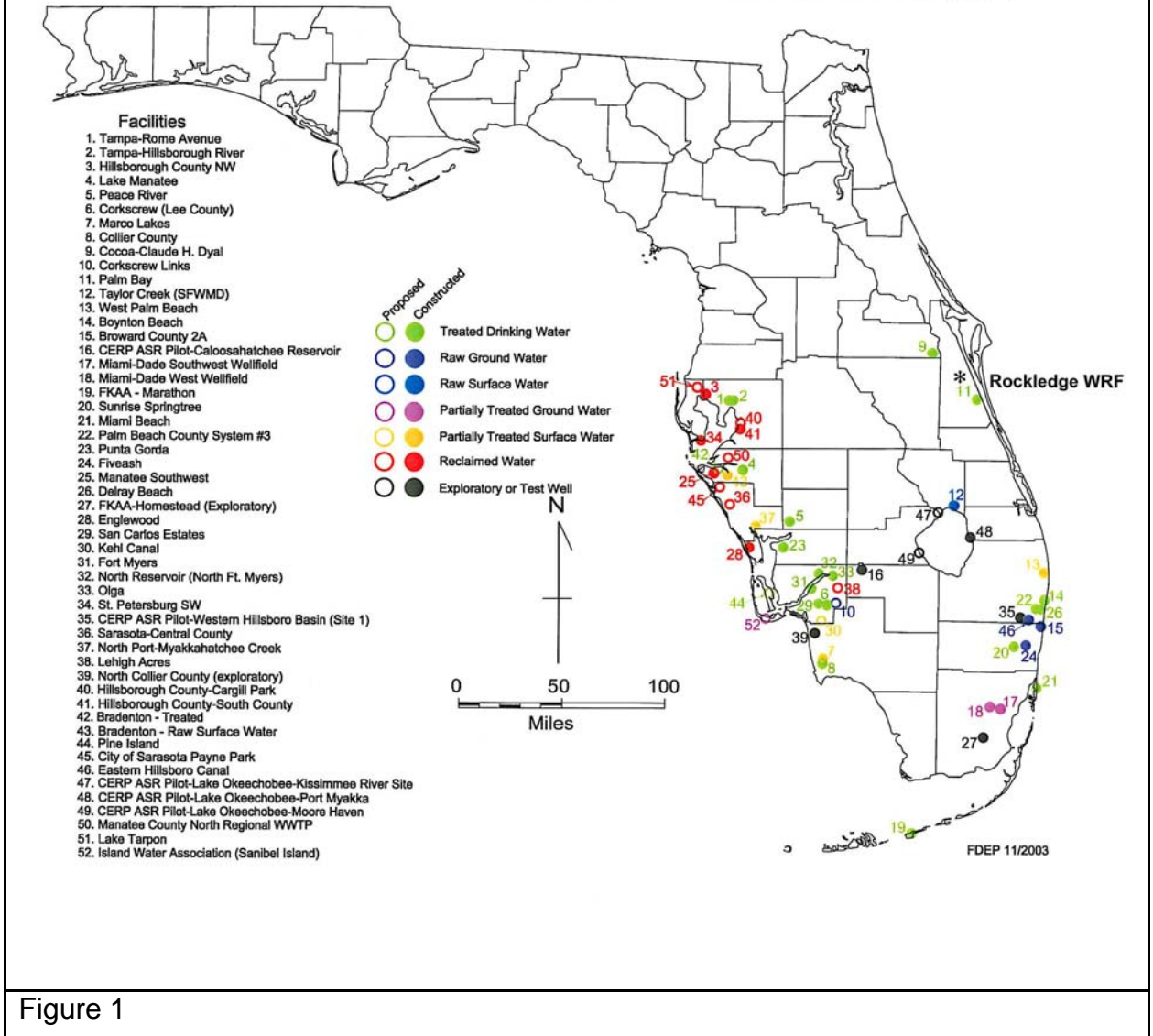


Figure 1

Well Information:

Applicant Well ID	District Well ID	Casing Diameter (inches)	Casing Depth (feet bls)	Well Depth (feet bls)	Status/ Type	Aquifer
ASR-1	39884	17.4 SCH80- PVC	400	510	Proposed (storage and recovery)	Upper Floridan
ASR-2	39885	17.4 SCH80- PVC	400	510	Proposed (storage and recovery)	Upper Floridan
SMW-1	39886	5	270	510	Proposed (monitor)	Upper Floridan
SZMW-1	39887	8	590	510	Proposed (exploratory monitor)	Upper Floridan
WTMW- 1	39888	4	15	510	Proposed (monitor)	Upper Floridan
SMW-2	39889	5	270	510	Proposed (monitor)	Upper Floridan
SZMW-2	39890	8	590	510	Proposed (monitor)	Upper Floridan
WTMW- 2	39891	4	270	510	Proposed (monitor)	Upper Floridan