CITY OF OVIEDO

WATER MASTER PLAN

FINAL REPORT

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WATER MASTER PLAN

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CHAPTER 1

EXECUTIVE SUMMARY

1.1 Background

In 2002, the Legislature expanded the local government comprehensive plan requirements to strengthen coordination of water supply planning and local land use planning. This was done in response to concerns that the limits of groundwater are being approached in many areas of the State and that alternative water supplies must be identified, quantified and developed in addition to the implementation of local water conservation strategies and Florida Department of Environmental Protection (FDEP) permitted water reuse programs. A 10-year Water Supply Facilities Work Plan (Work Plan) was prepared and approved by St. Johns River Water Management District (SJRWMD) in response to this concern and requirement. Local Governments were required to develop 10-Year Water Supply Plans. The City of Oviedo (City) 10-Year Water Supply Plan was approved in December 2008.

A Water Master Plan for the City potable water system was developed in 2006. Since that time, many things have changed in the City. These changes consist of the following items that impact water supply and demand:

A) Reclaimed water system expansion(s).
B) Reclaimed Water Master Plan, March 2006.
C) Acquisition of the Alafaya Water Reclamation Facility, October 2010.
D) Reclaimed Water Master Plan Update, September 2011.
E) Phase –out of the A.M. Jones Water Treatment Plant for water treatment and supply. It is now a booster pump station and storage facility, July 2010.
F) West Mitchell Hammock Water Treatment Plant (WTP) is the only water provider, July 2010.

Oviedo has prepared this ***2013 Water Master Plan*** to supply a road map for the future. It incorporates the previous information and includes the relationship between potable water sources and reclaimed water sources to provide an overall evaluation of the available water for use in the City.

1.2 Overview

1.2.1

The ***2013 Water Master Plan*** incorporates and continues the progressive plan that the City has been implementing since the inception of the water utility. The City plan is based on seeking economical and environmentally sound solutions for water supply and providing the highest quality water economically feasible for their customers. The ***2013 Water Master Plan*** incorporates four basic areas:

- Development and optimization of the existing groundwater supplies in accordance with the City St. Johns River Water Management District (SJRWMD) Consumptive Use Permit (CUP)
- Expansion of reclaimed water systems from the available reclaimed water resources of the Oviedo Wastewater Reclamation Facility (WRF) and the City of Orlando Iron Bridge Regional Wastewater Reclamation Facility (IBRWRF).
- Water conservation program(s) including conservation rate structures
- Evaluation of alternative water sources.

1.2.2

On a priority basis, the City will continue to invest and expand in the existing reuse system and the water conservation program. The City will continue to work with the neighboring communities and Seminole County in the planning related to alternative water supply development for future long term needs.

1.2.3

As part of creating the Water Master Plan, the City will continue to work with the SJRWMD to ensure the Regional Water Supply Plan (RWSP) is considered. The RWSP details the District's studies of water supply opportunities available to local communities to reduce their dependence on local groundwater.

1.2.4

Discussions with the SJRWMD regarding potential water supply sources, the amounts of water available to be permitted from these sources, coordination with other water suppliers and support funding for capital projects will be ongoing. Discussions will continue year-to-year as improved water supply information becomes available, projects are updated and technologies to produce and

conserve water are improved.

1.2.5

The reclaimed system was originally created in the City to alleviate potable water/groundwater withdrawals. It has been very successful in achieving this goal. However for utilities, decreased potable water consumption directly correlates to decreased revenues, because reclaimed water is typically less expensive than potable water. Although when available, homeowners will typically use more reclaimed water for irrigation purposes than potable water, but these differences are not always significant enough to overcome the gaps in revenue. Based on the ***2011 Master Reclaimed Water Plan***, it was determined that 59% of the Kingsbridge West pre-reclaimed water consumed was for irrigation. The post-reclaimed potable water usage was 41% of the pre-reclaimed potable water usage. This is most likely a typical value. Data from 2012 indicates potable usage as 353 gpd per connection (based on 108 gallons per person and 3.27 people per house) and reclaimed usage as 567 gpd per connection. Potable usage for 2012 was approximately 38% and reclaimed water usage was 62%.

The exchange of reclaimed water for potable water for irrigational purposes is not "REVENUE NEUTRAL". There is a concern about the revenue impacts of supplying more reclaimed water. Traditionally, potable water used for irrigation purposes produces higher revenues because potable water is priced at a higher rate ($ per 1000 gallons) than reclaimed and the conservation rate structure creates incrementally higher rates for higher consumption (irrigation volumes are typically above 10,000 gallons per month). This is a valid concern and needs to be considered in any rate structure. However the alternate plan, continuing on the same path of using groundwater for all water needs is not sustainable. The City CUP limits the groundwater withdrawal to 4.67 MGD AADF.

1.3 Consideration of Regional Water Supply Plan

The City has cooperated with the SJRWMD with regards to the relevant aspects of the RWSP.

On May 30, 2006, the City was notified by SJRWMD of the following in a letter:

"The following water supply development project(s) is/are identified in DWSP 2005 (Table 14) as options that should be implemented by your water supply entity. At least one should be implemented.

Eastern Orange and Seminole Counties Regional Reclaimed Water Reuse Project
St. Johns River Near Lake Monroe
St. Johns River Near Deland"

The City implemented the Eastern Orange and Seminole Counties Regional Reclaimed Water Reuse Project. The City has an inter-local agreement with Seminole County for a maximum daily demand of 3 MGD (equivalent to approximately 2.0 MGD Annual Average Daily Demand (AADD)) of reclaimed water from the IBRWRF. The 2.0 MGD represents a max day peaking factor of 1.5. The City also owns the Oviedo WRF which currently has approximately 1.3 MGD of reclaimed water.

Based on a continuation by the City of the residential reclaimed water system and conservation programs, the City will not need additional groundwater or other potable water sources to meet their needs through 2040. This assumes the CUP value of 4.67 MGD from 2013 to 2028 and a reclaimed water distribution system of 3 MGD (equivalent to approximately 2.0 MGD AADD of reclaimed based on a max day factor of 1.5) resource from IBRWRF and approximately 2.0 MGD from the Oviedo WRF. Several options have been previously investigated for the timeframe beyond 2030:

1. Expansion of the Oviedo WRF to 3.0 MGD
2. Using Lake Jesup or Mullet Lake as a source water either independently or through an agreement with Winter Springs and others.
3. Connecting to the Tri-Party System (Sanford/Lake Mary/Seminole) for "secondary level" water as a source water (Lake Monroe).
4. Connecting to the Seminole County Yankee Lake System.

No agreements between any entities have been reached or signed.

1.4 Overview of Potable Water Suppliers in Oviedo

Oviedo is located in Seminole County in Central Florida. A service area map is shown in Chapter 2 as Figure 2-2. This figure identifies the potable water service area. Within the incorporated area of Oviedo, potable water is supplied to customers by the City utility system and Seminole County Environmental Services. Reclaimed water is supplied by the City within the city limits of the City. Sources of reclaimed water include the Oviedo WRF and the IBRWRF.

1.4.1 Oviedo Utilities

The City owns and operates one water treatment plant within its corporate limits. This facility and the associated distribution system have been interconnected to form one system and they are covered by one SJRWMD CUP.

The following is a summary of the facilities by Water Plant:

Oviedo WTP: Decommissioned

A.M. Jones: Storage and Booster station.

Process	Capacity
Storage/Treatment	1.0 Million Gallons
High Service	3.5 MGD (2435 gpm, firm)

West Mitchell Hammock: The sole remaining water treatment facility.

Process	Capacity
Wells	22.0 MGD (15,300gpm)
Aeration	10.0 MGD (6944 gpm)
Storage/Treatment	2.5 Million Gallons
High Service	17.3 MGD (12,000 gpm, firm)

Firm = largest pump out of service criteria.
See further description herein for the above capacities.

1.4.2 Seminole County Utilities Water Supply (SCES)

SCES currently supplies potable water to Oviedo Marketplace Mall. SCES supplies approximately 42,000 gpd AADF based on the last twelve months of City water meter records. According to information available from the Seminole County Water Supply Facilities Work Plan, the South East Service Area (SESA) is supplied by the Southeast Regional WTP, Indian Hills WTP and Lake Hayes WTP. In general, the amount of water sold to the City is a small fraction of the County's overall water demand and should be easily incorporated into the County's overall water Work Plan. The City will monitor the County plan for any changes and will update its own Water Supply Plan if necessary.

1.4.3 City Water Supplied to Unincorporated Users

Oviedo does not supply significant amounts of water to unincorporated areas. The City serves the Black Hammock area within the County through an interlocal agreement. It is a general policy of the City to only serve within its corporate limits. The City supplies approximately 135,000 gpd AADF to

outside areas.

1.4.4. Self-Supply Water Suppliers

There are no significant residential or commercial facilities in the City that are on individual wells.

1.4.5 Private Utilities

There are no private utilities operating within the City Limits.

1.5 City Service Area Water Supply Strategy

The City's approach to meeting the projected water demand over the next 20 years is by first optimizing the use of potable groundwater and second by utilizing a lower quality water for non-potable uses. This source is the reclaimed water supply available from the Oviedo WRF and the IBRWRF. The groundwater source is the most economical of the water sources and the infrastructure for treatment and distribution is already in place for this supply. The water supply strategy is based on the following basic principles:

1. Optimize the use of the existing groundwater resources in an environmentally effective manner.
2. Continue the implementation of water conservation initiatives. Evaluate effectiveness of measures and adjust if necessary.
3. Review and modify land development regulations to affect reduction in potable water use patterns.
4. Effect short-term reduction in per capita water use by both water conservation and replacing current potable water irrigation with lower quality water such as reclaimed water. Evaluate effectiveness of implemented retrofit projects to reduce potable water usage. Continue implementation of the residential reuse system. Optimize participation in areas where reclaimed lines are already available for use.
5. Continue to require future development to provide facilities (reclaimed water lines) for lower quality water for irrigation.
6. Continue evaluation and development of Alternative Water Supplies and/or augmentation sources.
7. Support regional water supply initiatives.
8. Seek funding assistance on reclaimed water and alternative water supply programs to reduce burden on customer base.

On a priority basis, the City will continue to invest in their existing reuse system and water conservation programs.

In order to develop capital projects to meet water demands for the next 20 years, certain projections and assumptions were required. These assumptions were made based on the best information available at this time. Because the City's water supply strategy is diversified, and there are many unknowns related to regulatory permitting of both current (groundwater) and future (brackish and surface water) sources, it will be necessary to review these assumptions on a regular basis in future updates.

Table 1-1, Water Supply Needs and Sources, identifies the projections of the potable water demands. The table identifies the SJRWMD permitted allocation versus the current demand to determine the groundwater surplus or deficit in the service area. The combination of the existing groundwater source and the available reclaimed water source is projected to exceed the projected demand for the planning period.

1.5.1 Summary of Ten-Year Capital Facility Projects

Table 1-2, Proposed Water Supply Projects for the Work Plan – Description, identifies the ***2013 Water Master Plan*** projects.

1.6 Comprehensive Plan Amendments

This ***2013 Water Master Plan*** provides data and background information that can be utilized to address changes on the Potable Water Element of the City's Comprehensive Plan (CP). The Water Master Plan will be reviewed annually with new or revised city data and updated every five years to match the timing of SJRWMD Water Supply documents/publications (should these occur).

1.7 Economic Impact Statement

See Appendix D.

1.8 Overview of Regional Water Supply Plans

In anticipation of the rapid population growth and increasing water demands facing the state and the potential threats to both the economy and natural resources, the Legislature amended the Florida

Water Resources Act (Chapter 373, F.S.) in 1997. The amendments required the five Water Management Districts to initiate regional water supply planning in all areas of the state where reasonable anticipated sources of water were deemed inadequate to meet year 2020 projected demands. Four of the Districts were required to complete regional water supply plans: Northwest Florida, Southwest Florida, St. Johns River, and South Florida.

A RWSP includes a projection of water demands and an identification of potential sources of water to meet these demands. The RWSP looks forward in time for 20 years and is intended to provide the framework for future water supply decisions in the areas where it has been determined that traditional sources of water are not adequate to provide for future needs while sustaining the water resources and related natural systems. Within these areas existing and reasonably anticipated sources of water and conservation efforts may not be adequate to:

(1) supply water for all existing legal users and reasonably anticipated future needs and
(2) to sustain the water resources and related natural systems.

The RWSP identifies potential water supply source options for water supply development, including traditional and alternative sources that will exceed the needs projected by the district. The RWSP also estimates the associated costs for developing these sources. Sources include:

(1) new well fields
(2) increased use of reclaimed water
(3) storage reservoirs
(4) surface water withdrawals
(5) aquifer storage and recovery
(6) reverse osmosis/desalination
(7) conservation

The water source options identified in the RWSP represent a “menu” of possible options for water supply development from which local governments, government-owned and privately owned utilities, self-suppliers and others may choose. The options are provided as reasonable concepts that water users in the region can pursue in their water supply planning. Water users may want to select a water supply option as presented in the plan or combine elements of different options that better suit their water supply needs. Additionally, the plan provides information to assist water users in developing funding strategies to construct water supply development projects.

The goal of the RWSP is to identify sufficient sources of water within the planning region to meet projected water demands. Prior to future development of any water supply option, it will be necessary to meet the conditions for issuance of and obtain all applicable permits. Following a decision to pursue any option identified in the RWSP, it will be necessary for the interested party(ies) to conduct more detailed engineering, hydrologic, economic and biological assessments to provide the necessary technical support for developing the option. Each RWSP is updated every five years.

1.9 Conservation – Usage Restrictions

On May 7, 2007, the City established Ordinance No. 1401 to describe the City's water restrictions. On January 22, 2008, the City adopted Ordinance No. 1428 to provide water conservation efforts through landscaping. Copies of these Ordinances are contained in Appendix F.

The City has implemented or accomplished the following conservation measures:

- Implemented a two water conservation ordinances as described above.
- Implemented an aggressive reuse water system plan.
- Educated the public on the need for water conservation and methods of protecting the City's water supply such as videos; exhibits at schools and public events; and/or distributing information to customers by newsletters, billings, and/or newspaper.
- Requires the use of water conserving plumbing fixtures as stated in Chapter 553 F.S.

The City will also endeavor to improve their conservation educational efforts. The following items will be considered:

1. Implement further ordinances that will encourage water conservation, xeriscape landscaping and low water use devices, etc.
2. Implement educational opportunities with local schools, such as "Drop Savers" and "Project WET".
3. Develop a water efficient landscape demonstration project.
4. Display water conservation exhibits at City public places.
5. Develop a communication program for water users. Distribute flyers that identify

water conservation ideas.

1.10 City Efforts to Date on Alternate Water Sources

Our projections for the use of reclaimed water indicate that public reception is above average and that it is a viable source of water to the City. It reduces potable water demand and allows the City to use potable water for new development at its highest and best use. In an effort to provide reclaimed water services to residents, the City has two reclaimed sources as described below.

a. Oviedo WRF Reclaimed System Connection

The Oviedo WRF serves water to the Reclaimed System. The facility produces a "Public Access" quality effluent and provides it for residential irrigation. The subdivisions currently receiving reclaimed water services include:

- Big Oaks
- Chapman Cove
- Chapman Groves
- Chapman Oaks
- Easton Park
- Ekana Green
- Kingsbridge East
- Kingsbridge West
- Lake Rogers
- Little Creek
- Live Oak Reserve
- Oviedo Forest
- River Pines Estates
- Sanctuary
- Twin Rivers – Phase I
- Waverlee Woods

And, the Twin Rivers Golf Course (aka Ekana)

b. IBRWRF Reclaimed Water Service Connection

The IBRWRF reclaimed supply system is a cooperative project with Seminole County and

the City of Orlando. The City installed a reclaimed water transmission main along Lockwood Boulevard. In cooperation with Seminole County, at the intersection of Lockwood Road and Lockwood Boulevard, the line becomes a joint use line with Seminole County. This reclaimed line, in turn, is connected to the City of Orlando Reclaimed Water System from the IBRWRF at the intersection of Lockwood Road and McCulloch Road. The IBRWRF is operated by the City of Orlando but is located in Seminole County. Oviedo has established an agreement with Seminole County to receive up to 3 million gallons per day of reclaimed water through this connection. This source is connected to the City reclaimed system and is considered a secondary source. Oviedo WRF reclaimed water is used prior to IBRWRF reclaimed water.

1.11 Water Supply Strategy

The City is currently operating at a potable water average service level of approximately 110 gallons per capita day and it is the goal to reduce this potable demand to 95 gpcd by 2025. The pre-reclaimed water demand was 145 gpcd. The population is expected to reach 55,775 people in 2040 based on data received from the City. The Average Daily Total Water Demand is projected to be 8.09 MGD (based on the pre-reclaimed data) and the Maximum Daily Demand is projected to be 16.2 MGD by the year 2040, and a deficit of 3.42 MGD is expected for the amount of raw water that can be withdrawn from the Floridan Aquifer per the CUP (4.67 MGD). Reclaimed water and other alternate sources will be used to compensate for the 3.42 MGD deficit. Reclaimed water will provide a reasonable solution through 2032, but after that it may become necessary to find other sources of water to meet household potable water demands. Currently, the reclaimed demand is 1.44 MGD. In order to meet future 2040 water demand, the City would need approximately 2.5 times the current reclaimed customer base and/or demand. The City reclaimed water source is 3.0 MGD (maximum) from an agreement with Seminole County plus 1.3 MGD from the Oviedo WRF. The reclaimed source is available, so the customers would need to increase accordingly to match demand. Table 1-2, Five Year Summary Recommended Water Distribution Capital Improvement Projects and Table 1-3, Five Year Summary of Recommended Reclaimed Water Capital Improvement Projects show the projects required to meet the five year goals of the City Water System.

Table 1-1
Water Supply Needs and Sources

Year	Total Projected Water Demand[(a)] (mgd)	Total Projected Supply Groundwater Sources[(b)] (mgd)	Total Projected Supply Required From Alternative Water Source[(c)] (mgd)	Maximum Potential Reclaimed Water [(d)] (MGD)	Conservation Program
2013	5.12	4.67	0.45	3.5	Y
2014	5.22	4.67	0.55	3.5	Y
2015	5.32	4.67	0.65	3.5	Y
2016	5.44	4.67	0.77	4.0	Y
2017	5.55	4.67	0.88	4.0	Y
2018	5.66	4.67	0.99	4.0	Y
2019	5.78	4.67	1.11	4.0	Y
2020	5.89	4.67	1.22	4.0	Y
2025	6.65	4.67	1.98	4.0	Y
2030	7.02	4.67	2.35	4.0	Y
2035	7.55	4.67	2.88	4.0	Y
2040	8.09	4.67	3.42	4.0	Y

(a) Based on historic usage patterns through 2000-2003 (145 gpcd) pre-reclaimed.
(b) Groundwater sources. Based on CUP. Value frozen at 2013 permitted level.
(c) Total projected water demand (pre-reclaimed demand) less total projected groundwater sources equals total projected supply required from alternative water source. This is a minimum value.
(d) This value represents reclaimed water anticipated for use based on system expansion and connection of units. Maximum daily available source of 3.0 MGD from Iron Bridge WRF. A maximum daily flow is equivalent to 2.0 MGD AADF based on a 1.5 max day factor. Oviedo WRF can provide up to 1.5 AADF until plant modifications are made. Oviedo WRF reclaimed capacity in 2016 is assumed to be 2.0 AADF. This yields 1.0 MGD available for peaking demand.
(e) Actual potable demand in 2012 was 3.74 MGD and actual reclaimed demand was 1.44 MGD.

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TABLE 1-2
FIVE YEAR SUMMARY
RECOMMENDED WATER DISTRIBUTION
CAPITAL IMPROVEMENT PROJECTS

Water Treatment, Storage, and High Service Pumping CIP	Estimated Construction Cost[1]	FY 2014-FY 2018
Riverwoods Park Connection – Install 8-inch for Alafaya to Big Oaks	$147,425	X
Carib and Tomoka – 6-inch WM to replace 2-inch line	$184,000	X
SR 426 – install 12-inch on SR 434 to Franklin	$230,000	X
SR 426/West Mitchell Hammock Turn Lanes conflict remediation 16-inch to 20-inch.	$65,000	X
Back door WTP Connection – install 12-inch from WTP to SR434	$135,000	X
Emergency Interconnect with Winter Springs	$69,000	X

TABLE 1-3
FIVE YEAR SUMMARY RECOMMENDED RECLAIMED WATER SYSTEM
CAPITAL IMPROVEMENT PROJECTS

Item	Project Description	Cost Estimate	FY 2014-FY 2018
1	Install reclaimed water distribution system into Alafaya Woods Phases 17 & 18	$743,000	X
2	Install reclaimed water distribution system into Little Creek Areas 1, 2 and 3	$609,000	X

The projects necessary to meet the 5-year potable water supply needs of the City are related to three categories:

1) The first category is related to potable water treatment plant requirements. Since the groundwater supply is capped in 2013 at 4.67 MGD AADF, the treatment capacity of the existing facilities (5.0 MGD) exceeds the available groundwater supply. There are no projects in this category.

2) The second category is related to improvements to the water distribution system. These projects provide better distribution system pressure.

3) The third category is related to the reclaimed water system. These projects will reduce the demand on the potable water system and, in our opinion, replace the potable demand.

CHAPTER 2

INTRODUCTION

2.1 Purpose of this Plan

The purpose of this Water Master Plan is to analyze the capabilities of the existing water system, compare those capabilities to current and future needs and to project a minimum 20-year program for further development of the City's total water system. It also prepares a Capital Improvement Plan for both 5-Year (immediate needs) and 10-Year projections (long range needs). The Plan includes evaluations of the capacities, preliminary locations of additional needed facilities, and a description of techniques which may be appropriate for implementation of the system described by the Plan.

Contained within this report is a detailed description and analysis of the Oviedo Water System. The Oviedo Water System is comprised of wells and raw water transmission mains, water treatment facilities, and the distribution system. Included in this report are recommendations for improvements and projections for handling the increased growth within the service area for the Water System and the related reclaimed water system.

2.2 Geographic Location and Service Area

The City is located in South Central Seminole County, Florida. It is south of Lake Jesup and mostly east of S.R. 426 and the Greenway (SR 417). The City stretches north and south along S.R. 434 from Chapman Road to Lake Jesup. The northern boundary is Florida Avenue (by planning area agreement) and the southern boundary is the Seminole County service area. The western boundary is approximately the Greenway and the eastern boundary is approximately one mile east of the Econlockhatchee River. The City covers approximately 9800 acres. The City is served by a number of arterial highways including State Roads 417, 426 and 434 and County Road 419. The City location is shown on Figure 2-1. Due to the downturn in the economy, the City has experienced low growth in the last 5 years.

2.2.1 Water Areas of Concern

The SJRWMD has identified Lake Mills as a Lake of concern and has identified a Minimum Flow and Level (MFL) for Lake Mills. Lake Mills is located in the center of Chuluota and lies between the Econolockhatchee and St. Johns Rivers and is in the general geographic area of Oviedo, but

outside the corporate limits. SJRWMD has indicated that Lake Mills is of concern due to surface groundwater levels. It is not believed that Lake Mills is directly or indirectly connected to the Floridan Aquifer. With this in mind, we do not believe that this lake MFL will have an impact of the well withdrawals of the City well fields. Since Lake Mills is affected by the surface groundwater water levels, it is important to maintain some recharge via the reclaimed water use for irrigational purposes. The reclaimed system will provide water to plants and grasses, but also water to the surface groundwater table.

2.2.2 Water Service Area – Existing

The City provides potable water service and fire protection to all areas within the incorporated City limits. Currently, the City Limits include a total area of approximately 15.3 square miles. The existing water service area is shown in Figure 2-2. The City also has four (4) interconnections with Seminole County located at the intersections of: C.R. 426 and Neile Court; Lockwood Boulevard and Old Lockwood Road; S.R. 434 and Dalton Drive; and, Oviedo Market Place Boulevard and Dovera Boulevard. The City also has a wholesale water agreement to supply potable water to Seminole County's Black Hammock service area adjacent to the City's central northern boundary.

The City and Seminole County (County) entered into a wholesale agreement, "City of Oviedo and Seminole County Wholesale Water and Wastewater Service Agreement", on June 17, 1996. The agreement references the reservation of wholesale water capacity by the City of 262,500 gpd from the County to serve the **Oviedo Crossing – Development of Regional Impact (DRI)**, parcels 12, 13 and 34 and wholesale wastewater service by the County to the Dovera Community Development District (CDD) property located in the northeast corner of the Oviedo Crossing DRI. The term of the agreement is for 10 years with automatic successive 10 year renewals. The agreement also provides that the City may return to the County unused water capacity and that the County shall reimburse the City at the cost originally paid for such capacity. To date, no capacity has been returned to the County by the City. There is no termination provision in the agreement absent the renewal provisions.

In addition to the above agreement, the City and the County previously entered into a Wholesale Water Service Capacity Agreement dated January 22, 1988 (the "Initial Wholesale Water Agreement"). This agreement enabled the County to connect to the City's Water System and to purchase water service on a wholesale basis from the City. This agreement expired by its terms on

February 1, 2003. In response to the County's request to continue its connection to the City Water System and to have sufficient water capacity to serve an area north of the City referred to as the Black Hammock area, the City and the County entered into the Black Hammock Wholesale Water Service Capacity Agreement on November 15, 2004 (the "Black Hammock Water Agreement"). This agreement sets forth the terms and conditions for providing potable water capacity between the parties in like amounts, the delineation of the water service area boundaries in the northern portion of the City, and the rates charged for wholesale service between the parties. The agreement states that the City's service area shall be within the incorporated City limits as may from time to time be amended but the agreement provides water to the residents located in the service area identified therein. The term of the Black Hammock Water Agreement is 20 years renewable for additional ten (10) year periods upon mutual consent of both parties. The parties have the right to terminate the agreement upon thirty (30) days written notice (with or without cause).

The City provides water to the entire distribution system from the West Mitchell Hammock WTP. The City decommissioned the Oviedo WTP and re-commissioned the A.M. Jones WTP to the A.M. Jones Storage and Booster Pump Station. The West Mitchell Hammock WTP has taken over as the central water treatment facility for potable water. The City provides potable water service to over 12,000 retail service accounts. The composition of the accounts is approximately 94% residential service and 6% commercial (general use). Currently, there are no industrial users within the City Water System service area.

2.2.3 Water Service Area - Future

In the years 1985 to 2000, there were a significant number of new developments that caused the service area to expand. In the years 2000 to 2007, there was moderate growth and in-fill was the primary method of growth. Based on the fact that the remaining available areas for development are outside the existing City corporate limits and are in the service area of other utilities (with corresponding infrastructure), we do not believe that the water distribution system will be expanded beyond the current service area. The City boundaries may change, but we do not anticipate that there would be any significant expansion of the water service area.

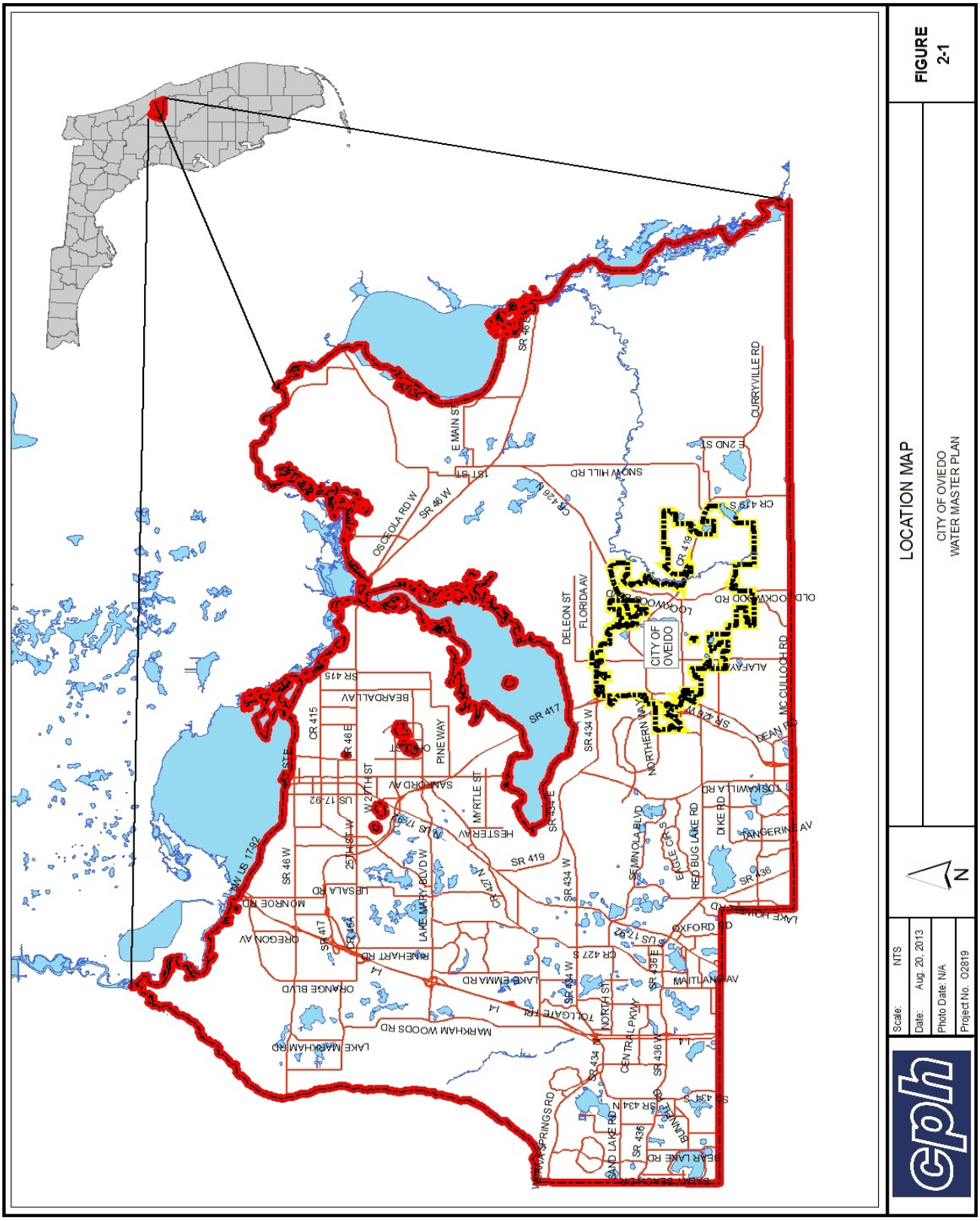
2.2.4 Land Use

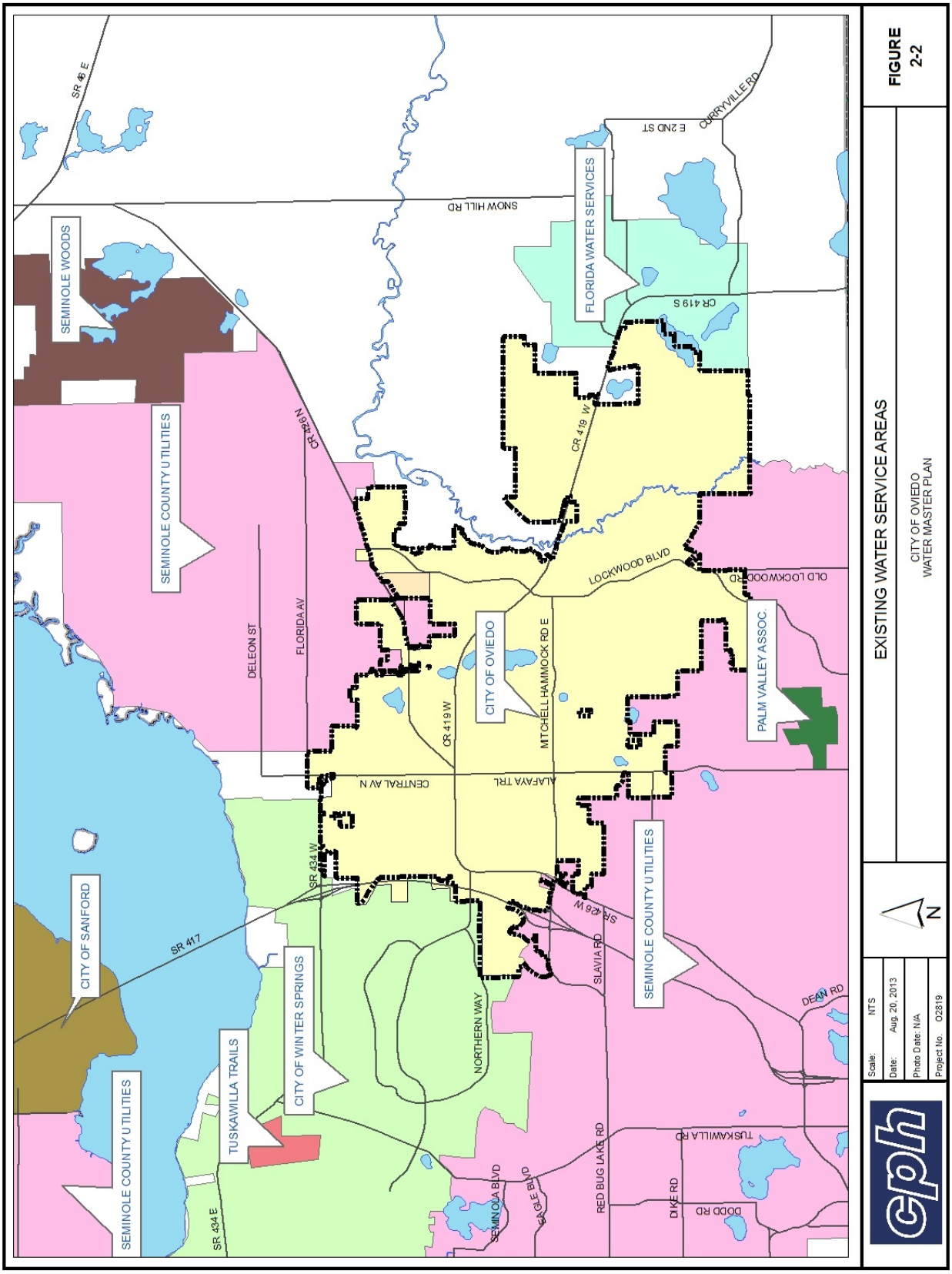
The existing water service area includes approximately 9,800 acres of incorporated area. The current and future land uses in the City and surrounding unincorporated areas are primarily

residential, commercial, industrial and conservation. Figures B-1 and B-2 in Appendix B present existing and future land use maps for the City's service area. The current and future zoning and associated acreage for incorporated Oviedo and surrounding areas are listed in Tables B-1 and B-2 in Appendix B.

2.3 Climate

Central Florida is generally humid and warm with long summers and mild winters. Rainfall is generally greatest in July and August with annual rainfall between 45 and 50 inches. April and May are generally dry months with a high irrigation demand. Irrigation demand is also high during the summer due to high evapotranspiration. Climate is a significant part of the water demand. We anticipate that more irrigation demand will be accommodated by reclaimed water as we move forward.


LOCATION MAP
CITY OF OVIEDO
WATER MASTER PLAN
FIGURE 2-1
N
Scale: NTS
Date: Aug. 20, 2013
Photo Date: N/A
Project No. O2819
cph
CITY OF OVIEDO
SR 46 W
SR 46 E
SR 417
SR 434 W
SR 434 E
SR 419
SR 436
SR 415
OR 415
US 17-92
OSCEOLA RD W
E MAIN ST
1ST ST
SNOW HILL RD
CR 426 N
CR 419
CR 419 S
CURRYVILLE RD
E 2ND ST
DELEON ST
FLORIDA AV
LOCKWOOD RD
OLD LOCKWOOD RD
ALAFAYA
MC CULLOCH RD
DEAN RD
TOSKAWILLA RD
TANGERINE AV
DIKE RD
RED BUG LAKE RD
EAGLE CR S
SEMINOLA BLVD
NORTHERN WAY
BEARDALL AV
PINE WAY
MYRTLE ST
HESTER AV
SANFORD AV
W 25TH ST
W 27TH ST
LAKE MARY BLVD W
LEISALA RD
MONROE RD
OREGON AV
ORANGE BLVD
RINEHART RD
LAKE EMMA RD
MARKHAM WOODS RD
LAKE MARKHAM RD
TOLLGATE TRL
NORTH ST
CENTRAL PKWY
MAITLAND AV
OXFORD RD
LAKE HOWELL RD
CR 427 S
CR 426 A
CR 427
SAND LAKE RD
BEAR LAKE RD
BLUNDER
SR 434 N
SR 434 S
SR 436 E
SR 436 W
SR 436
WINTER SPRINGS RD


SR 46 E
SEMINOLE WOODS
SEMINOLE COUNTY UTILITIES
CR 426 N
DELEON ST
FLORIDA AV
SNOW HILL RD
FLORIDA WATER SERVICES
E 2ND ST
CURRYVILLE RD
CR 419 S
CR 419 W
LOCKWOOD BLVD
OLD LOCKWOOD RD
CITY OF OVIEDO
MITCHELL HAMMOCK RD E
PALM VALLEY ASSOC.
CR 419 W
CENTRAL AV N
ALAFAYA TRL
SR 434 W
SR 426 W
SEMINOLE COUNTY UTILITIES
CITY OF SANFORD
SR 417
CITY OF WINTER SPRINGS
NORTHERN WAY
SLAVIA RD
DEAN RD
TUSKAWILLA TRAILS
SEMINOLE COUNTY UTILITIES
SR 434 E
SEMINOLA BLVD
EAGLE BLVD
RED BUG LAKE RD
TUSKAWILLA RD
DIKE RD
DODD RD
FIGURE 2-2
EXISTING WATER SERVICE AREAS
CITY OF OVIEDO
WATER MASTER PLAN
N
Scale: NTS
Date: Aug. 20, 2013
Photo Date: N/A
Project No. 02819
cph

2.4 Topography and Drainage

The Oviedo area is relatively flat with the major streams (and their associated tributaries) of the Econlockhatchee River and the Little Econlockhatchee River, flowing through the center of the City. They join in the geographical center of the City and flow north and east to the St. John's River. Elevations in the City range from 10 to 75 feet NGVD. The planning area is predominantly developed with fill-in areas remaining. Redevelopment is occurring along S.R. 426 and S.R. 434 and in the downtown core.

2.5 Surface Water

The Econlockhatchee River is an Outstanding Florida Water in the planning area. All other surface waters are designated Class III waters, suitable for recreation and for propagation of fish and wildlife.

2.6 Soils

Soils have been mapped by the Natural Resources Conservation Service of the U.S. Department of Agriculture, Figure 2-3. Sand, sandy clay, muck and made land make up most of the soils in the area. The muck is concentrated along the streams and lakes. These soils represent the surface soils of about 20 feet deep with the Hawthorne formation to 100-foot depth over the Floridan Aquifer.

2.7 Ecology

Wetlands border the surface water bodies that drain the City. No encroachment on existing wetlands is proposed or anticipated. The area is predominantly developed and there are no prime or unique farmlands or plant and animal communities.

2.8 Flood Plain

Flood plains are confined to the areas immediately adjacent to the streams of the Econlockhatchee River and Little Econlockhatchee and their associated tributaries.

2.9 Socio-Economic Conditions

2.10.1 Population

Population data is contained in Chapter 5.

2.10.2 Land Use and Development

The planning area is primarily residential with commercial and light industrial. Land use is established in the City Comprehensive Plan. Land Use maps and data are contained in Appendix B.

2.10 Scope of the Study and Limitations

This study generally refers to and presents a long-range plan to meet the expected demands on the water supply (potable and reclaimed), water production (potable and reclaimed), water quality and distribution system. It includes discussion on phasing, financing, and flexibility that will provide general information and guidance to the City as the systems are developed. The projects described in this report are the result of our examination of the available data and discussions with the City Staff. Appropriate adjustments were made based on current conditions and the 2008 SJRWMD CUP.

The opinions of probable cost presented in this report are only to planning level accuracy. The phasing plan provides a general concept of the way in which the physical system may develop and improve over the years. Improvement timing will depend on the actual needs at various times in the future, and the financing techniques available at those times.

Evaluation of water treatment requirements is based on current regulatory requirements and requirements currently under consideration for implementation. As major regulatory changes occur, the treatment techniques should be re-evaluated.

The timing and density of the projected development presents the most unpredictable limitation on the study. The nature of projected development can have a significant impact on the amount of water demand. If the housing development densities of some of the geographical area change, then the water demand will likely change. When that occurs, the Plan should be reviewed and modified.

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
UNIVERSITY OF FLORIDA
FLORIDA AGRICULTURAL EXPERIMENT STATIONS

GENERAL SOIL MAP
SEMINOLE COUNTY, FLORIDA

SOIL ASSOCATIONS

2 BLANTON-LAKELAND ASSOCIATION: UNDULATING,MODERATELY WELL DRAINED TO SOMEWHAT EXCESSIVELY DRAINED, SANDY SOILS INTERSPERSED WITH LAKES, PONDS AND WET, DEPRESSIONS.

3 BLANTON-LEON-PLUMMER ASSOCIATION: NEARLY LEVEL MODERATELY WELL DRAINED, SANDY SOILS INTERSPERSED WITH AREAS OF SLIGHTLY WET AND WET SOILS, AND DOTTED WITH LAKES AND PONDS.

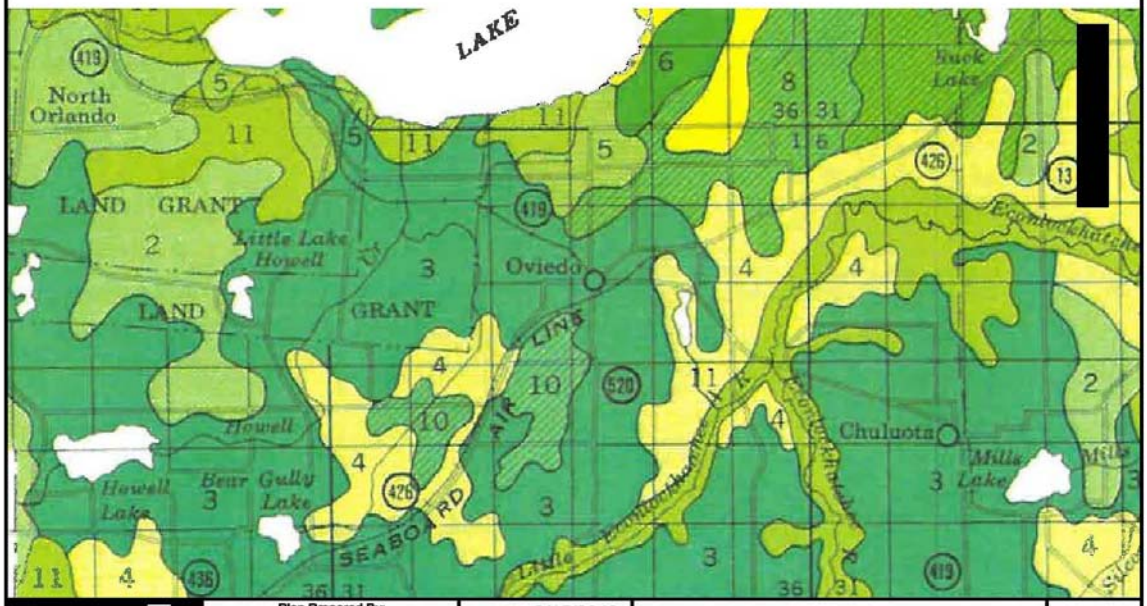
4 LEON-IMMOKALEE-PLUMMER ASSOCIATION: NEARLY LEVEL, SOMEWHAT POORLY DRAINED, SANDY SOILS UNDERLAIN BY A BROWN, STAINED PAN, AND VERY POORLY DRAINED SOILS IN SLOUGHS, SWAMPS, AND PONDS.

5 LEON-DELRAY-ST. JOHNS ASSOCIATION: NEARLY LEVEL, SOMEWHAT POORLY DRAINED TO VERY POORLY DRAINED SOILS THAT ARE SANDY TO A DEPTH OF MORE THAN 30 INCHES.

6 POMPANO-DELRAY ASSOCIATION: NEARLY LEVEL, POORLY DRAINED AND VERY POORLY DRAINED SOILS THAT ARE SANDY TO A DEPTH OF MORE THAN 30 INCHES.

10 ISTOKPOGA ASSOCIATION: NEARLY LEVEL, VERY POORLY DRAINED WOODY PEAT SOILS.

11 SWAMP ASSOCIATION: NEARLY LEVEL AREAS OF FRESH WATER SWAMP COVERED BY WATER MOST OF THE TIME.



cph www.cphcorp.com	Plan Prepared By: CPH. Inc. Licenses: Eng. C.O.A. No. 3215 Survey L.B. No. 7143 Arch. Lic. No. AA2600926 Lndscp. Lic. No. LC0000298	Date: 3/15/2013	GENERAL SOIL CHARACTERISTICS	FIGURE 2-3
		Job No. O2189		
		Scale: NONE	CITY OF OVIEDO WATER MASTER PLAN OVIEDO/SEMINOLE/FLORIDA	
		File: Soil Map		
1117 E. Robinson St. ~ Orlando, Fl. 32801 ~ Ph: 407.425.0452		©2013		

2.11 Reuse Program

The SJRWMD has implemented a program encouraging the reuse of wastewater effluents (reclaimed water) to decrease the amount of withdrawal from the Floridan Aquifer for nonpotable uses such as irrigation. The City provides reclaimed water to recreational parks, commercial customers and residential areas from the Oviedo WRF (potential of 2.0 MGD AADF); the joint reuse project with Seminole County (up to 2.0 MGD AADF); and, a 20 year agreement with the wastewater plant in Chuluota currently owned by Florida Governmental Utilities (FGUA) (up to 0.20 MGD). The source of the Oviedo WRF reclaimed water is the acquisition of Alafaya Utilities in October 2010. Sewage generated within the City is treated at this facility and reclaimed water, meeting public access criteria, is produced. The source of the joint reuse project water is the Iron Bridge Regional Wastewater Reclamation Facility (IBRWRF) operated by the City of Orlando and located in South Seminole County. The effluent is treated to an unrestricted public access standard, meaning it has been filtered and disinfected to high-level disinfection standards. The expansion of the irrigation program into residential areas has and will continue to reduce the per capita demand for water from the potable system. The benefits of the reuse program are significant for several reasons including: reducing the withdrawals from the Floridan Aquifer, decreasing surface water discharges, providing a cost effective effluent disposal method and increasing groundwater recharge in the upper groundwater tables.

2.12 Plan Maintenance

The Plan should be reviewed every year and evaluated based on regulatory changes, water quality, actual growth, and experience with the reuse program. The network of transmission mains is a major and critical part of the system. A water plant's value is certainly limited by the ability to transmit water to all locations through the system at adequate volume and pressure. A mathematical model of the transmission system will be maintained in the files and on the Engineer's computer for subsequent computer analysis to see if the water uses, as revised, would require any adjustment of the recommended transmission system improvements.

CHAPTER 3

WATER SUPPLY SOURCES AND QUALITY CONSIDERATIONS

3.1 General

The U.S. Geological Survey (USGS) has done considerable work in Seminole County with respect to availability of groundwater for agricultural and municipal uses. Reports have been published by the USGS containing information such as aquifer elevations, depth, thickness, water yield, and water quality generally through investigation of the numerous wells located within the various parts of Seminole County.

The City adopted a ***Water Supply Plan*** as required by the State of Florida Department of Community Affairs (DCA) in December 2008. The plan was found in compliance by DCA on March 2, 2009. This plan provides the City with a roadmap to meet future water resource and supply needs of the Water System including the following components:

- Reclaimed alternative water sources;
- A Capital Improvements Plan;
- Water conservation recommendations;
- Adoption of a strict irrigation ordinance which promotes low water use plants and landscape irrigation conservation;
- Implementation of a watering restriction policy; and,
- Development of interconnections with other utilities.

These items have been implemented by the City and this 2013 Water Master Plan continues with these same goals and objectives.

3.2 Historical Information

3.2.1 Characteristics of the Floridan Aquifer in Seminole County/Oviedo Source Water

The Floridan Aquifer is the primary source of potable water for most of north central and northern Florida. This aquifer is a series of limestone formations up to hundreds of feet in thickness, which lie beneath the surficial sediments. The aquifer is recharged by infiltration of rainwater through permeable surface sands into the uppermost limestone formations. Discharge from the aquifer occurs naturally through artesian springs and artificially through wells which penetrate it.

Groundwater recharge is a natural occurring step of the Earth's hydrologic cycle. As water is discharged from the aquifers through pumping and seepage, more water is simultaneously replaced through percolation. Recharge is very dependent on local conditions such as soil characteristics, potentiometric surfaces and precipitation. In general, recharge to the Floridan Aquifer is restricted to areas where the elevation of the surface water table is greater than the elevation of the potentiometric surface of the confined aquifers.

The groundwater recharge potential for the Floridan Aquifer within the area that constitutes the Oviedo Service Area is characterized as "poor" by the United States Geological Survey (USGS). Groundwater recharge of the surface aquifers is better and helps to lessen the impact on the Floridan. The Water Resources Atlas of Florida also identifies the Oviedo area as a zone with little or no Floridan recharge potential. Since the potentiometric surface elevation of the Floridan Aquifer is nearly equal to or greater than the surrounding surface elevation in Oviedo and the surrounding area (the SJRWMD river basin), numerous natural springs occur in the area that discharge from the Floridan Aquifer.

In Seminole County, considerable variation in aquifer yield and water quality is present due primarily to the influence of the St. Johns River, its tributaries, and springs. Areas which are known to exhibit relatively high well yield generally also exhibit superior water quality. This information is contained in "Availability of Ground Water in Seminole County and Vicinity, Florida" by C.H. Tibbals, 1977. However, it can be seen from the figures in that report that groundwater from the areas near Lake Monroe, Lake Jesup, and the St. Johns River exhibits relatively high levels of chlorides and hardness compared to areas further to the south and west in Seminole County. More recent updates are not available. It is anticipated that the Water 2020 Program by SJRWMD will provide new information.

The purpose of the SJRWMD Water 2020 Program is to focus attention on developing water supply plans designed to correct or prevent possible water resource problems through the year 2020. A water supply assessment was completed in 1998 and the current emphasis is on groundwater source modeling to determine the impacts on the aquifer caused by the projected demands. SJRWMD expects the potentiometric surface of the Floridan Aquifer system to decline based on the projected demands.

The USGS (Barraclough, 1962) has indicated that long ago the elevation of seawater was as high as 25 feet above the current levels. Many low areas in Seminole County were inundated by seawater during this period and in these areas the seawater infiltrated through the surface sediments into the underlying limestone formations. A distinct correlation has been observed between the 25-foot topographic contour line and the zone of better quality groundwater within the aquifer. Due to continual recharging of the aquifer by the percolation of rainfall over a long period of time the older, saltier water is believed to have been pushed deeper into the limestone beds. High rates of aquifer withdrawal, i.e., well pumping, in the uppermost limestone formations is believed to cause an upward infiltration of the poorer quality water from the deeper formations below. For this reason, design well pumpage rates must be carefully considered and close monitoring of chloride levels should be conducted by well owners for wells located in areas which are in close proximity to or within the areas of observed poor groundwater quality and well yield.

We reviewed the historical Floridan Aquifer potentiometric contour maps for the Oviedo supply area. The following information was gathered:

Year	Aquifer Elevational Range	Source
1954	50-65	Barroclough (USGS)
1977	40-45	Tibbals (USGS)
1989	35-50	USGS
1992	35-45	USGS

The data indicates a general decrease of the potentiometric head which reveals a general depletion of water supply.

3.2.2 Water Use Caution Area and MFLs

Seminole County has been identified as a Water Use Caution Area (WUCA) by the SJRWMD. The designation as a WUCA is based on concerns that future groundwater withdrawals from the Upper Floridan Aquifer will reduce the discharge from nearby springs and contribute to migration of high chloride water from the Wekiva River, St. Johns River, the Econlockhatchee River and the Little Econlockhatchee River. While the SJRWMD is currently working on developing strategies to avoid and/or mitigate these anticipated negative impacts, it is clear that the City should consider these concerns in future water supply planning.

The SJRWMD has identified Lake Mills as a Lake of concern and has identified a Minimum Flow and Level (MFL) for Lake Mills. Lake Mills is located in the center of Chuluota and lies between the Econolockhatchee and St. Johns Rivers and is in the general geographic area of Oviedo, but outside the City corporate limits. SJRWMD has indicated that Lake Mills is of concern due to surface groundwater levels. It is not believed that Lake Mills is directly or indirectly connected to the Floridan Aquifer. With this in mind, we do not believe that this lake MFL will have an impact of the well withdrawals of the City well fields.

3.2.3 Consumptive Use Permit (CUP)

Withdrawal of drinking water from the Florida Aquifer is regulated by the SJRWMD. This process is known as the CUP. A CUP is issued when the utility or other user demonstrates that the proposed water use is consistent with the public interest, is a reasonable beneficial use of water and will not interfere with any presently existing legal use of water. The SJRWMD issued CUP 8252 to the City on October 14, 2008 for all its raw water supply wells. The permit is a 20-year CUP which expires on October 14, 2028. Under the CUP, the City has the ability to withdraw water from the Upper Floridan Aquifer up to a maximum withdrawal (a cap), occurring in the fifth year (2013) through the 20th year (2028), of 4.67 MGD. The maximum annual groundwater withdrawals, as identified in CUP 8252, are summarized in Table 3-1, Summary of Permitted Maximum Groundwater Withdrawals. A copy of the City CUP dated October 14, 2008 (20-year permit) is contained in Appendix A.

TABLE 3-1
SUMMARY OF PERMITTED MAXIMUM GROUNDWATER WITHDRAWALS

Year	Series 100 Well Field (MGD)	Series 300 Well Field (MGD)	Combined Well Fields (MGD)
2008	1.468	2.936	4.404
2009	1.486	2.972	4.458
2010	1.504	3.008	4.512
2011	1.522	3.044	4.566
2012	1.540	3.080	4.620
2013 - 2028	1.558	3.116	4.674

3.3 Water Quality Source and Treatment

Generally, the raw water quality meets the maximum contaminant levels (MCL's) for currently regulated inorganic and organic contaminants and is good with the exception of variable concentrations of hydrogen sulfide, sulfate and chlorides, at specific wells.

Water quality compliance needs to address three areas:

- Source
- Treatment
- Conveyance

Groundwater quality in east Seminole County has been an area of concern for the SJRWMD. Hence, the Oviedo West Mitchell Hammock WTP site was master planned for RO membrane treatment should the stability of the nearby Upper Floridan Aquifer wells be of concern or should the Lower Floridan Aquifer be explored as an alternative water supply (AWS) source for the City.

The City's CUP #8252 requires the City to monitor its production wells quarterly for potential adverse impacts to the resource. As a result of the monitoring program, the City has successfully reduced source water impacts by redistributing withdrawal allocations.

Source water impacts and distribution system conveyance networks help drive treatment decisions. Review of chloride trends performed relative to production well redistribution demonstrated a stable

wellfield not experiencing additional mineralization from mineralized groundwater in the aquifer east of the well field site. Regulatory impacts have been mitigated by this strategy. The result is a water quality with lower Total Dissolved Solids (TDS)/chloride water at the treatment facility. In addition to the more stable source water quality, the formation of disinfection by-products (DBPs) have been further reduced with a lower chlorine dose because of H2S removal by forced draft aeration and the use of chloramines for secondary disinfection has ceased the additional formation of DBPs in the distribution system.

Still the potential for additional mineralization in the source wells may exist in the future. Therefore, the City should consider installation of a conductivity meter on the source water inlet to the treatment process to provide continuous monitoring of TDS. The conductivity meter monitoring can also help staff set operational targets for well rotation schedules, which can help enhance the treatment at West Mitchell Hammock WTP. The conductivity data trend could be used as a surrogate to correlate to inorganics such as chloride and bromide. Should the City begin to experience elevated TDS or desire to explore the lower Floridan Aquifer as an AWS; the MHWTP has been “master planned” to provide RO membrane treatment.

3.3.1 Raw Water Quality

The City is currently utilizing wells to withdraw groundwater from the upper Floridan Aquifer. Although the Floridan Aquifer is generally an excellent source of potable water, in some areas of Oviedo the aquifer is mineralized with saline water that has remained from the Pleistocene geologic era when sea levels were much higher than present levels. Once the saline seas retreated, freshwater recharged from the surface and began to slowly flush the saline water from the Florida Aquifer but a few areas, such as those in Oviedo, still contain the saline water deposits.

a. Water Quality

A transitional zone of brackish water separates the ancient seawater from the freshwater. The brackish water, existing at various depths in the Floridan Aquifer, discharges to the upper Floridan Aquifer through the faults and springs located along the St. Johns River, Econlockhatchee River, Mitchell Hammock area, and north of the City along Lake Jessup.

As more and more freshwater is pumped from the Florida Aquifer along the interface with the brackish water, the freshwater balance is disrupted. The trend can induce lateral or

vertical movement of saline water toward the pumping wells, which has occurred with wells 101, 102, 103, 201, 202, 203, 204, and 205. Wells 201, 202 and 203 have been abandoned and were grout filled. Wells 204 and 205 have been re-commissioned as monitoring wells. Wells 101, 102 and 103 remain active and pump to the West Mitchell Hammock WTP.

b. Water Quality Testing for Chlorides

Chloride intrusion to the production wells has been an issue of concern for the City. The Colinas Group (TCG) prepared a report entitled "Water Quality Monitoring Report City Potable Well Field Consumptive Use Permit 8252; November, 2012". TCG was previously contracted to conduct a groundwater withdrawal impact analysis and the results were summarized in a report dated July 16, 2007.

The TCG report recommended that the 200 series production wells be taken out of production and be used for monitoring and back-up purposes. In addition, withdrawals from the remaining production wells was recommended to be balanced in order to mitigate mineralization changes of water quality throughout the well field.

The City implemented the recommendations. However, the 200 series wells will only be used for monitoring and not used for back-up production. The TCG report identified the impact on groundwater quality of not using the 200 series wells. Since chloride concentration levels have stabilized, the plan of action appears to be producing positive results. More detail can be obtained by reading the TCG report.

c. Microbiological Quality

The microbial quality of the raw water has been compliant with no evidence of coliform bacteria. The raw water wells are typical of a Floridan groundwater.

d. Sulfide Issues

Any new or altered well with total sulfide concentration greater than 0.3 mg/l requires, under new regulations, treatment (FDEP 62-555.315). West Mitchell Hammock WTP has advanced sulfide removal treatment. High concentrations of sulfide are removed from the water prior to the Point-of-Entry (POE) for the following reasons:

- Hydrogen sulfide (H2S) produces a "rotten egg" odor, thereby creating an aesthetic problem and a deterioration of the public's confidence in the utility's ability to generate a safe and palatable drinking water; and

- Hydrogen sulfide, oxidation with chlorine, produces sulfide turbidity problems and water quality concerns.

3.3.2 Finished Water Quality

The finished water quality produced by the Oviedo PWS meets all State and Federal regulations related to the production of a safe drinking water. However, as new regulations become effective, the City may be required to enhance the treatment process to meet the MCL's which are currently proposed.

3.3.3 Corrosion Control

The City uses pH adjustment for corrosion control at the West Mitchell Hammock WTP.

3.3.4 Water Quality Policy

We recommend that the City establish a Water Quality Policy. Establishing a Water Quality Policy helps set stage for the best and most economic treatment enhancements to address future water quality regulations. A water policy should address the following:

- Set water quality goals so that regulated compliance standards are easily met and not exceeded.
- Address consumer confidence concerns regarding aesthetics

For instance, setting a goal for TTHMs < 60 µg/L and HAA5 < 40 µg/L, will provide a target to help select solutions associated with source water, treatment and distribution system strategies to mitigate compliance challenges and address consumer confidence.

3.4 Groundwater Contamination and Land Use

An additional consideration in selection of future water supply source locations and considerations for existing well locations is the potential for past and future contamination of the aquifer by organic pesticides, solvents and other hazardous chemicals and the potential for water quality degradation. Regarding contamination, an uncertainty which exists is how rapidly the groundwater will migrate outward from a contaminated site. Since the direction of groundwater flow is to the northeast toward Lake Jesup in this particular part of the County, it is recommended that any new wells be located upgradient, if possible, from known pesticide application and industrial areas where hazardous chemicals are frequently handled or utilized. Therefore, land use surrounding a water

supply site should be a major consideration in selection of new sites and in evaluating the potential for contamination of existing sites. The City should implement a wellhead protection plan and identify all potential sources of contamination for the existing wells.

3.5 Potential Future Sources of Water

In general, the groundwater supply is sufficient in both quality and quantity in the Oviedo area. It is anticipated, based on the population projections and the existing well capacity, that new wells will not be required. Significant changes in the population growth or contamination/quality degradation of existing supplies may necessitate additional supply sources some time in the future. Location of future well sites and use of existing well sites will most likely be restricted in use by potential contamination sources and setback requirements rather than by the quality and quantity of water, although the quality and quantity of water available from any well is always unpredictable.

We recommend that any new wells be constructed to produce capacities of between 1200 and 1500 gpm. Larger capacities than 1500 gpm tend to produce lower water quality and excessive drawdown levels. Wells less than 1200 gpm capacity tend to not be economical.

The City has plans for a significant residential reclaimed water system using the potential 2.0 MGD from the Oviedo WRF; the 0.20 MGD from the Chuluota wastewater plant (by 20 year agreement); and, the 3.0 MGD of reclaimed water from IBRWRF (by agreement). The 3.0 MGD from IBRWRF is a significant alternate source of water and it has been demonstrated that potable per capita water demand can be reduced in Oviedo by the use of reclaimed water.

3.6 Current Well Siting Regulations

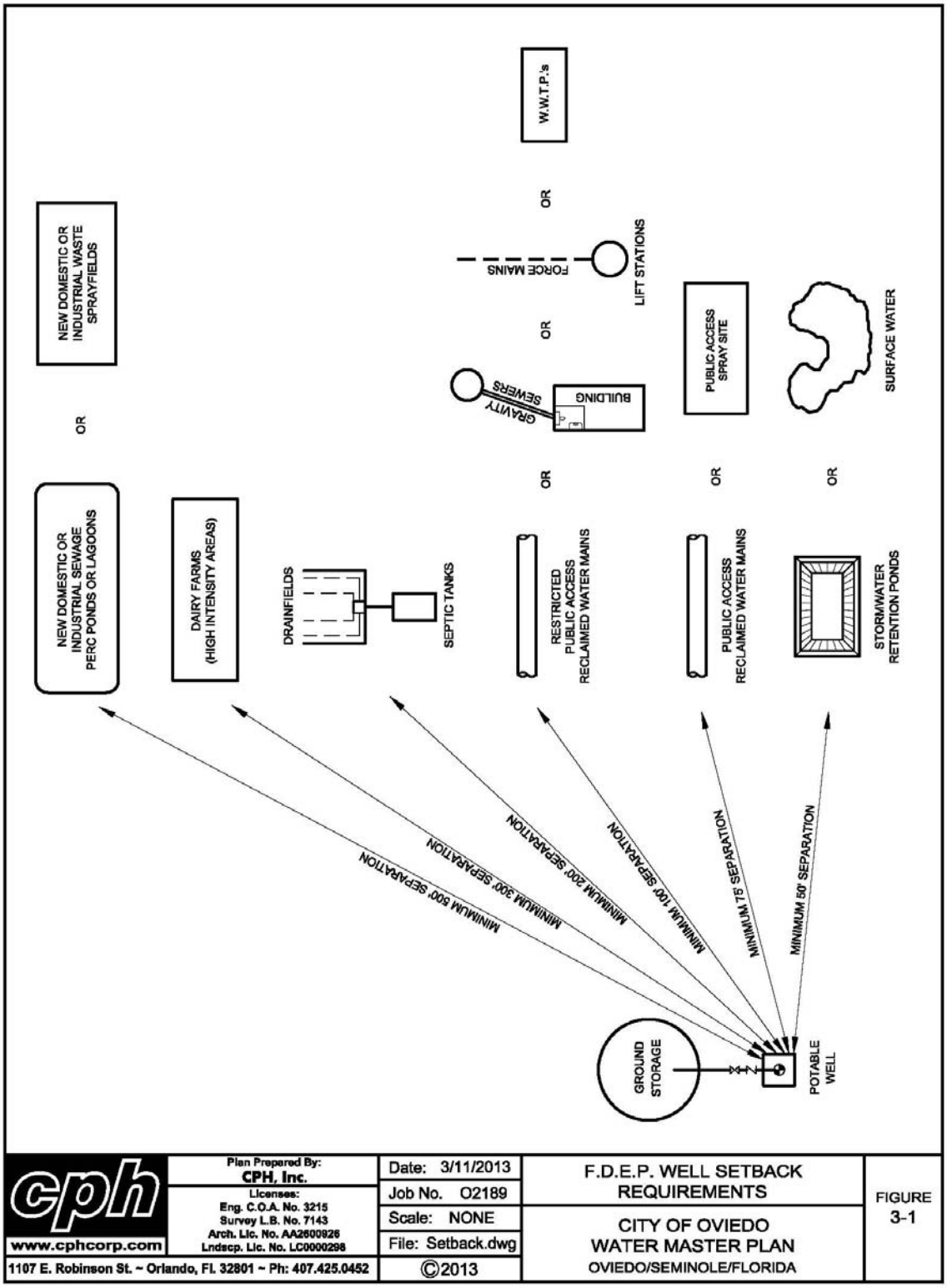
The City has two well fields available in two separate locations of the City. Based on population and flow projections, no additional wells are required to meet future flow demands; however, unanticipated changes may make it necessary to replace or add additional wells as discussed above and there are many factors which must be considered. We believe there is excess well capacity in the current system. The FDEP has established certain guidelines for the placement of new wells. Figure 3-1 illustrates these guidelines. The major consideration in developed areas as related to well placement is the 100-foot minimum setback to sewer lines, etc. and the 200-foot minimum setback to retention areas and septic tanks, etc. These setback requirements become the limiting factor for new well locations and the setback requirements determine the minimum size of

the well site. Additional considerations in selection of future water supply source locations is the potential for past and future contamination of the aquifer by organic pesticides, solvents, and other hazardous chemicals.

Final selection of any well site, if needed, must consider surrounding land use. In addition, an investigation should be conducted by a geohydrologist to estimate the recommended well size and depth, pumping capacity, casing length, projected aquifer drawdown, and other site specific considerations to be utilized in final design. The St. Johns River Water Management District should be consulted to obtain their reactions to the well field site and their requirements for a testing program. Test wells may be needed to determine ambient aquifer water quality, aquifer yields, drawdowns, etc., prior to full development of any well site.

3.7 Water Treatment

Recent regulatory trends have resulted in additional and stricter standards for drinking water. As a result of the 1986 Safe Drinking Water Act (SDWA), Environmental Protection Agency (EPA) has and will continue to establish additional and revised standards. As a result of the additional monitoring and possible treatment requirements and the costs associated with these requirements, it is recommended that no additional water plants should be incorporated into the Oviedo system. Any additional water plants would only increase operational costs and we believe it is more cost effective to improve and expand the existing facility. The existing plant should be expanded as needed to meet any future demands.



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		Job No. O2189		
		Scale: NONE	CITY OF OVIEDO WATER MASTER PLAN OVIEDO/SEMINOLE/FLORIDA	
		File: Setback.dwg		
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CHAPTER 4

EXISTING CONDITIONS

4.1 General

The water system consists of one water treatment plant, one booster pump station and a water distribution system which serve approximately **12,562** service connections. The water plant is identified as the West Mitchell Hammock Water Treatment Plant (WTP) and the booster pump station is known as the A.M. Jones Storage and Booster Pump Station. Tables 4-1 to 4-4 contain a summary of the existing capacities of the wells, storage facilities, treatment components and pumping facilities. The water system consists of the following:

- Water Supply Wells (groundwater aquifer)
- Raw water pumping from the groundwater aquifer and piping
- Aeration (forced draft)
- Chlorination (by concentrated sodium hypochlorite)
- Sedimentation (storage)
- High service pumping
- Distribution system (pipes).

The City owns, operates and maintains the water treatment facilities and distribution system within its corporate limits. The City serves only minor unincorporated areas via interlocal agreements with Seminole County.

The FDEP, SJRWMD and the EPA regulate the water system. FDEP and EPA regulations primarily deal with the quality requirements of both the raw water quality and finished water quality distributed to the public. In addition, they regulate and approve the type of treatment used by the City. Regulation of the quantity of water is performed by the SJRWMD (via the CUP process). The City possesses the required permits and is in compliance with the permit(s) and other applicable requirements. Periodic reports to regulators have been filed on a timely and complete basis. The City is currently in compliance with all current applicable federal, state and local regulations with respect to the operation of the water system.

4.2 Existing Water Plants

The 2006 Water Master Plan recommended that the City move all water treatment capabilities to

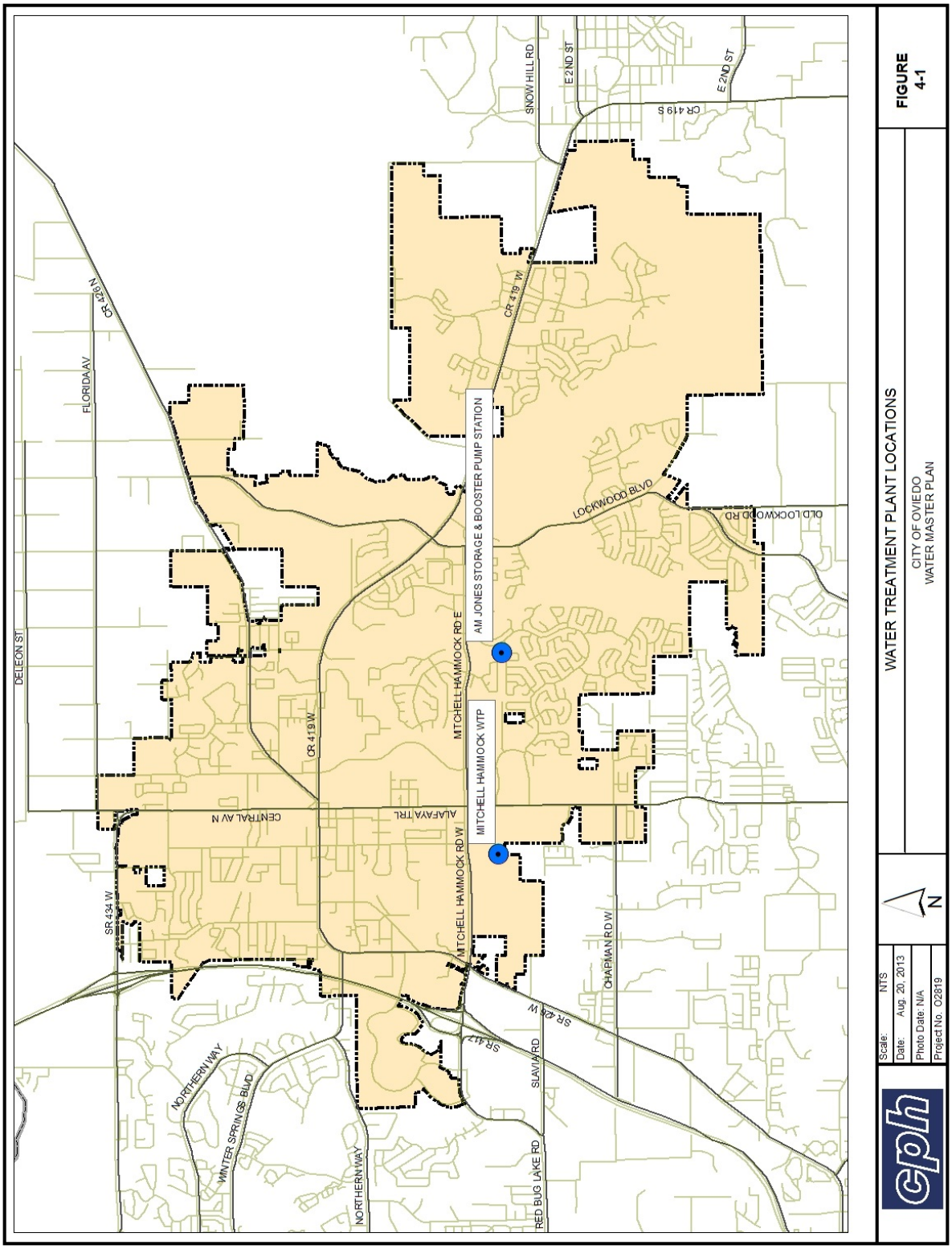
the West Mitchell Hammock WTP. This was completed in July 2010 when the water distribution improvements were completed between the West Mitchell Hammock WTP and the AM Jones WTP. At this same time, the AM Jones WTP was also converted to the AM Jones Booster Pump Station.

The City currently owns three (3) and operates one (1) water treatment facilities: Oviedo WTP (de-commissioned), the A.M. Jones WTP (re-classified and re-commissioned to the AM Jones Booster Pump Station, and the West Mitchell Hammock WTP. Although the Oviedo WTP and the A.M. Jones WTP were de-commissioned, historical data from these plants are included in the water system analysis. The locations of the City's existing facilities are shown on Figure 4-1, Water Treatment Plant Locations. The raw water supply for the West Mitchell Hammock WTP is provided by ten (10) active wells located in the vicinity of the City and shown in Figure 4-2, Well Locations.

4.2.1 Raw Water Supply

The source of supply of the City's water treatment facilities is the upper Floridan aquifer, which is characterized as a highly productive aquifer. The City maintains and operates three (3) well fields; the A.M. Jones, the Oviedo, and the Southwest well fields. The A.M. Jones well field included six (6) wells: well numbers 202, 202A, 203, 203A, 204 and 205 which were all de-commissioned because of poor water quality; and well 301 was re-directed to the West Mitchell Hammock WTP. The Oviedo well field includes four (4) operational wells: well numbers 101, 102, 103 and 301; and the Southwest well field consists of six (6) operational wells: well numbers 303, 304, 305, 306, 307 and 308. Due to the de-commissioning of the Oviedo WTP and the re-commissioning of the A.M. Jones WTP to a storage and booster pump station, all well fields have been redirected to the West Mitchell Hammock WTP. The location of the raw water supply wells in relation to the West Mitchell Hammock WTP and the water service area are illustrated in Figure 4-2, Well Locations. Table 4-1, Summary of Raw Water Supply Facilities, summarizes the location, casing diameter, depth and pumping capacity of each currently active raw water supply well.

The existing CUP held by the City is an individual permit (Permit No. 8252) issued by the SJRWMD and is contained in Appendix A, Existing Consumptive Use Permit. Details on withdrawal rates are contained in the permit. The permit is dated October 14, 2008.


DELEON ST
FLORIDA AV
CR 426 N
SR 434 W
NORTHERN WAY
WINTER SPRINGS BLVD
NORTHERN WAY
CENTRAL AV N
CR 419 W
ALAFAYA TRL
MITCHELL HAMMOCK RD W
MITCHELL HAMMOCK RD E
MITCHELL HAMMOCK WTP
AM JONES STORAGE & BOOSTER PUMP STATION
SR 417
SR 420 W
SLAVIA RD
RED BUG LAKE RD
CHAPMAN RD W
LOCKWOOD BLVD
OLD LOCKWOOD RD
CR 419 W
SNOW HILL RD
E 2ND ST
CR 419 S
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N
WATER TREATMENT PLANT LOCATIONS
CITY OF OVIEDO
WATER MASTER PLAN
FIGURE
4-1
cph
Scale: NTS
Date: Aug. 20, 2013
Photo Date: N/A
Project No. O2819

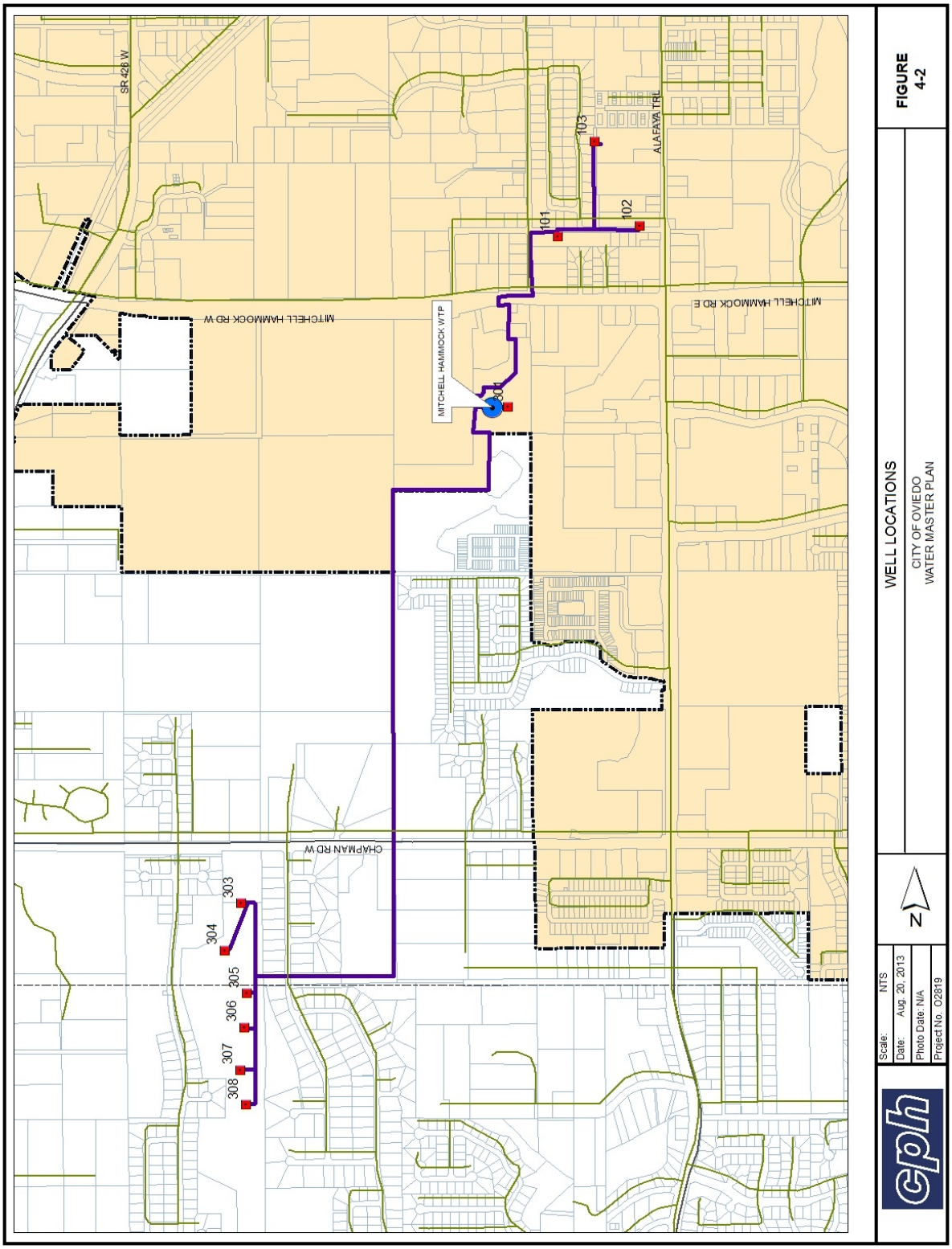

SR 426 W
MITCHELL HAMMOCK RD W
MITCHELL HAMMOCK WTP
101
102
103
ALAFAYA TRL
MITCHELL HAMMOCK RD E
CHAPMAN RD W
303
304
305
306
307
308
WELL LOCATIONS
CITY OF OVIEDO
WATER MASTER PLAN
FIGURE
4-2
N
Scale: NTS
Date: Aug. 20, 2013
Photo Date: N/A
Project No. O2819
cph

TABLE 4-1
SUMMARY OF RAW WATER SUPPLY FACILITIES

Location	Well #	Casing Diameter (in)	Casing Depth (ft)	Total Depth (ft)	Operation (hrs/wk)	Pump Capacity (GPM)
Oviedo Wellfield	101	12	285	340	72	900
	102	12	148	365	72	900
	103	12	117	250	72	750
	204*	12	161	300	MW	
	205*	24	138	250	MW	
	301	24	142	395	72	1,500
Southwest Wellfield	303	18	157	350	72	1,500
	304	18	137	250	72	1,500
	305	18	157	250	72	1,500
	306	18	157	350	72	1,500
	307	18	157	325	72	1,500
	308	18	157	300	72	1,500

*Water Quality of these wells was lower than optimal and the wells were decommissioned.
MW = Monitoring Well (these wells were re-commissioned as monitoring wells).
Wells 202, 202A and 203A have been abandoned and grouted.

4.2.1.1 Raw Water Supply – Water Quality

See section 3.3.1 for information.

4.2.2 A.M. Jones Storage and Booster Pump Station

The A.M. Jones WTP has been re-commissioned as the A.M. Jones Storage and Booster Pump Station.

4.2.2.1 Storage, and High Service Pumping Facilities

The A.M. Jones Storage and Booster Pump Station has two (2) existing ground storage tanks, each with a capacity of 500,000 gallons. Six (6) high service pumps can be used to deliver finished water

to the City's distribution network and boost pressure during high demand periods. The design conditions for the high service pumps are summarized in Table 4-2, Summary of Raw Water Supply Facilities at the A.M. Jones Storage and Booster Pump Station.

TABLE 4-2
SUMMARY OF HIGH SERVICE PUMP CAPACITIES
AT THE
A.M. JONES STORAGE AND BOOSTER PUMP STATION

Pump No.	Design Flow (GPM)	Total Dynamic Design Head (feet)
1	1,800	179
2	1,800	179
3	1,800	179
4	750	168
5	750	168
6	750	168

4.2.3 West Mitchell Hammock Water Treatment Plant

The West Mitchell Hammock WTP was placed into operation in December 2005. It is located one (1) mile east of the intersection of S.R. 426 and West Mitchell Hammock Road. This plant has a design maximum day treatment capacity of 10.0 MGD expandable to 12.0 MGD. The WTP provides water treatment utilizing forced draft aeration.

Once this facility became operational, the City de-commissioned the Oviedo WTP and when distribution piping improvements were made in 2010, the A.M. Jones WTP was re-commissioned into a combined remote storage and booster pump station for potable water.

4.2.3.1 Treatment Process

The West Mitchell Hammock WTP employs forced draft degasification for removal of hydrogen sulfide. ***The facility also includes provisions for future membrane treatment for the removal of chlorides and disinfection byproduct precursors. Under a membrane treatment scenario, raw water would pass through cartridge filters for particulate removal prior to membrane treatment. Hydrogen sulfide would then be removed from the permeate from the membrane***

skids via forced draft aeration. Subsequently, degasified permeate would be pumped to an on-site ground storage tank. Concentrate from the membrane treatment process would pass through a small forced draft degasifier prior to discharge to the City's wastewater collection system.

Several chemicals are added to the water at various locations within the WTP under the conventional degasification treatment scenarios. Carbon dioxide is added prior to air stripping to enhance hydrogen sulfide removal. Sodium hypochlorite and ammonium hydroxide are introduced prior to storage for disinfection. Hydrofluorosilicic acid and a corrosion inhibitor are also added prior to storage for fluoridation and corrosion control, respectively. Sodium hypochlorite and ammonia are once again added downstream of the high service pumps to ensure a disinfectant residual. Carbon dioxide and sodium hydroxide are also fed downstream of the high service pumps for stabilization.

Off-gasses from the forced draft aeration process are directed to a 2-stage packed tower odor control system. Potassium hydroxide is added in both stages while sodium hypochlorite is added to just the second stage. Blowdown from the scrubbers is periodically discharged to the City's sewer system. Sulfuric acid is added to the blowdown prior to discharge in order to prevent scale formation. Table 4-3, West Mitchell Hammock WTP Summary of Treatment Components, presents a summary of the various unit operation and treatment processes within the West Mitchell Hammock WTP.

4.2.3.2 Storage Facilities

Finished water is stored in a 2.50 MG post tensioned concrete ground storage tank.

4.2.3.3 High Service Pumps

The finished water is pumped into the City's distribution network by four (4) high service pumps with a capacity of 4,000 GPM each. The high service pump layout is expandable and can include up to a total of six (6) units.

TABLE 4-3
WEST MITCHELL HAMMOCK WTP
SUMMARY OF TREATMENT COMPONENTS

Unit Operation / Process	Description / Size
Degasification System Packed Towers	
No. of Units	2
Type	Forced Draft
Diameter	12.00 Feet
Packing Depth	12.00 Feet
Capacity, Each	5.00 MGD
Hydrogen Sulfide Removal Efficiency	95%
Degasification Blowers	
No. of Units	2
Type	Centrifugal
Capacity, Each	15,000 cfm
Horsepower	40 HP
Transfer Pumps	
No. of Units	3
Type	Vertical Turbine
Capacity, Each	4,000 GPM @ 58 Feet TDH
Horsepower	125 HP
Odor Control System	
No. of Units	1 -2 Stage System
Type	Wet Scrubber
Diameter	9.00 Feet
Packing Depth	13.00 Feet
Capacity	30,000 cfm
Design Hydrogen Sulfide Discharge Concentration	0.67 ppm
Chemical Feed	
Potassium Hydroxide	1st and 2nd Stages
Sodium Hypochlorite	2nd Stage Only
Chemical Feed Systems	
Carbon Dioxide	
Bulk Storage	140 Tons
Application Points	Upstream of Degasifiers and Downstream of High Service Pumps
Feed System	3 Solution Feed Panels, 2 @ 500 lbs/hr, 1 @ 100 lbs/hr.

TABLE 4-3 (Cont'd.)
WEST MITCHELL HAMMOCK WTP
SUMMARY OF TREATMENT COMPONENTS

Unit Operation / Process	Description / Size
Sodium Hypochlorite Bulk Storage Application Points Feed System	 12,000 Gallons Transfer Pump Station Wetwell, Transfer Pump Discharge Piping, High Service Pump Discharge Piping, Degasifiers, and Wet Scrubber 2-40 GPH Metering Pumps and 2-70 GPH Metering Pumps
Ammonium Hydroxide Bulk Storage Application Points Feed System	 2,000 Gallons Transfer Pumps Discharge Piping & High Service Pump Discharge Piping 75-gallon Day Tank, 2-5.0 GPH Metering Pumps, and 2-10.0 GPH Metering Pumps
Corrosion Inhibitor Bulk Storage Application Point Feed System	 1,000 Gallons Transfer Pump Discharge Piping 50-gallon Day Tank, 2-8.0 GPH Metering Pumps
Hydrofluorosilicic Acid Bulk Storage Application Point Feed System	 1,000 Gallons Transfer Pump Discharge Piping 50-gallon Day Tank, 2-8.0 GPH Metering Pumps
Potassium Hydroxide Bulk Storage Application Point Feed System	 6,000 Gallons Wet Scrubber 200-Gallon Day Tank, 2-15.0 GPH Metering Pumps
Sulfuric Acid Bulk Storage Application Point Feed System	 1,000 Gallons Wet Scrubber Waste Stream 50-Gallon Day Tank and 2-6.0 GPH Metering Pumps

TABLE 4-4
SYSTEM-WIDE SUMMARY OF EXISTING WATER SUPPLY, TREATMENT, STORAGE AND PUMPING FACILITIES

Item	Oviedo WTP	A.M. Jones BPS	West Mitchell Hammock WTP	Totals
Wells	1 @ 750 GPM 2 @ 900 GPM	1 @ 1,500 GPM	6 @ 1,500 GPM	18.8 MGD
Treatment Membrane Skids Forced Draft Aeration			FUTURE 2 @ 5.00 MGD	10.0 MGD
Storage		2 @ 0.50 MG	1 @ 2.50 MG 1 potential @ same size	3.5 MG
High Service Pumps		1 @ 280 GPM 1 @ 375 GPM 1 @ 680 GPM 1 @ 1,100 GPM 2 @ 2,500 GPM	4 @ 4,000 GPM	30.1 MGD
The Oviedo WTP was de-commissioned and the wells were transferred to West Mitchell Hammock. The A.M. Jones WTP was re-commissioned as the A.M. Jones Storage and Booster Pump Station. Wells 204 and 205 were re-commissioned as monitoring wells and wells 202, 202A, 203 and 203A were abandoned and grouted. Only active components are shown in this Table.				

4.3 Distribution System

The City's water distribution system consists of approximately 175 miles of water main ranging from 4-inch to 36-inch in diameter. Ninety-nine percent (99%) of the water distribution system is constructed of ductile iron pipe. The remaining one percent is galvanized iron pipe which is being replaced as part of the City's ongoing renewal and replacement program on an as needed basis. Figure 4-3, Existing Water Distribution System, shows the existing distribution system and pipe sizes. The map of the existing distribution system (through 2012) was provided by the City. A hydraulic analysis of the system to determine the current service capability and to evaluate improvements for the future to provide adequate service was performed by others. This was included in the 2006 Water Master Plan. CPH was provided a copy of this model. We re-calibrated and updated the model for the 2009 water main distribution improvements. As part of the 2009

water main distribution project, it was recommended that the raw water main connecting wells 204 and 205 to the West Mitchell Hammock WTP be re-commissioned as a potable water distribution main. As described in this section, wells 204 and 205 had poor water quality and the wells were abandoned. This action made the raw water line available for re-commissioning. It was a choice of either re-commissioning the line or paying to have it removed or grouted and abandoned in place. The preferable option was to re-commission the line. This action saved the City approximately $2 million. The line was in good condition and it was advisable to proceed with this project. A permit request was submitted to FDEP and under the conditions contained in that permit, the line was converted for public potable water use. The 2006 Master Plan had major water distribution mains projected as future capital improvements. With the re-commissioning of the raw water line to a potable water main, many of these improvements were not required. Thereby reducing the number of projects in the capital improvements plan and saving additional dollars. These projects are listed in Table 4-5, Summary of the Recommended Water Distribution Improvements of the 2006 Water Master Plan. Table 4-5 identifies the disposition of each project at the present time.

The pressure in the water distribution system at the West Mitchell Hammock WTP is set at 82 psi. Pressure is regulated by variable frequency drives on the high service pumps. The extreme end of the distribution system is generally maintained between 51 and 55 psi which meets the City's requirements. The distribution system is also designed and tested by modeling for the ability to maintain fire flow under maximum day demand plus fire flow. The modeling indicates that the system will maintain pressure and flow under these conditions of flow. The water distribution system is looped wherever possible to maintain alternate flow patterns in case of a break anywhere in the system. This allows a piece of the system to be shut down, and still maintain service to as many areas as possible during the shutdown. The distribution system is equipped with isolation valves throughout which enables repairs and maintenance to be performed without shutting down significant portions of the water system. Looping also maintains a higher water quality throughout the system. There are some dead end lines and they are flushed periodically to maintain water quality.

Interconnects have been made with Seminole County Environmental Services Department for back-up emergency water service. In addition, plans have been developed for the interconnection of the Winter Springs and Oviedo systems in two locations. These have not been implemented to date. In the past, the City has not had to rely on the use of any interconnect to meet any water system

demands. The water distribution system includes approximately 1124 fire hydrants to provide fire protection services.

There are several projects that are added due to the following:

1) **Roadway Improvements:** Periodically, water mains need to be relocated as part of roadway improvement projects. The SR426 Widening Project requires the relocation of water mains on CR419/SR426 and SR 434. There is also a turn lane improvements project at West Mitchell Hammock Blvd. and SR 426.
2) **Interconnects:** An interconnecting line on SR 434 with the City of Winter Springs was designed in 2009. This will provide emergency service capability.
3) Water Quality Issues: The City desires that The Isles of Oviedo subdivision be served with Oviedo water and separated from the Seminole County system. This is the Oviedo Marketplace project. The Oviedo Marketplace Mall will remain on Seminole County water.
4) **Looping:** A water main loop system can be created by the Chapman Ragsdale connection.
5) **Improved Distribution:** A 12 inch line from the WMHWTP to SR 434 will provide a "back door" feed capability for the WMHWTP and improve system reliability. If we experience a line break of the 36 inch line leaving the WMHWTP or a line break on the lines on West Mitchell Hammock , this new 12 inch line provides an alternate way for water delivery to the Oviedo system.
6) **Service Upgrades:** The City desires to replace and upgrade 2 inch galvanized lines. This is the Carib and Tomoka project.
7) These projects have been added to the Capital Improvements Projects listed in Chapter 7.

The SR 426/419 widening project will be performed in Phases and utility coordination is required along this alignment. The project is managed by Seminole County with Florida Department of Transportation (FDOT) involvement due to the state road designation and federal funding. Utility relocations or upgrades that are required during by the roadway widening are to be paid by the utility.

Phase 1: The limits are along SR 434 from Smith Street north to Franklin Street. Design is 100% complete. FDOT is currently wrapping up the acquisition of properties. Construction funding is through TRIP money which is available in 2015. The County recently found additional funds

(County funds) that can be utilized to assist in expediting the construction phase. Phase 1 construction will likely begin in 2015.

Phase 2: The limits of this phase are along SR 426/419 from North Pine Avenue to Avenue B. The project is currently in the design phase. Construction may occur within the next ten years.

Phase 3: The limits of this phase are from Avenue B to Lockwood Blvd. The construction of this phase is beyond the ten year window. There is no money for design, acquisition, or construction at this time.

TABLE 4-5
SUMMARY OF RECOMMENDED WATER DISTRIBUTION SYSTEM IMPROVEMENTS OF THE 2006 WATER MASTER PLAN

No.	Description
Phase 1	1. *Mitchell Hammock Road Improvements* • Install 36" WM on West Mitchell Hammock Road from the WTP to Alafaya Woods Boulevard. • Install 20" WM on East Mitchell Hammock Road from Alafaya Woods Boulevard to Lockwood Boulevard. *These two projects were replaced by the "Water System Improvements Project 2009" completed in 2010 (see discussion above).* 2. *Eyrie Drive* • Install 8" WM from Eyrie Drive south to West Mitchell Hammock Road. *Not required with the installation of the 16" water main on SR426.* 3. *Timberwood Subdivision* • Install 8" WM on SR 426 from W. Franklin St. to North Lake Jessup Avenue to Timberwood Trail. *Not required with improvements to SR 426 water main.* 4. *SR 426 Improvements* • Install 16" WM on SR 426 from West Mitchell Hammock Road to North Pine Avenue. *Completed with the roadway improvements in 2008.*
Phase 2	1. *CR419/SR 426 Improvements* • Install 16" WM on CR 419/SR 426 from North Pine Ave. to Division Street *To be completed with future roadway improvements.* 2. *Lockwood Road* • Install 16" WM on Lockwood Blvd. south of East Mitchell Hammock Blvd. *Project is replaced by Riverwoods Park 8"WM, construction to be completed in 2014.* 3. *North Pine Avenue* • Install 10" WM on North Pine Avenue from CR 419/SR 426 to Bentley Street *Not required with the installation of the 16" water main on SR426.* 4. *CR419/SR 426 Improvements* • Install 16" WM on CR 419/SR 426 from Division St. to Lockwood Blvd. *To be completed with future roadway improvements.* 5. *Oviedo Marketplace* • Install 16" WM on CR 419/SR 426 from Division St. to Lockwood Blvd. *Replaced with Isles of Oviedo 8" WM..*

4.4 Distribution System Water Aging

One of the consequences of adding reclaimed water in residential neighborhoods is that potable water demand decreases in direct proportion to the irrigation used in the subdivision. For Example, the Oviedo Forest subdivision has 100% of available customers connected to the reclaimed water system for irrigation. The potable demand has decreased dramatically (50%) and the City is seeing low flow conditions in the watermains. In addition, since the City uses chloramination as the disinfection process, the City is may see nitrification in these lines. Nitrification is the biological oxidation of ammonia by oxygen first into nitrite and then followed by continued oxidation of these nitrites into nitrates. Nitrates in the drinking water system are undesirable. The "potable" water distribution is sized for higher per capita demands and fire flow capability. Normal design parameters create larger sized mains than are required to serve the day to day potable water needs of the community. This is done to serve and accommodate all flow conditions. Therefore, it is critical to maintain existing water main looping and require future water main looping to maintain flow-through conditions. We recommend that the Oviedo Forest area be monitored closely. If the City sees any trends toward lower water quality, modifications may be required to the existing distribution system near Oviedo Forest in an effort to maximize "flow through" and minimize ageing of the water in the Oviedo Forest distribution system.

Another concern is the A.M. Jones Storage and Booster Pump Station. This facility could create a longer residence time (water aging) that may allow nitrification of the disinfected water to occur. We advise that the system be monitored for the following signs:

1) Loss of chlorine residual in the distribution system
2) Nitrate/Nitrite increase – check concentrations at the WTP, A.M. Jones Storage tank discharge and within the distribution system at the farthest locations from the WTP. Take the data and plot trends.
3) The presence of "free ammonia" is a precursor for the formation of nitrites/nitrates– check the free ammonia concentrations in the potable water at the discharge point of the WTP
4) Loss of dissolved oxygen
5) Increase in Heterotrophic Plate Count.

The water treatment plant staff makes sure that the aging time at A.M. Jones is minimized. Water does not stay in the tank for extended periods of time. The staff makes it a point to utilize the water and they routinely drawdown the tank levels to provide a full use of the tank volume. At the current time, no problems have been observed.

The methods of nitrification mitigation include:

1) Periodic free chlorine burn of the distribution system
2) Chlorine/Ammonia booster at the re-pump station and minimize dosage at the WTP
3) Reduce water age in distribution system by flushing and looping
4) Diligent monitoring of chlorine and ammonia dosage to maintain the correct mix.

We have included a copy of the EPA White Paper on Nitrification in Appendix E.

4.5 Chlorination/Disinfection

The Oviedo water facilities use sodium hypochlorite (a.k.a. concentrated bleach) to disinfect the raw water withdrawn from the Upper Floridan aquifer. The City also adds ammonia into the water distribution system to form chloramines. Chloramines provide longer disinfection residual time within the water distribution system which increases the time within the piping system that the chlorinated water has the ability to kill bacteria. Chloramines also lower the potential for the formation of chlorinated hydrocarbons (chlorinated hydrocarbons are known as probable carcinogens) such as Trihalomethanes and Trihaloacetic acids. The use of chloramines yields concentrations of total Trihaloacetic acids and total Trihalomethanes below EPA maximum contaminant levels for drinking water within the Oviedo water distribution system.

4.6 Corrosion Control

The treatment facilities are required to reduce the corrosion potential of the potable water and meet the requirements of the EPA for lead and copper concentrations. The West Mitchell Hammock WTP uses pH adjustment (sodium hydroxide) for corrosion control and corrosion inhibition.

4.7 Condition of Water System

The component condition of the water system varies from good to excellent. Newer facilities are in excellent condition and depending on the age, the condition changes. The West Mitchell Hammock Facility is in very good condition and the equipment is properly maintained and serviced. The system is functioning properly and as intended. The system is in compliance with regulatory requirements. CPH has made periodic visits to the facilities, interviewed staff, reviewed monthly operating reports and permits. CPH has reviewed information regarding materials of construction and age of the water main system. Based on this information, CPH has determined that the overall

condition of the water system is good.

The City has a water meter replacement program in progress and has made excellent strides on updating all their meters. Based on this program, we believe the meter system is in excellent condition.

4.8 Reclaimed Water System

The construction of the City reclaimed water distribution system began in 2004. Reclaimed water was available for use in October 2008 from the IBRWRF and the City reclaimed water system began at that time. In October 2010, the City acquired the assets of the Alafaya Utilities system. Alafaya Utilities began residential reclaimed service in 2002 with 50 customers.

The City serves approximately 2539 metered customers with reclaimed water for irrigation purposes. The existing distribution system consists of 16.52 miles of PVC and HDPE pipes ranging in size from 4-inch to 24-inch diameter which provide reclaimed water to the following residential subdivisions:

Big Oaks	Chapman Cove
Chapman Groves	Chapman Oaks
Easton Park	Ekana Green
Kingsbridge East and West	Lake Rogers
Little Creek	Live Oak Reserve
Oviedo Forest	River Pines Estates
Sanctuary	Twin Rivers – Phase I
Waverlee Woods	

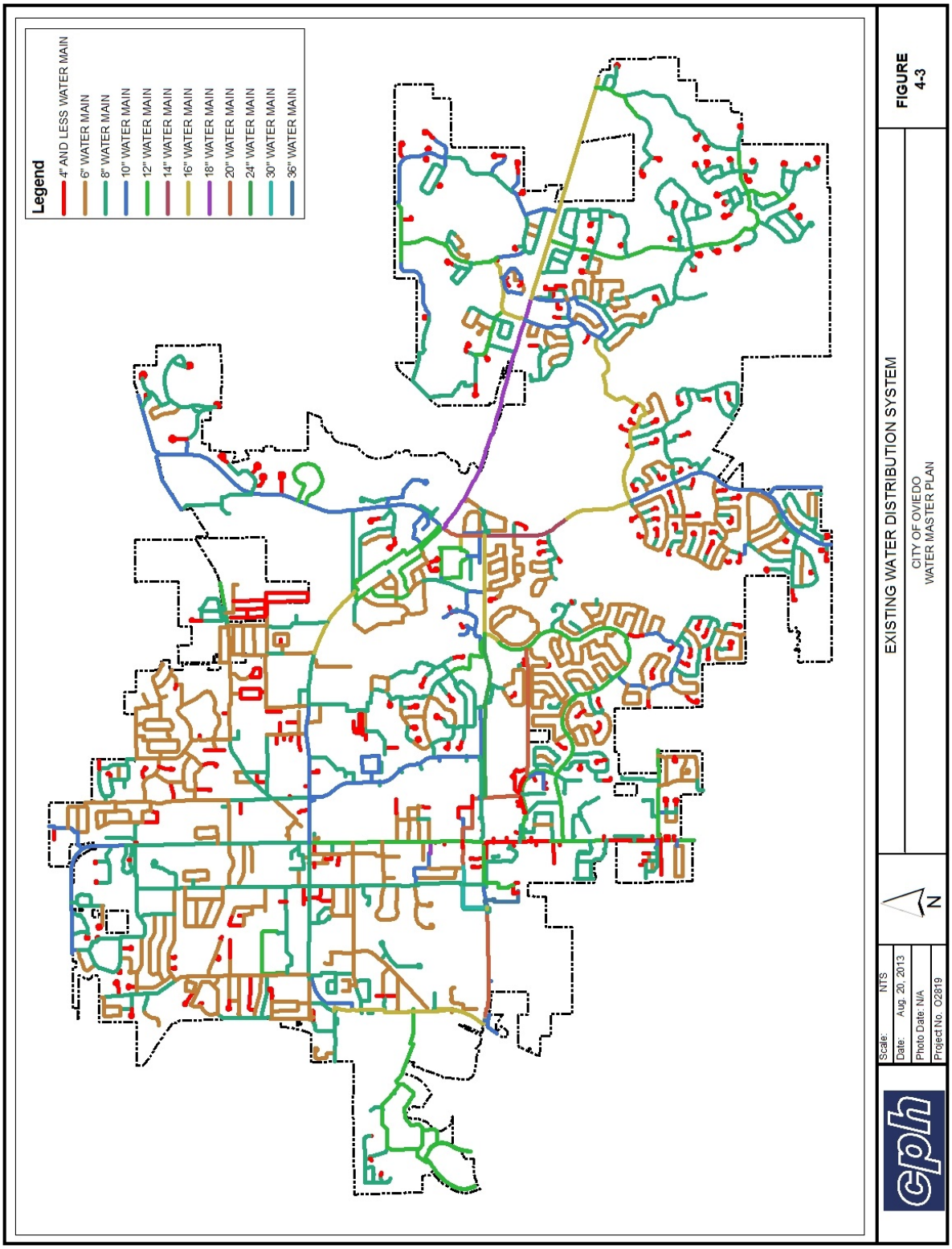
Reclaimed water is distributed throughout the community as an alternate water source for irrigation use. The accounts served are 98% residential. There were 46 commercial customers in 2012.

4.9 Condition of Reclaimed Water System

Based on our review of the City's existing Reclaimed Water System, the overall condition is considered excellent. The reclaimed system is operating properly and is in compliance with regulatory agency requirements. The facilities are all relatively new and in excellent operational order. Our opinion is based on: inspections during construction of some of these facilities; review of construction codes (City codes); interviews with City staff; and, review of available permits and

reports. The piping is all PVC or HDPE in new condition and the oldest construction completion date is 2002 (the Alafaya System).

The FDEP regulates the quality, use and distribution of reclaimed water. The City was issued a construction permit for the initial construction of the reclaimed water distribution system (permit number CS59-0112080-004). A Portion of the City reclaimed service area is a part of the IBRWRF FDEP Domestic Wastewater Facility Permit (Permit Number FL0037966). Under this permit, the City is allowed to expand the reclaimed system within the City limits and connect customers without further construction permits. After the acquisition of Alafaya Utilities, the City obtained the permit rights of the reclaimed water system operated by Alafaya Utilities (Permit Number FLA011074). Upon renewal of the Oviedo Wastewater operating permit next year, the City intends to cover the reclaimed system under the one permit number.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4" AND LESS WATER MAIN
6" WATER MAIN
8" WATER MAIN
10" WATER MAIN
12" WATER MAIN
14" WATER MAIN
16" WATER MAIN
18" WATER MAIN
20" WATER MAIN
24" WATER MAIN
30" WATER MAIN
36" WATER MAIN
EXISTING WATER DISTRIBUTION SYSTEM
CITY OF OVIEDO
WATER MASTER PLAN
FIGURE
4-3
N
Scale: NTS
Date: Aug. 20, 2013
Photo Date: N/A
Project No. O2819
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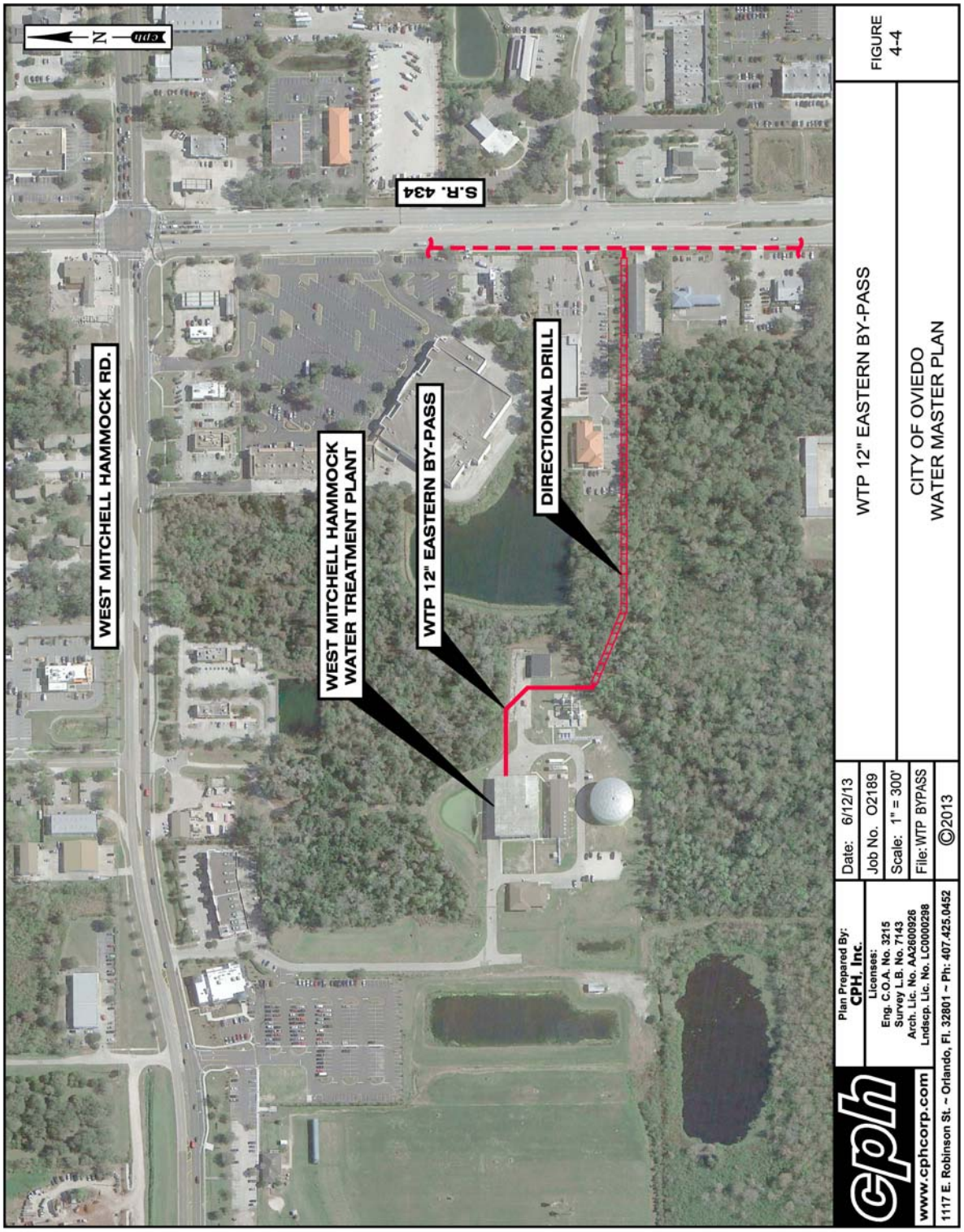
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WEST MITCHELL HAMMOCK RD.
WEST MITCHELL HAMMOCK WATER TREATMENT PLANT
WTP 12" EASTERN BY-PASS
DIRECTIONAL DRILL
S.R. 434
Plan Prepared By:
CPH, Inc.
Licenses:
Eng. C.O.A. No. 3215
Survey L.B. No. 7143
Arch. Lic. No. AA26000926
Lndscp. Lic. No. LC0000298
www.cphcorp.com
1117 E. Robinson St. ~ Orlando, Fl. 32801 ~ Ph: 407.425.0452
Date: 6/12/13
Job No. O2189
Scale: 1" = 300'
File:WTP BYPASS
©2013
WTP 12" EASTERN BY-PASS
CITY OF OVIEDO
WATER MASTER PLAN
FIGURE
4-4

CHAPTER 5

POPULATION, WATER FLOWS, WATER SERVICE AREA, RECLAIMED FLOWS AND RECLAIMED SERVICE AREA

5.1 Population and Future Land Use

Population data and projections are based on previous reports such as the 2008 Water Supply Plan, the SJRWMD Consumptive Use Permit (CUP) submitted population data, and current data, both historical and projections, provided by the City. During the SJRWMD CUP process, SJRWMD requested that the City only include the actual service area of the City water system. It was determined during the ***2008 Water Supply Plan*** process that many of the areas of future growth as identified in the Water and Wastewater Master Plan, 2006, were already served by other utility systems. Therefore, the population within these future growth areas was not included in the ***2008 Water Supply Plan***, nor were they considered by the SJRWMD CUP process. In addition, other areas shown in the Water and Wastewater Master Plan, 2006 are under development restrictions (units per acre) created by planning agreements with Seminole County. In this update to the Water Master Plan, we have continued with the procedure followed in the ***2008 Water Supply Plan***. The Historical population data is described in Section 5.2 below and is shown in Table 5-1, Historical Population Growth Data. The future population projections are provided in Table 5-2, Existing Water Service Area Population Projections SJRWMD Approved CUP Data, and Table 5-3, Existing Water Service Area Population Projections. They reflect the actual existing and future water service area, i.e., areas where the City has existing or planned water distribution lines and where no other utility already exists and is providing services. Table 5-2, Existing Water Service Area Population Projections SJRWMD Approved CUP Data, contains the population projections submitted to SJRWMD in support of the CUP application. It is based on existing house counts within each subdivision and was obtained from the traffic study being performed by the City at the time of the SJRWMD CUP submittal. This data was accepted by the SJRWMD staff for evaluating the CUP application and the projected amount of groundwater available to the City through 2013 is 4.67 MGD AADF. In 2013, the groundwater withdrawal is capped at 4.67 MGD AADF until the 2028 CUP expiration date. We do not know the available quantity of water after that date.

Table 5-3, Existing Water Service Area Population Projections, contains projected population data based on the most recent information received from the City Planning Department. The Table 5-3, Existing Water Service Area Population Projections, data was used to evaluate the maximum needs

of the community through the planning period. The maximum potable water flow need is shown in Tables 5-6, Historical and Projected Population Potable Water Flow for Service Area. The City water service area does not include areas served by other utilities (even if these areas are or can be annexed in the future). If an area is annexed, it is assumed that the customers therein cannot be switched to the City system or become City utility customers. We have projected population growth based on the best available data from the City and coordinated this with the recent Consumptive Use Permit application process.

If a significant change in population projections occurs due to changes in development, the proposed water system improvements must be reevaluated.

5.2 Population Data Methodology

The population methodology was established in the 2008 Water Supply Plan and the submittals to SJRWMD for the 2008 CUP. We have continued the same methodology for the Water Master Plan 2013. Population questions were asked and resolved during the CUP application process and the City received a 20 year CUP. Five years later, we find that the population figures are down a little due to the economy of the last several years, but in general, the actual figures track fairly closely with the projections of the 2008 Water Supply Plan.

5.3 Historical Population

The vast majority of the City consists of single family homes. Since 1980, the City has followed the pattern of many cities in Central Florida as it has experienced a period of rapid population growth. The City's growth rate was low between 1980 and 1985. The population growth began to increase sharply in 1986. The population grew at an average rate of approximately 5% per year from 1980 to 1985. Between 1985 and 1990, the City experienced their most rapid growth, an average growth rate of approximately 20% per year and between 1990 and 1995, the City's population grew at an average rate of 12% per year. A favorable Central Florida economy, the City's proximity to the University of Central Florida and other major employers, and improved access to the metropolitan area contributed to the rapid growth in the City from 1986 to 2000. The historical data indicates that the increase in the City's population has leveled off. Population growth has averaged approximately 2.5 percent from 2001 through 2012. Historical population data is presented in Table 5-1, Historical Population Growth Data. It is estimated by the 2010 Census, that there are 3.27 persons per household in the City.

TABLE 5-1
HISTORICAL POPULATION GROWTH DATA[1]

Year	Population	Annual Increase	Annual % Increase
1980	3,074	0	0
1981	3,151	77	2.5
1982	3,201	50	1.6
1983	3,249	48	1.5
1984	3,419	170	5.2
1985	3,729	310	9.1
1986	4,839	1,110	29.8
1987	6,259	1,420	29.3
1988	7,586	1,327	21.2
1989	8,844	1,258	16.6
1990	11,114	2,270	25.7
1991	13,049	1,935	17.4
1992	14,538	1,489	11.4
1993	15,722	1,184	8.1
1994	16,788	1,066	6.8
1995	17,910	1,122	6.7
1996	19,247	1,337	7.5
1997	20,497	1,250	6.5
1998	21,674	1,177	5.7
1999	22,517	843	3.9
2000	26,316	3,799	16.9
2001	27,165	849	3.1
2002	28,012	847	3.0
2003	29,018	1,006	3.5
2004	29,928	910	3.0
2005	30,800	872	2.9
2006	31,946	1146	3.7
2007	32,855	909	2.9
2008	33,431	576	1.8
2009	33,529	98	0.3
2010	33,342	(187)	(0.6)
2011	33,815	473	1.4
2012	34,573	758	2.2

[1] Data provide from the City Comprehensive Plan 2003 Update, BEBR Population Estimates, 1980, 1990, 2000 and 2010 U.S. Federal Census and current analysis from the City Planning Department. The data for 2004 thru 2012 are from BEBR provided by the City.

TABLE 5-2
EXISTING WATER SERVICE AREA POPULATION PROJECTIONS
SJRWMD APPROVED CUP DATA

YEAR	PROJECTED POPULATION
2007	31,066
2008	31,452
2009	31,839
2010	32,225
2011	32,611
2012	32,998
2013	33,384
2014	33,771
2015	34,157
2016	34,543
2017	34,930
2018	35,316
2019	35,703
2020	36,089
2021	36,475
2022	36,862
2023	37,248
2024	37,635
2025	38,021

Data as submitted to SJRWMD for the CUP Application.

TABLE 5-3
EXISTING WATER SERVICE AREA POPULATION PROJECTIONS

YEAR	PROJECTED POPULATION – 2013*	WATER SUPPLY PLAN - 2008
2015	36,739	42,313
2020	40,613	45,858
2025	44,544	49,241
2030	48,416	-
2035	52,095	-
2040	55,775	-

*BEBR Data provided by the City Planning Department

5.4 Demand for Water

The criteria utilized for the projection of future water demands is discussed in Chapter 6, Design Criteria. The water demands and historical factors are summarized in Table 5-4, Summary of Demands and Peaking Factors, and are based on historical data from January 2009 to December 2012. Projected potable demands are shown in Table 5-5, Projected Potable Water Demands. Table 5-5 shows flows and demands based on population after applying the factors of Table 5-4. From review of the historical data presented in summary format in Table 5-6, Historical and Projected Population Potable Water Flow for Service Area, an average daily use of approximately 115 gallons per capita per day (GPCD) was calculated for the last four years. We used the historical data from the last four years because it coincides with the activation of the reclaimed water system. Based on nine years of historical records, potable water usage has been in a range from a high of 146 GPCD in 2006 to a low of 108 GPCD in 2012. It should be noted that this water consumption rate is not just the quantity of water that an average person uses daily. It also includes commercial and industrial water usage and irrigation with potable water and allocated by population. It is our opinion that the reduction of potable water demand is directly related the reclaimed water availability. Reclaimed water usage has been steadily reducing the demand for potable water. This reduction of potable demand has two adverse revenue consequences. First, it replaces “normal” potable demand revenue with “cheaper” reclaimed water revenue. Second, the higher end use (occurring in the upper rate tiers) is replaced by lower tier rate use. This exchange problem was created by the implementation of “conservation rates” that are meant to encourage conservation of water.

Note: The exchange of reclaimed water for potable water for irrigational purposes is not “REVENUE NEUTRAL”. There is a concern about the revenue impacts of supplying more reclaimed water. Traditionally, potable water used for irrigation purposes produces higher revenues because potable water is priced at a higher rate ($ per 1000 gallons) than reclaimed and the conservation rate structure creates incrementally higher rates for higher consumption (irrigation volumes are typically above 10,000 gallons per month). This is a valid concern and needs to be considered in any rate structure. However the alternate plan, continuing on the same path of using groundwater for all water needs is not sustainable. The City CUP limits the groundwater withdrawal to 4.67 MGD AADF.

The projected average day demand for the City water system through the year 2040 is provided in Table 5-6, Historical and Projected Population Potable Water Flow for Service Area. It can be seen from the tables that the average daily demand (within the existing service area) will reach 4.67 MGD of potable demand and 2.79 MGD of reclaimed water demand by the year 2030. In order for the potable demand to remain at or below the 4.67 MGD AADF capped rate of the CUP from 2013 to 2040, it is required that reclaimed water continue to replace existing potable water demand, thereby reducing the potable per capita demand and allowing new potable customers to be connected.

TABLE 5-4
SUMMARY OF DEMANDS AND PEAKING FACTORS

Item Description	Calculation	Historical Factor	Factor Used
Average Day Demand (Last Five Years)	From Historical Records	115 GPDC	Varies*
Maximum Day Demand Factor	From Historical Records for Design	1.89	1.77
Peak Hour Demand Factor	Recommended for Design	Undetermined	3.0

* Potable demand decreases as irrigation demand is transferred from the potable groundwater supply to the reclaimed supply. Goal is to reduce potable demand to 95 GPCD or less (see below).

TABLE 5-5
PROJECTED POTABLE WATER DEMANDS

	2015	2020	2025	2030	2035	2040
Population	36,739	40,613	44,544	48,416	52,095	55,775
Per Capita Demand (gpcd)	110	102	95	95	90	84
Average Daily Flow (MGD)	4.04	4.14	4.23	4.60	4.67	4.67
Average Daily Flow (gpm)	2,805	2,875	2,938	3,194	3,243	3,243
Max. Day (MGD)	7.15	7.33	7.49	8.14	8.27	8.27
Max Day (gpm)	4,965	5,089	5,200	5,653	5,740	5,740
Peak Hour (gpm)	8,415	8,625	8,814	9,582	9,729	9,729
National Board of Fire Underwriters Fire Flow (50%)	2,904	3,043	3,177	3,302	3,415	3,524
MDD Plus Fire Flow	7,869	8,132	8,377	8,955	9,155	9,264

Note: Potable water production/supply is capped at 4.67 MGD in 2013 in accordance with the SJRWMD CUP.

TABLE 5-6
HISTORICAL AND PROJECTED POPULATION
POTABLE WATER FLOW
FOR SERVICE AREA

YEAR	Population Data	Demand AADD (MGD)	Capacity AADD (CUP)	Surplus (Deficiency) (CUP)	Per Capita Usage	Per Capita Projected
1996	19,247	3.21			168	
1997	20.497	3.25			159	
1998	21,674	3.79			175	
1999	22,517	3.87			172	
2000	26,316	4.38			167	
2001	27,615	3.66			135	
2002	28,012	3.82	3.90	0.08	137	
2003	29,018	3.95	3.97	0.02	139	
2004	29,928	4.09	4.04	(0.05)	136	
2005	30,800	4.05	4.12	0.07	131	
2006	31,946	4.66	4.27	(0.39)	146	
2007	32,855	4.20	4.35	0.15	138	
2008	33,431	4.16	4.40	0.24	124	
2009	33,529	3.96	4.46	0.56	118	
2010	33,342	3.62	4.51	0.89	109	
2011	33,815	3.91	4.57	0.66	116	
2012	34,573	3.74	4.62	0.88	108	
2013	***35,295***	***3.88***	***4.67***	***0.79***		***110***
2014	36,017	3.96	4.67	0.71		110
2015	36,739	4.04	4.67	0.63		110
2016	37,514	4.05	4.67	0.62		108
2017	38,289	4.10	4.67	0.57		107
2018	39,064	4.10	4.67	0.57		105
2019	39,839	4.10	4.67	0.57		103
2020	40,613	4.14	4.67	0.53		102
2025	44,544	4.23	4.67	0.44		95
2030	48,416	4.60	4.67	0.07		95
2035	52,095	4.67	4.67	0		90
2040	55,775	4.67	4.67	0		84

Notes for Table 5 -6:

"Capacity AADD" is the permitted CUP Value, not plant capacity.
Historical Population and Future Population are based on data provided by the City.
CUP was approved October, 2008 and Expires October, 2028.
Deficiencies of 2032 through 2040 to be supplemented/offset with reclaimed supply or Alternate Source of water. Further reductions in potable per capita use will have to be obtained.
4.67 MGD could support up to a population of 42,454 at the current 110 gpcd rate of consumption. This would occur between 2022 to 2023.

As shown in Table 5-6, Historical and Projected Population Potable Water Flow for Service Area, the historical potable per capita consumption levels range from 108 GPCD to 146 GPCD, while the average per capita consumption for the latest 5-year period equaled 115 GPCD. These are fairly typical values for a medium-sized municipality, however, they are considered to be on the low end of the spectrum in view of the amount of residential land use and residential irrigation. The per capita consumption value should continue to decrease over the next few years as a result of various water conservation efforts and increased use of reclaimed water. Therefore, a per capita consumption of between 110 down to 102 gpcd was used from 2013 through 2020 and 95 down to 84 gpcd was used from 2025 to 2040. These values are considered appropriate for planning purposes and are necessary to serve the new anticipated customers with potable water.

The impact of the reclaimed water source on the water system has not been fully quantified because the program has not been fully implemented for a long enough time to develop a complete database. Based on the available data, it appears that the reuse system will reduce the per capita water demands through the use of reclaimed water for irrigation of residential areas, commercial and industrial uses and other sub-potable purposes.

The SJRWMD is increasingly requiring public water suppliers to implement methods of wastewater reuse to reduce groundwater withdrawals from the aquifer. The existing reclaimed water systems and their use by City customers will benefit the City in this regard. Table 5-6 shows the required reduction in per capita potable demand during the planning period. This can be accomplished through a variety of options. The options chosen by the City for potable consumption reduction include reclaimed water (as an alternate water supply source) and conservation. Another potable option exists and that is to obtain an alternate potable water supply from one of the proposed regional facilities.

5.5 Wastewater Reuse Program a.k.a. Reclaimed Water

Reclaimed water and potable water service are forever linked in the City because they are the water supply sources of the present and the future. We need to look at water supply in two directions. The total water supply need is equal to the combination of potable/household use and reclaimed uses. The potable water supply is limited by the sustainable yield of the Floridan Aquifer in the Oviedo area as determined by SJRWMD. Future potable water uses can only be accommodated by taking irrigation demand off the potable side of the ledger and supplying this demand with reclaimed water.

In addition, we can decrease the rise or need per capita for potable/household water by encouraging conservation; or the development of alternate sources of drinking water. Alternate sources of drinking water (potable) such as using reverse osmosis to treat lower quality waters are costly. Surface water sources have also been explored in the SR 46 area (along the St. Johns River), but this option is no longer available due to funding constraints. The organization spearheading a facility at the SR 46 bridge by Lake Jesup no longer exists and planning level funding is no longer available from SJRWMD. The Yankee Lake facility is a possible source of alternate water but it is on the other side of the county from Oviedo. The transmission system development costs are high to bring the water from the Yankee Lake facility to Oviedo. A possible way of obtaining the water without a separate transmission main is a process called “wheeling”. This would involve agreements with Sanford and Winter Springs to utilize their distribution systems through interconnections and water metering and transfers.

The current program of reclaimed water as the alternate source of water is a reasonable solution to meet the water supply and demand of the residents of the City. Reclaimed water is available for use and the system appears to be cost effective. The use of reclaimed water for irrigation and the continued emphasis on household water conservation have been a successful venture. As the City moves forward with their conservation efforts and the reclaimed system, the potable water per capita usage has been declining as predicted. The reclaimed water from Oviedo WRF has been available to residential customers since 2002 when only 0.053 MGD was provided to the customers. This source has grown over the years to approximately 1 MGD AADF. The reclaimed water from the IBRWRF system has been available since 2008. It is a secondary source of reclaimed water. The primary source is the Oviedo WRF. Table 5-7, Historical Customer and Reclaimed Water Flow for Service Area, shows the steady growth demand of the reclaimed water system. Table 5-8, Existing and Projected Reclaimed Water Demands, shows the projected demand through 2040 by five year increments.

The City has implemented a wastewater reuse program which uses the effluent from the IBRWRF and from the Oviedo WRF. The maximum available supply from IBRWRF is 2 MGD AADF. The current flow from the Oviedo WRF is approximately 1.2 MGD AADF. The Oviedo WRF reclaimed water quantity will be growing over the next several years due to the ability to transfer flows that currently are routed to the IBRWRF service area to the Oviedo WRF service area via several lift stations and the construction of new forcemain interconnects to the Oviedo WRF. This is due to the

recent acquisition of Alafaya Utilities by the City. The Oviedo WRF is projected to provide a capacity of 2.0 MGD AADF and will be used to serve existing/retrofitted residential sites. The IBRWRF reclaimed water will be used to supplement the demand for reclaimed water. The Oviedo WRF is the primary provider and it is incumbent on the City to dispose of Oviedo WRF reclaimed water first and utilize the IBRWRF second. This is advantageous to the City as the IBRWRF reclaimed water comes at a cost. Also the City can use the IBRWRF reclaimed water for peak demand times and use the Oviedo WRF reclaimed water to meet their base needs. It provides the City with reclaimed water source flexibility.

In addition to the use of the Oviedo WRF as reclaimed water, it is necessary to dispose of the WRF effluent as the Oviedo WRF is in a zero discharge zone. So the reclaimed use as an alternate water source provides two essential functions; alternate water source and an effluent disposal system.

Table 5-9, Projected Population Total, Potable and Reclaimed Water Flow for Service Area, is a compilation of the data formulated using the parameters contained in Chapter 5.

TABLE 5-7
HISTORICAL CUSTOMER and RECLAIMED WATER FLOW FOR SERVICE AREA

Year	Customer Data	Demand AADD (MGD)	Per Customer Usage AADF (gpd)	Per Capita Usage (3)	Per Capita Impact All Persons Considered
2008 (1)	140	0.09	642	196	2.7
2009	616	0.26	422	129	7.75
2010 (2)	1020	0.45	441	135	13.5
2011	2287	1.23	538	165	36.4
2012	2539	1.44	567	152	34.7

Notes: 1) 2008 was the start of the Oviedo reclaimed program and was a partial year.
2) Alafaya Utilities was acquired in October 2010 and these customers became Oviedo customers.
3) Assumes 3.27 persons per household.
4) Because of irrigation schedules (even/odd address cycle) the **"per customer demand"** is twice the **"per customer usage"** shown above.

TABLE 5-8
EXISTING AND PROJECTED RECLAIMED WATER DEMANDS

	2012	2015	2020	2025	2030	2035	2040
Population	34,573	36,739	40,613	44,544	48,416	52,095	55,775
Customers	**2539**	2257	3157	4092	4920	5079	6032
Average Daily Flow (MGD)	**1.44**	1.28	1.79	2.32	2.79	2.88	3.42

Notes:
1) 2012 is actual Data
2) Projected Customers are based on Table 5-9.
3) ADF is based on 567 gallons per day per customer (the calculated average for 2012).

TABLE 5- 9
PROJECTED POPULATION
TOTAL, POTABLE AND RECLAIMED WATER FLOW
FOR SERVICE AREA

Year	Population Data	Total Water Demand	Potable Water Demand	Reclaimed Water Contribution Needed (MGD)	Reclaimed Water Contribution Needed (gpcd)	Estimated Customers Needed	Reclaimed Water Supplied (MGD)
2012	**34,573**	5.01	**3.74**			**2539**	**1.44**
2013	35,295	5.12	3.88	1.24	35.1	2186	
2014	36,017	5.22	3.96	1.26	35.0	2222	
2015	36,739	5.32	4.04	1.28	34.8	2257	
2016	37,514	5.44	4.05	1.39	37.1	2451	
2017	38,289	5.55	4.10	1.45	37.8	2557	
2018	39,064	5.66	4.10	1.55	39.7	2734	
2019	39,839	5.78	4.10	1.67	41.9	2945	
2020	40,613	5.89	4.10	1.79	44.1	3157	
2025	44,544	6.46	4.14	2.32	52.1	4092	
2030	48,416	7.02	4.23	2.79	57.6	4920	
2035	52,095	7.55	4.67	2.88	55.3	5079	
2040	55,775	8.09	4.67	3.42	61.3	6032	

1) 2012 data in **BOLD** are actual numbers.
2) Pre-reclaimed demand is equivalent to TOTAL water demand
3) Pre-reclaimed demand is based on historical per capita of 145 gpd/capita for 2000 through 2003 (prior to reclaimed availability).
4) Post reclaimed demand is based on Table 5-6. The historical per capita average is 111 gpd/capita for 2010 through 2012 (after implementation of both programs). Years 2035 and 2040 are frozen at 4.67 MGD.
5) Estimated customers is based on 2012 AADF of 567 gpd per customer.

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TABLE 5- 10
PROJECTED RECLAIMED CUSTOMERS
FOR SERVICE AREA

Year	Subdivision	Total Lots	75% Connection	Cumulative	Estimated Customers Needed
Existing	See Section 4.7	3797	2539*		
2013	Alafaya 17 &18	178	134	2673	2186
2013	Little Creek	118	89	2791	2222
2015					2257
2016					2451
2017					2557
2018					2734
2019	Twin Rivers	1048	786	3548	2945
2020					3157
2025	Riverside	782	587	4135	4092
2030	Alafaya Woods	1881	1411	5546	4920
2035					5079
2040					6032

* Actual Meter Count , includes commercial. Actual percentage of connected lots is 67%.

5.6 Service Area Growth

The City is highly developed and is surrounded by other highly developed areas. To the West of S.R. 426 is the Seminole County service area; to the South is first the Seminole County service area and just beyond is the Orange County service area; to the East is a private utility recently purchased by FGUA; to the Northwest is the Lake Jesup/Winter Springs service area; and, to the Northeast is the Lake Jesup/Seminole County Service area. Growth will occur, but we do not foresee an expansion of Oviedo's water distribution system into the unincorporated areas beyond the current City limits as most of these areas are already served by the above referenced utilities.

The largest future project is an "in-fill" project known as Oviedo on the Park and contains both residential and commercial development. It is located on the north side of East Mitchell Hammock Road just east of SR 434. Other completed in-fill residential subdivision projects include: Covington Club; Oviedo Forest; Preserve at Black Hammock; Big Oak Reserve; River Oaks and Little Creek.

CHAPTER 6

DESIGN CRITERIA

6.1 General

In order to evaluate the adequacy of the various components of the existing water supply and treatment system and to provide a basis for sizing new elements of the system, it is necessary to establish the appropriate design criteria. Population and corresponding water demand rates are the most important factors in the determination of the need for additional supply and treatment facilities. Land use considerations are also important with respect to sizing new improvements to the water distribution system. Since the basis for most of the criteria discussed below is observed or projected water demand, historical rates of water usage must first be analyzed to establish appropriate demand factors.

6.2 Historical Water Demands

Historical data from January 1994 to December 2008 from previous reports and analysis was gathered and analyzed. In addition, more recent historical data from January 2007 to December 2012 was provided by the City and was analyzed. Only the more recent data from January 2004 to December 2012 was utilized and reported herein because of the many changes in the system: new water treatment plant capable of producing a higher quality of water; de-commissioning of the Oviedo WTP and the recommissioning of the A.M. Jones WTP as a booster pump and storage facility; distribution improvements; addition of reclaimed water as an alternate water supply source in 2008; and, the acquisition of Alafaya Utilities in October 2010 (which provided an additional water supply source of reclaimed water). With the activation of the West Mitchell Hammock WTP in 2006, the City is producing a better water quality for the consumers. With the advent of the reclaimed water system, the City water facilities are providing this higher quality of water for domestic (potable) uses and reclaimed water is available for lower quality uses such as irrigation. Reclaimed water has had an impact on total water supply within the City system. We see a shift in potable water demand which produces a lessening demand on the groundwater source. The use of potable water for irrigation purposes is lessening. This can be seen by the per capita usage reported in Table 5-6, Historical and Projected Population Potable Water Flow for Service Area. The per capita usage has been in a downward trend since 1998. The factors affecting this downward trend are:

- Aggressive potable water conservation efforts for residential and commercial

customers

- Irrigation conservation efforts; irrigation limitations as defined by City Ordinance No. 1477 and SJRWMD Rules which place limitations on potable irrigation to two (2) days per week during daylight Savings Time and one (1) day per week during Eastern Standard Time.
- New Land Development Code provisions that encourage conservation through landscaping; City Ordinance #1428 requires landscaping using Florida-friendly plants and grasses. New yards have to be designed in zones where the plants and irrigation capacities match:
    - 30% of yard can be high water irrigation,
    - 30% of yard can be medium irrigation and
    - 40% of yard should be drip or no irrigation.

  This code reduces wasted irrigation water at new/redeveloped units by about 50%. *(Note- new homes were using up to 1,000,000 gallons of potable water per year, in the first year, to properly "establish" yards prior to the Florida-friendly building code changes. This was mainly because of cheap irrigation designs that did not match the water needs of the plants. Therefore, irrigation water was heavily wasted in areas where it was not needed to keep turf areas green.)*

- New Florida and International building code provisions (plumbing) requiring low volumes fixtures and shower heads
- Reclaimed water availability starting in 2008
- Price considerations (generally only temporary); implementation of an aggressive water conservation rate for residential customers.

Water demands are typically expressed in terms of four conditions:

- Average Day Demand is the total water consumed during a calendar year divided by 365 days. Flow rates vary from day to day and even seasonally. The average day demand rate was determined from the City's historical monthly Water Plant reports. Average day demand is not generally used as a direct criteria for any component in water systems, but it is a basis from which other, more significant criteria are determined.

- Maximum Day Demand is the largest volume of water flow delivered by the City system

during a continuous 24-hour period (a day) expressed as a volume per unit time during the year, i.e. million gallons per day per year. Based on information provided by the City (January 2007 to December 2012), the maximum day demand factor ranged from 1.69 to 2.12 and provides an average ratio of 1.89 times the AADF for a 5-year period. The ratio of maximum day demand to average day demand is known as the "maximum day demand factor" and is normally 2.0 to 3.0. In simplest terms, it means that on the day of maximum delivery during the year, approximately two to three times as much water is delivered as on the average day during the year. For Oviedo the maximum day demand factor is established as 2.0.

- Peak Hour Demand is the maximum flow that must be supplied during the hour of greatest water use. The "peak hour factor" is the factor which indicates the rate of water used during a single hour of peak demand in comparison to the rate of water used in an average hour. Plant records provide limited data to determine the peak hour demand. Based on the data available and in conjunction with published guidelines, the factor for peak hour flow rate will be established at 3.0 times the average day demand. (Normal range is 3.0 to 4.5.)

- Fire Flow is the flow rate of water required to fight a major fire. The City has minimum criteria for fire flows to various types of building use. This is reported in Table 6-1, Summary of Evaluation Criteria for potable Water Facilities. We also compared this with the National Board of Fire Underwriters. The formula generally produces a higher demand because it does not assume that only one fire would be active at any one point in time. The required fire flow capacity depends on many factors including population, type of facility being protected, type of construction, value of improvements, level of protection desired, etc. The National Board of Fire Underwriters have adopted a formula for relating required fire flow to population as follows:

  Required Fire Flow in GPM = $(1020\sqrt{P})\ (1- 0.01\sqrt{P})$
  Where P = Population in Thousand

We recommend the use of 50% of this value to account for a heavy residential component in the City and the sprinkler requirement for commercial buildings within the City. Table 5-5, Projected Potable Water Demands, shows a summary of these basic design parameters including the fire flow calculated from the above formula. These same numbers have been

used in our evaluation that follows in this section.

Table 5-6, Historical and Projected Population Potable Water Flow for Service Area summarizes historical and projected water consumption data. It is based on plant flow records from January 1996 to December 2012 and shows the SJRWMD CUP data in comparison to actual groundwater usage.

6.3 Design Criteria

To maintain consistency throughout the planning process, the same criteria used for the 2008 Water Supply Plan was used herein and is described in Table 6-1, Summary of Evaluation Criteria for Potable Water Facilities.

The reclaimed water system design criteria used herein is based on 567 gallons (irrigation demand) per day AADF equivalent demand per customer. Design issues are more completely described in the Reclaimed Water Master Plan Update, September 2011. This number (567 gpd per customer) is based on current 2012 data available from the City. Reclaimed customers are on a similar schedule to irrigation customers on potable water. Irrigation takes place by using even and odd addresses. The City has established an irrigation schedule for reclaimed and potable irrigation customers. The SJRWMD has established very strict potable water restrictions for irrigation use. Their goal is to minimize waste of the groundwater aquifer. Reclaimed water is somewhat exempt from this consideration as it is better to use reclaimed for irrigation (beneficial reuse) than it is to send it to percolation ponds or a direct discharge. The reclaimed irrigation system schedule has a greater degree of flexibility than the schedule for potable irrigation customers. This allows the City to maximize reclaimed water disposal and maximize the benefits of reuse.

TABLE 6-1
SUMMARY OF EVALUATION CRITERIA FOR POTABLE WATER FACILITIES

Demands/Flows	• Maximum Day Demand (MDD) = Average Daily Demand (ADD) x Maximum Day Factor (i.e., ADD x 2.0) • Peak Hour Demand (PHD) = ADD x Peak Hour Factor (PHF) (i.e., ADD x 3.0) • Fire Flow for Residential Areas = 750 GPM • Fire Flow for Commercial Areas = 1,500 GPM • Fire Flow for Oviedo Marketplace = 3,000 GPM (with sprinkler systems, this is 1500 gpm)
Wells	FDEP Criteria - Rule 62-555.315 (3) states: *The total well capacity connected to a water system using only ground water shall equal at least the system's design maximum-day water demand (including design fire-flow demand if fire protection is being provided). In addition…the total well capacity with the largest producing well out of operation shall equal at least the design average daily water demand, and preferably the design maximum-day water demand, for the system…* • Condition 1: The total well capacity shall equal or exceed the MDD (including design fire flow demand). • Condition 2: With the largest well out of service, total well capacity shall equal or exceed the ADD, preferably the MDD.
Forced Draft Aeration	• The capacity of the system shall allow delivery of the ADD with the largest treatment unit out of service.
Transfer Pumping	• The pumping system shall be capable of delivering MDD with the largest pumping unit out of service (10 State Standards).
Chemical Storage and Feed Systems	• Storage tanks shall provide at least 30 days of storage at ADD conditions (10 State Standards). • Backup chemical feed pumps shall be provided to allow delivery of the design feed rates with the largest unit out of service (10 State Standards).
Finished Water Storage	Rule 62-555.320 (19) states… *This subsection addresses finished-water storage capacity necessary for operational equalization to meet peak water demand. (If fire protection is being provided, additional finished-water storage capacity shall be provided as necessary to meet the design fire-flow rate for the design fire-flow duration.) The finished-water storage capacity necessary to meet the peak water demand for a consecutive system may be provided by the*

	consecutive system or by a wholesale system delivering water to the consecutive system. (a) *Except as noted in paragraph (b) below, the total useful finished-water storage capacity (excluding any storage capacity for fire protection) connected to a water system shall at least equal 25 percent of the system's maximum-day water demand, excluding any design fire-flow demand.* Recommended Criteria: • Equalization Storage: 25% of MDD or volume based on mass diagram analysis (FAC 62-555). • Fire Storage: 3,000 GPM for 3 hours of Oviedo Marketplace (AWWA M-32, Oviedo Engineering Standards Manual and ISO Guidance). • Four Log Treatment: Storage requirements can also be influenced by the Four-Log Virus Treatment Criteria for Groundwater. Storage volume is used to provide adequate contact time to achieve 99.99% removal of viruses. • Contingency Storage: Estimated at 15% based on an opinion of system reliability and the level of uncertainty regarding system behavior (AWWA M-32). This is 15% of the calculated storage for Equalization and Fire.
High Service Pumping	FDEP Criteria - Rule 62-555.320 (15) states: For purposes of this subsection, well pump installations shall be considered high-service pumping stations if the well pumps serve as high-service pumps. *(a) Unless elevated finished-drinking-water storage is provided, the total capacity of all high-service pumping stations connected to a water system, or the capacity of a booster pumping station, shall be sufficient to:* *1. Meet at least the water system's, or the booster station service area's, peak-hour water demand (and if fire protection is being provided, meet at least the water system's, or the booster station service area's, design fire-flow rate plus a background water demand equivalent to the maximum-day demand other than fire-flow demand); and* *2. Maintain a minimum gauge pressure of 20 pounds per square inch throughout the water system's, or the booster station service area's, distribution system up to each customer's point of connection to the distribution system.* AND: (c) *At each high-service or booster pumping station that is constructed*

	or altered under a construction permit for which the Department receives a complete application on or after August 28, 2003, and that is connected to a community water system (CWS) serving, or designed to serve, 350 or more persons or 150 or more service connections, the supplier of water ***shall provide an installed or uninstalled standby pump of sufficient capacity to replace the largest pump.*** *However, for CWSs that have multiple interconnected pumping stations subject to this requirement, the supplier of water may provide one uninstalled standby pump for each size of high-service or booster pump installed in the water system instead of providing a standby pump on site at each high-service or booster pumping station; and for water systems that have only one pumping station subject to this requirement and that are designed to serve 10,000 or fewer persons, as many as three water systems located in the same county, or within 50 miles of one another, may enter into a mutual aid agreement to share one appropriately sized, uninstalled standby pump instead of providing a standby pump on site at each water system's high-service or booster pumping station.*
Standby Power	• Sufficient capacity to deliver at least Average Daily Demand (ADD) during a power outage (FAC Chapter 62-555).
Distribution System	• Pressures must be at least 20 psi under PHD and MDD plus fire flow conditions at all points within the distribution system (FAC Chapter 62-555). • Velocities: The maximum velocity in pipes 12 inches and smaller should not exceed 5.0 feet per second (fps) and velocities in pipes larger than 12 inches should not exceed 6.0 fps (suggested criteria to limit excessive pressure drops and the potential for high transient pressures).

Notes:

1. The Great Lakes Upper Mississippi River Board of State Public Health and Environmental Managers publication entitled "Recommended Standards for Water Works, 1992 Edition" is commonly known as "10 State Standards". The requirements of this document are incorporated in FAC Chapter 62-555 by reference.

2. The document titled "Water Treatment Plant Design, 3rd Edition, 1997", which is published by the American Society of Civil Engineers, is incorporated under FAC Chapter 62-555 by reference.

CHAPTER 7

EVALUATION OF WATER SYSTEM IMPROVEMENTS

7.1 Water Supply and Treatment

7.1.1 General

In this chapter, we evaluate various alternatives to ensure adequate system capabilities through the twenty-year planning period. The evaluation is based on serving the existing and proposed service area with two sources of water. The first is potable groundwater supply. The second is reclaimed water from the IBRWRF and the Oviedo WRF. It was decided and documented in the 2008 City Water Supply Plan that the groundwater supply would be maximized at a useful capacity of 4.67 MGD+/- (Estimated 2013 timeframe) per the groundwater withdrawal allowances of the 2008 SJRWMD CUP. The WMHWTP is fully capable of treating water for 5 MGD AADF (10 MGD MDF) without further improvements. Recommendations are made on this basis. We anticipate that the reclaimed water supply will reduce the per capita potable water demand and thereby allow new water customers to connect to the water supply system. The potable demand that can be supplied from the Mitchell Hammock WTP cannot exceed the 4.67 MGD AADF level imposed by the SJRWMD CUP. The following analysis is based on a 4.67 MGD AADF supply from the West Mitchell Hammock WTP. At this time, we do not recommend further capacity improvements to this facility beyond meeting the requirements of a 5.00 MGD level (approximate design capacity of the current facilities).

7.1.2 Wells

The FDEP well capacity criteria has been stated in Chapter 6. It consists of two conditions which we will discuss below.

The total existing available well capacity of all active wells in the Oviedo system is 19.52 MGD or 13,550 gpm. With the largest well in the system out of service, which would be a 1500 gpm well, the well capacity is 17.4 MGD or 12,050 gpm. A summary of the existing and projected well capacities is shown in Table 7-1, Well Capacity Synopsis, below. Based on a 4.67 MGD water treatment plant supply capability (capped by the SJRWMD CUP 2013 requirements), the MDD plus fire flow would be 13.3 MGD, or 9,264 gpm. The existing well capacity will be adequate to serve demands for the planning period provided that other restrictions such as well contamination issues do not arise.

Condition 1: *The total well capacity shall equal or exceed the MDD (including design fire flow demand).* The required well capacity for a 4.67 MGD AADF capacity and the Year 2040 population fire flow demand under this condition would be approximately 9,264 gpm. **This condition is met with the current well system.**

Condition 2: *With the largest well out of service, total well capacity shall equal or exceed the ADD, preferably the MDD*. The required well capacity for a 4.67 MGD capacity under this condition would be approximately 3,243 gpm for the ADD and 5,740 gpm for the MDD. **Both of these conditions are met with the current well system.**

TABLE 7-1
WELL CAPACITY SUMMARY

Year	Required Well Capacity		Existing Well Capacity (1)	
	(GPM)	(MGD)	(GPM)	(MGD)
2015	7,689	11.1	13,550	19.5
2020	8,132	11.7	13,550	19.5
2025	8,377	12.1	13,550	19.5
2030	8,955	12.9	13,550	19.5
2035	9,155	13.2	13,550	19.5
2040	9,264	13.3	13,550	19.5

(1) Largest well out of service capacity is 12,050 gpm.
YEAR 2013 CUP cap on the groundwater withdrawal allowance equals 4.67 MGD AADF. See Table 5-5 for additional information.

We recommend the following for wells:

1. **No improvements are required.**

7.1.3 Forced Draft Aerators

The criteria for forced draft aeration, which is established in Chapter 6, is based on several items. They are as follows:

2) With proper operation and maintenance, the units should not fail as they are not mechanical devices.
3) Proper maintenance is “cleaning of the units” which takes about 24 hours and can be accomplished during the low demand period of the year. Maintenance should be

scheduled to avoid the maximum demand months of May and June.

4) The City has available ground storage capacity to meet system needs during maintenance.
5) The City can by-pass the aeration units and as a back-up capability, they can use chlorination to remove the H2S.

The existing West Mitchell Hammock WTP includes two (2) packed tower degasifiers with a capacity of 5.00 MGD each. The WTP should be capable of delivering the ADD with the largest degasifier out of service; therefore, additional degasification facilities are not necessary to meet the criteria during the study period.

In light of the maximum treatment capability being capped at 4.67 MGD AADF due to available groundwater sources, the addition of a third degasifier would provide full treatment redundancy at the MDD. The facility would be able to treat the MDD with the largest unit out of service. This would be an increase in reliability for the residents. We do not believe that full redundancy at the MDD is necessary.

We recommend the following for the forced draft aerators:

1. No improvements are required.

7.1.4 Transfer Pumping

The existing transfer pumping system includes a wetwell below the degasifiers that receives the treated water and three (3) vertical turbine transfer pumps. There are provisions in the design of the wetwell, piping, and electrical system for installation of a fourth pump. Each transfer pump has variable speed capability and a capacity of 5.76 MGD. The capacity of the existing system with the largest unit out of service equals 11.52 MGD. Since the maximum throughput is limited to 9.34 MGD (capped due to groundwater sources and the degasifier capacity), no improvements are required to the transfer pumping system within the planning period.

We recommend the following for transfer pumping:

1. No improvements are required.

7.1.5 Finished Water Storage

In view of the decommissioning of the Oviedo WTP and the use of the A.M. Jones WTP as a

booster pump/storage facility, and considering the advantages associated with operating a single WTP, the finished water storage capacities were evaluated under the assumption that all new/future storage tanks will be located at the West Mitchell Hammock WTP. The current storage facilities are 2.5 MG at West Mitchell Hammock WTP and 1.0 MG at the A.M. Jones Storage and Booster Pump Station. Distribution system storage such as located at the A.M. Jones booster station may increase the potential to form TTHMs and HAA5s due to increased detention time (water aging). As the distribution water sits in the tank, the potential for formation of TTHMs and HAA5s increases. Current operational procedures keep this water cycled into the system. This operational procedure must be maintained at all times. Table 7-2, System Projected Treatment Storage Requirements, presents a summary of the Maximum Day Demand (MDD) and storage requirement for each 5-year increment of the 25-year planning period.

The Oviedo water supply system utilizes both free and combined chlorine to achieve disinfection. Free chlorine is utilized after forced draft aeration into the transfer pump station. Ammonia (to create combined chlorine) is added after the transfer pumps. The finished water is then placed in the storage tank to be distributed by the high service pumps into the distribution system. The current Four Log Treatment storage reported below is based on and determined by the use of combined chlorine and other FDEP/EPA criteria. Based on the data submitted to the FDEP and approved by that same agency, 1,619,235 gallons (approval letter of February 7, 2011) are required in the existing 2.5 million gallon storage tank to meet the Four Log Virus Treatment Criteria. This volume provides the necessary contact time to achieve a level of confidence that 99.99% (Four log removal) of all viruses have been destroyed. This storage cannot be used for any other simultaneous storage criteria. This minimum volume must be maintained in the storage tank at all times.

The existing tank should be periodically removed from service, cleaned and inspected. During such down times, the City must provide “reasonable assurance” that the required four log criteria are being met and that disinfection has adequately been provided. If the City has to take the existing tank out of service, another option is available for meeting the Four Log Criteria. Under this option, the City would chlorinate to a higher level during the ground storage tank shutdown and increase the monitoring and sampling of the City’s water supply to verify compliance with the rule. However, this is not recommended as a standard practice because higher chlorine dosages will most likely result in the formation of TTHMs and HAA5s. These are by-products created by the combination of adding excessive chlorine and available organic compounds in the source water. The ability to use

this option is also limited by a maximum concentration of 4 mg/l of chorine injected into the system. We recommend that this option only be used in an emergency situation.

We recommend that that the City resubmit the Four Log Treatment calculations to FDEP and request approval of the new calculations based on the maximum daily flow of 8.27 MGD (5743 gpm). This is based on the FDEP letter of November 16, 2012, "Approval for Reduced Drinking Water Operator Staffing". It is our opinion that under this flow rate, the clearwell for the transfer pumps would provide the necessary detention time, with free chlorine, to meet the Four Log Criteria.

With only one storage tank at the West Mitchell Hammock WTP, the City does not have a back-up capability if the existing tank was removed from service. Therefore, it would be advisable from the operational point of view to construct a second tank to provide back-up reliability. This should be performed before 2025. Table 7-2 shows the various storage volumes necessary to meet the criteria (See Table 6-1) established by the regulatory agencies and common engineering practice if the City continues with the May 31, 2011 Four Log FDEP Approval Letter requirements. Table 7-3 shows the storage volumes if the City resubmits the Four Log Criteria in accordance with the November 16, 2012 FDEP staffing approval letter.

TABLE 7-2
SYSTEM PROJECTED TREATMENT STORAGE REQUIREMENTS
(millions of gallons)

	2015	2020	2025	2030	2035	2040
Population	36,739	40,613	44,544	48,416	52,095	55,775
Average Daily Flow (MGD)	4.04	4.14	4.23	4.60	4.67	4.67
Max. Day (MGD)	7.15	7.33	7.49	8.14	8.27	8.27
Equalization Storage	1.79	1.83	1.87	2.03	2.07	2.07
Fire Flow Storage	0.54	0.54	0.54	0.54	0.54	0.54
Four Log Treatment	1.62	1.62	1.62	1.62	1.62	1.62
Contingency Storage	0.35	0.35	0.36	0.38	0.39	0.39
Total Storage Required	4.30	4.34	4.39	4.57	4.62	4.62
Storage Existing	3.5	3.5	3.5	3.5	3.5	3.5
Proposed	2.5	2.5	2.5	2.5	2.5	2.5
Proposed and Existing Storage - Total	6.0	6.0	6.0	6.0	6.0	6.0

Note: These values are capped at the Year 2013 CUP value.

TABLE 7-3
SYSTEM PROJECTED TREATMENT STORAGE REQUIREMENTS
WITHOUT FOUR LOG STORAGE and ONLY WEST MITCHELL HAMMOCK WTP STORAGE
(millions of gallons)

	2015	2020	2025	2030	2035	2040
Population	36,739	40,613	44,544	48,416	52,095	55,775
Average Daily Flow (MGD)	4.04	4.14	4.23	4.60	4.67	4.67
Max. Day (MGD)	7.15	7.33	7.49	8.14	8.27	8.27
Equalization Storage	1.79	1.83	1.87	2.03	2.07	2.07
Fire Flow Storage	0.54	0.54	0.54	0.54	0.54	0.54
Four Log Treatment	0	0	0	0	0	0
Contingency Storage	0.35	0.35	0.36	0.38	0.39	0.39
Total Storage Required	2.68	2.72	2.77	2.95	3.00	3.00
Storage Existing	3.5	3.5	3.5	3.5	3.5	3.5
Proposed			2.5	2.5	2.5	2.5
Proposed and Existing Storage - Total	3.5	3.5	6.0	6.0	6.0	6.0

Note: These values are capped at the Year 2013 CUP value.

We recommend the following for storage:

1. **Submit revised calculations to FDEP for meeting the Four Log Criteria and remove current storage restrictions.**

2. **The addition of a second ground storage tank equal to the existing 2.5 million gallons at the West Mitchell Hammock Water Treatment Plant between 2020 and 2025. This also provides needed storage back-up capabilities.**

7.1.6 High Service Pumping

The existing high service pumping system at the West Mitchell Hammock WTP includes four (4) variable speed high service pumps with a capacity of 4,000 GPM each. This configuration provides a gross delivery capacity of 16,000 GPM or 23.04 MGD. With one (1) unit out of service, the “firm” capacity equals 12,000 GPM or 17.28 MGD. These capacities are based on a discharge pressure of 95 psi pursuant to requirements set forth in the contract documents for the West Mitchell Hammock WTP.

As previously stated, the high service pumping system must be capable of delivery for PHD, as well as the MDD plus fire flow. Table 7-4, Summary of High Service Pumping Requirements, presents a summary of the projected demands that must be met by the high service pumps throughout the 25-

year planning period.

TABLE 7-4
SUMMARY OF HIGH SERVICE PUMPING REQUIREMENTS

Parameter	2015	2020	2025	2030	035	2040
AADD (gpm)	3,243	3,243	3,243	3,243	3,243	3,243
MDD (gpm)	5,613	5,754	5,877	6,388	6,486	6,486
Fire Flow (gpm)	2,904	3,043	3,177	3,302	3,415	3,524
MDD+FF (gpm)	8,517	8,797	9,054	9,690	9,901	10,010
PHD (gpm)	8,419	8,630	8,816	9,582	9,729	9,729

As shown in Table 7-4, Summary of High Service Pumping Requirements, the MDD plus fire flow condition exceeds the PHD condition throughout the planning period, therefore, the MDD plus fire flow will be the governing demand condition in an analysis of pumping capacity. The stated individual pump capacity of 4,000 GPM results in an existing firm capacity of 17.28 MGD or 12,000 gpm. This is greater than the projected 2040 MDD plus fire flow. The FDEP High Service Pump criteria requires a back-up pump for the largest pump in the system and this criteria is met based on the 2013 cap of groundwater supply and potable demand. This analysis does not include the high service pumps located at the A.M. Jones Storage and Booster Pump Station. These pumps provide another separate level of assurance that peak water demands of the distribution system can be met.

The existing pump system at the West Mitchell Hammock WTP includes four (4) equally sized pumps with provisions for the addition of two (2) more identical machines.

We recommend the following for high service pumping:

1. **No improvements are required.**

7.1.7 Chemical Storage and Feed Systems

The West Mitchell Hammock WTP includes several chemical feed systems to accomplish a variety of treatment goals. Table 7-5, Summary of Chemical Feed Rate and Storage Requirements,

summarizes the various chemicals, estimated feed rates, and storage requirements. It is apparent that the chemical storage facilities are adequate.

The delivery capacities of the various metering pumps and related equipment must be sized to address feed rates occurring at future MDD conditions. Table 7-6, Chemical Feed Equipment Capacity Summary, summarizes the various feed system components, their delivery capacities, and the maximum projected chemical feed rates.

TABLE 7- 5
SUMMARY OF CHEMICAL FEED RATE AND STORAGE REQUIREMENTS

Chemical	Purpose	Design Dosage	Solution Density	Solution Concentration	Feed Rate at Projected 2025 ADD	Existing Storage	Days of Storage @ Projected 2025 ADD	Assessment
Carbon Dioxide	pH Depression to Enhance Degasification	75 mg/L	N/A	N/A	5,884 lbs/day	70 Tons	24	No improvements necessary
	Stabilization	8 mg/L						
Sodium Hypochlorite	Disinfection	10 mg/L	9.67 lbs/gal	10%	733.1 GPD	12,000 gal	16	No improvements necessary
	Odor Control	See Note 1						
Ammonium Hydroxide	DBP Control	0.89 mg/L	7.75 lbs/gal	19%	42.8 GPD	2,000 gal	47	No improvements necessary
Hydrofluorosilicic Acid	Dental Prophylaxis	0.60 mg/L	10.29 lbs/gal	23%	22.7 GPD	1,000 gal	44	No improvements necessary
Corrosion Inhibitor	Control of Lead & Copper Corrosion	1.00 mg/L	11.51 lbs/gal	36%	17.1 GPD	1,000 gal	58	No improvements necessary
Potassium Hydroxide	Odor Control Process Enhancement	See Note 2	12.1 lbs/gal	45%	225.7 GPD	6,000 gal	23	No improvements necessary
Sulfuric Acid	Scale Prevention In Odor Control System Blowdown	See Note 3	NA	NA	NA	1,000 gal	NA	No improvements necessary

Notes:

1. When and if additional degasifiers are installed, the 2-stage packed tower odor control system will be converted to a single stage system with the towers operating in parallel. A biofilter will also need to be installed downstream of the wet scrubbers and sodium hypochlorite will only be necessary for control of biological growth on the scrubber media.
2. Potassium hydroxide usage for odor control is based on a dosage of 3.30 lbs of potassium hydroxide per lb. of hydrogen sulfide removed and a raw water hydrogen sulfide concentration of 6.0 mg/L.
3. Needed for periodic cleaning. This chemical is not routinely injected.

TABLE 7-6
CHEMICAL FEED EQUIPMENT CAPACITY SUMMARY

Chemical	Feed Equipment Capacity	Maximum Required Feed Rate	Assessment
Carbon Dioxide for Degasification	2 @ 500 lbs/hr	443 lbs/hr	No Improvements Necessary
Carbon Dioxide for Stabilization	1 @ 100 lbs/hr	47 lbs/hr	No Improvements Necessary
Sodium Hypochlorite - Pre GST	2 @ 40.0 gal/hr	61.1 gal/hr	No Improvements Necessary
Sodium Hypochlorite–Post GST	2 @ 70.0 gal/hr	122.2 gal/hr	No Improvements Necessary
Ammonium Hydroxide–Pre GST	2 @ 5.0 gal/hr	3.6 gal/hr	No Improvements Necessary
Ammonium Hydroxide-Post GST	2 @ 10.0 gal/hr	7.2 gal/hr	No Improvements Necessary
Hydroflurosilicic Acid	2 @ 6.0 gal/hr	1.9 gal/hr	No Improvements Necessary
Corrosion Inhibitor	2 @ 5.0 gal/hr	1.4 gal/hr	No Improvements Necessary
Potassium Hydroxide	2 @ 20.0 gal/hr	21.3 gal/hr	No Improvements Necessary
Sulfuric Acid	2 @ 3.0 gal/hr	NA	No Improvements Necessary

The chemical delivery systems are adequate for the projected cap for the facility of 9.34 MGD, MDD.

We recommend the following for chemical storage and feed system:

1. **No improvements are required.**

7.1.8 Auxiliary Power

FAC 62-555 states that standby power facilities must be sufficient to allow delivery of at least AADD during a power outage. The production wells are remote from the West Mitchell Hammock WTP and there are standby power facilities at the Oviedo and A.M. Jones Booster Facility. Although these facilities were decommissioned as WTPs, the standby power systems remain operable and connected to the various wells and booster pumps. This allows the City to comply with the requirements of FAC 62-555 without purchasing or relocating generator sets.

The West Mitchell Hammock WTP includes one (1) 1,500 kilowatt (KW) generator set with provisions for future addition of another 1,500 KW unit. Delivering the projected CUP capped AADD

value of 4.67 MGD will require operation of one (1) degasifiers, the odor control system, one (1) transfer pumps, one (1) high service pump, the chemical feed systems, and related lighting and control systems. This results in an operating load of under 1,000 horsepower. The larger starting loads associated with the blowers, transfer pumps, and high service pumps are mitigated through the use of solid state "soft-start" units or variable frequency drives; therefore, it appears that the existing 1,500 KW generator set is adequate to meet the requirements of FAC 62-555 even at projected flows. For reliability purposes, the City should consider installing the additional 1,500 KW generator set. However, this improvement can be implemented when funds are available and is not required.

We recommend the following for auxiliary power:

1. **No improvements are required.**

7.2 Summary of Recommended WTP Improvements

The timing of the improvements is dependent on the rate of development in the service area and resulting increases in demand. The rate of development depends on several factors, such as interest rates, the real estate market, and general condition of the economy; therefore, it is not possible to accurately assign improvements to specific years. No substantial capital improvements to the West Mitchell Hammock WTP will be necessary during the planning period as the City shifts to an alternate water source and the existing facility reaches its capacity via the 4.67 MGD SJRWMD CUP cap.

TABLE 7-7
RECOMMENDED WATER PLANT SYSTEM IMPROVEMENTS

No.	Description
1	2020 to 2025 *Ground Storage* • Install a 2.5 million gallon ground storage tank at West Mitchell Hammock WTP

7.3 Distribution System

7.3.1 Distribution System Model

Hydraulic models are used as tools in planning water systems. The hydraulic models serve the following primary functions in the planning process:

- Assignment of water demands to existing or proposed water distribution systems.

- Hydraulic calculations to determine pressures based on specified demands.
- Sum the demands in a service area to determine the required water plant capacities and high service pumping requirements.
- Analyze alternative future configurations or interconnections to improve the distribution system.

See Section 4.3 of this plan for more details. The 2006 Water Master Plan analysis used the "H2O Net" model. The capital improvements that resulted from this analysis are described below and are incorporated into the Capital Improvements Plan herein. Table 7-8, Recommended Water Distribution System Improvements, lists the various improvements and indicates the estimated time period for implementation of each improvement. Descriptions of the Phase I projects are listed below:

Riverwoods Park: Installation of an 8" WM from Alafaya Woods Subdivision (McCully Court) to the Big Oaks Subdivision (Hart Branch Drive). There are two existing 8-inch stubs along each road and a connection between the two lines would provide additional service to the southern portion of the services area. The line is approximately 1400 feet in length with an estimated cost of $147,425.00. This looping line provides better flow and pressure and eliminates the need for a more expensive 16-inch line on Lockwood Boulevard.

Carib and Tomoka: Installation of a 6" WM upgrade on Carib and Tomoka which replaces a 2" line. This is a service upgrade.

SR 426 Phase I Widening Conflict Remediation and Improvements: Installation of a 12" WM on SR 434 from SR426 to Franklin. This will improve water service (flow and pressure) to the northern part of the service area.

SR 426/West Mitchell Hammock Turn Lanes Conflict Remediation: Upgrade the 16" WM to 20" WM at the intersection during construction. The roadway improvements require the relocation of an 16-inch existing line. Upgrading to a 20-inch line will increase service into the western part of the service area.

Backdoor WTP Connection: Installation of a 12" WM from WMHWTP to SR 434. This line will increase distribution system reliability. This provides a back door service opportunity if the line on West Mitchell Hammock is compromised in any way. Service to the City and to the A.M. Jones storage and booster pump station can be provided via this line.

Emergency Interconnect: Install an emergency interconnect with the Winter Springs System on SR 434 in the northernmost section of the City. This allows the City to have emergency service at several points within the City distribution system.

Phase 2 projects are a part of the utility relocations needed for SR 426 roadway improvements.

Future projects are to be performed when needed or if development is available to contribute to their construction.

TABLE 7-8
RECOMMENDED WATER DISTRIBUTION SYSTEM IMPROVEMENTS

No.	Description
Phase 1 2013 -2018	*Riverwoods Park* Install 8" WM from Alafaya Woods Subdivision to Big Oaks Subdivision. *Carib and Tomoka* Install 6" WM upgrade on Carib and Tomoka. Replaces 2" line. *SR 426 Phase I Widening Conflict Remediation and Improvements* Install 12" WM on SR 434 from SR426 to Franklin. *SR 426/West Mitchell Hammock Turn Lanes Conflict Remediation* Upgrade the 16" WM to 20" WM at the intersection during construction. *Backdoor WTP Connection* Install 12" WM from WMHWTP to SR 434. *Emergency Interconnect* Install an emergency interconnect with the Winter Springs System.
Phase 2 2019 – 2025	*CR419/SR 426 Conflict Remediation and Improvements* • Install 16" WM on CR 419/SR 426 from North Pine Avenue to Division Street • Install 16" WM on CR 419/SR 426 from Division Street to Lockwood Boulevard These projects depend on the timing of the CR 419/SR 426 roadway improvements.
Future	*Chapman/Ragsdale Connector* Install 8" WM looping line. Project depends on development timing. *Oviedo Marketplace/Isles of Oviedo* Install 8" WM on Oviedo Marketplace Boulevard from SR 417 to Isles of Oviedo.

7.4 Reclaimed Water Sources

There are two sources of reclaimed water available to the City. The first source is the Oviedo WRF and the second source is IBRWRF. This is discussed earlier in this report.

7.4.1 Service Area Demand

The City needs to increase the reclaimed demand within the service area over time to match the decrease required in the potable demand in order to provide for new customers of the potable water system. Table 5-9 identifies the needed reclaimed customers.

7.4.2 Recommendations

The September 2011 Reclaimed Water Master Plan Update recommended implementation of Phases I through III of the Plan. Phase 1 provides service to the developments of Big Oaks, Twin Rivers Phase 1, Alafaya Woods 17 and 18 and Little Creek Areas 1 thru 3. Alafaya Woods 17 and 18 and Little Creek Areas remain to be connected. These projects will be completed by the end of 2013. With the areas already connected to the City reclaimed water system (through February 2013), there are 2539 customers connected out of a possible 4093 lots. We estimate that by the end of 2013 that 2790 homes could be connected. This number of connections (2790) would provide the reclaimed demand (replacing potable demand) necessary through 2018 based on the projections of need. There are numerous subdivisions that have low connection percentages, i.e. the actual number of connections divided by the total lots within the subdivision. It is assumed that if a house is connected, they are also using reclaimed water. If each subdivision had a minimum participation rate of 75%, this would yield 3235 customers and would provide the demand needed through approximately 2020.

Phase 2 retrofits identified in the 2011 Master Reclaimed Plan Update includes two residential areas that have densities and potentially high connection rates that make them economically feasible for retrofit. The two areas are the Twin Rivers development which is located adjacent to the main transmission main along Lockwood Boulevard on the east and west sides and the Riverside development which is located south of CR419 and alongside the Econ River. Both of these areas would be considered “in-fill” for the overall reclaimed water distribution system.

7.4.3 Future Phases

Since a majority of the anticipated growth is expected to come from the central and northern

portions of the City's service area, it is recommended to expand the City's reclaimed distribution system into this area. The City already has existing communities in the northern portion of the service area that have internal reclaimed water infrastructure. However, there are no reclaimed water distribution main lines in this area. These developments include Meadows, Lake Charm Country Estates, Preserve at Lake Charm, and Black Hammock Preserve. As this area begins to develop more into the future, it is anticipated that the City will have the available reclaimed water supply. The estimated costs to construct a reclaimed water transmission main in this area are $1,160,608.

The anticipated future developments in this portion of the service area include Oviedo on the Park, the Le Parc development, the 60-acres north of Florida Avenue, and the 69 acres north of SR 426. These developments will have to comply to the City's Land Development Codes, requiring them to be constructed with reclaimed water infrastructure. Therefore, the City would need to provide the main transmission lines to serve each development. The City currently has an existing 16-inch reclaimed water main running up Oviedo Boulevard. This main could adequately serve the anticipated Oviedo on the Park development, without major capital costs expenditures.

The other anticipated future development is located on SR 426, west of Lockwood Boulevard. This development is anticipated to have 93 units, which would generate a minimum reclaimed water demand of 32,550 gpd (75% of 93 units at 500 gpd per unit). The City currently has an existing reclaimed water main running up Lockwood Boulevard that serves the Oviedo Forest Subdivision. To provide service to the anticipated development a 6-inch reclaimed water main could be extended up Lockwood Boulevard approximately 700 LF, and westward down SR 426 approximately 2,600 LF. The recommended improvements are estimated to cost $223,464.

The other connection is the remaining areas of Alafaya Woods. The anticipated demand for this area is 705,000 GPD. This area could be retrofitted and connected to the reclaimed water distribution system if the expected flow can be obtained and costs to connect the area can be reduced to an acceptable level. Presently, the anticipated cost to retrofit this area is approximately $7.58 Million dollars. This equates to a per unit cost of $4,027. As a result of the cost to provide service, this phase is not recommended at this time, but will be needed by 2030.

7.4.4 Reuse Practices

Reuse or reclaimed water use is an integral part of the water supply system for meeting the water needs of the City. A reclaimed distribution and connection policy or ordinance will be required for the proper operation of the reuse system. The following are recommended items for consideration in this policy document:

1) Require connection of new development or substantial redevelopment to the reuse system, to supply uses that do not require potable water.
2) Require installation of meters for individual connections to the reuse system (already a policy of the City).
3) Require installation of dual water distribution lines that will initially use the existing water source until the reclaimed source is available (already a policy of the City).
4) Require use of reclaimed water for irrigation and other non-potable needs in public areas owned by the City (many such areas are already under this requirement).
5) Enter partnerships with other wastewater utilities to retrofit existing development with connections to a reuse system, to supply uses that do not require potable water.

TABLE 7-9
RECOMMENDED RECLAIMED WATER SYSTEM CAPITAL IMPROVEMENT PLAN

Item	Project Description	Cost Estimate	Fiscal Year	75% AADD Capacity (GPD)
1	Install reclaimed water distribution system into Alafaya Woods Phases 17 & 18	$743,000	2013	66,750
2	Install reclaimed water distribution system into Little Creek Areas 1, 2 and 3	$609,000	2013	44,250
3	Install reclaimed water distribution system into Twin Rivers (remaining)	$3,640,000	2018	393,000
4	Install reclaimed water distribution system into Riverside	$2,398,000	2024	293,250

Note: **Projects 1 and 2 are currently funded by an FDEP SRF loan.**
Projects 3 and 4 do not have a source of funding at this time.

7.5 Treatment of Surface Water (any location)

If the City is not able to obtain additional volumes of reclaimed water, surface water could potentially be used to supplement the reclaimed water system. However, treatment of surface water would be required to ensure comparable quality to that of reclaimed water. Since the surface water proposed as an alternative irrigation source will not be distributed for human consumption, many of the existing natural chemical parameters can remain unchanged resulting in minimal treatment requirements. In order to meet reclaimed water quality requirements, surface water requires filtration and disinfection. Filtration is required to remove solids to prevent clogging in the irrigation systems and to allow the disinfectant to work more efficiently. Disinfection is required for public health since irrigation water may come into external physical contact with people. The treatment process must meet the following criteria to be viable as an augmentation system:

1. Must be flexible in terms of capacity of flow treated and on-off conditions.
2. Must be easily started and usable water must be immediately available to the distribution system.
3. Must be able to withstand extended downtime without adverse affects on treatment.

Surface water treatment typically consists of low service supply pumps, filtration, disinfection, and high service distribution pumps. The City can choose to use surface water for augmentation only or use surface water as a stand-alone source. A stand-alone system would have a continuously operating treatment system with a steady flow feeding storage facilities while an augmentation system is used only during high demand periods. It is recommended to use surface water to augment the reclaimed water system with the option to expand it into a stand-alone system at a later time. Additional investigations of surface water systems would be required prior to connection to the reclaimed system.

7.6 Lake Jesup Water Quality

Use of water from Lake Jesup is possible. The lake water quality has been evaluated by others to determine the necessary treatment required prior to distribution. Depending on the location for withdrawal and the amount of water required, additional investigations would need to be done to determine treatment methods and possible impacts.

7.7 Cost of Non-Potable Surface Water Treatment

The capital costs for treatment of surface water to non-potable requirements are summarized in

Table 7-9. The estimated cost is shown for a 1.0 MGD treatment plant that can be expanded into 2.0 and 3.0 MGD. The 18" PVC distribution line length of 7,400 lineal feet (LF) is the approximate distance from Lake Jesup due south to the intersection of Artesia Avenue and S.R. 434.

TABLE 7-10
ESTIMATED COST FOR NON-POTABLE SURFACE WATER TREATMENT

ITEM	Phase 1 (1MGD)	Phase 2 Expansion (2 MGD)	Phase 3 Expansion (3 MGD)
Mobilization/Site Work (5%)	$115,750	$72,750	$72,750
Low Service Supply Pumps	$125,000	$75,000	$75,000
Coagulation Chemical Feed	$150,000		
Filtration	$350,000	$350,000	$350,000
Wetwells / Tanks	$350,000		
Disinfection System	$75,000		
Electrical/Control Building	$40,000		
SCADA	$45,000	$25,000	$25,000
Electrical	$205,000	$155,000	$155,000
Storage	$750,000	$750,000	$750,000
Distribution Pump Station	$150,000	$100,000	$100,000
Residual Backwash Pump Station	$75,000		
Contingency (10%)	$231,500	$145,500	$145,500
Design/Survey (7%)	$162,050	$101,850	$101,850
Legal/Administrative/etc. (5%)	$115,750	$72,750	$72,750
Construction Administration (5%)	$115,750	$72,750	$72,750
Land Purchase (3 Acres)	$750,000		
Transmission Line (7,400 LF 18" PVC)	$740,000		
TOTAL **Cost per gallon treated**	**$4,545,800** **$4.54/gal**	**$1,920,600** **$1.92/gal**	**$1,920,600** **$1.92/gal**

The costs presented in Table 7-8, Estimated Cost for Non-potable Surface Water Treatment, also apply to other surface water sources since the required treatment is similar; however, the land purchase cost and the transmission line cost may vary. Table 7-8, Estimated Cost for Non-potable Surface Water Treatment, shows that as the surface water treatment facility increases in capacity, the **Construction** cost per gallon of treated water drops from an initial estimated cost of $4.54 per gallon to $1.92 per gallon. **This estimate is for the production of Non-potable water. The cost of treating to a potable water level is considerably higher.**

Another option is to obtain non-potable/reclaimed water from the City of Sanford. The City of Sanford is part of a tri-party agreement between the City of Sanford, City of Lake Mary, and Seminole County for use of water from Lake Monroe for augmentation. Additional investigations into the actual amounts needed and the areas that would be served would need to be determined in order to determine the location of the treatment facility and the method of installation and location of transmission lines and interconnects.

CHAPTER 8

WATER MASTER PLAN CAPITAL IMPROVEMENTS PROGRAM

8.1 Introduction

This section presents a capital improvement plan (CIP) that will be implemented over the next 20 years based on the Water Master Plan, 2013. The CIP addresses existing issues in the short term and outlines future needs to provide sufficient water supply, treatment, storage, pumping and distribution capacity to meet water system demands and required levels of service as the City grows. ***Water supply is defined to include all water supply sources within the City and includes reclaimed water.***

The estimated CIP cost for each phase is shown in Table 8-1, Estimated Capital Improvements Program Costs, and a summary of the recommended CIP with the associated planning years is shown in Table 8-2, Summary of Recommended Water Capital Improvement Projects. The estimated 5-year CIP for the reclaimed water (alternate water source) system is shown in Table 8-3, Recommended Reclaimed Water System Capital Improvement Plan and is a duplicate of Table 7-7, Recommended Reclaimed Water System Capital Improvement Plan. The reclaimed program is a necessary part of the Water Supply Plan to meet the future water supply needs of the City.

TABLE 8-1
ESTIMATED CAPITAL IMPROVEMENTS PROGRAM COSTS
(includes reclaimed water improvements)

CIP Phase		Estimated Cost
Phase I	First 5 -Year Increment (2014 – 2018)	$830,425
Phase II	Second 5 - Year Increment (2019 – 2023)	$5,928,100
Phase III	Third 5 – Year Increment (2024 – 2028)	$3,486,100
TOTAL		**$10,244,625**

TABLE 8-2
SUMMARY OF RECOMMENDED WATER PLANT
CAPITAL IMPROVEMENT PROJECTS

Water Treatment, Storage, and High Service Pumping CIP	Estimated Construction Cost[1]	FY 2014-FY 2018	FY 2019-FY 2023	FY 2024-FY 2028
2.5 million gallon ground storage tank	$1,200,000		X	

[1] Cost includes materials, installation and contingency.

TABLE 8-3
SUMMARY OF RECOMMENDED WATER DISTRIBUTION
CAPITAL IMPROVEMENT PROJECTS

Water Treatment, Storage, and High Service Pumping CIP	Estimated Construction Cost[1]	FY 2014-FY 2018	FY 2019-FY 2023	FY 2024-FY 2028
Riverwoods Park Connection – Install 8-inch for Alafaya to Big Oaks	$147,425	X		
Carib and Tomoka – 6-inch WM to replace 2-inch line	$184,000	X		
SR 426 – install 12-inch on SR 434 to Franklin	$230,000	X		
SR 426/West Mitchell Hammock Turn Lanes conflict remediation 16-inch to 20-inch.	$65,000	X		
Back door WTP Connection – install 12-inch from WTP to SR434	$135,000	X		
Emergency Interconnect with Winter Springs	$69,000	X		
Install 16” WM on CR 419/SR426 from North Pine Avenue to Division St.	$1,088,100		X	
Install 16” WM on CR 419/SR426 from Division Street to Lockwood Blvd.	$1,088,100			X

[1] Cost includes materials, installation and contingency.
[2] Deferred due to groundwater supply limitations.
[3] Project required to maintain potable water level of service standards.

TABLE 8-4
SUMMARY OF RECOMMENDED RECLAIMED WATER SYSTEM CAPITAL IMPROVEMENT PLAN

Item	Project Description	Cost Estimate	Fiscal Year	75% AADD Capacity (GPD)
1	Install reclaimed water distribution system into Alafaya Woods Phases 17 & 18	$743,000	2013	66,750
2	Install reclaimed water distribution system into Little Creek Areas 1, 2 and 3	$609,000	2013	44,250
3	Install reclaimed water distribution system into Twin Rivers (remaining)	$3,640,000	2018	393,000
4	Install reclaimed water distribution system into Riverside	$2,398,000	2024	293,250

Note: **Projects 1 and 2 are currently funded by an FDEP SRF loan and are not include in the First Year CIP list.**

Projects 3 and 4 do not have a source of funding at this time

APPENDIX A

Consumptive Use Permit (2008 to 2028)

St. Johns River
Water Management District
Kirby B. Green III, Executive Director • David W. Fisk, Assistant Executive Director

4049 Reid Street • P.O. Box 1429 • Palatka, FL 32178-1429 • (386) 329-4500
On the Internet at *www.sjrwmd.com.*

October 14, 2008

City of Oviedo
400 Alexandria Blvd.
Oviedo, FL 32765

SUBJECT: Consumptive Use Permit Number 8252
City of Oviedo

Dear Sir/Madam:

Enclosed is your permit as authorized by the St. Johns River Water Management District on October 14, 2008.

Please be advised that the period of time within which a third party may request an administrative hearing on this permit may not have expired by the date of issuance. A potential petitioner has twenty-six (26) days from the date on which the actual notice is deposited in the mail, or twenty-one (21) days from publication of this notice when actual notice is not provided, within which to file a petition for an administrative hearing pursuant to Sections 120.569 and 120.57, Florida Statutes. Receipt of such a petition by the District may result in this permit becoming null and void.

Permit issuance does not relieve you from the responsibility of obtaining permits from any federal, state and/or local agencies asserting concurrent jurisdiction over this work.

The enclosed permit is a legal document and should be kept with your other important records. Please read the permit and conditions carefully since the referenced conditions may require submittal of additional information. All information submitted as compliance with permit conditions must be submitted to the nearest District Service Center and should include the above referenced permit number.

Sincerely,

Gloria Lewis

Gloria Lewis, Director
Division of Regulatory Information Management

Enclosures: Permit, Conditions for Issuance, Compliance Forms, Map, Well Tags

cc: District Permit File

Agent: CPH Engineers, Inc.
1117 East Robinson
Orlando, FL 32801

RECEIVED
NOV 2 4 2008
CPH ORLANDO

GOVERNING BOARD

David G. Graham, CHAIRMAN JACKSONVILLE
Susan N. Hughes, VICE CHAIRMAN PONTE VEDRA
Ann T. Moore, SECRETARY BUNNELL
W. Leonard Wood, TREASURER FERNANDINA BEACH
Douglas C. Bournique VERO BEACH
Michael Ertel OVIEDO
Hersey "Herky" Huffman ENTERPRISE
Arlen N. Jumper FORT McCOY
Hans G. Tanzler III JACKSONVILLE

PERMIT NO. 8252 **DATE ISSUED:** October 14, 2008
PROJECT NAME: City of Oviedo

A PERMIT AUTHORIZING:

The District authorizes, as limited by the attached permit conditions, the use of 4.68 million gallons per day (annual average) of ground water for household, urban landscape, water utility, and unaccounted for types of use and 0.0006 million gallons per day (annual average) of surface water for urban landscape irrigation, and 0.532 million gallons per day (annual average) of public access reclaimed water for landscape irrigation to serve a projected population of 38,021 in 2025.

LOCATION:

Site: CITY OF OVIEDO
Seminole County

Section(s):	16, 21, 22, 23, 28	Township(s):	21S	Range(s):	31E

ISSUED TO:

City of Oviedo
400 Alexandria Blvd.
Oviedo, FL 32765

Permittee agrees to hold and save the St. Johns River Water Management District and its successors harmless from any and all damages, claims, or liabilities which may arise from permit issuance. Said application, including all maps and specifications attached thereto, is by reference made a part hereof.

This permit does not convey to permittee any property rights nor any rights of privileges other than those specified herein, nor relieve the permittee from complying with any law, regulation or requirement affecting the rights of other bodies or agencies. All structures and works installed by permittee hereunder shall remain the property of the permittee.

This permit may be revoked, modified or transferred at any time pursuant to the appropriate provisions of Chapter 373, Florida Statutes and 40C-1, Florida Administrative Code.

PERMIT IS CONDITIONED UPON:

See conditions on attached "Exhibit A", dated October 14, 2008

AUTHORIZED BY: St. Johns River Water Management District
Department of Resource Management

By: Harold A. Wilkening III
Director

By: Kirby B. Green, III
Executive Director

"EXHIBIT A"
CONDITIONS FOR ISSUANCE OF PERMIT NUMBER 8252
CITY OF OVIEDO
DATED OCTOBER 14, 2008

1. District authorized staff, upon proper identification, will have permission to enter, inspect and observe permitted and related facilities in order to determine compliance with the approved plans, specifications and conditions of this permit.

2. Nothing in this permit should be construed to limit the authority of the St. Johns River Water Management District to declare a water shortage and issue orders pursuant to Section 373.175, F.S., or to formulate a plan for implementation during periods of water shortage, pursuant to Section 373.246, F.S. In the event of water shortage, as declared by the District Governing Board, the permittee must adhere to reductions in water withdrawals as specified by the District.

3. Prior to the construction, modification or abandonment of a well, the permittee must obtain a water well permit from the St. Johns River Water Management District or the appropriate local government pursuant to Chapter 40C-3, F.A.C. Construction, modification or abandonment of a well will require modification of the consumptive use permit when such construction, modification or abandonment is other than that specified and described on the consumptive use permit application form.

4. Leaking or inoperative well casings, valves, or controls must be repaired or replaced as required to eliminate the leak or make the system fully operational.

5. The District must be notified, in writing, within 30 days of any sale, conveyance, or other transfer of a well or facility from which the permitted consumptive use is made or within 30 days of any transfer of ownership or control of the real property at which the permitted consumptive use is located. All transfers of ownership or transfers of permits are subject to the provisions of section 40C-1.612, F.A.C.

6. A District-issued identification tag shall be prominently displayed at each withdrawal site by permanently affixing such tag to the pump, headgate, valve or other withdrawal facility as provided by Section 40C-2.401, F.A.C. Permittee shall notify the District in the event that a replacement tag is needed.

7. If the permittee does not serve a new projected demand located within the service area upon which the annual allocation was calculated, the annual allocation will be subject to modification.

8. The permittee must ensure that all service connections are metered.

9. All submittals made to demonstrate compliance with this permit must include the CUP number 8252 plainly labeled on the submittal.

10. This permit shall expire October 14, 2028.

11. The lowest quality water source, such as reclaimed water or surface/storm water, must be used as irrigation water when deemed feasible pursuant to District rules and applicable state law.

12. The permittee's consumptive use shall not adversely impact wetlands, lakes, and spring flows or cause or contribute to a violation of minimum flows and levels adopted in Chapter 40C-8, F.A.C., except as authorized by an SJRWMD-approved minimum flow or level (MFL)

recovery strategy. If unanticipated significant adverse impacts occur, the SJRWMD shall revoke the permit in whole or in part to curtail or abate the adverse impacts, unless the impacts are mitigated by the permittee pursuant to a District-approved plan.

13. Legal uses of water existing at the time of permit application may not be significantly adversely impacted as a result of the consumptive use. If unanticipated significant adverse impacts occur, the District shall revoke the permit in whole or in part, to curtail or abate the adverse impacts, unless the impacts are mitigated by the permittee pursuant to a District-approved plan.

14. Prior to initiation of use, the following wells, pumps, and connection points shall be equipped with totalizing, in-line, flowmeters: Wells 101 (GRS Station No. 15354), 102 (GRS Station No. 15355), 103 (GRS Station No. 15356), 204 (GRS Station No. 15358), 205 (GRS Station No. 15361), 301 (GRS Station No. 15362), 303 (GRS Station No. 15364), 304 (GRS Station No. 15365), 305 (GRS Station No. 15366), 306 (GRS Station No. 15367), 307 (GRS Station No. 15368), 308 (GRS Station No. 15369), The Meadows (GRS Station No. 34725), Moss Creek (GRS Station No. 34726), 203a (GRS Station No. 223526), 302 (GRS Station No. 242560), and Seneca Bend (GRS Station No. 242566); Pumps Worthington 1 (GRS Station No. 34728) and Worthington 2 (GRS Station No. 34729); and Connection Point Iron Bridge No. 1 (GRS Station No. 34730). These meters must maintain 95% accuracy, be verifiable and be installed according to the manufacturer's specifications. If meters have not already been installed, documentation of proper meter installation (photograph and manufacturer specifications) of these meters must be submitted within 30 days of meter installation.

15. Total withdrawals of water from Wells 101 (GRS Station No. 15354), 102 (GRS Station No. 15355), 103 (GRS Station No. 15356), 204 (GRS Station No. 15358), 205 (GRS Station No. 15361), 301 (GRS Station No. 15362), 303 (GRS Station No. 15364), 304 (GRS Station No. 15365), 305 (GRS Station No. 15366), 306 (GRS Station No. 15367), 307 (GRS Station No. 15368), 308 (GRS Station No. 15369), The Meadows (GRS Station No. 34725), Moss Creek (GRS Station No. 34726), 203a (GRS Station No. 223526), 302 (GRS Station No. 242560), and Seneca Bend (GRS Station No. 242566); Pumps Worthington 1 (GRS Station No. 34728) and Worthington 2 (GRS Station No. 34729); and Connection Point Iron Bridge No. 1 (GRS Station No. 34730) must be recorded continuously, totaled monthly, and reported to the District, using Form EN-50, at least every six months from the initiation of withdrawal. The reporting dates each year will be as follows for the duration of the permit:

Reporting Period	Report Due Date
January-June	July 31
July – December	January 31

16. The Permittee shall document proper installation of flow meters by submitting a copy of the manufacturer's specifications and a photograph, or by a site visit by District staff, within 30 days of meter installation.

17. The permittee must maintain all flow meters. In case of failure or breakdown of any meter, the District must be notified in writing within 5 days of discovery. A defective meter must be repaired or replaced within 30 days of discovery.

18. The permittee must have all flowmeters checked for accuracy at least once every 3 years within 30 days of the anniversary date of permit issuance, and recalibrated if the difference between the actual flow and the meter reading is greater than 5%. District Form No. EN-51 must be submitted to the District within 10 days of the inspection/calibration.

19. Maximum annual groundwater withdrawals (combined total) from the "Series 100 Well Field" (Well No. 101 (GRS Station No. 15354), Well No. 102 GRS Station No. 15355), Well No. 103 (GRS Station No. 15356), Well No. 301 (GRS Station No. 15362), and Well No. 302

(GRS Station No. 242560)) for household, urban landscape irrigation, commercial/industrial, unaccounted for, and water utility types of use must not exceed as follows:

535.74 million gallons (1.468 million gallons per day, average) in 2008,
542.32 million gallons (1.486 million gallons per day, average) in 2009,
548.90 million gallons (1.504 million gallons per day, average) in 2010,
555.48 million gallons (1.522 million gallons per day, average) in 2011,
562.06 million gallons (1.540 million gallons per day, average) in 2012, and
568.64 million gallons (1.558 million gallons per day, average) in 2013- 2028.

20. Well No. 301 (GRS Station No. 15362) and Well No. 302 (GRS Station No. 242560) shall not be operated simultaneously.

21. Maximum annual groundwater withdrawals (combined total) from the "Series 300 Well Field" (Well No. 303 (GRS Station No. 15364), Well No. 304 (GRS Station No. 15365), Well No. 305 (GRS Station No. 15366), Well No. 306 (GRS Station No. 15367), Well No. 307 (GRS Station No. 15368), and Well No. 308 (GRS Station No. 15369)) for household, urban landscape irrigation, commercial/industrial, unaccounted for, and water utility types of use must not exceed as follows:

    1071.47 million gallons (2.936 million gallons per day, average) in 2008,
    1084.63 million gallons (2.972 million gallons per day, average) in 2009,
    1097.80 million gallons (3.008 million gallons per day, average) in 2010,
    1110.96 million gallons (3.044 million gallons per day, average) in 2011,
    1124.13 million gallons (3.080 million gallons per day, average) in 2012, and
    1137.29 million gallons (3.116 million gallons per day, average) in 2013- 2028.

22. Maximum annual groundwater withdrawals (combined total) from the "City Owned Irrigation Wells" (Wells Chapman Oaks 1 (GRS Station No. 34721), Chapman Oaks 2 (GRS Station No. 34722), Chapman Groves 1 (GRS Station No. 34723), Chapman Groves 2 (GRS Station No. 34724), The Meadows (GRS Station No. 34725), 203a (GRS Station No. 223526), Seneca Bend (GRS Station No. 242566) and Moss Creek (GRS Station No. 34726) for urban landscape irrigation type use must not exceed as follows:

    29.6 million gallons (0.081 million gallons per day, annual average) in 2008; and
    3.2 million gallons (0.009 million gallons per day, annual average) in 2009–2028

23. Maximum annual surface water withdrawals (combined total) from surface water pumps Worthington 1 (GRS Station No. 34728) and Worthington 2 (GRS Station No. 34729) for urban landscape irrigation type use must not exceed as follows:
    0.232 million gallons in 2008 –2028.

24. The permittee shall provide the following annual quantities of reclaimed water, via the Iron Bridge No. 1 connection point (GRS Station No. 134730), for use in the City's service area:

    0 million gallons (0.000 million gallons per day, average) in 2008,
    26.4 million gallons (0.072 million gallons per day, average) in 2009 - 2016,
    44.65 million gallons (0.122 million gallons per day, average) in 2017,
    62.90 million gallons (0.172 million gallons per day, average) in 2018,
    81.15 million gallons (0.222 million gallons per day, average) in 2019,
    99.40 million gallons (0.272 million gallons per day, average) in 2020,
    117.65 million gallons (0.322 million gallons per day, average) in 2021,
    139.55 million gallons (0.382 million gallons per day, average) in 2022,
    157.80 million gallons (0.432 million gallons per day, average) in 2023,
    176.05 million gallons (0.482 million gallons per day, average) in 2024, and
    194.30 million gallons (0.532 million gallons per day, average) in 2025 – 2028.

The permittee may provide additional quantities of reclaimed water for use in the City's service area, provided such additional quantities are as necessary for economic and efficient utilization.

25. Maximum daily ground water withdrawals from the Floridan aquifer for fire protection from the "Series 100 Well Field" (Well No. 101 (GRS Station No. 15354), Well No. 102 GRS Station No. 15355), Well No. 103 (GRS Station No. 15356), Well No. 301 (GRS Station No. 15362), and Well No. 302 (GRS Station No. 242560)), plus the "Series 300 Well Field" (Well No. 303 (GRS Station No. 15364), Well No. 304 (GRS Station No. 15365), Well No. 305 (GRS Station No. 15366), Well No. 306 (GRS Station No. 15367), Well No. 307 (GRS Station No. 15368), and Well No. 308 (GRS Station No. 15369)), plus Well 204 (GRS Id No. 15358) and Well 205 (GRS Id No. 15361) shall not exceed 22.608 million gallons as a combined daily total. The permittee shall maintain a separate accounting of all water used for fire protection. The permittee shall submit documentation of water used for fire protection to the District within 30 days of each occurrence on which water is withdrawn for fire protection (essential) type use.

26. The permittee shall plug and abandon Wells 203 (GRS Station No. 15357), 202 (GRS Station No. 15360), Chapman Oaks 1 (GRS Station No. 34721), Chapman Oaks 2 (GRS Station No. 34722), Chapman Groves 1 (GRS Station No. 34723), Chapman Groves 2 (GRS Station No. 34724), and 202a (GRS Station No. 223525) not later than October 31, 2009. Plugging and abandonment of these wells shall conform to District requirements under chapter 40C-3, F.A.C.

27. The permittee shall plug and abandon Well 203a (GRS Station No. 223526) not later than October 31, 2010. Plugging and abandonment of this well shall conform to District requirements under chapter 40C-3, F.A.C.

28. The permittee shall convert MW-300 (GRS Station No. 223527), aka "Oviedo 4" Irrigation Well," as described in plans presented to the District on January 11, 2008. The permittee shall video log the entire length of the well to evaluate the condition of the well casing and to evaluate suitable locations to set the pump and packers prior to proceeding with the modification. Modification of the well shall conform to District requirements under chapter 40C-3, F.A.C. The modification of MW-300, as required by this condition, shall be completed by March 31, 2009, and a report of the modification shall be provided to the District no later than April 30, 2009.

29. The permittee must collect and have analyzed a water quality sample from each of the following Wells (Well 103 (GRS Id No. 15356), Well 204 (GRS Id No. 15358), Well 205 (GRS Id No. 15361), Well 301 (GRS Id No. 15362), Well 303 (GRS Id No. 15364), Well 308 (GRS Id No. 15369), and MW-300 (GRS Id No. 223527)) in May of each year for the duration of this permit. Each sample must be analyzed for the following:

Field

Field temperature (°C)	Field specific conductance (umhos/cm)
Field pH (Units)	Field turbidity (NTU)

Laboratory

Bicarbonate alkalinity (as mg/L CaCO3)	Potassium (mg/L)
Carbonate alkalinity (as mg/L CaCO3)	Sodium (mg/L)
Lab pH (Units)	Sulfate (mg/L)
Calcium (mg/L)	Specific Conductance (umhos/cm)
Chloride (mg/L)	Total Iron (mg/L)
Magnesium (mg/L)	Total Dissolved Solids (mg/L)

Sample Collection

Samples must be collected in accordance with all applicable provisions of the Florida Department of Environmental Protection's (FDEP) standard operating procedures (SOP), DEP-SOP-001/01, DEP Quality Assurance Rule, 62-160, F.A.C.

The wells must be purged in accordance with DEP-SOP-001/01 and well purging must be documented using the Groundwater Sampling Log form found in the referenced FDEP SOP. Samples must be stored on ice immediately after collection, and remain on ice until received by the laboratory. It is recommended that sample duplicates be taken to allow for laboratory errors or data loss and these samples be stored by the laboratory for a minimum of 60 days to ensure backup sample availability should re-analyses be required.

Quality Assurance

The permittee must provide documentation using forms specified in DEP-SOP-001/01 that field instruments were properly calibrated prior to obtaining field measurements.

All water quality analyses must be performed by a laboratory certified by the Florida Department of Health (FDOH) and the National Environmental Laboratory Accreditation Conference (NELAC). All laboratory analyses must be by methods for which the laboratory has FDOH certification. All laboratory analyses must be completed within EPA holding times. If the data is lost or a laboratory error occurs and the EPA holding time for the analysis has expired, the Permittee must resample the well within 15 days of notification from the laboratory that a loss or laboratory error has occurred.

With the exception of pH, laboratory analyses utilizing selective ion electrodes are not acceptable due to the inadequate sensitivity of these methods. Analyses utilizing test kits typically used for field screening (e.g., Hach and LaMotte) are also not acceptable for the same reason.

All major ion analyses must be checked for anion-cation balance and must balance (equivalent concentrations as meq/L) within 5%. If the anion-cation balance does not balance within 5%, the permittee must review the data and include in the report submitted to the District a discussion of the cause or explanation of the imbalance. If the anion-cation balance does not balance with 5%, the permittee may be required to re-analyze the sample if it is within acceptable holding times, or resample the well and reanalyze the sample.

Reports

A report of the results of each sampling event must be submitted to the District no later than June 30 of the year in which samples were collected and shall include:

(a) Well sampling log
(b) Field instrumentation calibration verification
(c) Chain of custody forms
(d) Laboratory analytical report in approved format

All data must be submitted to the District in a District approved electronic format consistent with FDOH and NELAC laboratory reporting requirements.

30. The permittee shall obtain water quality data from groundwater samples collected from District monitoring wells S-1193, S-1189, and S-1078, all of which are located on the permittee's property, in May and October of each year of the permit duration. Reports of these data shall be provided to the District by June 30 for samples collected in May and by November 30 for samples collected in October. As long as the District is collecting samples

from these wells as part of the District long-term water quality monitoring program, the permittee may obtain water quality data from the District's Division of Ground Water Programs to fulfill this condition.

31. In the event that the District ceases to collect and analyze groundwater samples from District monitoring wells S-1193, S-1189, and S-1078, the permittee shall collect and analyze samples from these wells in February, May, August and November of each year of the permit duration. Sample collection procedures and quality assurance shall conform to Florida Department of Environmental Protection's (FDEP) standard operating procedures (SOP), DEP-SOP-001/01, DEP Quality Assurance Rule, 62-160, F.A.C., as described above. Samples collected in May shall be analyzed for (Field: Field temperature (degrees C), Field specific conductance (umhos/cm), Field pH (Units), Field turbidity (NTU); Lab: Bicarbonate alkalinity (as mg/L CaCO3), Potassium (mg/L), Carbonate alkalinity (as mg/L CaCO3), Sodium (mg/L), Lab pH (Units), Sulfate (mg/L), Calcium (mg/L), Specific Conductance (umhos/cm), Chloride (mg/L), Total Iron (mg/L), Magnesium (mg/L), and Total Dissolved Solids (mg/L)). Samples collected in February, August and November shall be analyzed for (Field: Field temperature (degrees C), Field specific conductance (umhos/cm), Field pH (Units), Field turbidity (NTU); Lab: Bicarbonate alkalinity (as mg/L CaCO3), Sulfate (mg/L), Specific Conductance (umhos/cm), Chloride (mg/L), and Total Dissolved Solids (mg/L)).

    A report of the results of May sampling event must be submitted to the District no later than June 30 of the year in which samples were collected. Reports of the results for the February, August and November sampling events shall be submitted to the District no later than the following dates in the year in which samples were collected: March 31 for the February sampling event, September 30 for the August sampling event, and December 31 for the November sampling event. The reports of results shall include:

    (a) Well sampling log
    (b) Field instrumentation calibration verification
    (c) Chain of custody forms
    (d) Laboratory analytical report in approved format

    All data must be submitted to the District in a District approved electronic format consistent with FDOH and NELAC laboratory reporting requirements.

32. The permittee must collect and have analyzed a water quality sample from each of the following Wells (Well No. 101 (GRS Station No. 15354), Well No. 102 GRS Station No. 15355), Well No. 103 (GRS Station No. 15356), Well No. 301 (GRS Station No. 15362), and Well No. 302 (GRS Station No. 242560), Well No. 303 (GRS Station No. 15364), Well No. 304 (GRS Station No. 15365), Well No. 305 (GRS Station No. 15366), Well No. 306 (GRS Station No. 15367), Well No. 307 (GRS Station No. 15368), and Well No. 308 (GRS Station No. 15369), Well 204 (GRS Id No. 15358) and Well 205 (GRS Id No. 15361)) in February, May, August and November of each year for the duration of this permit. Each sample must be analyzed for the following:

    Field
    Field temperature (°C) Field specific conductance (umhos/cm)
    Field pH (Units) Field turbidity (NTU)

    Laboratory
    Sulfate (mg/L) Chloride (mg/L)
    Total Dissolved Solids (mg/L) Specific Conductance (umhos/cm)

    Sample Collection

Samples must be collected in accordance with all applicable provisions of the Florida Department of Environmental Protection's (FDEP) standard operating procedures (SOP), DEP-SOP-001/01, DEP Quality Assurance Rule, 62-160, F.A.C.

The wells must be purged in accordance with DEP-SOP-001/01, and well purging must be documented using the Groundwater Sampling Log form found in the referenced FDEP SOP. Samples must be stored on ice immediately after collection, and remain on ice until received by the laboratory. It is recommended that sample duplicates be taken to allow for laboratory errors or data loss and these samples be stored by the laboratory for a minimum of 60 days to ensure backup sample availability should re-analyses be required.

Quality Assurance

The permittee must provide documentation using forms specified in DEP-SOP-001/01 that field instruments were properly calibrated prior to obtaining field measurements.
All water quality analyses must be performed by a laboratory certified by the Florida Department of Health (FDOH) and the National Environmental Laboratory Accreditation Conference (NELAC). All laboratory analyses must be by methods for which the laboratory has FDOH certification. All laboratory analyses must be completed within EPA holding times. If the data is lost or a laboratory error occurs and the EPA holding time for the analysis has expired, the Permittee must resample the well within 15 days of notification from the laboratory that a loss or laboratory error has occurred.

With the exception of pH, laboratory analyses utilizing selective ion electrodes are not acceptable due to the inadequate sensitivity of these methods. Analyses utilizing test kits typically used for field screening (e.g., Hach and LaMotte) are also not acceptable for the same reason.

Reports

Reports of the results for the February, August and November sampling events shall be submitted to the District no later than the following dates in the year in which samples were collected: March 31 for the February sampling event, September 30 for the August sampling event, and December 31 for the November sampling event. The reports of results shall include:

(a) Well sampling log
(b) Field instrumentation calibration verification
(c) Chain of custody forms
(d) Laboratory analytical report in approved format

All data must be submitted to the District in a District approved electronic format consistent with FDOH and NELAC laboratory reporting requirements.

33. If water quality data collected by the permittee or the District indicate that significant saline water intrusion is occurring as a result of withdrawals authorized by this permit, the permittee must submit a plan, subject to District approval, to abate the impact caused by the saline water intrusion. The plan must contain a schedule for implementation of corrective action, which may include modification of the well construction, well rehabilitation and reduction in well withdrawal rates or other measures identified by the permittee to abate the impact. The permittee must implement the District-approved plan pursuant to the schedule set forth in the plan.

34. The permittee shall participate in the District's Water Conservation Partnership Campaign during the term of this permit.

35. The permittee shall implement the landscape irrigation ordinance submitted to the District as part of its application package on January 11, 2008. The permittee shall review and revise the landscape irrigation ordinance to require that landscape irrigation within the City of Oviedo's service area is limited to the number of days and time periods provided for in section 40C-2.042, Florida Administrative Code.

36. The permittee shall implement the draft landscape ordinance submitted to the District as part of its application package on January 11, 2008.

37. The permittee shall implement the water conservation rate structure submitted to the District as part of its application package on July 18, 2007.

38. The permittee shall perform formal reviews of the effectiveness of its rate structure in promoting water conservation for both potable and non-potable water in conjunction with the 5-year compliance reports. Such reviews shall include an assessment of whether the existing rate structure would be more effective in promoting water conservation if it were modified, and if so, the permittee shall describe and implement the changes needed to make the rate structure more effective. The permittee shall provide a report of each such review to the District, for review and approval with the compliance reports that are due to the District by December 31st of 2013, 2018 and 2023.

39. In addition to the periodic formal reviews of the permittee's water conservation rate structure required in conjunction with the 5-year compliance reports, the permittee may undertake more frequent reviews of the permittee's water conservation rate structure. If the permittee undertakes such a review and concludes that it is necessary to modify its water conservation rate structure, the permittee shall evaluate whether any proposed changes to the rate structure would be more effective in promoting water conservation. The permittee shall describe and implement the changes needed to make the rate structure more effective and provide any proposed changes to the water conservation rate structure to the District for its review and approval.

40. The permittee shall continue to develop and expand the use of alternative water sources. Efforts in this regard shall include but not be limited to investigations into the use of available alternative water sources for use within the City of Oviedo and creating partnerships with other utilities to develop and use alternative water sources, including reclaimed water, surface water, and storm water. The permittee shall prepare a report of its efforts to develop and expand the use of alternative water sources for each calendar year of the duration of this permit. The report shall summarize investigations into the use of available alternative water sources and shall document discussions with other utilities to develop and use alternative water sources. The report for each calendar year shall be delivered to the District by January 31st of the following year.

41. The permittee shall evaluate the condition of Well 204 (GRS Id No. 15358) and Well 205 (GRS Id No. 15361) via down hole video logging no later than September 9, 2013. A report of the evaluation shall be provided to the District with the compliance report due December 31, 2013, or within 90 days following completion of the video logging if completed sooner than September 9, 2013. If the results of the survey indicate a need for repairs to either well, the report shall include recommendations for such repairs and propose a schedule to complete any repairs.

42. Water level monitoring must be initiated by April 14, 2009. The permittee must conduct hydrologic and photo monitoring at each of the four (4) wetland areas listed below, as depicted in the submittal received on June 5, 2008:

    a. Wetland 7F, Unnamed hardwood forest, (Sec 21 & 22, T. 21 S., R. 31 E.);
    b. Wetland 20, Lake Rogers (Sec 22 & 23, T. 21 S., R. 31 E.);

c. Wetland 34, Unnamed marsh, (Sec 10, T. 21 S., R. 31 E.);
d. Wetland 37D, Unnamed hardwood forest, (Sec 15, T. 21 S., R. 31 E.).

The permittee must install shallow monitoring wells at each of the above-listed wetland sites. The wells must be located near the upland/wetland interface. The monitoring well design and specific locations must be approved in writing by the District staff before the wells are installed. The monitoring wells must be installed by a licensed water well contractor (as required in 373.336 (1)(b), F.S.), and all monitoring devices shall be surveyed to NAVD (1988) to an accuracy of +/- 0.01 foot.

If another agency or utility is monitoring the same water body, then the same monitoring equipment/data can, upon written approval by SJRWMD, be used with the owner's consent. A staff gauge may substitute for a shallow monitoring well if District staff determine that the substitution would be capable of capturing a complete range of water fluctuation.

43. Transect locations where vegetation and soils are to be sampled must be approved by the District for each wetland monitoring site by April 14, 2009. Each transect shall be 150 feet in length, and located such that 50 feet of the adjacent upland is included, and oriented towards the wetland center and perpendicular to the wetland edge. The monitoring well should be located on the transect (if possible). If the adjacent upland consists of placed fill, then the transect may be limited to 120 feet in length, such that 20 feet of the adjacent upland is included. The following information must be recorded for each transect:

* A permanent photo station must be monumented on the transect near the monitoring well for annual photographs.
* Soil surface elevations must be recorded to an accuracy of +/- 0.1 foot at 5 foot intervals and wherever there is a change in plant community.
* Other environmental features such as the upland/wetland interface, current water level, *cypress buttress* inflection points (up to 3 individuals), lower extent of *lichen* lines or upper extent of *moss* collars, watermarks, and the lower edge of the *saw palmetto (Serenoa repens)* fringe must be surveyed, if present.
* Plant communities must be described, including a listing of all *vascular plant species*, by plant community, present within 10 feet of one side of the transect line, their relative abundance, and the diameter at breast height (d.b.h.) of any *woody plants* greater than 1" d.b.h.
* A description of soil color, texture, and hydric soil indicators must be made in the top 24 inches of soil at 25 foot intervals along the transect described above for a total of 7 stations. If the soil survey depicts the soils as open water, then the soil description will occur out to a water depth of 3 feet, and depth to sediment surface, and depth of organic substrate will be recorded for the remaining intervals.

44. Rainfall from a rain gauge in the vicinity of the monitoring wells must be recorded weekly, on the same day as the water level recordings. Locations of rain gauges shall be submitted to the District by April 14, 2009 for written approval. The same rain gauge may be used for more than one monitoring site if the sites are located within a ten-mile radius.

45. A Baseline Monitoring Site Report must be submitted to the District on or before, September 9, 2009. The report must include the following information for each monitoring site (as applicable): a) a diagram of the elevations, plant communities, and hydric soils located along the transect, b) a summary of the soils data collected, c) a summary of the vegetation data collected, d) a map showing the location of the rain gauge(s), and e) information regarding the installation of the monitoring wells, including a well completion report, latitude/longitude coordinates of the well, well location on a map, and a brief site description.

46. Monitoring data must be submitted electronically as spreadsheets on or before January 31st and July 31st, in a District approved computer accessible format. Data submittal will start on

July 31st, 2009. The following information must be recorded by the permittee for each wetland monitoring site: water level (weekly without data loggers or daily with data loggers), inches of rainfall (weekly), and pumping volume (weekly by well). Water level data must be reported as elevation above sea level (NAVD). The Permittee must contact the District for specific details on how to submit the computer accessible information. These data must also be submitted as a legible paper copy (two copies).

47. On or before March 31st, starting in 2010, the permittee must submit an annual report summarizing the monitoring efforts and comparing all of the wetland monitoring data recorded for the last calendar year and previous years. The report must include panoramic photographs taken in September at the established photo stations, and graphs summarizing the rainfall, pumping volume, and monitoring data. The elevation of the upland/wetland interface must be indicated on the graphs. In addition, the report will include a brief analysis of any data trends.

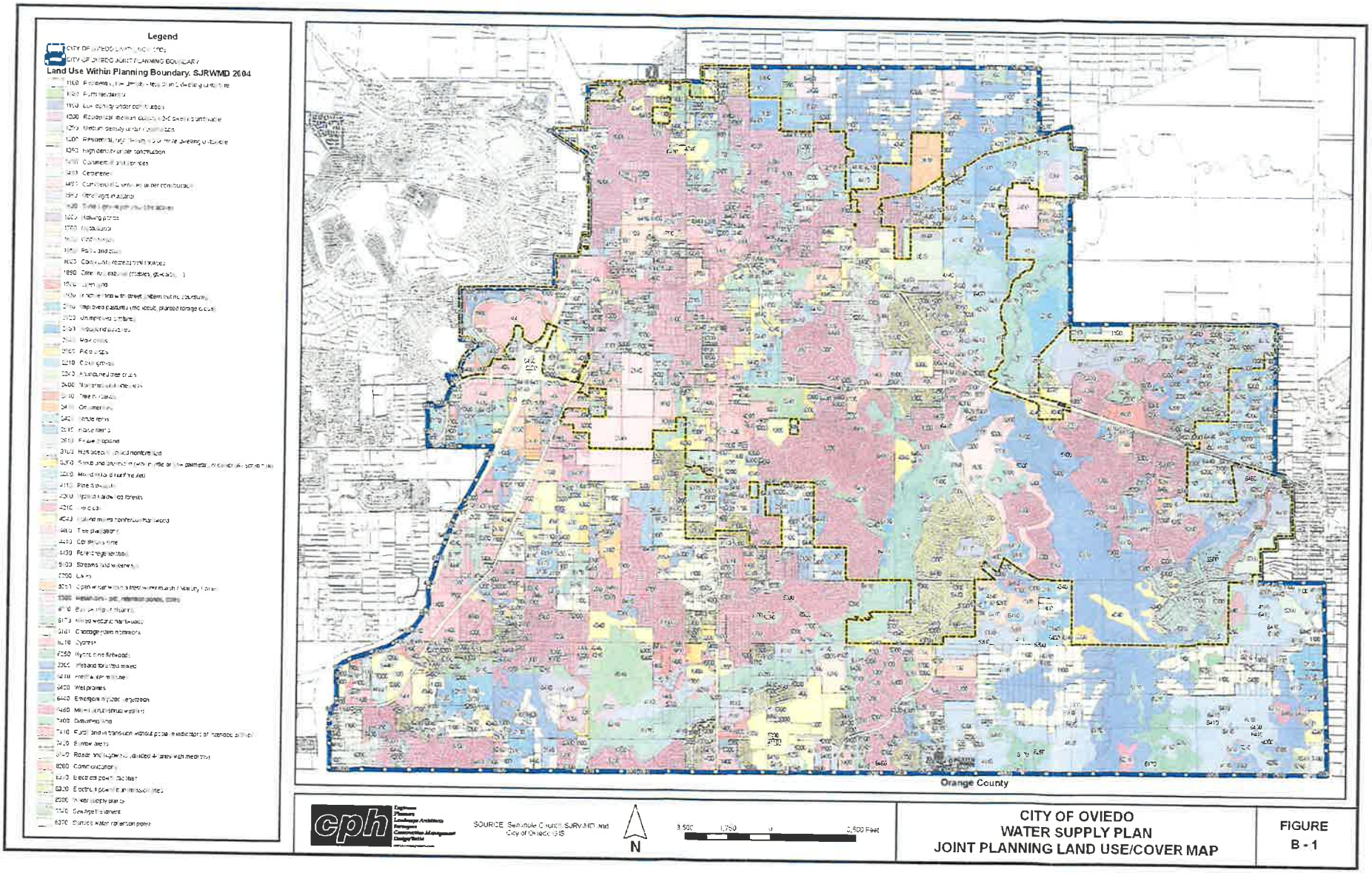
48. If the permittee is unable to obtain or maintain legal access to any of the monitoring sites referenced above, the permittee must notify SJRWMD in writing within 15 days of concluding that access to any specific site is not possible. Within 45 days of this notification, the permittee must submit an alternative site to modify the monitoring network. Within six months of SJRWMD approval of the monitoring network modification, the permittee must implement the approved change(s).

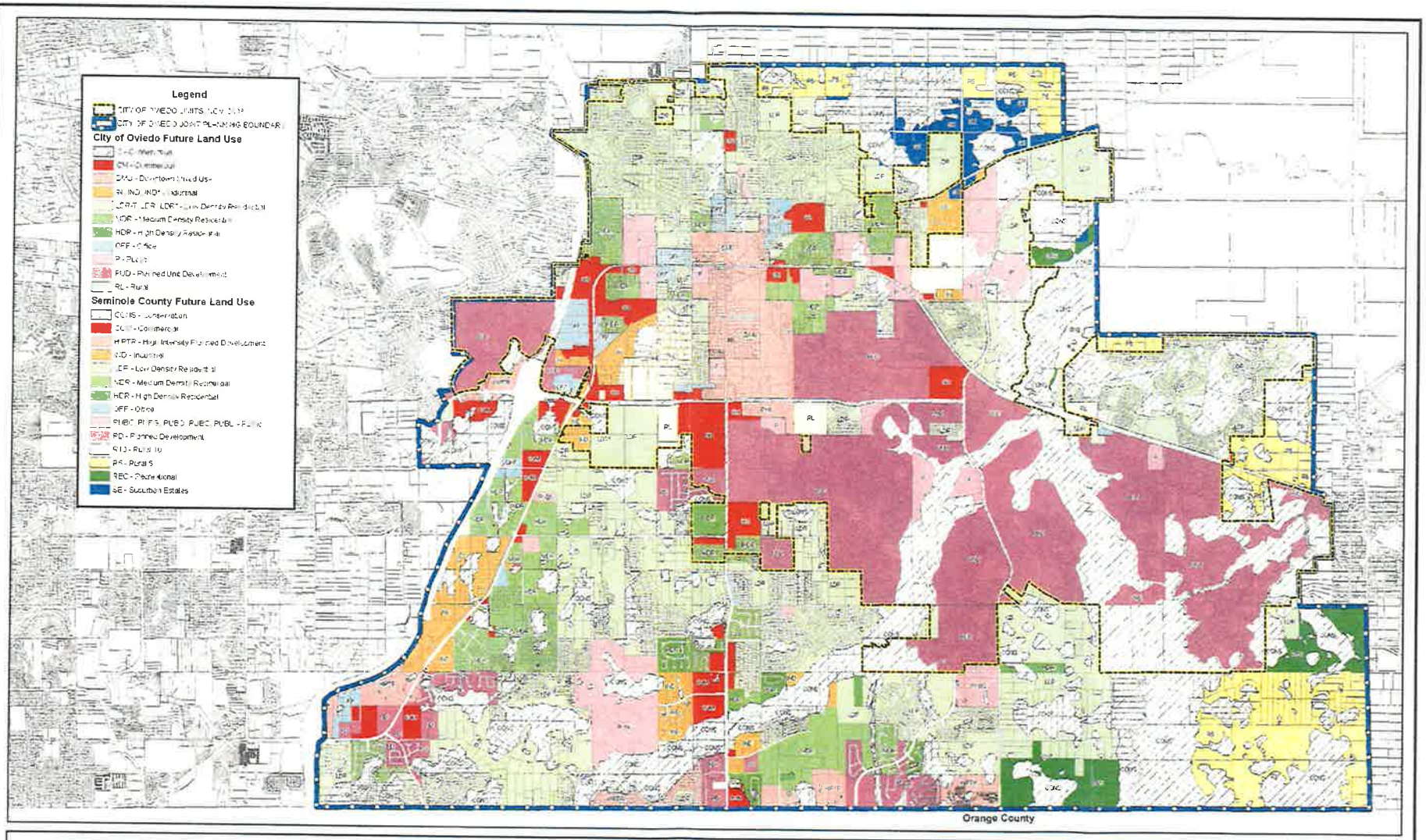
49. The Permittee must submit to the District a compliance report every five years pursuant to subsection 373.236(3), Florida Statutes. The Permittee must submit the report by December 31st of 2013, 2018 and 2023. The report must contain sufficient information to demonstrate that the permittee's use of water continues, for the remaining duration of the permit, to meet the conditions for permit issuance set forth in the District rules that existed at the time the permit was issued for 20 years by the District. In providing such assurance, the compliance report must, at a minimum:

    a. Meet the submittal requirements of section 4.2 of the Applicant's Handbook: Consumptive Uses of Water, August 12, 2008;
    b. Evaluate whether the permittee is implementing all available water conservation measures, programs and technologies and evaluating any new programs or technologies and the potential savings of these measures;
    c. Report on progress in developing additional supplemental water supply projects, and evaluate the feasibility of using any such supplemental water supply projects instead of groundwater to meet demands for the remainder of the permit duration;
    d. Evaluate whether residential per capita water use remains within acceptable ranges;
    e. Evaluate whether unaccounted for water losses remain within acceptable limits.
    f. Demonstrate all effluent is evaluated for its potential to be reused; and
    g. Evaluate summary statistics and time series trend analysis for each production and monitoring well for water quality data generated under the requirements of this permit to ensure significant adverse water quality changes do not occur.

APPENDIX B

Land Use Data


Legend
CITY OF OVIEDO LIMITS
CITY OF OVIEDO JOINT PLANNING BOUNDARY
Land Use Within Planning Boundary: SJRWMD 2004
Orange County
N
SOURCE: Seminole County, SJRWMD, and City of Oviedo GIS
CITY OF OVIEDO
WATER SUPPLY PLAN
JOINT PLANNING LAND USE/COVER MAP
FIGURE
B - 1



cph

SOURCE: Seminole County and City of Oviedo GIS

N

3,500 1,750 0 3,500 Feet

CITY OF OVIEDO
WATER SUPPLY PLAN
JOINT PLANNING AREA FUTURE LAND USE MAP

FIGURE
B - 2

APPENDIX C

Ordinance No. 1401
And
Ordinance No. 1428

MARYANNE MORSE, CLERK OF CIRCUIT COURT SEMINOLE COUNTY, CFN 2007069414 BK 06688 Pgs 0162 - 166; (5pgs) RECD 05/09/2007 11:50:54 AM
REC FEES 44.00, RECD BY T Smith

@ City of Oviedo

ORDINANCE NO. 1401

AN ORDINANCE OF THE CITY OF OVIEDO, FLORIDA, RELATING TO LANDSCAPE IRRIGATION; PROVIDING FOR LOCAL IMPLEMENTATION OF THE WATER CONSERVATION RULE FOR LANDSCAPE IRRIGATION OF THE ST. JOHNS RIVER WATER MANAGEMENT DISTRICT; PROVIDING DEFINITIONS; PROVIDING FOR LEGISLATIVE INTENT AND PURPOSE; PROVIDING FOR WATER CONSERVATION; PROVIDING FOR THE LANDSCAPE IRRIGATION SCHEDULE; PROVIDING FOR EXCEPTIONS TO THE LANDSCAPE IRRIGATION SCHEDULE; PROVIDING FOR ENFORCEMENT; PROVIDING FOR PENALTIES AND FEES; PROVIDING FOR VARIANCES AND APPEALS; PROVIDING FOR CODIFICATION; PROVIDING FOR SEVERABILITY, CONFLICTS, AND AN EFFECTIVE DATE.

WHEREAS, the St. Johns River Water Management District has responsibility and exclusive authority under Chapter 373, *Florida Statutes*, for regulating the consumptive use of water; and

WHEREAS, the St. Johns River Water Management District has amended Rule 40C-2.042, *F.A.C.*, its General Consumptive Use Permit by Rule that regulates small irrigation uses below consumptive use permit thresholds in Rule 40C-2.041(1), *F.A.C.*; and

WHEREAS, Rule 40C-2.042 (2) (a), *F.A.C.*, grants a general permit to each person located within the District to use, withdraw or divert water for such small landscape irrigation uses, provided the irrigation does not occur more than two days per week and does not occur between the hours of 10:00 a.m. and 4:00 p.m. daily, subject to certain exceptions as set forth in Section 4 below; and

WHEREAS, Rule 40C-2.042, *F.A.C.*, applies to landscape irrigation regardless of whether the water comes from ground or surface water, from a private well or pump, or from a public or private utility; and

WHEREAS, Rule 40C-2.042 (2) (b) provides that local governments may adopt an ordinance identifying the specific two days for which the irrigation is allowed; and

WHEREAS, Rule 40C-2.042(2) (b) provides that any such ordinance shall include a District-specified irrigation schedule; and

WHEREAS, the City Council of the City of Oviedo, Florida desires to adopt such an ordinance in accordance with 40C-2.042(2)(a) and (b); and

WHEREAS, the City Council of the City of Oviedo has determined that this ordinance is appropriate and will benefit the public health, safety and welfare.

NOW, THEREFORE, BE IT ENACTED BY THE CITY COUNCIL OF THE CITY OF OVIEDO, FLORIDA, AS FOLLOWS:

SECTION 1. LEGISLATIVE INTENT AND PURPOSE.

(a) The recitals to this Ordinance (Whereas clauses) are hereby adopted by the City Council of the City of Oviedo as the legislative intent and purpose of this Ordinance.

(b) It is the intent and purpose of this Ordinance to implement provisions, processes and procedures that promote water conservation through the more efficient use of landscape irrigation within the City of Oviedo.

(c) The City Manager may delegate decision making authority hereunder to a person or City staff whom the City Manager deems appropriate.

SECTION 2. DEFINITIONS. For the purpose of this Ordinance and the administrative actions of the City, the following terms, phrases, words and their derivatives shall have the meaning given herein. When not inconsistent with the context, words used in the present tense include the future, words in the plural include the singular, and words in the singular include the plural. The following words shall be defined as follows:

(a) "Address" means the house number of a physical location of a specific property. This includes "rural route" numbers but excludes post office box numbers. If a lot number in a mobile home park or similar community is used by the U.S. Postal Service to determine a delivery location, the lot number shall be the property's address. An "even numbered address" means an address ending in the numbers 0, 2, 4, 6, 8 or the letters A-M. An "odd numbered address" means an address ending in the numbers 1, 3, 5, 7, 9 or the letters N-Z.

(b) "District" means the St. Johns River Water Management District.

(c) "Person" means any person, firm, partnership, association, corporation, company, or organization of any kind.

(d) "Landscape irrigation" means the outside watering of plants in a landscape such as shrubbery, trees, lawns, grass, ground covers, plants, vines, gardens and other such flora that are situated in such diverse locations as residential areas, cemeteries, public, commercial, and industrial establishments, and public medians and rights of way. "Landscape irrigation" does not include golf course greens, tees, fairways, primary roughs, and vegetation associated with intensive recreational areas such as, but not limited to, playgrounds, and football, baseball and soccer fields.

SECTION 3. IRRIGATION SCHEDULES.

(a) Landscape irrigation at odd numbered addresses may only occur on Wednesdays and Saturdays and must not occur between 10:00 a.m. and 4:00 p.m. on the days specified.

(b) Landscape irrigation at even numbered addresses or no numbered addresses may only occur on Thursdays and Sundays and must not occur between 10:00 a.m. and 4:00 p.m. on the days specified.

(c) No landscape irrigation shall occur on Mondays, Tuesdays or Fridays unless a written variance has been previously granted by the City or is otherwise excepted pursuant to Section 4 below.

NOTE: Subject to the exceptions listed in Section 4 below, it is prohibited and unlawful to irrigate landscaping inconsistent with the provisions of this Section.

SECTION 4. EXCEPTIONS TO LANDSCAPE IRRIGATION SCHEDULE. Landscape irrigation shall be subject to the following irrigation schedule exceptions:

(a) Irrigation using a micro-irrigation system is allowed at anytime.

(b) Irrigation of new landscape is allowed at any time of day on any day for the initial 30 days and every other day for the next 30 days for a total of one 60-day period, provided that the irrigation is limited to the minimum amount necessary for such landscape establishment. Receipts and/or documentation may be required for proof of new landscape materials purchased

(c) Watering in of chemicals including, insecticides, pesticides, fertilizers, fungicides, and herbicides when required by law, the manufacturer or best management practices is allowed at anytime within twenty-four (24) hours of application.

(d) Irrigation systems may be operated anytime for maintenance and repair purposes not to exceed ten (10) minutes per hour per zone.

(e) Irrigation using a hand-held hose equipped with an automatic shut-off nozzle is allowed at anytime.

(f) Discharge of water from a water-to-air air conditioning unit or other water dependent cooling system is not limited.

(g) For reclaimed water customers of the City, the use of water from a reclaimed water system for landscape irrigation is allowed only in accordance with the landscape irrigation schedule and the exceptions thereto. For users of reclaimed water who are not customers of the City, the use of water from a reclaimed water system is allowed anytime. For the purpose of this paragraph, a reclaimed water system includes systems in which the primary source is reclaimed water, which may or may not be supplemented from another source during peak demand periods.

(h) The use of recycled water from wet detention treatment ponds for irrigation is allowed anytime provided the ponds are not augmented from any ground or off-site surface water, or public supply sources.

SECTION 5. RELIEF FROM SPECIFIC DAY OF THE WEEK LIMITATIONS.

(a) A Variance from the Section 3 landscape irrigation schedule of this Ordinance above may be granted by the City Manager only if strict application of that schedule would lead to unreasonable or unfair results in particular instances, provided that the applicant demonstrates, with particularity to the City Manager, that compliance with the schedule will result in a substantial economic, health or other hardship on the applicant requesting the variance or those served by the applicant.

(b) Where a contiguous property is divided into different zones, a variance may be granted hereunder in order that each zone may be irrigated on different days than other zones on the property; provided, however, that no single zone may be irrigated more than two (2) days a week.

SECTION 6. APPEALS. Decisions of the Enforcement Official may be appealed in writing to the Public Works Director or his/her designee within ten (10) days of the Enforcement Official's decision.

SECTION 7. ENFORCEMENT OFFICIALS. The City Manager may delegate enforcement responsibility relating to this Ordinance to such personnel and departments of the City as deemed appropriate.

SECTION 8. FEES.

(a) First time violation of the above shall result in a written warning notice to user either by door hanger, fax, mail, and/or hand delivery.

(b) Second time violation of the above shall result in a $75.00 water service penalty imposed on the water service portion of the utility bill and a written notice.

(c) Third and all additional violations of the above shall result in a $150.00 water service penalty imposed on the water service portion of the utility bill and a written notice.

(d) Violators with greater than three (3) violations shall have water service disconnected until all water service penalties have been paid.

SECTION 9. PENALTIES. Any person violating any of the provisions of this Ordinance shall be punished to the maximum extent as provided in State law. The City may engage in any code enforcement activities and processes, as it deems appropriate under the circumstances.

SECTION 10. CODIFICATION. It is the intent of the City Council of the City of Oviedo that the provisions of this Ordinance shall become and be made a part of the *Code of Ordinances of the City of Oviedo* and that the provisions of this Ordinance may be renumbered or relettered; provided, however, that the provisions of Sections 11, 12, and 13 shall not be codified. When

appropriate word and such other organizational words and phrases may be, likewise, altered. The Code codifier is hereby granted broad and liberal authority to codify the provisions of this Ordinance.

SECTION 11. SEVERABILITY. The provisions of this Ordinance are declared to be severable and if any section, sentence, clause or phrase of this Ordinance shall for any reason be held invalid or unconstitutional, such decision shall not affect the validity of the remaining sections, sentences, clauses or phrases of this Ordinance, but they shall remain in effect, it being the legislative intent that this Ordinance shall stand notwithstanding the invalidity of any part; provided, however, that this Ordinance shall be construed in a manner that protects the property rights of the City of Oviedo.

SECTION 12. CONFLICTS. All ordinances or part of ordinances in conflict with this Ordinance are hereby repealed.

SECTION 13. EFFECTIVE DATE. This Ordinance shall become effective upon enactment by the City Council.

FIRST READING: April 2, 2007

SECOND READING: May 7, 2007

PASSED AND ADOPTED THIS 7th **day of** May **A.D., 2007.**

THOMAS G. WALTERS
MAYOR of the City of Oviedo, Florida

ATTEST:

BARBARA J. BARBOUR
CITY CLERK

CITY OF OVIEDO FLORIDA SEAL

ORDINANCE NO. 1428

AN ORDINANCE OF THE CITY OF OVIEDO, FLORIDA, FURTHER AMENDING ORDINANCE NO. 1340, AS PREVIOUSLY AMMENDED, WHICH ORDINANCE AS AMMENDED, IS CODIFIED AS *THE LAND DEVELOPMENT CODE OF THE CITY OF OVIEDO, FLORIDA*; PROVIDING FOR THE DELETION, REVISION, REWORDING, RENUMBERING AND REORGANIZATION OF VARIOUS PROVISIONS OF THE LAND DEVELOPMENT CODE, INCLUDING ARTICLE XII (LANDSCAPING, TREE PLANTING AND BUFFER REQUIREMENTS), ARTICLE XV (ENVIRONMENTAL PRESERVATION), ARTICLE XVI (UTILITIES) AND ARTICLE XVIII (BASIC DEFINITIONS AND INTERPRETATIONS); PROVIDING FOR CODIFICATION AND POWERS OF THE CODE CODIFIER; PROVIDING FOR CONFLICTS, SEVERABILITY AND AN EFFECTIVE DATE.

WHEREAS, the City Council of the City of Oviedo has determined that it would benefit the City for the City's *Land Development Code* to expand water conservation regulations; and

WHEREAS, City staff has worked towards the development of such regulations; and

WHEREAS, the City Council has fully considered the recommendations of the Development Review Committee (DRC), the Planning, Zoning and Appeals Board (PZA) and all public comments relating to the adoption of the water conservation regulations to the City's *Land Development Code*; and

WHEREAS, the City of Oviedo has complied with requirements and procedures of Florida State law in every respect relative to the processes, procedures, and requirements of substantive and controlling law relating to the adoption of water conservation regulations to the City's *Land Development Code*; and

WHEREAS, this Ordinance is enacted in accordance with the provisions of the Local Government Comprehensive Planning and Land Development Regulation Act as codified in Part II, Chapter 163, *Florida Statutes*; and

WHEREAS, additionally, the City Council of the City of Oviedo may act in accordance with the provisions of Article VIII, Section 2(b) of the *Constitution of the State of Florida*, which provides, in pertinent part, that "[m]unicipalities shall have governmental, corporate and proprietary powers to enable them to conduct municipal government, perform municipal functions and render municipal services, and may exercise any power for municipal purposes except as otherwise provided by law"; and

WHEREAS, additionally, the City Council of the City of Oviedo may act in accordance with the provisions of Section 166.021(1), *Florida Statutes*, which provides, in pertinent part, that "[a]s provided in S. 2(b), Art. VIII of the State Constitution, municipalities shall have the governmental, corporate, and proprietary powers to enable them to conduct municipal government, perform municipal functions, and render municipal services, and may exercise any power for municipal purposes, except when expressly prohibited by law"; and

City of Oviedo

WHEREAS, additionally, the City Council of the City of Oviedo may act in accordance with the provisions of Section 166.021(3), *Florida Statutes*, which provides, in pertinent part, that "[t]he Legislature recognizes that pursuant to the grant of power set forth in S. 2(b), Art. VIII of the State Constitution, the legislative body of each municipality has the power to enact legislation concerning any subject matter upon which the state legislature may act" except for certain very limited matters; and

WHEREAS, this Ordinance is enacted under the general home rule, police powers and land development regulatory powers of the City of Oviedo; and

WHEREAS, the City of Oviedo has complied with all requirements and procedures of Florida law in processing, noticing and advertising this Ordinance including, but not limited to, full and deliberate review and analysis by the Development Review Committee, the Planning Zoning and Appeals Board, which have recommended approval of this Ordinance to the City Council,

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF OVIEDO, FLORIDA, AS FOLLOWS:

SECTION 1. **LEGISLATIVE FINDINGS AND INTENT.** The provisions set forth in the recitals to this Ordinance (whereas clauses) are hereby adopted by the City Council of the City of Oviedo as the legislative findings and intent pertaining to this Ordinance.

SECTION 2. **ADOPTION OF AMENDMENTS TO ARTICLE XII (LANDSCAPING, TREE PLANTING AND BUFFER REQUIREMENTS), TO ARTICLE XV (ENVIRONMENTAL PRESERVATION), TO ARTICLE XVI (UTILITIES) AND TO ARTICLE XVIII (BASIC DEFINITIONS AND INTERPRETATIONS)** Articles XII, XV, XVI and XVIII of the City of Oviedo Land Development Code are hereby amended as provided for in Exhibits A, B, C, and D, respectively, adopted as part of the City of Oviedo Land Development Code, and shall serve as land development code regulations pertaining to and controlling the development of real property within the City Limits of the City of Oviedo.

SECTION 3. **PENALTIES/CODE ENFORCEMENT.** The City may enforce the provisions of this Ordinance in accordance with the provisions of applicable State law and pursue any and all available legal remedies including, but not limited to, assessing, or causing to be assessed, the maximum penalties allowed by State law.

SECTION 4. **CODIFICATION.** It is the intent of the City Council of the City of Oviedo that the provisions of this Ordinance shall become and be made a part of the *City of Oviedo Land Development Code* and the Exhibits to this Ordinance shall be codified, provided however, Sections 1, 3, 4, 5, 6, and 7 shall not be codified. The provisions of this Ordinance may be renumbered or relettered. When codified, the word "Ordinance", or similar words, may be changed to "Section," "Article", or other appropriate word and such other organizational words and phrases may be, likewise, altered. The Code codifier is hereby granted broad and liberal authority to codify the provisions of this Ordinance into the City's *Land Development Code*, which may, thereafter, be

amended from time-to-time and be re-codified from time-to-time pursuant to actions of the City Council.

SECTION 5. **SEVERABILITY.** If any section, sentence, phrase, word or portion of this Ordinance is determined to be invalid, unlawful or unconstitutional, said determination shall not be held to invalidate or impair the validity, force or effect of any other section, sentence, phrase, word or portion of this Ordinance not otherwise determined to be invalid, unlawful or unconstitutional.

SECTION 6. **CONFLICTS.** All ordinances or part of ordinances in conflict with this Ordinance are hereby repealed consistent, however, with the provisions of this Ordinance relative to the transitional application of land development regulations.

SECTION 7. **EFFECTIVE DATE.** This Ordinance shall take effect immediately upon passage and adoption; provided, however, that the City Manager is hereby authorized to take any and all administrative actions that may be necessary and appropriate to implement the provisions of this Ordinance.

FIRST READING: January 7, 2008

SECOND READING: January 22, 2008

PASSED AND ADOPTED this 22nd **day of** January, **2008.**

Mary Lou Andrews
MARY LOU ANDREWS
MAYOR of the City of Oviedo, Florida

ATTEST:

Barbara J. Barbour
Barbara J. Barbour
CITY CLERK

CITY OF OVIEDO, FLORIDA SEAL

APPENDIX D

Alternate Water Source Letters

02145

The City of
Oviedo
FLORIDA

400 ALEXANDRIA BOULEVARD • OVIEDO, FLORIDA 32765

May 31, 2007

Mr. Kirby B. Green III
Executive Director
SJRWMD
P.O. Box 1429
Palatka, FL 32178-1429

RE: Required Water Supply Entity Response

Dear Mr. Green:

The City of Oviedo is currently constructing a reclaimed water supply main from the City of Orlando's Iron Bridge Regional Wastewater Facility to provide reclaimed water to the City of Oviedo's reclaimed service area. That project is a joint project undertaken by Seminole County, and as part of that project the City has three (3) million gallons of capacity of reclaim water from the Iron Bridge Facility. It is our intention to utilize this supply as an offset to water that is currently being used for irrigation where the source is potable. This project is also known and identified in the May 30, 2006 letter as the Eastern Orange and Seminole Counties Regional Reclaimed Water Reuse Project.

That project has been in the works in Oviedo, and the City of Oviedo's Land Development Regulations for new development mandates construction of dual systems for reuse. In addition to the new construction, the City is retrofitting several neighborhoods to provide an increase in reclaimed irrigation. This capacity and project will provide our alternative water needs through 2013.

In addition to this alternative water supply from the Iron Bridge Facility, the City is in discussions with the City of Winter Springs and the City of Sanford regarding the potential of joint projects for this Eastern portion of Seminole County and possibly water supply for adjacent customers in Orange County.

You are aware at this time that there is no program sponsor for the State Road 46 / Mullet Lake Project, but that project or a project where we would partner with the City of Winter Springs or an Eastern Orange County entity (i.e., Orange County, Orlando Utilities Commission, or a private utility) is a project that we would intend to identify as an alternative source for the future. Again, the City of Oviedo wishes to support and participate in this project.

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CPH ORLANDO

The City of Oviedo is committed to reducing our potable consumption through the use of reclaim water, and we look forward to working with the District in the future on this most important matter.

If you have any questions or need further information, please do not hesitate to contact me at (407) 971-5642 or by email at tsegreto@cityofoviedo.net.

Sincerely,

Tony Segreto
Director of Public Works

Attachment: Form for Required Response to District Water Supply Plan 2005 – Water Supply Entity Notification

cc: Gerald Seeber, City Manager
Bobby Wyatt, Engineering Services Manager / City Engineer
Kip Lockoff, City of Winter Springs
Terry Zaudtke, CPH Engineers

Form for
Required Response to District Water Supply Plan 2005 – Water Supply Entity Notification

The St. Johns River Water Management District's (SJRWMD) Governing Board approved the District Water Supply Plan 2005 (DWSP 2005), on February 7, 2006. Subsequently, pursuant to the provisions of Section 373.0361, *Florida Statutes*, SJRWMD notified by certified mail each water supply entity that should implement water supply development project options identified in the DWSP 2005. Water supply entities have one year from the receipt of the notification letter to respond to the District. This form may be used to submit the required response. Water supply entities that received notification should complete the appropriate information and send to Penni Hauck phauck@sjrwmd.com or at St. Johns River Water Management District, P.O. Box 1429, Palatka, FL 32178-1429. If you have any questions, please contact her by e-mail or phone: (386) 329-4873.

Please complete a separate form for each water supply development project to be implemented.

1. Name of water supply entity: City of Oviedo

2. Water supply entity staff contact person for this response:

   Name: Tony Segreto
   Title: Public Works Director
   Address: 650 S. Central Ave. . Oviedo. FL 32765
   Telephone number: 407-971-5641
   E-mail address: tsegreto@cityofoviedo.net
   Date of response: May. 2007

3. The information on this form should be approved by an authorized water supply entity manager or chief administrative officer. Please identify the name and title of that person here:

   Name: Tony Segreto
   Title: Director of Public Works

4. Name of project: Eastern Orange and Seminole Counties Regional Reclaim Water Reuse Project

5. Was this project identified in Item 1 of the notification letter as a project to be considered for implementation by your water supply entity? Yes X No ☐

6. If the answer to number 5 is "No," are you requesting that this project be considered for inclusion in the DWSP in its next update or amendment? Yes ☐ No ☐

7. What type of alternative supply is to be developed? (Check box.)

Brackish groundwater for potable use	☐
Surface water for potable use	☐
Seawater for potable use	☐
Reclaimed water	X
Reuse augmentation	☐
Other (describe) _____	☐

8. What is the source and location of withdrawal? City of Orlando Iron Bridge WWTF

9. How much water will be withdrawn from the source? 35 mgd

10. How much water will be made available for use by the project? 3.0 mgd

11. How much reject/concentrate water, if any, will be produced by the project? 0 mgd

12. What are the project's major components and total capacities? (Check box if included.)

Wells	☐	____ mgd
Surface water withdrawal facilities	☐	____ mgd
Treatment facilities	☐	____ mgd
Tank storage	☐	____ mgd
Surface reservoir storage	☐	____ mgd
Aquifer storage	☐	____ mgd
Transmission lines	X	3.0 mgd
Other (describe) _____	☐	mgd

13. What is the project schedule? (month/year)

Financial planning	Start date	____	Finish date	____
Facilities master planning	Start date	4/2005	Finish date	3/2006

(If facilities master plan is complete, provide title and date.)

City of Oviedo Reclaimed Master Plan, March 2006

Design	Start date	1999	Finish date	2007
Permitting	Start date	2003	Finish date	2008
Construction	Start date	2003	Finish date	2008

14. What are the project costs?

Planning	$ 67,713
Design	$ 252,720
Capital construction cost	$ 2,574,545 + $14.2 Million for neighborhoods
Non-capital construction cost	$ 248,423 C/A on Reclaim Trans. Line
Total project costs	$ 17.3 Million

15. What is the unit cost of production per 1,000 gallons of finished water? (Calculate this number based on the instructions provided at the end of this document and show the calculation, including production costs and total water quantity produced.) $ 1.26/1,000 gallons

16. Is this project being performed in cooperation with one or more other water supply entities? Yes X No ☐

17. What are the proposed funding sources? (Specify amount from each funding source.)

Water supply entity	$ _____
Other water supply entities or regional water supply entity	$ _____
SJRWMD	$ _____
Other water management district (Specify which district(s).)	$ _____
State of Florida	$ _____
Federal	$ _____
Other State of Florida Revolving Loan Fund	$ 7.2 M
TOTAL	$ _____

Instructions for calculating unit cost of production:

Unit production cost is defined as the total annual cost of water production divided by the total annual production volume as follows:

UPC = Annual Cost /(ADF x (1,000) x (365))

Where:

UPC = unit production cost in $/1,000 gallons
Annual Cost = total equivalent annual cost of water production including treatment costs, storage costs and transmission costs (as applicable) in $/year. Equivalent annual cost includes amortized capital costs plus annual operation and maintenance costs.
ADF = average daily flow of product water, in mgd.

Capital costs should include construction costs, land costs and all other non-construction capital costs such as planning, permitting and design, as applicable. Additional general guidance may be found in SJ2005-SP1 *Cost Estimating and Economic Criteria for 2005 District Water Supply Plan.*

02145

The City of
Oviedo
FLORIDA

400 ALEXANDRIA BOULEVARD • OVIEDO, FLORIDA 32765

July 6, 2007

Mr. Kirby Green
Executive Director
St. John's River Water Management District
Post Office Box 1429
Palatka, FL 32178-1479

RE: Alternative Water Supply Sources

Dear Mr. Green:

The City of Oviedo understands the importance and urgency of developing an alternative water supply to serve the anticipated demands of the residents of the City and Central Florida. The City also recognizes that the St. John's River is a source of potential water supply which may provide benefit to our long term demand need. In consideration of these acknowledgements, City staff supports the development of an alternative water supply project, and by transmittal of this letter we are requesting inclusion in the effort to develop a regional Preliminary Design Report.

City staff understands that District staff proposes to recommend for inclusion in the District's fiscal year 2008 budget sufficient funds for the District's share of the preliminary design costs, subject to the approval of the interlocal agreement and budget by the District's Governing Board. Budgetary support by the City for any potential effort is available subject to the approval of the City Council following the specific identification of any fair share cost sharing agreement.

We look forward to participating in this endeavor in consideration of the potential community and regional benefit. Should you require additional assistance or information please do not hesitate to contact me at 407-971-5557.

Sincerely,

Gerald J. Seeber
City Manager

Cc: Tony Segreto, Public Works Director
Bobby Wyatt, City Engineer
Terry Zaudtke, CPH Engineers

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JUL 11 2007
CPH ORLANDO

St. Johns River
Water Management District

Kirby B. Green III, Executive Director • David W. Fisk, Assistant Executive Director

4049 Reid Street • P.O. Box 1429 • Palatka, FL 32178-1429 • (386) 329-4500
On the Internet at *www.sjrwmd.com.*

file to Water Facility Supply Work Plan

RECEIVED
AM/PM
AUG 16 2007
CITY OF OVIEDO
Public Works Department

August 13, 2007

Mr. Tony Segreto
Public Works Director
City of Oviedo
400 Alexandria Blvd.
Oviedo, FL 32765

Dear Mr. Segreto:

The St. Johns River Water Management District (SJRWMD), in compliance with Section 373.0361, *Florida Statutes (F.S.)*, on May 30, 2006 distributed notifications to water supply entities for which projects to meet future water supply needs were identified in the District Water Supply Plan 2005 (DWSP). The notification advised water supply entities that they were required by Subsection (373.0361(7)(b), F.S.) to respond within one year on receiving that notice to SJRWMD with a statement of whether they intend to implement any or all of the identified projects or to provide details of alternative projects that would meet their water supply needs through 2025.

The response for your utility has been evaluated and found to be adequate to meet the reporting requirement and in identifying one or more projects to assure that your utility's water supply will be adequate through 2025.

Sincerely,

Donald Brandes
Donald Brandes, Ph.D.
Senior Project Manager

GOVERNING BOARD

David G. Graham, CHAIRMAN JACKSONVILLE
Ann T. Moore, SECRETARY BUNNELL
Duane L. Ottenstroer, TREASURER JACKSONVILLE
Susan N. Hughes PONTE VEDRA
Michael Erlel OVIEDO
Hersey "Herky" Huffman ENTERPRISE
Arlen N. Jumper FORT McCOY
William W. Kerr MELBOURNE BEACH
W. Leonard Wood FERNANDINA BEACH

APPENDIX E

EPA White Paper – Nitrification

United States
Environmental Protection
Agency

Office of Water (4601M)
Office of Ground Water and Drinking Water
Distribution System Issue Paper

Nitrification

August 15, 2002

PREPARED FOR:

U.S. Environmental Protection Agency
Office of Ground Water and Drinking Water
Standards and Risk Management Division
1200 Pennsylvania Ave., NW
Washington DC 20004

Prepared by:
AWWA
With assistance from
Economic and Engineering Services, Inc

Background and Disclaimer

The USEPA is revising the Total Coliform Rule (TCR) and is considering new possible distribution system requirements as part of these revisions. As part of this process, the USEPA is publishing a series of issue papers to present available information on topics relevant to possible TCR revisions. This paper was developed as part of that effort.

The objectives of the issue papers are to review the available data, information and research regarding the potential public health risks associated with the distribution system issues, and where relevant identify areas in which additional research may be warranted. The issue papers will serve as background material for EPA, expert and stakeholder discussions. The papers only present available information and do not represent Agency policy. Some of the papers were prepared by parties outside of EPA; EPA does not endorse those papers, but is providing them for information and review.

Additional Information

The paper is available at the TCR web site at:

http://www.epa.gov/safewater/disinfection/tcr/regulation_revisions.html

Questions or comments regarding this paper may be directed to **TCR@epa.gov.**

1.0 Introduction

The goal of this document is to review existing literature, research and information on the potential public health implications associated with Nitrification.

Nitrification is a microbial process by which reduced nitrogen compounds (primarily ammonia) are sequentially oxidized to nitrite and nitrate. Ammonia is present in drinking water through either naturally-occurring processes or through ammonia addition during secondary disinfection to form chloramines. The nitrification process is primarily accomplished by two groups of autotrophic nitrifying bacteria that can build organic molecules using energy obtained from inorganic sources, in this case ammonia or nitrite.

In the first step of nitrification, ammonia-oxidizing bacteria oxidize ammonia to nitrite according to equation (1).

$$NH_3 + O_2 \rightarrow NO_2^- + 3H^+ + 2e^- \qquad (1)$$

Nitrosomonas is the most frequently identified genus associated with this step, although other genera, including *Nitrosococcus,* and *Nitrosospira.* Some subgenera, *Nitrosolobus* and *Nitrosovibrio,* can also autotrophically oxidize ammonia (Watson et al. 1981).

In the second step of the process, nitrite-oxidizing bacteria oxidize nitrite to nitrate according to equation (2).

$$NO_2^- + H_2O \rightarrow NO_3^- + 2H^+ + 2e^- \qquad (2)$$

Nitrobacter is the most frequently identified genus associated with this second step, although other genera, including *Nitrospina*, *Nitrococcus*, and *Nitrospira* can also autotrophically oxidize nitrite (Watson et al. 1981).

Various groups of heterotrophic bacteria and fungi can also carry out nitrification, although at a slower rate than autotrophic organisms (Verstraete and Alexander 1973; Watson et al. 1981). Speciations of nitrifying bacteria in drinking water systems (Wolfe 1990 and 2001) suggest that the number of heterotrophic nitrifiers in drinking water systems may be negligible compared to autotrophic nitrifiers. In comparison, heterotrophic nitrification occurs in wastewater applications (Grady et al. 1980).

Chloramines are produced in a reaction between free chlorine and ammonia. Chloramination is commonly used for secondary disinfection purposes to control microbial growth in finished water. Chloramines include monochloramine, dichloramine, trichloramine, and organochloramines. For disinfection purposes, monochloramine is the preferential form.

Chloramine use is expected to increase in the near future as a result of more stringent disinfection by-product (DBP) maximum contaminant levels (MCLs) associated with the Stage I and Stage II Disinfectant/Disinfection By-Product Rule (DDBP Rule). Review of the Information Collection Rule (ICR) database indicates that 33% of 353 treatment plants use chloramines. The draft regulatory impact analysis prepared for the Stage 2 Microbial and

Disinfection Byproducts Federal Advisory Committee predicted that the use of chloramines could increase to as much as 65% of surface water systems (U.S. EPA M/DBP FACA Support Document, 2000). For non-ICR systems serving less than 10,000 people, it is estimated that approximately 50% of utilities will shift from free chlorine to chloramines to reduce DBP levels below the Stage I MCLs (U.S. EPA M/DBP FACA Support Document, 2000).

2.0 Description of Potential Water Quality Problems

Nitrification can have the adverse impacts of increasing nitrite and nitrate levels, reducing alkalinity, pH, dissolved oxygen, and chloramine residuals, and promoting bacterial regrowth (Wilczak et al. 1996). Table 1 provides a summary of water quality problems associated with nitrification.

Table 1
Summary of Water Quality Problems Associated with Nitrification

Chemical Issues	Biological Issues
Disinfectant Depletion	HPC Increase
Nitrite/Nitrate Formation	Ammonia Oxidizing Bacteria (AOB) Increase
Dissolved Oxygen Depletion	Nitrite Oxidizing Bacteria (NOB) Increase
Reduction in pH and Alkalinity	
DBP Formation due to Mitigation Techniques	

Various potential health impacts have been associated with issues identified in Table 1. The Chemical Health Effects Tables (U.S. Environmental Protection Agency, 2002a) provides a summary of potential adverse health effects from high/long-term exposure to hazardous chemicals in drinking water. The Microbial Health Effects Tables (U.S. Environmental Protection Agency, 2002b) provides a summary of potential health effects from exposure to waterborne pathogens.

While nitrification can degrade water quality, the formation of nitrite/nitrate and DBP formation during nitrification mitigation are the only water quality issue identified in the literature with the potential to impact public health directly. Other issues listed in Table 1 either are already regulated under provisions of the Safe Drinking Water Act, or were not identified within existing literature as posing direct public health impacts. However, more research may be needed to better understand interactions between these issues.

For example, reductions in pH and alkalinity can be a symptom of nitrification, as shown by hydrogen ion formation in equations (1) and (2). Although reductions in pH and alkalinity may not pose a direct public health threat, such reductions could theoretically lead to a violation of the USEPA Lead and Copper Rule (1991) either through failure to maintain designated optimal water quality parameters, or possibly through an action level exceedence at the tap. In 1997, the City of Willmar, Minnesota conducted a study to determine the causes of copper corrosion within household plumbing systems. Preliminary indications were that both nitrification and copper corrosion proceeded simultaneously during water distribution, so that there might be some linkage between the two phenomena within specific households (Murphy et al., 1997). System-wide Lead and Copper Rule violations due to nitrification were not cited in the literature.

Disinfection depletion and HPC increases are other examples of water quality impacts associated with nitrification that are addressed under provisions of the Safe Drinking Water Act. The loss of disinfectant residual does not necessarily pose a direct public health threat (many systems throughout the world are operated without use of a disinfectant residual). However, disinfectant decay can contribute to microbiological problems such growth of organisms within the bulk water or accumulated sediments. The Surface Water Treatment Rule establishes maximum contaminant level goals (MCLGs) for viruses, *Legionella*, HPC, and *Giardia lamblia*. It also includes treatment technique requirements for filtered and unfiltered systems that are specifically designed to protect against the adverse health effects of exposure to these microbial pathogens. The Surface Water Treatment Rule requires that a "detectable" disinfectant residual (or HPC measurements not exceeding 500/mL) be maintained in at least 95% of samples collected throughout the distribution system on a monthly basis. A system that fails to comply with this requirement for any two consecutive months is in violation of the treatment technique requirement. Public water systems that disinfect must monitor for the presence of a disinfectant residual (or HPC levels) at the same frequency and locations as total coliform measurements taken pursuant to the total coliform regulation.

Nitrite/Nitrate Formation

Under the Safe Drinking Water Act (SDWA), primary MCLs have been established for nitrite-N, nitrate-N, and the sum of nitrite-N plus nitrate-N. The MCLs are 1 mg/L for nitrite-N, 10 mg/L for nitrate-N, and 10 mg/L for nitrite + nitrate (as N). The current nitrite and nitrate standards are measured at the point of entry to the distribution system so any subsequent elevated nitrite/nitrate levels resulting from nitrification within the distribution system are not identified by compliance monitoring.

Nitrite and nitrate are produced during nitrification through ammonia utilization by nitrifying bacteria. According to equations (1) and (2), for every mole of ammonia-N produced, a 1-mole equivalent of nitrite-N is produced. Subsequently, for every mole of nitrite-N produced, a 1-mole equivalent of nitrate-N is produced.

Ammonia can also be released from chloramines through a series of complex reactions. Reactions 2 through 6 in Table 2 describe five mechanisms of ammonia release presented by Woolschlager et al. (2001). According to Valentine et al (1998), the overall net stoichiometries can be used to examine the relationship between chloramine decay and ammonia production. Review of the equations presented thus far indicates that the greatest fraction of ammonia species is produced from Reaction 3 in Table 2.

Table 2 Overview of Nitrification and Chloramine Reactions	
Reaction Description	**Overall Reaction**
1. Ammonium and nitrite utilization	$NH_3 + O_2 \rightarrow NO_2^- + 3H^+ + 2e^-$ $NO_2^- + H_2O \rightarrow NO_3^- + 2H^+ + 2e^-$
2. Release of ammonia through chloramine decay (autodecomposition)	$3NH_2Cl \rightarrow N_2 + NH_3 + 3Cl^- + 3H^+$
3. Release of ammonium through oxidation of organic matter by chloramine	$1/10\ C_5H_7O_2N + NH_2Cl + 9/10H_2O \rightarrow 4/10CO_2 + 1/10HCO_3^- + 11/10NH_4^+ + Cl^-$
4. Release of ammonium through reaction of chloramine with corrosion products at pipe surfaces*	$1/2NH_2Cl + H^+ + Fe^{2+} \rightarrow Fe^{3+} + 1/2NH_4^+ + 1/2Cl^-$
5. Release of ammonia through catalysis reactions of chloramine at pipe surfaces	$3NH_2Cl \rightarrow N_2 + NH_3 + 3Cl^- + 3H^+$
6. Release of ammonia through oxidation of nitrite by chloramine*	$NH_2Cl + NO_2^- + H_2O \rightarrow NH_3 + NO_3^- + HCl$

Source: Adapted from Woolschlager et al. 2001
* These equations may not be significant in distribution systems, especially in situations of biologically-accelerated chloramine decay.

In this case, ammonium is released through oxidation of organic matter by chloramine. Greater than one mole of ammonium is produced (11/10 mole), all of which can be converted to nitrate, based on the molar ratios presented in Reaction 1. Many of these reactions can occur simultaneously; however, a conservative approach for predicting *maximum* nitrite/nitrate formation would be to use Reaction 3 in Table 2. Based on this approach, Table 3 was developed to assess the impact of Cl_2:NH_3-N ratio, total chloramine dose, and chloramine decay on theoretical nitrite/nitrate-N formation through nitrification.

Table 3
Theoretical Nitrite/Nitrate Production Based on Chloramine Decay Stoichiometry

Chlorine to Ammonia-N Ratio	Total Chlorine Dose (mg/L)	Ammonia-N Dose (mg/L)	Nitrite/Nitrate-N Produced* (mg/L)
5:1	4	0.8	0.9
4:1	4	1.0	1.1
3:1	4	1.3	1.5
5:1	3	0.6	0.7
4:1	3	0.8	0.8
3:1	3	1.0	1.1
5:1	2	0.4	0.4
4:1	2	0.5	0.6
3:1	2	0.7	0.7
5:1	1	0.2	0.2
4:1	1	0.3	0.3
3:1	1	0.3	0.4

* Assumes: (1) 100% of chloramine decay according to reaction: $_{1/10}\ C_5H_7O_2N + NH_2Cl + {}_{9/10}H_2O \rightarrow {}_{4/10}CO_2 + {}_{1/10}HCO_3^- + {}_{11/10}NH_4^+ + Cl^-$, (2) 100% conversion of ammonia to nitrite/nitrate.

The results in Table 3 show that using the most conservative chloramine decay reaction, the nitrite-N MCL of 1 mg/L could theoretically be exceeded if the chloramine dose is at 3 or 4 mg/L (as total chlorine), and the Cl_2:NH_3-N ratio is less than 5:1. As the chlorine to ammonia-N ratio decreases, more ammonia becomes available for the nitrification process. This calculation is quite conservative as it is unlikely that 100% of chloramine decay will occur according to one single pathway.

Valentine et al (1998) conducted a series of mass and redox balances on solutions of varying pH, NOM concentration, and initial chloramine concentration. For all conditions that were studied, the amount of nitrate formed as a percentage of monochloramine decay was less than 15 percent, and for all but three cases the amount was less than 10 percent. The authors concluded that although nitrate is an important decomposition product of monochloramine decay, it is not the major nitrogen-containing decay species.

Using data from a survey of 40 utilities that use chloramine as a disinfectant and an earlier survey by Hack (1984), Wilczak et al. (1996) indicate that nitrite and nitrate levels may increase on the order of 0.005 to 0.5 mg/L, although increases of greater than 1 mg/L are possible. The authors concluded that changes in nitrite and nitrate levels in drinking water usually caused by nitrification are not substantial enough to exceed regulatory requirements as long as source related levels are not near the regulatory MCLs. Nitrite levels during nitrification episodes have been reported ranging from 0.005 to 0.5 mg/L as NO_2^- - N, with levels more frequently ranging from 0.015 to 0.1 mg/L (Wolfe et al. 2001). Figure 1 compares treatment plant effluent and distribution system nitrite concentrations in nine chloraminating utilities (Kirmeyer et al. 1995). This figure demonstrates that nitrite levels during nitrification events can vary from as little as 0.05 mg/L to as much as 1 mg/L.

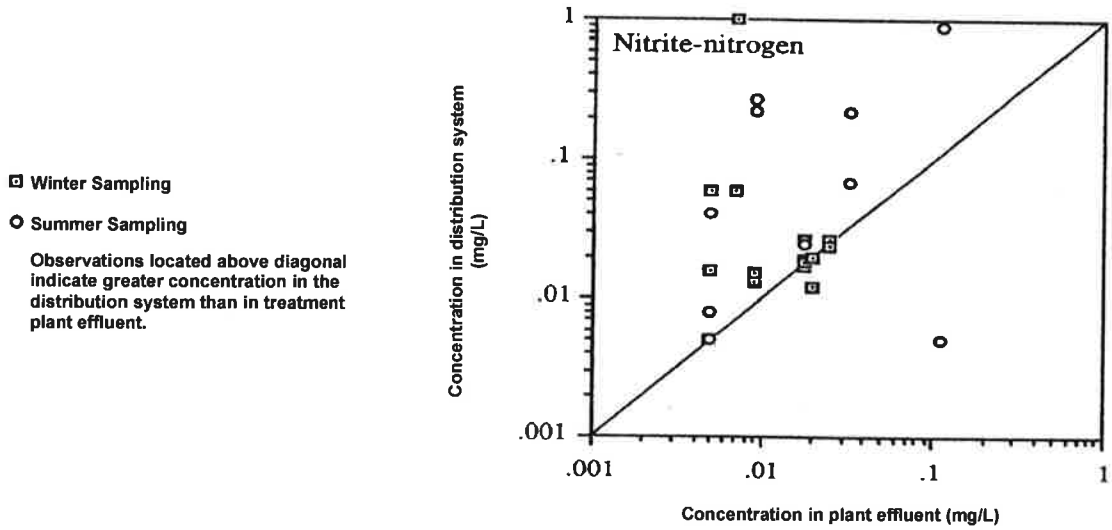


Figure 1
Comparison Between Plant Effluent and Distribution System Concentrations of Nitrite
Source: Kirmeyer et al. 1995

3.0 Prevention/Mitigation Methods

Both groups of nitrifying bacteria are obligate aerobic organisms commonly found in terrestrial and aquatic environments (Holt et al. 1995, Watson et al. 1981). Their growth rates are controlled by:

- Substrate (ammonia-N) concentration,
- Temperature,
- pH,
- Light,
- Oxygen concentration, and
- Microbial community composition.

Water quality and environmental factors affecting nitrification are discussed below.

3.1 Source Water Treatment

3.1.1 Sources of Ammonia, Nitrate, and Nitrite

Excess nitrogen in the form of ammonia in finished water can be the principal cause of nitrification since ammonia serves as the primary substrate in the nitrification process. Ammonia, nitrate and nitrite can typically be found in surface water supplies as a result of natural processes. These natural sources of nitrogen generally have minimal impacts on water supply distribution systems because the concentration of nitrite nitrogen in surface and ground waters is normally far below 0.1 mg/L (Sawyer and McCarty, 1978). Other sources of nitrogen can include agricultural runoff from fertilization or livestock wastes or contamination from sewage. Ammonia also occurs naturally in some groundwater supplies, and groundwater can become contaminated with nitrogen as agriculture runoff percolates into aquifers. A survey of 67 large utilities (greater than 50,000 customers) found that average levels of raw water nitrate ranged from 0 to 5.7 mg/L (Kirmeyer et al. 1995). To protect public health, any system with source water that exceeds the inorganic contaminant MCLs for nitrate and nitrite of 10 mg/L and 1 mg/L (as Nitrogen), respectively, must treat the water to below those levels (USEPA 2001). However, if a water treatment plant removes nitrate and nitrite levels to just meet the MCLs, and the water system uses chloramine for disinfection, there is a potential for nitrate and nitrate values during a nitrification event to exceed the numeric values of their respective MCLs.

Ammonia is deliberately added to a chloraminated water supply. In these systems, the concentration of free ammonia present in the distributed water will be a function of the chlorine to ammonia-N (Cl_2:NH_3-N) ratio. Free ammonia is almost completely eliminated when a 5:1 weight ratio of Cl_2:NH_3-N is used (Kirmeyer et al. 1993). Nitrate/nitrite-N formation results presented previously in Table 3 showed that the lowest amount of nitrate/nitrite-N is formed when a 5:1 ratio is used.

3.1.2 Removal of Natural Organic Matter (NOM)

Song (1999) documented the impact of NOM on chloramine decay by altering NOM concentrations through GAC adsorption of the test water. Figure 2 shows the impact of NOM on chloramine decay rates.

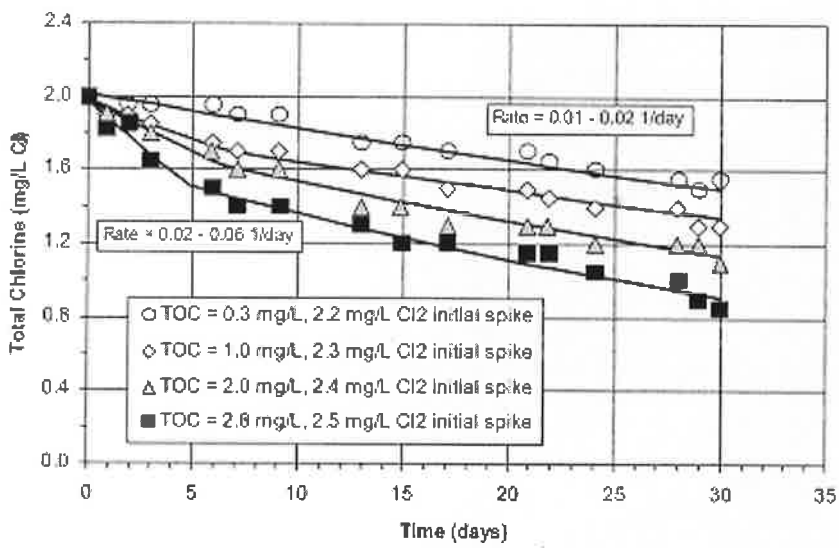


Figure 2
Elimination of Chloramine-NOM Reaction by TOC Removal with GAC Adsorption in USL WTP Filtered Water at pH = 8.5
Source: Song 1999.

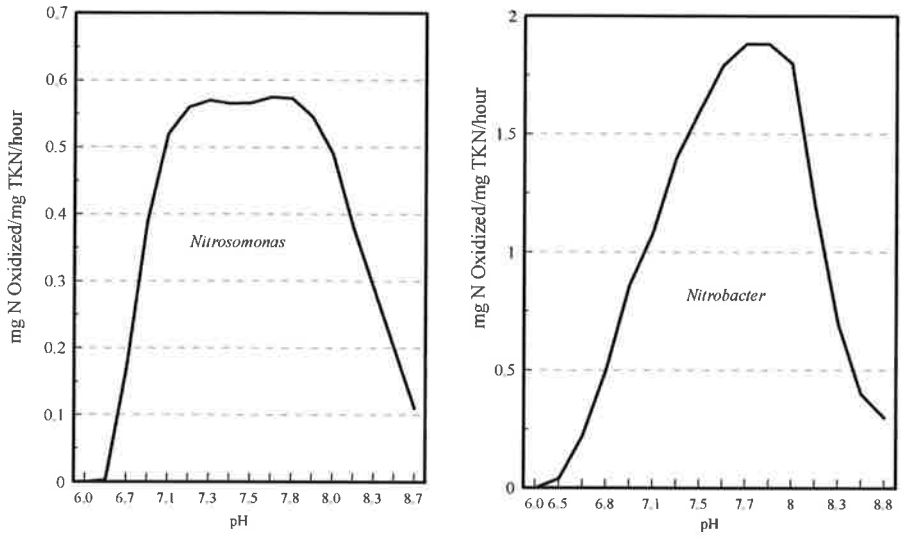
For the lowest TOC condition, only the autodecomposition pathway occurred. Bone et al (1999) hypothesized that the NOM oxidation mechanism is the dominant pathway for chloramine decay early in the decay process (i.e., within 24 hours), and that autodecomposition is the dominant cause of chloramine decay later.

3.1.3 pH and Alkalinity

Bulk water pH value is an important factor in nitrification activity for two reasons. First, a reduction of total alkalinity may accompany nitrification because a significant amount of bicarbonate is consumed in the conversion of ammonia to nitrite. A model developed by Gujer and Jenkins (1974) indicates that 8.64 mg/L of bicarbonate (HCO_3^-) will be utilized for each mg/L of ammonia-nitrogen oxidized. While reduction in alkalinity does not impose a direct public health impact, reductions in alkalinity can cause reductions in buffering capacity, which can impact pH stability and corrosivity of the water toward lead and copper. The relationships between pH, alkalinity, corrosivity, and metals leaching are addressed in a separate White Paper.

Secondly, nitrifying bacteria are very sensitive to pH as shown in Figure 3. *Nitrosomonas* has an optimal pH between approximately 7.0 and 8.0, and the optimum pH range for *Nitrobacter* is approximately 7.5 to 8.0. Some utilities have reported that an increase in pH (to greater than 9)

can be used to reduce the occurrence of nitrification (Skadsen et al. 1996). However, many other factors contribute to the viability of nitrifying bacteria and as a result, nitrification episodes have been observed at pH levels ranging from 6.6 to 9.7 (Odell et al. 1996).



Source: Grady and Lim 1980

Figure 3
Effects of pH on *Nitrosomonas* and *Nitrobacter* enrichment cultures

According to Wilczak (2001) pH appears to be the most important factor controlling the rate of chloramine autodecomposition. Thomas (1987) stated that the rate of chloramine decay approximately doubles for a drop in pH of 0.7 units.

3.1.4 Disinfection Practices

Chemical control or treatment of nitrifying bacteria typically involves either the maintenance of high distribution system disinfectant residuals (greater than 2 mg/L) or periodic breakpoint chlorination. Analytical survey results of ten U.S. utilities showed that greater than 90% of distribution system samples with increased nitrite and nitrate levels, indicative of nitrification, occurred in water with disinfectant residuals less than 2 mg/L (Wilczak et al. 1996). Many utilities have found that increasing disinfectant residuals by increasing chemical doses or managing water age has helped to control nitrification.

Utilities can use booster chlorination in the distribution system to increase disinfectant residuals. This practice is generally not employed in chloraminated distribution systems because chloramines are normally more stable than free chlorine (Woolschlager et al. 2001, Valentine et al. 1998). In addition, uncontrolled blending of chlorinated and chloraminated water could occur near a chlorine booster station; in some cases uncontrolled blending has been shown to cause unintended breakpoint chlorination, increases in DBP levels, or decreases in disinfectant residuals (Mahmood et al. 1999 and Muylwyk et al. 1999). In 2001, one utility installed a chloramine booster station that adds both sodium hypochlorite and aqueous ammonia to increase residuals in a remote area of a distribution system (Potts et al. 2001). The booster station was

designed to carefully control the chlorine to ammonia ratio and avoid excess ammonia in the downstream system. The effects of the booster station on nitrification have not yet been fully assessed (Potts et al. 2001).

Free chlorine is more effective at inactivating ammonia-oxidizing bacteria colonies than chloramines (Wolfe et al. 1990). As a result, breakpoint chlorination is also used by utilities to treat nitrifying bacteria. According to Schrempp et al. (1994), mechanically cleaning pipelines; draining and cleaning reservoirs; and dead-end, unidirectional and continuous flushing; were not sufficient to control nitrification at one mid-western utility. When these strategies were replaced with breakpoint chlorination, nitrification was controlled and target residuals could be maintained. Some systems using breakpoint chlorination have reported an initial increase in HPC bacteria and total coliform levels immediately following treatment that is probably attributable to biofilm sloughing (Odell et al. 1996, Wilczak et al. 1996).

3.2 Absence of Sunlight

Although monochloramine will degrade when exposed to the atmosphere at varying rates depending on the amount of sunlight, wind, and temperature (Wilczak, 2001), nitrifiers are very sensitive to near UV, visual, and fluorescent light; consequently, nitrification episodes in distribution systems occur in the dark (in covered reservoirs, pipelines, taps, etc.) (Wolfe et al, 2001). Wolfe et al (2001) also report that nitrifiers do have an excision repair mechanism for DNA repair; therefore low levels of nitrifiers may be recovered from partially shaded reservoirs or channels.

The Long-Term 2 Enhanced Surface Water Treatment Rule will require utilities to either cover uncovered finish water reservoirs or treat reservoir discharge to the distribution system to achieve a 4-log virus inactivation, unless the State/Primacy Agency determines that existing risk mitigation is adequate. The potential increase in nitrification episodes associated with covering uncovered storage facilities within chloraminated systems was not addressed within the literature.

3.3 Operations Activities

Nitrifying bacteria are slow growing organisms, and nitrification problems usually occur in large reservoirs or low-flow sections of the distribution system. According to Kirmeyer et al (1995), operational practices that ensure short residence time and circulation within the distribution system can minimize nitrification problems. Low circulation areas of the distribution system such as dead-ends and reservoirs are prime areas for nitrification occurrence since detention time and sediment buildup can be much greater than in other parts of the system.

Water temperature has a strong effect on the growth rate of nitrifying bacteria. Numerous researchers have documented that nitrification episodes are more common during the warmer months. Most strains of nitrifiers grow optimally at temperatures between 25 and 30°C (Watson, Valos, and Waterbury, 1981) but nitrification has occurred over a wide range of temperatures (8-26°C) (Kirmeyer et al. 1995). Operations activities that lead to decreased water age may also result in decreased bulk water temperatures.

The blending of distribution system waters containing different disinfectants may also have an impact on nitrification. Typically, the blended Cl_2:NH_3-N ratio will increase after blending. Most often this is due to dilution of the ammonia fraction in the chloraminated water. The impact on the blended total chlorine residual will be a function of the initial chlorine and chloramine residuals.

A few studies have assessed the feasibility of blending chloraminated and chlorinated water in distribution systems (Mahmood et al. 1999; Muylwyk et al. 1999; and Barrett et al. 1985). Documented problems related to blending chlorinated and chloraminated water include the loss of disinfectant residuals, increases in tastes and odors, and increases in disinfection by-products, all of which are related to uncontrolled breakpoint chlorination that occurs in disinfectant blending zones (Barrett et al. 1985; and Mahmood et al. 1999). However, a few utilities do successfully blend their own chlorinated supplies with purchased chloraminated water. This is primarily accomplished when the chloraminated supply has excess ammonia that, when blended with the chlorinated supply, serves to form chloramines (Wolfe et al. 1988). In those cases, the blending ratios, and chlorine to ammonia ratios are strictly controlled to prevent breakpoint chlorination (Barrett et al. 1985).

A new AwwaRF Report which updates the 1993 report *Optimizing Chloramine Treatment* (Kirmeyer et al. 1993) includes an international survey of chloraminating utilities and is expected to provide additional information on blending multiple disinfectants.

3.4 Monitoring

The EPA Phase II Inorganic Contaminant regulations require water systems to sample for nitrite and nitrate at each entry point to the distribution system on at least an annual basis. Additional monitoring is required on a quarterly basis for at least one year following any one routine sample in which the measured concentration is greater than 50 percent of the MCL (EPA 2001). The MCLs are 1 mg/L for nitrite-N, 10 mg/L for nitrate-N, and 10 mg/L for nitrite + nitrate (as N).

Monitoring distribution system water quality can help to predict the on-set of a nitrification event. According to Wilczak et al, (1996), nitrification is often indirectly identified by one or more symptoms including:

- Loss of chloramine residual,
- Increase in water temperature,
- Decrease in dissolved oxygen,
- Drop in pH and alkalinity, and
- Increase in HPC population.

Individual utilities use combinations of the indicators listed based on their system's experience managing nitrification to initiate nitrification control measures. Example criteria reported in the literature as triggers for breakpoint chlorination include nitrite action levels of 0.05 mg/L and falling chloramine residuals (Odell et al. 1996, Wilczak et al. 1996, Wolfe 1988).

Nitrification occurrence can be confirmed by monitoring for nitrite or nitrate. Wilczak et al (1996) suggest that an accurate nitrogen balance and specific biological monitoring for ammonia-oxidizing bacteria and nitrite-oxidizing bacteria are the best ways to determine whether nitrification is occurring.

4.0 Summary

Nitrification is a microbial process by which reduced nitrogen compounds (primarily ammonia) are sequentially oxidized to nitrite and nitrate. Ammonia is present in drinking water through either naturally-occurring processes or through ammonia addition during secondary disinfection to form chloramines. Chloramine use is expected to increase in the near future as a result of more stringent disinfection by-product (DBP) maximum contaminant levels (MCLs) associated with the Stage I and Stage II Disinfectant/Disinfection By-Product Rule (D/DBP Rule). There are several symptoms of nitrification that can impact distribution system water quality. Of the water quality issues identified in the literature and summarized in Table 1, only the formation of nitrite and nitrate within the distribution system poses a potential direct public health threat, and is not addressed through current provisions of the Safe Drinking Water Act. The findings of this paper suggest that a nitrite or nitrate MCL violation with the distribution system is unlikely, unless treated water nitrite and nitrate levels are near their respective MCLs. Additional research may be warranted to determine if nitrification episodes can cause direct violations of the Lead and Copper Rule. The causes of nitrification and prevention and mitigation approaches have been thoroughly documented within the literature.

5.0 Secondary Considerations

5.1 Increased Disinfection By-Products during Mitigation

Nitrification mitigation techniques such as break-point chlorination or temporarily switching from chloramines to free chlorine can result in increased levels of disinfection by-products. Disinfection by-products are regulated under the Stage 1 Disinfectants and Disinfection By-Product Rule. Under the Disinfectants and Disinfection By-Product Rule compliance monitoring samples are be collected under routine operating conditions. Thus, disinfection by-product samples collected during a nitrification mitigation episode are not typically included in MCL compliance calculations. It would also be possible to exceed a Maximum Residual Disinfectant Level (MRDL) under the Disinfection By-Product Rule during a nitrification mitigation episode. However, the USEPA specifically allows short-term exceedence of MRDLs to control microbiological contamination problems.

5.2 Source Water Nitrification

Under certain circumstances nitrification can have a beneficial impact on drinking water quality. This would be true in the controlled conditions at a water treatment plant. Rittmann and Snoeyink (1984) reported that nitrification of ammonia-containing groundwater resulted in "biologically stable" water that did not permit bacterial growth in the distribution system. Kurtz-Crooks et al. (1986) showed that the chlorine demand of ammonia-laden groundwater was

reduced after nitrification. Nitrification was found to lower treatment costs and reduce formation of trihalomethanes.

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APPENDIX F

FDEP Four Log Approval

Drinking Water Operator Staffing Approval

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

CENTRAL DISTRICT
3319 MAGUIRE BOULEVARD, SUITE 232
ORLANDO, FLORIDA 32803-3767

RICK SCOTT
GOVERNOR

JENNIFER CARROLL
LT. GOVERNOR

HERSCHEL T. VINYARD JR.
SECRETARY

VIA E-MAIL
JGRUSAUSKAS@CITYOFOVIEDO.NET

November 16, 2012

Josef Grusauskus, Utilities Manager
City of Oviedo
400 Alexandria Boulevard
Oviedo, FL 32765

OCD-PW-CE-12-1045

Seminole County-PW
City of Oviedo / West Mitchell Hammock WTP
PWS ID Number 3590970
Approval for Reduced Drinking Water Operator Staffing

Dear Mr. Grusauskus:

The Department received correspondence made on the City's behalf dated November 12, 2012, regarding a request to reduce certified drinking water operator staffing requirements at the West Mitchell Hammock Water Treatment Plant.

Rule 62-699.311(8)(a), Florida Administrative Code (F.A.C.) states: "Staffing hours and visits shall be reduced to no less than the minimum staffing that would be required if the permitted capacity of a water treatment plant were considered to be equal to the actual maximum-day production."

Based on the representations made in the letter, the Department approves a reduction in the required on-site staffing time for this Category IV, Class B drinking water plant according to the following schedule:

Plant Name	Max Day Design Capacity – MGD (Category, Class)	Rule 62-699(2)(e)5, F.A.C. Requirements	Approved Reduction
West Mitchell Hammock	10 (IV, B)	Class C or higher operator: 16 hours/day for 7 days/week*	Class C or higher operator: 6 hours/day, 5 days/week, and one visit on EACH weekend day.

***The lead or chief operator must be remain Class B or higher.**

If the maximum-day production of the plant were to exceed 10 MGD at any time, this approval will be rescinded and staffing requirements will revert to those originally required in Rule 62-699(2)(e)4, F.A.C.

Sincerely,

Christianne C. Ferraro

Christianne C. Ferraro, P.E.
Administrator, Water Resource Management

cc: Steve Medeiros, City of Oviedo [smedeiros@cityofoviedo.net]
Scott Breitenstein, P.E., CPH Engineers, Inc. [sbreitenstein@cpheng.com]
Reggie Phillips, DEP Drinking Water Compliance and Enforcement

1117 East Robinson Street
Orlando, Florida 32801

Phone: 407.425.0452
Fax: 407.648.1036

www.cphengineers.com

November 12, 2012

Attention: Richard Lott, P.G., P.E.
Drinking Water Permitting Section
Florida Department of Environmental Protection
3319 Maguire Blvd, Ste 232
Orlando, FL 32803-3767

Reference: Seminole County – PW
The City of Oviedo - West Mitchell Hammock WTP
PWS ID Number 3590970
CPH Job No. O2188

Dear Richard:

We are submitting this letter to the Department to request reduction of the certified operator staffing requirements of the of the City of Oviedo's West Mitchell Hammock Water Treatment Plant (WMH-WTP). The permitted maximum day flow capacity of the WMH-WTP is 10 million gallons per day (MGD), and it is rated as a Category IV, Class B facility. The current on-site staffing time is 8 hrs/day, 7 days/week, and the City would like to reduce staffing to ***6 hours/day for 5 days/week and one visit on each weekend day.***

The basis of the request is related to the current and future flows expected by this WTP. The City is limited in their Consumptive Use Permit (CUP) by the 10 operational wells that are only allocated by the SJRWMD to draw up to 4.67 MGD (Average-Day Flow) of water from the Floridan Aquifer. The District has capped the amount of water the City can use from the Floridan Aquifer at 4.67 MGD starting in 2013 through 2028. As shown in Table 1, the MHW-WTP's current two year running average daily flow is 3.84 MGD, with a maximum day flow equal to 6.78 MGD that occurred in May 2011. The max-day to average day flow peaking factor is 1.77. Hence, the projected max-day flow of the MHW-WTP at 4.67 MGD is 8.27 MGD.

In addition, since issuance of the CUP in 2008, the City has aggressively implemented conservation and reclaimed water use programs to ensure that they are compliant with the CUP allocations. It is expected that the potable water demand will not increase beyond the 4.67 MGD due to the City's Reuse Program implemented to meet the SJRWMD's 2013 capped water allocation for the City's service area. Therefore, it is believed that the current FDEP permitted capacity of 10 MGD is well more than what the actual maximum-day potable needs (8.27 MGD) will be at this time and into the future at build-out. With that said, we request the Department to reduce the operator staffing requirements as stated above, based on the following rule:

62-699.311 Additional Classification and Staffing Requirements:

(8) Upon written request by the permittee or supplier of water, the Department shall approve in writing, in accordance with paragraphs (a) and (b) below, reduction in staffing requirements under paragraph 62-699.310(2)(a) or (e), F.A.C., for existing domestic wastewater or water treatment plants that are treating or producing less than the permitted capacity of the plant and that have been in compliance with applicable water quality standards and applicable operation and maintenance requirements for the past year.

(a) Staffing hours and visits shall be reduced to no less than the minimum staffing that would

be required if the permitted capacity of a domestic wastewater treatment plant were considered to be equal to the actual treatment plant influent flow or if the permitted capacity of a water treatment plant were considered to be equal to the actual maximum-day production.

(b) The class of the lead/chief operator shall not be reduced.

TABLE 1

	Monthly Max Day Flow		Total Monthly Flow
Nov-10	5,733,080	Nov-10	119,639,306
Dec-10	5,929,000	Dec-10	112,565,253
Jan-11	4,747,000	Jan-11	101,653,428
Feb-11	5,252,630	Feb-11	96,105,212
Mar-11	5,511,220	Mar-11	115,457,677
Apr-11	6,190,840	Apr-11	125,712,183
May-11	6,777,795	May-11	147,415,580
Jun-11	6,610,459	Jun-11	129,653,271
Jul-11	5,464,940	Jul-11	118,546,967
Aug-11	5,805,936	Aug-11	118,780,776
Sep-11	5,755,000	Sep-11	124,343,328
Oct-11	5,588,500	Oct-11	120,389,257
Nov-11	5,106,020	Nov-11	112,658,745
Dec-11	5,202,200	Dec-11	115,700,617
Jan-12	5,326,630	Jan-12	116,933,260
Feb-12	5,355,444	Feb-12	106,819,875
Mar-12	3,799,878	Mar-12	117,796,213
Apr-12	4,393,685	Apr-12	131,810,542
May-12	6,311,000	May-12	129,782,218
Jun-12	4,886,906	Jun-12	101,809,496
Jul-12	5,941,090	Jul-12	122,970,754
Aug-12	5,039,500	Aug-12	109,625,416
Sep-12	4,930,510	Sep-12	104,804,435
Oct-12	4,909,983	Oct-12	104,509,846
2 Year Max Flow	**6,777,795**	**2 Year Total Flow**	**2,805,483,655**
		2 Year Average Flow	**3,843,128**

We look forward to the Department's favorable review, but if you have any questions, please let us know.

Sincerely,
CPH ENGINEERS, INC.

Scott A. Breitenstein, P.E.
Vice President/Associate

Cc: Josef Grusauskas, Utility Manager, Oviedo

J:\O2188\Civil\Documents\Letter\Oviedo Request Letter to FDEP-Final.doc

Florida Department of Environmental Protection

Central District
3319 Maguire Boulevard, Suite 232
Orlando, Florida 32803-3767

Rick Scott
Governor

Jennifer Carroll
Lt. Governor

Herschel T. Vinyard Jr.
Secretary

VIA EMAIL
jgrusauskas@cityofoviedo.net

May 31, 2011

Josef Grusauskas
City of Oviedo
400 Alexandria Blvd.
Oviedo, FL 32765

OCD-PW-CE-11-0598

Seminole County - PW
City of Oviedo
PWS ID Number 3590970
Four-Log Approval Clarification

Dear Mr. Grusauskas:

This letter is a clarification to the DETERMINATION OF FOUR-LOG VIRUS TREATMENT OF GROUND WATER that the Florida Department of Environmental Protection issued on February 7, 2011 for the referenced water treatment plant. This letter should be kept with said determination.

While this determination remains in effect, you do not have to conduct assessment source water monitoring (i.e., monthly raw water sampling) under Rules 62-550.518(2) and (10), Florida Administrative Code (F.A.C.), for the ground water sources (i.e., wells) supplying water to the referenced WTPs. However, you are encouraged to collect at least quarterly informational raw water samples that are representative of each such well, identify the samples as "other: raw informational," have the samples analyzed for a fecal indicator (i.e., *E. coli*, enterococci, or coliphage), and submit the results of the analyses to the Central District Office of the Department.

If you have any questions regarding this letter, please call or e-mail Shelley Locklear at (407)894-7555 x2249 or by email at Shelley.Locklear@dep.state.fl.us.

Sincerely,

Christianne C. Ferraro, P.E.
Administrator
Water Resource Management

CCF/kmd/sjl

cc: Steve Medeiros, City of Oviedo [smedeiros@cityofoviedo.net]
Shelley Locklear, FDEP Drinking Water Compliance and Enforcement

Florida Department of
Environmental Protection
Central District
3319 Maguire Boulevard, Suite 232
Orlando, Florida 32803-3767

Rick Scott
Governor

Jennifer Carroll
Lt. Governor

Herschel T. Vinyard, Jr.
Secretary

February 7, 2011

SENT BY E-MAIL
jgrusauskas@cityofoviedo.net

City of Oviedo
400 Alexandria Boulevard
Oviedo, FL 32765

Attention: Josef Grusauskas
Utility Manager

Seminole County-PW
City of Oviedo- PWS ID 3590970
West Mitchell Hammock WTP
Determination of Four-Log Virus Treatment of Ground Water

Dear Mr. Grusauskas:

The Florida Department of Environmental Protection determines, based on the information identified in item number 1 below, that the referenced water treatment plant (WTP) achieves four-log virus treatment of groundwater by using the treatment technologies identified in item number 2 below, provided the compliance monitoring, operating, recordkeeping, and other requirements in item number 3 below are met.

1. Virus treatment information submitted for the referenced WTP: Demonstration of Four-Log Virus Treatment of Ground Water signed and sealed by Scott A. Breitenstein, P.E., on October 5, 2010 and received by the Department on October 6, 2010; responses to the Department's request for additional information dated December 1, 2010 and received on December 3, 2010 and January 27, 2011.

2. Chemical disinfection by free chlorine and combined chlorine are being used by the referenced WTP to achieve four-log virus treatment.

3. Compliance monitoring, operating, and recordkeeping requirements for the referenced WTP:

Treatment Train	Monitoring Requirements	Operating Requirements[1]	Recordkeeping Requirements[2]
Disinfection Using Free chlorine : Clearwell and 24/20 inch yard piping	Monitor the residual free chlorine concentration at the 24/20 inch discharge pipe from the transfer pumps (prior to ammonia addition) continuously using on-line chlorine analyzer meeting EPA Method 334.0 or using analytical method specified in 40 CFR 141.74(a)(2) or in Appendix A to Subpart C of 40 CFR 141. If there is a failure in continuous disinfectant residual monitoring equipment, conduct grab sampling every 4 hours until continuous monitoring is resumed and resume continuous monitoring within 14 days.	**At worst-case scenario :** Maintain a minimum residual free chlorine concentration of greater than or equal to (≥) 2.40 mg/l but not more than 4.0 mg/l [3]. Minimum temperature (T)= 20° C [4] pH range= 6-9 Peak hour flow= 12,000 GPM Usable volume of water in the clearwell at pump shut-off level= 18095.6 gallons (Gals)	Record the daily lowest residual free chlorine concentration at the 24/20 inch discharge pipe from the transfer pumps (prior to ammonia addition); to be recorded on the Monthly Operation Report (MOR) and used to calculate daily CT[5A, 5B, 5C].
Disinfection using combined chlorine: 2.5 MG ground storage tank (GST)	Monitor the residual combined chlorine concentration at the WTP office continuously using on-line chlorine analyzer meeting EPA Method 334.0 or using analytical method specified in 40 CFR 141.74(a)(2) or in Appendix A to Subpart C of 40 CFR 141. If there is a failure in continuous disinfectant residual monitoring equipment, conduct grab sampling every 4 hours until continuous monitoring is resumed and resume continuous monitoring within 14 days.	**At worst-case scenario :** Maintain a minimum residual combined chlorine concentration of greater than or equal to (≥) 2.80 mg/l but not more than 4.0 mg/l (as Chlorine). Minimum temperature (T)= 20° C pH range= 6-9 Peak hour flow= 12,000 GPM Usable volume of water in the GST at pump shut-off level= 1,619,234.39 Gals	Record the daily lowest residual combined chlorine concentration at the WTP office; to be recorded on the Monthly Operation Reports (MOR) and used to calculate daily CT [5A,5B, 5C].

[1] If the referenced WTP fails to maintain at least 4-log virus treatment, by failing to meet the operating requirements in this column, and does not correct the failure within 4 hours of determining the failure, the referenced WTP is in violation of treatment technique requirements. Such violations shall be reported to the Department of Environmental Protection Central District Office as soon as possible but in no case later than the end of the next business day.

[2] The information in this column shall be recorded and submitted on the monthly operation reports (MOR) for the referenced WTP. Also record on the MORs the duration of any failure to meet operating requirements.

[3] The free chlorine residual noted is computed for the worst-case scenario as indicated. It is the responsibility of the system operator to compute the corresponding free residual chlorine value during all periods of plant operation in order to ensure simultaneous compliance with all Department rules including the Stage 1 and Stage 2 Disinfectants and Disinfection Byproducts Rules.

[4]The minimum temperature is based on the substantiated historical lowest temperature during the entire period the plant was in operation from 2006 up to 2010.

[5A] The CT value computed for the chlorine disinfection segment must be converted to a value equal to the total 4-log inactivation using chlorine. The total 4-log inactivation using chlorine can be computed by dividing the actual CT value using with that of the required CT value using free chlorine at pH= 6-9 and minimum T= 20° C.

[5B] The CT value computed for the chloramines disinfection segment must be converted to a value equal to the total 4-log inactivation using chloramines. The total 4-log inactivation using chloramines can be computed by dividing the actual CT value with that of the required CT value using chloramines at pH= 8+/- and minimum T= 20° C.

[5C] The sum of the CT values computed in items 5A and 5B above must be $\geq$ 1.0 to show that 4-log virus inactivation of the entire system has been attained.

NOTICE OF RIGHTS

A person whose substantial interests are affected by this determination may petition for an administrative proceeding (hearing) under Sections 120.569 and 120.57, Florida Statutes. The petition must contain the information set forth below and must be filed (received by the clerk) within 21 days of receipt of this written notice in the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida 32399-3000.

Under Rule 62-110.106(4), Florida Administrative Code, a person may request enlargement of the time for filing a petition for an administrative hearing. The request must be filed (received by the clerk) in the Office of General Counsel before the end of the time period for filing a petition for an administrative hearing which is 21 days.

The failure of any person to file a petition within 21 days of receipt of notice shall constitute a waiver of that person's right to request an administrative hearing under Sections 120.569 and 120.57, Florida Statutes. Any subsequent intervention (in a proceeding initiated by another party) will be only at the discretion of the presiding officer upon the filing of a motion in compliance with Rule 28-106.205, Florida Administrative Code.

A petition that disputes the material facts on which the Department's action is based must contain the following information:

(a) The name and address of each agency affected and each agency's file or identification number, if known;

(b) The name, address, and telephone number of the petitioner; the name, address, and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding; and an explanation of how the petitioner's substantial interests will be affected by the Department's determination;

(c) A statement of when and how the petitioner received notice of the Department's decision;

(d) A statement of all disputed issues of material fact. If there are none, the petition must so indicate;

(e) A concise statement of the ultimate facts alleged, including the specific facts the petitioner contends warrant reversal or modification of the Department's proposed action;

(f) A statement of the specific rules or statutes the petitioner contends require reversal or modification of the Department's proposed action, including an explanation of how the alleged facts relate to the specific rules or statutes; and

(g) A statement of the relief sought by the petitioner, stating precisely the action petitioner wishes the Department to take with respect to the Department's proposed action.

Because the administrative hearing process is designed to formulate final agency action, the filing of a petition means that the Department's final action may be different from the position taken by it in this notice. Persons whose substantial interests will be affected by any such final decision of the Department have the right to petition to become a party to the proceeding, in accordance with the requirements set forth above.

Mediation under Section 120.573, Florida Statutes, is not available for this proceeding.

This determination is final and effective as of the date on the first page unless a petition is filed in accordance with the above. Upon the timely filing of a petition this determination will not be effective until further order of the Department.

Sincerely,

Christianne C. Ferraro, P.E.
Administrator
Water Resource Management

Cc: Scott A. Breitenstein, P.E., CPH Engineers [Sbreitenstein@cphengineers.com]
DEP: Kim Dodson, Richard Lott, Reggie Phillips, Nathan Hess, Daissan A. Villareal, Shelley Locklear

FILING AND ACKNOWLEDGMENT

FILED, on this date, under Section 120.52(7), Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Clerk	February 7, 2011 Date

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk herby certifies that this DETERMINATION OF FOUR-LOG VIRUS TREATMENT OF GROUND WATER and all copies were sent by e-mail before the close of business on February, 2011to the listed persons.

Maggie E. Nagy Clerk	February 7, 2011 Date

APPENDIX G

April 2012

Florida Department of Environmental Protection

Sanitary Survey

Florida Department of Environmental Protection

Central District
3319 Maguire Boulevard, Suite 232
Orlando, Florida 32803-3767

Rick Scott
Governor

Jennifer Carroll
Lt. Governor

Herschel T. Vinyard Jr.
Secretary

VIA EMAIL
JGRUSAUSKAS@CITYOFOVIEDO.NET

April 2, 2012

Mr. Josef Grusaukas
Assistant Utilities Manager
City of Oviedo Water Department
400 Alexandria Boulevard
Oviedo, FL 32765

OCD-PW-SS-12-0283

Seminole County – PW
City of Oviedo
PWS ID Number 3590970

Dear Mr. Grusaukas:

This confirms a visit to the subject community public water system on March 15, 2012, by Chris Rossing to conduct a sanitary survey inspection. A copy of the sanitary survey inspection report is enclosed for your reference and records.

Deficiencies found during the sanitary survey and in Department records are listed in the enclosed report. These deficiencies shall be corrected in order to return to compliance with *Florida Administrative Code* (F.A.C.) Rules 62-550, 62-555, 62-560 and 62-602.

Please correct the indicated deficiencies, and notify the Department in writing that the deficiencies have been corrected, **no later than May 4, 2012.** *(You may use the attached response form to indicate the corrective actions taken.)*

If you have any questions, please contact me by e-mail at Chris.Rossing@dep.state.fl.us or by phone at (407)897-4135.

Sincerely,

Christianne C. Ferraro

Christianne Ferraro, P.E.
Administrator, Water Resource Management

CCF/rfp/cr
Enclosures

cc: Steve Medeiros, Facility Superintendent (SMEDEIROS@CITYOFOVIEDO.NET)
Dwight Green, Lead Treatment Facility Operator (DGREEN@CITYOFOVIEDO.NET)

State of Florida
Department of Environmental Protection
Central District

SANITARY SURVEY REPORT

Plant Name **CITY OF OVIEDO-WEST MITCHELL HAMMOCK** County Seminole PWS ID # **3590970**
Plant Location 707 Highway 434 & 1600 Alafaya Woods Blvd., Oviedo, FL 32765 Phone 407/971-5684
Owner Name City of Oviedo Water Department, Attn: Josef Grusauskas Phone 407/971-5679
Owner Address 400 Alexandria Blvd., Oviedo, FL 32765
Contact Person Steve Medeiros Title Facility Superintendent Phone 407/971-5684
This Survey Date 3/15/12 Last Survey Date 3/19/09 Last Compliance Inspection Date 2/11/98

PWS TYPE: Community

PLANT CATEGORY & CLASS: (4B)

MAX-DAY DESIGN CAPACITY: 10 MGD

PWS STATUS: Approved

TREATMENT PROCESSES IN USE
Hypochlorination, chloramines, pH adjustment, packed tower aeration, fluoridation

SERVICE AREA CHARACTERISTICS
Municipality/City
Food Service: ☐ Yes ☐ No ☒ N/A

Number of Service Connections 11,918
Population Served 41,713 Basis: Operator

OPERATION & MAINTENANCE
O&M Log: ☒ Yes ☐ No Location Plant

CERTIFIED OPERATOR: Yes
Operator(s) & Certification Class-Number:
Steve Medeiros A-7326

Hrs/day: *Required* *8 *Actual* 8+
Days/wk: *Required* 7 *Actual* 7
Non-consecutive Days? ☐ Yes ☐ No ☒ N/A
Comments *Reduced operator staffing approved 5/18/06.

MONTHLY OPERATION REPORTS (MORs)
MORs submitted regularly? ☒ Yes ☐ No ☐ N/A
Data missing from MORs? ☒ No ☐ Yes ☐ N/A
Average Day (from MORs) 3.948 MGD
Maximum Day (from MORs) 6.777 MGD 5/11
Comments

Flow Measuring Device Flow Meter
Meter Size & Type 24" Venturi
Date Last Calibrated 4/14/11

RAW WATER SOURCE
☒ GROUND; Number of Wells 10
☐ PURCHASED from PWS ID #
☒ Emergency Water Source 3590571 SCES-SE
Emergency Water Capacity 1 MGD

STANDBY POWER SOURCE: Yes
Source Diesel generators
Capacity of Standby (kW) 1,500
Switchover: ☒ Automatic ☐ Manual
Hrs Operated Under Load 4 hrs/mo.
What equipment does it operate?
☒ Well Pumps *300 series wells
☒ High Service Pumps All
☒ Treatment Equipment All
Satisfy avg. daily demand? ☒Yes ☐No ☐Unknown
Audio-visual alarm? ☒Yes ☐No
Comments

PLANS AND MAPS

Coliform Sampling Plan	☒ Yes	☐ No	☐ N/A
D/DBP Monitoring Plan	☒ Yes	☐ No	☐ N/A
Lead and Copper Plan	☒ Yes	☐ No	☐ N/A
Distribution System Map	☒ Yes	☐ No	☐ N/A
Emergency Response Plan	☒ Yes	☐ No	☐ N/A

Comments

PREVENTIVE MAINTENANCE/O&M

Operation & Maintenance Manual	☒ Yes	☐ No	
Preventive Maintenance Program	☒ Yes	☐ No	
Flushing Program	☒ Yes	☐ No	☐ N/A
Records	☒ Yes	☐ No	☐ N/A
Isolation Valve Exercise	☒ Yes	☐ No	☐ N/A
Records	☒ Yes	☐ No	☐ N/A

Comments

CROSS CONNECTION CONTROL
BFPAs 3,529 # Tested 3,529
WWTP RPZ Yes Date Tested 2/29/12
Written Plan Inadequate Date 1998
Comments N/A

PWS ID # 3590970
Date 3/15/12

GROUND WATER SOURCE

Well Number (Florida Unique Well ID #)		303(AAH7404)	304(AAH7403)	305(AAH7402)	306(AAH7401)
Year Drilled		1999	1999	1999	1999
Depth Drilled		367'	250'	250'	250'
Drilling Method		Cable tool	Cable tool	Cable tool	Cable tool
Type of Grout		Neat cement	Neat cement	Neat cement	Neat cement
Static Water Level		Unknown	Unknown	Unknown	Unknown
Pumping Water Level		6'11"	Unknown	Unknown	Unknown
Design Well Yield		Unknown	Unknown	Unknown	Unknown
Test Yield		Unknown	Unknown	Unknown	Unknown
Actual Yield (if different than rated capacity)		Unknown	Unknown	Unknown	Unknown
Strainer		Open hole	Unknown	Unknown	Unknown
Length (outside casing)		98'11"	116'	100'	100'
Diameter (outside casing)		24"	24"	24"	24"
Material (outside casing)		Steel	Steel	Steel	Steel
Well Contamination History		None	None	None	None
Is inundation of well possible?		No	No	No	No
6' X 6' X 4" Concrete Pad		Yes	Yes	Yes	Yes
SET BACKS	Septic Tank	>200'	>200'	>200'	>200'
	Reuse Water	N/A	N/A	N/A	N/A
	WW Plumbing	>200'	>200'	>200'	>200'
	Other Sanitary Hazard	None observed	None observed	None observed	None observed
PUMP	Type	Vertical turbine	Vertical turbine	Vertical turbine	Vertical turbine
	Manufacturer Name	Fairbanks-Morse	Fairbanks-Morse	Fairbanks-Morse	Fairbanks-Morse
	Model Number	Unknown	Unknown	Unknown	Unknown
	Rated Capacity (gpm)	1,500	1,500	1,500	1,500
	Motor Horsepower	60	60	60	60
Well casing 12" above grade?		Yes	Yes	Yes	Yes
Well Casing Sanitary Seal		OK	OK	OK	OK
Raw Water Sampling Tap		Yes	Yes	Yes	Yes
Above Ground Check Valve		Yes	Yes	Yes	Yes
Security		Yes	Yes	Yes	Yes
Well Vent Protection		Yes	Yes	Yes	Yes

COMMENTS _____

PWS ID # 3590970
Date 3/15/12

GROUND WATER SOURCE

Well Number (Florida Unique Well ID #)		307(AAH7400)	308(AAH7689)	101(AAH7408)	102(AAH7409)
Year Drilled		1997	1997	1967	1967
Depth Drilled		325'	360'	341'	360'
Drilling Method		Cable tool	Cable tool	Cable tool	Unknown
Type of Grout		Neat cement	Neat cement	Unknown	Unknown
Static Water Level		Unknown	Unknown	Unknown	Unknown
Pumping Water Level		26'4"	5'	Unknown	Unknown
Design Well Yield		Unknown	Unknown	Unknown	Unknown
Test Yield		Unknown	Unknown	Unknown	Unknown
Actual Yield (if different than rated capacity)		Unknown	Unknown	Unknown	Unknown
Strainer		Open hole	Unknown	Unknown	Unknown
Length (outside casing)		100'	100'	285'	148'
Diameter (outside casing)		24"	24"	12"	12"
Material (outside casing)		Steel	Steel	Steel	Steel
Well Contamination History		None	None	None	None
Is inundation of well possible?		No	No	No	No
6' X 6' X 4" Concrete Pad		Yes	Yes	Yes	Yes
SET BACKS	Septic Tank	>200'	>200'	>200'	>200'
	Reuse Water	N/A	N/A	N/A	N/A
	WW Plumbing	>200'	>200'	>200'	>200'
	Other Sanitary Hazard	None observed	None observed	None observed	None observed
PUMP	Type	Vertical turbine	Vertical turbine	Vertical turbine	Vertical turbine
	Manufacturer Name	Fairbanks-Morse	Fairbanks-Morse	Worthington	Worthington
	Model Number	Unknown	Unknown	Unknown	Unknown
	Rated Capacity (gpm)	1,500	1,500	900	900
	Motor Horsepower	60	60	40	40
Well casing 12" above grade?		Yes	Yes	Yes	Yes
Well Casing Sanitary Seal		OK	OK	OK	OK
Raw Water Sampling Tap		Yes	Yes	Yes	Yes
Above Ground Check Valve		Yes	Yes	Yes	Yes
Security		Yes	Yes	Yes	Yes
Well Vent Protection		Yes	Yes	Yes	Yes

COMMENTS _____

PWS ID # 3590970
Date 3/15/12

GROUND WATER SOURCE

Well Number (Florida Unique Well ID #)		103(AAH7410)	301(AAH7407)
Year Drilled		1967	1987
Depth Drilled		249'	400'
Drilling Method		Unknown	Cable tool
Type of Grout		Unknown	Neat cement
Static Water Level		Unknown	7'7"
Pumping Water Level		Unknown	18'1"
Design Well Yield		Unknown	Unknown
Test Yield		Unknown	Unknown
Actual Yield (if different than rated capacity)		Unknown	Unknown
Strainer		Unknown	Unknown
Length (outside casing)		116'	90'
Diameter (outside casing)		12"	24"
Material (outside casing)		Steel	Steel
Well Contamination History		None	None
Is inundation of well possible?		No	No
6' X 6' X 4" Concrete Pad		Yes	Yes
SET BACKS	Septic Tank	>200'	>200'
	Reuse Water	N/A	N/A
	WW Plumbing	>200'	>100'
	Other Sanitary Hazard	None observed	None observed
PUMP	Type	Vertical turbine	Vertical turbine
	Manufacturer Name	Worthington	Ingersoll-Dresser
	Model Number	10DHLO-2	12NK
	Rated Capacity (gpm)	640	1,500
	Motor Horsepower	40	50
Well casing 12" above grade?		Yes	Yes
Well Casing Sanitary Seal		OK	OK
Raw Water Sampling Tap		Yes	Yes
Above Ground Check Valve		Yes	Yes
Security		Yes	Yes
Well Vent Protection		Yes	Yes

COMMENTS _____

PWS ID 3590970
Date 3/15/12

OTHER TASTE/ODOR CONTROL PROCESSES
Explain: Two forced draft aerators. CO_2 is added prior to the aerators. NaOCL, NaOH, and H_2SO_4 are used to control off-gas in the scrubber waste streams.

AMMONIATION
Make: Seepex x 4 (1hp) Capacity: Pre-2 x 10 gph after clearwell. Post 2 x 10 gph to distribution.
Injection Points Piping after clearwell and after HSP.
Comments Post is not normally used.

COAGULATION (Turbidity Removal)
Chemicals Used _____
Condition of Floc _____
Is settling OK? _____
Comments _____

SOFTENING (Ca/Mg Hardness Removal)

Chemical Precipitation Process:
Chemicals Used _____
Nature of Floc _____
Sludge Blanket Appearance _____
Is settling OK? _____
Excessive carry-over? _____
Secondary Precipitation _____
Effluent Stability _____
Recarbonation Type _____
Sludge Recirculation Used _____
Comments _____

Ion Exchange Process:
Make _____ Model _____
Capacity _____
Grade of Salt for Regeneration _____
Backwash Effluent Destination _____
Comments _____

STABILIZATION
Is pH control done? Yes
Chemical Used: CO_2 to facilitate H_2S removal.
Injection Point: Prior to aerators and after HSPs, if needed.
pH Range of Effluent Target 7.8

FILTRATION (Suspended Solids Removal)
Type _____
Size _____ No. of Units _____
Length of Filter Runs _____
Type of Filter Media _____
Is media visible? _____ Clean after BW? _____
Filter Rate _____ BW Rate _____
Filter Capacity _____
Cracks/Cementation/Channeling _____
Effluent Stability _____ Algae Growth _____
Turbidity in clearwell? _____
Head Loss Gauge _____
Comments _____

REVERSE OSMOSIS (Dissolved Solids Removal)
Make _____ Pressure _____
No. of Modules _____ Permeate Cap. _____
Blend Rate (GPM) _____
Chemicals Used _____
Waste-to-product Ratio _____
Pre-treatment _____
Effluent Quality: TDS (mg/L) _____
Waste Disposal Site _____
IW Permit # & Expir. Date _____
Comments _____

FLUORIDATION
Chemical Used Hydrofluosilicic acid Strength 23%
Corrosion Noted No Plugging Noted No
Feeder Make/Model See comments
High Level Ventilation (acid) Yes
Acid carboys/day tank vented outside Yes
Designated Electrical Outlet (acid) Yes
Analytical Testing Equipment Yes
Anti-siphon Valves Yes
Residual Range 0.7 ppm to 0.9 ppm
Point of Application Piping prior to GST
Emergency Eyewash Yes
Comments Pumps - Pulsatron 42 gpd x 2. Pulsafeeder 12.2 gph x 2. One large and one small pump operate together. The pairs are alternated on a rotating basis.

ADDITIVES
Meets NSF 60 & 61 Yes

CORROSION CONTROL
Chemical Used _____
Feeder Make/Model _____
Feed Rate _____
Point of Application _____
Comments: Still in use ??

PWS ID # 3590970
Date 3/15/12

CHLORINATION (Disinfection)
Type: ☐ Gas ☒ Hypo
Make Pulsatron Capacity2x40 gph-pre, 2x70 gph-post
Chlorine Feed Rate Varying levels
Avg. Amount of Cl_2 gas used N/A
Chlorine Residuals: Plant >2.2T Remote >2.2T
Remote tap location AM Jones re-pump station
DPD Test Kit: ☒ On-site ☐ With operator
☐ None ☐ Not Used Daily
Injection Points *Into clearwell and after HSPs.
Booster Pump Info N/A
Comments *Post not normally used.

Chlorine Gas Use Requirements	YES	NO	Comments
Dual System	☐	☐	
Auto-switchover	☐	☐	
Alarms:			
Loss of Cl_2 capability	☐	☐	
Loss of Cl_2 residual	☐	☐	
Cl_2 leak detection	☐	☐	
Scale	☐	☐	
Chained Cylinders	☐	☐	
Reserve Supply	☐	☐	
Adequate Air-pak	☐	☐	
Sign of Leaks	☐	☐	
Fresh Ammonia	☐	☐	
Ventilation	☐	☐	
Room Lighting	☐	☐	
Warning Signs	☐	☐	
Repair Kits	☐	☐	
Fitted Wrench	☐	☐	
Housing/Protection	☐	☐	

AERATION (Gases, Fe, & Mn Removal)
Type (2) Forced draft Capacity 3,500 gpm x2
Aerator Condition Good
Visible Algae Growth None
Protective Screen Condition Good
Frequency of Cleaning Every 6 months
Date Last Inspected/Cleaned#1-12/19/11 #2-11/28/11
Comments Aerators cleaned approximately every six months. CO_2 is added prior to the aerator to lower the raw water pH to 6.7.

STORAGE FACILITIES
(G) Ground (C) Clearwell (E) Elevated
(B) Bladder (H) Hydropneumatic / flow-through

Tank Type/Number	C	G
Capacity (gal)	28,276	2.5 M
Material	Concrete	Concrete
Gravity Drain	No	Yes
By-Pass Piping	Yes	Yes
Protected Openings	Yes	Yes
Sight Glass or Level Indicator	No	Yes
PRV/ARV	N/A	N/A
Pressure Gauge	N/A	N/A
On/Off Pressure	N/A	25'/35'
Access Secured	Yes	Yes
Access Manhole	Yes	Yes
Tank Sample Tap Location	Yes	Yes
Date of Inspection	2/9/12	2/9/12
Date of Cleaning	2/9/12	2/9/12

Comments Clearwell can be emptied by sump pump. GST will not be emptied except in cases of extreme emergencies. The City uses a diver to facilitate tank cleanings and inspections.

HIGH SERVICE PUMPS

Pump Number	T 1-3	HSP 1-4
Type	Vertical turbine	Vertical turbine
Make	Fairbanks	Fairbanks
Model	Unknown	Unknown
Capacity (gpm)	4,000	4,000
Motor HP	125	300
Date Installed	2006	2006

Comments Transfer pumps move water from the clearwell to the GST. VFD HSPs move water from the GST directly to the distribution system. The City has provisions for adding another T-pump and two more HSPs. HSP 4 is out for repair, and expected back within the month.

PWS ID # 3590970
Date 3/15/12

AM JONES RE-PUMP STATION

CHLORINATION (Disinfection)
Type: ☐ Gas ☐ Hypo
Make _____ Capacity _____
Chlorine Feed Rate _____
Avg. Amount of Cl_2 gas used N/A
Chlorine Residuals: Plant _____ Remote _____
Remote tap location _____
DPD Test Kit: ☐ On-site ☐ With operator
☐ None ☐ Not Used Daily
Injection Points _____
Booster Pump Info _____
Comments _____

Chlorine Gas Use Requirements	YES	NO	Comments
Dual System	☐	☐	
Auto-switchover	☐	☐	
Alarms:			
Loss of Cl_2 capability	☐	☐	
Loss of Cl_2 residual	☐	☐	
Cl_2 leak detection	☐	☐	
Scale	☐	☐	
Chained Cylinders	☐	☐	
Reserve Supply	☐	☐	
Adequate Air-pak	☐	☐	
Sign of Leaks	☐	☐	
Fresh Ammonia	☐	☐	
Ventilation	☐	☐	
Room Lighting	☐	☐	
Warning Signs	☐	☐	
Repair Kits	☐	☐	
Fitted Wrench	☐	☐	
Housing/Protection	☐	☐	

AERATION (Gases, Fe, & Mn Removal)
Type _____ Capacity _____
Aerator Condition _____
Visible Algae Growth _____
Protective Screen Condition _____
Frequency of Cleaning _____
Date Last Inspected/Cleaned _____
Comments _____

STORAGE FACILITIES
(G) Ground (C) Clearwell (E) Elevated
(B) Bladder (H) Hydropneumatic / flow-through

Tank Type/Number	G1 North	G2 South
Capacity (gal)	500,000	500,000
Material	Concrete	Concrete
Gravity Drain	Yes	Yes
By-Pass Piping	Yes	Yes
Protected Openings	Yes	Yes
Sight Glass or Level Indicator	Yes	Yes
PRV/ARV	N/A	N/A
Pressure Gauge	N/A	N/A
On/Off Pressure	10'/18'	10'/18'
Access Secured	Yes	Yes
Access Manhole	Yes	Yes
Tank Sample Tap Location	Yes	Yes
Date of Inspection	2/9/12	2/9/12
Date of Cleaning	2/9/12	2/9/12

Comments _____

HIGH SERVICE PUMPS

Pump Number	1-3	4-6
Type	Centrifugal	Centrifugal
Make	Fairbanks-Morse	Fairbanks-Morse
Model	Unknown	Unknown
Capacity (gpm)	1,500	750
Motor HP	100	50
Date Installed	2002	2002

Comments _____

PWS ID # 3590970
Date 3/15/12

DEFICIENCIES:

1. **The written Cross-connection Control Plan (CCCP) does not specify a frequency for refurbishing or replacing dual checks (DuCs) at service connections to residential premises where there is a reclaimed water system.** [AWWA Manual M14, 1990; Sections 2.3, 2.4, & 4.2 & Chapters 7 & 8] [AWWA Manual M14, 2004; pp. 14-15 & 17-20, Chapter 4, & Appendix A]

2. **The written CCCP does not address annual public education for customers with reclaimed water service.** Customers with reclaimed water service shall receive public education at the time of initial connection to the reuse system and annually after the reuse system is placed into operation. [FAC Rules 62-555.360(5), 62-610.468(6), & 62-610.469(7)(h)]

COMMENTS/REMINDERS:

- Disinfection byproducts sampling due July through September 2012.

  For other monitoring due in 2012, please review the full monitoring reminder schedule available at our website:

  http://www.dep.state.fl.us/central/Home/DrinkingWater/InHouseCompliance/MonitoringSchedules/MonitoringSchedules.htm

- For monitoring schedules and information about the Drinking Water Program, please visit the Central District's Drinking Water website at http://www.dep.state.fl.us/central/Home/DrinkingWater/default.htm.

Inspector _____ Title Env. Specialist II Date 4/2/12

Approved by _____ Title Env. Supervisor II Date 4/2/12

RESPONSE FORM

Please provide any changes to the following:

PWS ID Number: 3590970

PWS Name: **Oviedo, City of**

Mailing Address: _____

Date: _____

Business Name: _____

Owner(s) Name: _____

Mailing Address: _____

Phone Number(s): _____

Fax Number: _____

E-Mail Address: _____

Florida Department of Environmental Protection
Drinking Water Compliance/Enforcement Program
3319 Maguire Boulevard, Suite 232
Orlando, Florida 32803

Attention: Chris Rossing, Environmental Specialist II

In response to the Department's **Sanitary Survey Report** for the subject public water system dated March 15, 2012, the following actions were done to correct the listed deficiencies:

Deficiency Item No.	**Corrective Action Done**	**Date Done**

(Attach additional sheet if necessary)

I hereby certify to the correctness of the above information:

PWS Owner/Representative Signature: _____

Name of PWS Owner/Representative: _____
(Please Type or Print)

DISTRIBUTION	
City of Oviedo – PWS ID No. 3590970 **CROSS-CONNECTION CONTROL (CCC)**	
Is the Written CCC Plan Compliant (i.e., Does the Written CCC Plan Include the Following 6 Components)?	☒Yes ☐No
1. Legal authority for the CCC program (ordinance, bylaw or resolution, or service rules). [AWWA Manual M14, 1990; Sections 1.2 & 2.2 & Appendix B] [AWWA Manual M14, 2004; p. 13 & Appendix B] [FAC Rule 62-555.360(3)]	☒Yes ☐No
• Includes or references Elements 2 & 3 below?	☒Yes ☐No
• Establishes the right of the CWS to discontinue water service to any customer who fails to comply with the program?	☒Yes ☐No
• Establishes the right of the CWS to inspect any customer's potable water system for cross-connections?	☒Yes ☐No
2. Policy establishing where backflow protection at service connections is mandatory. [AWWA Manual M14, 1990; Section 4.1, Table 4-2, Chapter 5, & Section 6.3] [AWWA Manual M14, 2004; pp. 13 & 63-80]	☒Yes ☐No
• Specifies categories of customer premises & systems for which a backflow preventer (BP) is required at the service connection to the premises or system, & specifies the appropriate type(s) of BP for each such category?	☒Yes ☐No
• As stringent as AWWA Manual M14 (except for premises where there is auxiliary water, including reclaimed water)?	☒Yes ☐No
• Addresses commercial/industrial & residential premises where there is an auxiliary water system, including a reclaimed water system?	☒Yes ☐No
• Addresses temporary connections from fire hydrants?	☐Yes ☒No ☐NA
3. Policy regarding ownership, installation, testing, & maintenance of BPs at service connections. [AWWA Manual M14, 1990; Sections 2.3, 2.4, & 4.2 & Chapters 7 & 8] [AWWA Manual M14, 2004; pp. 14-15 & 17-20, Chapter 4, & Appendix A]	☒Yes ☐No
• Specifies who (the CWS or customers) is responsible for ownership, installation, testing, & maintenance of BPs?	☒Yes ☐No
• Specifies design/performance standards, & installation criteria, for new BPs?	☒Yes ☐No
• Specifies that BP assemblies shall be tested after installation or repair & at least annually thereafter & shall be repaired if they fail a test?	☒Yes ☐No
○ Specifies minimum qualifications for persons testing BP assemblies?	☒Yes ☐No
○ Specifies procedures to be used for testing BP assemblies?	☒Yes ☐No
• Specifies frequency for refurbishing or replacing dual checks (DuCs) if DuCs are allowed/used at service connections to residential premises where there is a reclaimed water system?	☐Yes ☒No ☐NA
4. Procedures for evaluating new & existing service connections to determine the need for BPs at service connections. [AWWA Manual M14, 1990; Section 2.5] [AWWA Manual M14, 2004; pp. 16-17]	☒Yes ☐No
• The CWS evaluates each new service connection before providing water service?	☒Yes ☐No
• The CWS evaluates/re-evaluates existing service connections when the customer first connects to a reclaimed water distribution system?	☒Yes ☐No ☐NA
• The CWS evaluates/re-evaluates existing service connections whenever there is a change in the customer of record or at some other frequency (unless a reduced-pressure principle assembly [RP] already is installed at the service connection)?	☒Yes ☐No
5. Procedures for keeping CCC program records. [AWWA Manual M14, 1990; Section 2.6] [AWWA Manual M14, 2004; pp. 22-23] [FAC Rule 62-550.720(3)]	☒Yes ☐No
• The CWS keeps a record of the latest evaluation of each service connection?	☒Yes ☐No
• The CWS keeps an up-to-date inventory of all BPs installed at service connections?	☒Yes ☐No
• The CWS keeps for at least 10 years records of tests of BP assemblies installed at service connections?	☒Yes ☐No
6. For customers with a reclaimed water system, public education & inspection programs. (The public education & inspection programs may be implemented by either the CWS or the wastewater facility permittee or reuse authority.) [FAC Rules 62-555.360(5), 62-610.468(6), & 62-610.469(7)(h)]	☐Yes ☒No ☐NA
Is the CCC Program Being Implemented?	☒Yes ☐No
Total # of RPs, double check valve assemblies (DCs), & pressure vacuum-breaker assemblies (PVBs) at Service Connections: 3,529	# of RPs, DCs, & PVBs at Commercial/Industrial Service Connections: 1,574
	# of RPs, DCs, & PVBs at Residential Service Connections: 1,955
Total # of Service-Connection RPs, DCs, & PVBs Tested Last Year: 3,529	
Total # of DuCs at Residential Service Connections: 2,701	
Total # of Service-Connection DuCs Replaced or Refurbished Last Year: 1,063	
Comments: 1. Ordinance No. 996, dated 6/3/96. 2. Dual checks are changed out every three years, per FDEP's approval. However, this is not addressed in the written plan. 3. Utility uses XC2 software.4. Service area assessment to be completed by 2015-2016. 5. Switching to radio–read meters.	

RESPONSE FORM

PWS ID Number: 3590970

PWS Name: **Oviedo, City of**

Mailing Address: 400 Alexandria Blvd.
Oviedo FL 32765

Date: April 16, 2012

Please provide any changes to the following:

Business Name: City of Oviedo FL

Owner(s) Name: City of Oviedo FL

Mailing Address: 400 Alexandria Blvd. Oviedo FL 32765

Phone Number(s): 407-971-5684

Fax Number: 407-971-5808

E-Mail Address: SMedeiros@cityofoviedo.net

Florida Department of Environmental Protection
Drinking Water Compliance/Enforcement Program
3319 Maguire Boulevard, Suite 232
Orlando, Florida 32803

Attention: Chris Rossing, Environmental Specialist II

In response to the Department's **Sanitary Survey Report** for the subject public water system dated March 15, 2012, the following actions were done to correct the listed deficiencies:

Deficiency Item No.	**Corrective Action Done**	**Date Done**
1	Modify Cross Connection Control Manual at upcoming City Council meeting. City Council by resolution will adopt a modification to the Cross Connection Plan to include inspection, refurbish or replace dual check valves every 3 years by December 31, 2012.	Initiated April 16, 2012
2	Modify Cross Connection Control Manual at upcoming City Council meeting. City Council by resolution will adopt a modification to the Cross Connection Plan to include annual mail out of public education materials By December 31, 2012.	Initiated April 16, 2012

(Attach additional sheet if necessary)

I hereby certify to the correctness of the above information:

PWS Owner/Representative Signature: Steve Medeiros, Water/Wastewater Superintendent

Name of PWS Owner/Representative: Stephen E. Medeiros
(Please Type or Print)

RESOLUTION NO. 2520-12

A RESOLUTION OF THE CITY OF OVIEDO, FLORIDA, ACCEPTING AND ADOPTING REVISION TWO (2) OF THE CITY OF OVIEDO MANUAL OF CROSS CONNECTION CONTROL; PROVIDING FOR CONFLICTS, SEVERABILITY, AND EFFECTIVE DATE.

WHEREAS, a Manual of Cross Connection Control is necessary to protect the public potable water system and is of critical importance to public health, safety and welfare of the City of Oviedo; and

WHEREAS, the City's Cross Connection Control Program adopted by City Council on June 3, 1996 includes the Oviedo Manual of Cross Connection Control; and

WHEREAS, revisions to the Manual of Cross Connection Control are necessary from time to time in order to implement updated standards and processes; and

WHEREAS, Section 4 of Ordinance No. 996 adopting the City's Cross Connection Control Program provides for the ability to revise the Manual of Cross Connection Control by Resolution.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF OVIEDO, FLORIDA, AS FOLLOWS:

SECTION 1. The City Council of the City of Oviedo accepts and adopts Revision Two (2) of the Manual of Cross Connection Control, dated June 4, 2012.

SECTION 2. Conflicts. All Resolutions or parts of Resolutions in conflict with any of the provisions of this Resolution are hereby repealed.

SECTION 3. Severability. If any Section or portion of a Section of this Resolution proves to be invalid, unlawful, or unconstitutional, it shall not be held to invalidate or impair the validity, force, or effect of any other Section or part of this Resolution.

SECTION 4. Effective Date. This Resolution shall become effective immediately upon its passage and adoption.

PASSED AND ADOPTED this 4th day of June, A.D., 2012

DOMINIC PERSAMPIERE
MAYOR of the City of Oviedo, Florida

ATTEST:

BARBARA J. BARBOUR
CITY CLERK

SEAL
CITY OF OVIEDO, FLORIDA