APPENDIX B

WATER SUPPLY WORK PLAN

CITY OF ORMOND BEACH

WATER SUPPLY WORK PLAN (2007-2017)

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Table of Contents

d) Artificial Recharge

e) Conservation, Reclaimed, and Demand Reduction Strategies

Section III: Water and Reclaimed Water Systems

A. Existing Water System

(1) Water Supply and Production Areas

(2) Existing Wells and Capacities

(3) Treatment/Distribution/Storage Facilities

a) Existing Treatment Processes

(1) Aeration

(2) Lime Softening Process

(3) Recarbonation Process

(4) Filtration Process

(5) Disinfection

b) High Service Pumping and Storage

c) Water Distribution

B. Reclaimed Water Facilities

(1) Historical Flows and Available Reclaimed Water Supply

(2) Reclaimed Water Service Options

a) Option 'A' South Peninsula Reclaimed Water Distribution

b) Option 'B' Breakaway Trails and Hunter's Ridge Reuse Extension

Section IV: Water Use and Capital Needs

A. Historic Water Use

B. Demand Analysis and Projection

(1) Current CUP Status

C. Source Needs Assessment

(1) Groundwater

(2) Brackish Groundwater

(3) Conservation and Demand Reduction

(4) Facility Work Plan Capital Needs

Section V: Listing of Projects

A. Water Supply Projects

(1) Project WS-1, Rima Ridge Wells

(2) Project WS-2, Division Avenue Wellfield Replacement Wells

B. Treatment Plant Projects

(1) Project WT-1, 4.0 MGD R/O Expansion

(2) Project WT-2, Lime Softening Area Upgrades

C. Reclaimed Water Projects

(1) Project RW-1, Orchard Street Reuse Storage Tank and Pump Station

(2) Project RW-2, Holly Hill Reuse Interconnect

(3) Project RW-3, Airport Road Force Main Conversion

(4) Project RW-4, US1 Reuse Transmission Main

(5) Project RW-5, Riverbend Golf Course Tie-In and Booster Pump

(6) Project RW-6, Breakaway Trails and Hunter's Ridge Reuse Tie-In

D. Funding Sources

Section I

Utility Service Area

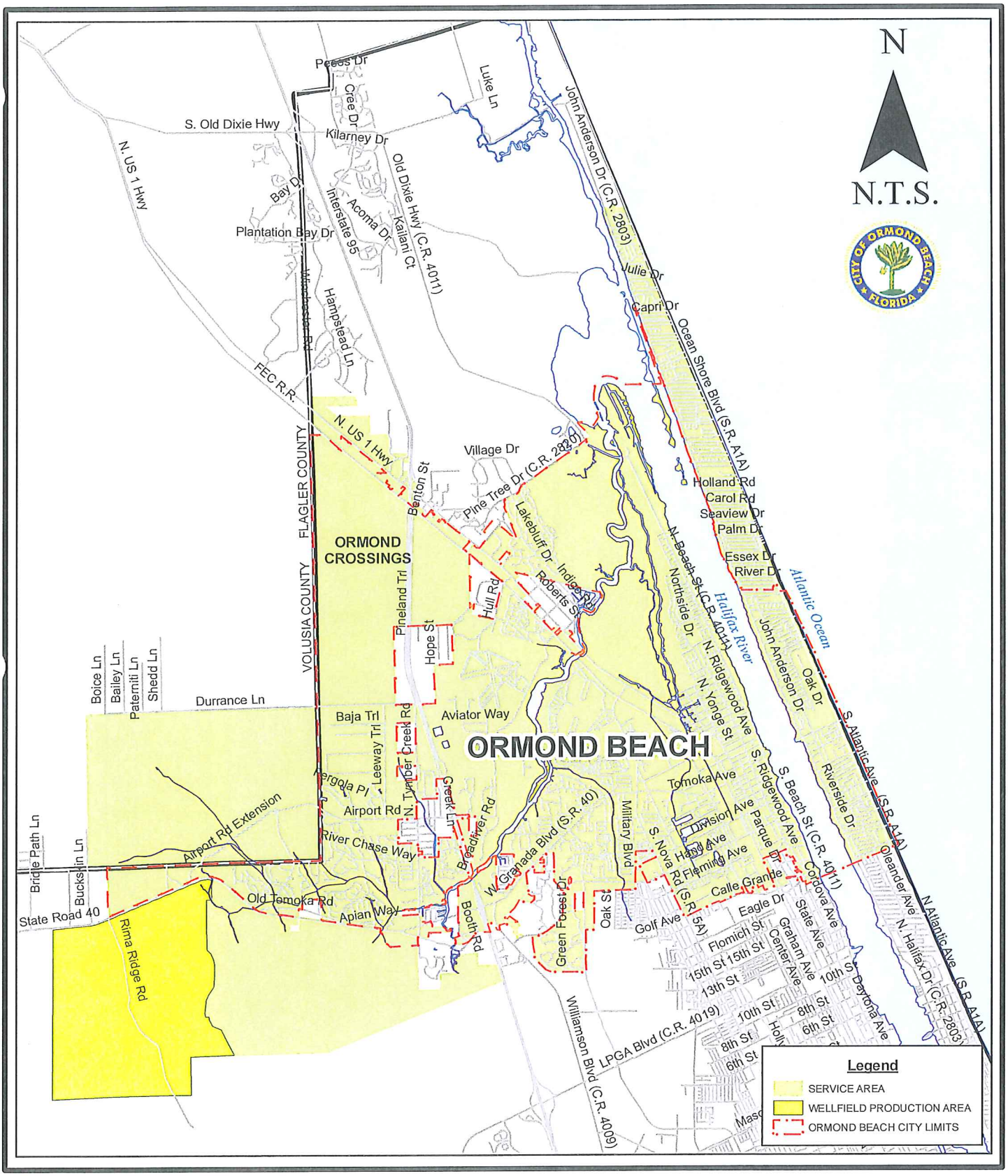
A. Service Area Description this Planning Period

(1) Description of Service Area With Map any Planning Horizon

The City of Ormond Beach is located in northeastern Volusia County, North of Daytona Beach and Holly Hill, and South of Flagler County. It has a municipal boundary encompassing approximately 36 square miles and a utility service area encompassing approximately 57 square miles. The utility service area includes portions of unincorporated Volusia County, incorporated areas within Ormond by the Sea and portions of unincorporated Flagler County. The 2006 population of Ormond Beach, within its municipal boundaries, is 40,294 (source: Ormond Beach Community Development). The current utility service area has a population of approximately 55,667, (QLH 2006 Utility Master Plan Update). There were 21,118 total retail water accounts as of March 2007.

A 'Utility Service Area Map' illustrating Ormond Beach's municipal boundary and service area is included herein as Figure 2.1-1. The limits shown are consistent with the City's comprehensive plan and 201 facilities plan.

For the purposes of the plan, no significant service area boundary changes are expected; however it is important to differentiate which services are provided in areas inside and outside of Ormond Beach's municipal boundary. Significant areas are: North Peninsula, Pine Run, Tomoka Estates, Broadwater, Hidden Hills, Tomoka View, Tanglewood, and Tymber Creek. Varying services are provided within each and details are listed below:



City of Ormond Beach
G.I.S. Department
P.O. Box 277
Ormond Beach, Fl 32174
August 28, 2008

CITY OF ORMOND BEACH WATER PLANNING SERVICE AREA

FIGURE 2.1-1

UTILITY SERVICE AREA MAP

Area	Incorporation	Est. Population	Service Provided
North Peninsula	Outside City	9,463	• Retail water service • Retail sewer service to select condominiums
Pine Run	Outside City	530	• Private water system • Private sewer system
Tomoka Estates	Inside City	1,083	• Wells • Septic Tanks
Broadwater	Inside City	163	• Retail water system • Septic Tanks
Hidden Hills	Inside City	693	• Retail water system • Septic Tanks
Tomoka View	Inside City	268	• Private water system • Septic Tanks
Tanglewood	Inside City	250	• Private water system • Septic Tanks
Tymber Creek	Outside City	1,180	• Wholesale water system • Private sewer system
Twin Rivers	Inside City	80	• Private Water System • Septic Tanks
Durrance Acres	Inside City	92	• Wells • Septic Tanks

Utility service area boundaries are established via interlocal agreements with adjoining municipalities, Counties, and private utility providers. Additional descriptions are contained within Section A(3).

It is important to note that the water service area boundary differs from the wastewater and reclaimed water service area boundary. Projections for future water demands differ from projected wastewater flows. Water projections include service to the above referenced areas.

(2) Current Flow/Population Served/Per Capita Usage

Table 1-1 exhibits the average day, peak day, and peak month per year. Data was obtained from the Monthly Operating Reports of the City's Water Treatment Plant.

Table 1-1
Average and Peak Raw Water Flows
City of Ormond Beach Service Area

Year	Average Daily Flow (MGD)	Peak Day (MGD)	Average Day Peak Month (MGD)
1997	5.01	6.16	5.26
1998	5.02	6.93	6.24
1999	5.38	6.48	5.90
2000	5.70	6.74	6.18
2001	5.50	6.58	5.80
2002	5.56	7.05	6.23
2003	5.60	7.41	6.12
2004	5.87	8.35	6.35
2005	5.92	7.23	6.52
2006	6.25	8.45	6.77

The peak day during 2006 occurred in the month of July and had a peak day flow of 8.45 MGD. Thus over a ten-year period, the annual average daily flow increased by 25% and the monthly peak flow increased by 29%. Average daily flows have increased an average of 2.3% /year for the past ten (10) years.

Historically, population in the Ormond Beach utility service area has exhibited steady growth. Development trends in the area remain strong and population is expected to increase steadily throughout the planning period. A moderate

decline in the rate of population increase is expected to occur as the area approaches build-out. However, a large D.R.I., Ormond Crossings, will continue development trends and generally sustain historical growth patterns. Service Area population information was obtained from Ormond Beach's Community Development Department (CUP) data and Traffic Analysis Zone (TAZ) data. Historical population increases in the utility service area since 1996 are detailed below in **Table 1-2.**

Table 1-2
Ormond Beach Utility Service Area
Historical Population (1996 – 2006)

Year	Population
1996	47,023
1997	47,801
1998	48,579
1999	49,358
2000	50,870
2001	51,654
2002	52,369
2003	53,224
2004	53,974
2005	54,853
2006	55,667

Review of **Table 1-2** yields an average growth rate of 1.7% per year for the 10 year period. A slightly lower rate of growth is generally expected to continue throughout the study period due to the effects of build-out, but specific developments and service area increases are expected to maintain a growth rate of approximately 1.4% through 2025. These areas are described in more detail within Section IV.

Table 1-3
Historical Flow and Population

YEAR	Raw Water Flow (mgd)	HR & BT Flow (mgd)	Total Ground Water Flow (mgd)	Population	Gross Per Capita Flow (gpcd)
1997	5.01	0.63	5.64	47,801	118
1998	5.02	0.81	5.83	48,579	120
1999	5.38	0.64	6.02	49,358	122
2000	5.70	0.82	6.52	50,870	128
2001	5.50	0.72	6.22	51,654	120
2002	5.56	0.66	6.22	52,369	119
2003	5.60	0.58	6.18	53,224	116
2004	5.87	0.59	6.46	53,974	120
2005	5.92	0.75	6.67	54,853	122
2006	6.25	1.34	7.59	55,667	136

Notes:
1. HR & BT Flow represents groundwater used for irrigation in Hunter's Ridge and Breakaway Trails
2. Historical population based upon planning department, CUP and TAZ Data.

Historical flow data is obtained from the City's Water Treatment Plant and irrigation system records. The 'raw water flow' represents influent flow into the water plant. The 'HR & BT' flow represents well withdrawals for irrigation supply at Hunter's Ridge and Breakaway Trails. Irrigation demand at Breakaway Trails is supplemented by stormwater from an on-site pond.

Demand in 2006 was high due to drought conditions. Excessive irrigation demand in the potable distribution system and within Hunter's Ridge/Breakaway Trails contributed to abnormally high per capita demand.

(3) Planning Period

The planning timeframe for the Water Supply Work Plan is 10 years (FY 07/08 through FY 16/17).

(4) Unincorporated Service Areas and Wholesale Agreements

A) Hunters Ridge

The City provides water and sewer service to residents within Hunter's Ridge. This development is located in Volusia and Flagler County. Flagler County residents who will reside in Hunter's Ridge will be wholesale or retail customers of Ormond Beach. A groundwater allocation of approximately 426,000 GPD is assigned by SJRWMD in 2021 to supply Flagler County residents in Hunter's Ridge. The portion of Hunter's Ridge in Flagler County will have an estimated buildout of 1,624 units and 3,492 people.

B) S.W. Service Area

Unincorporated areas south of SR 40 and west of Tymber Creek Road are identified herein as the S.W. Service Area. A recently negotiated Utility Service Agreement (USA), involving Daytona Beach and Ormond Beach, established boundaries and terms for water and sewer service within the area.

Based upon the County's Future Land Use Map (FLUM) for the subject area, it is largely composed of conservation and rural residential zoned property. Traffic Analysis Zone (TAZ) data for the property indicated a 2020 population of approximately 3,100 within the area. It is probable that future zoning changes in the area will increase densities. A 16-inch diameter extension of the 16-inch water main along SR 40 is recommended to serve this future area.

A portion of the service area is sited east of the Tomoka River and south of Old Tomoka Road. It is isolated from the remainder of the area and will require separate water main extensions. The extensions will connect to the existing main on SR 40 or the proposed water main extension along Hand Avenue, when it is constructed.

C) County – Halifax Plantation

At the far northern extents of the City's service area is the community of Halifax Plantation in unincorporated Volusia County. Water service to the subject community is provided by Volusia County Utilities via their Halifax Plantation water plant. The County plant would benefit greatly by an interconnect with the Ormond Beach system. If the County plant was ever shut down for maintenance or failure, an interconnect with the City's system could allow for a redundant water supply at negotiated wholesale rates. At this time, neither an interconnect or wholesale rate exists.

The subdivision currently has 1,873 metered water connections and average daily consumption is approximately 200,000 GPD. The estimated buildout unit count in Halifax Plantations and Plantation Oaks is 4,200, (source: Volusia County Utility Department).

D) North Peninsula

The unincorporated beachside areas north of Sandcastle Drive receive retail water service from the City of Ormond Beach. Approximately 9,400 Volusia County residents live in the area typically referenced to as 'Ormond By-The-Sea'.

E) County – North, US1 Highway 1

Unincorporated areas north of Southland Drive, adjacent to US Highway 1, are served by the City. This includes significant commercial and industrial areas in

the vicinity of the I-95/US1 intersection. It is at the extremity of the service area and represents high seasonal demands and fireflows.

N

N.T.S

LEEWAY ELEVATED WATER TANK

HUDSON WELLFIELD 30-42

SHADOW CROSSINGS RAW WATER TANK

RIMA RIDGE WELLFIELD 50-53

BWT WELLFIELD BWT2 - BWT4 RAW WATER GROUND AND ELEVATED STORAGE TANKS

WATER PLANT AND PRODUCTION WELLS 1 - 6

SR40 WELLFIELD 22-28

DIVISION WELLFIELD 7 - 21A

STANDISH STORAGE TANK AND PUMP STATION

REVISION					
DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION

QUENTIN L. HAMPTON ASSOCIATES, INC.
CONSULTING ENGINEERS
FLORIDA CERTIFICATE OF AUTHORIZATION NUMBER: 626
P.O. DRAWER 280247 PORT ORANGE, FL 32129-0247
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CITY OF ORMOND BEACH
WATER
SUPPLY PLAN

PRIMARY WATER COMPONENTS

FIGURE 2.1

RICHARD W. FERNANDEZ, P.E. 14722
MARK A. HAMPTON, P.E. 27391
BRADLEY T. BLAIS, P.E. 47130
DAVID A. KING, P.E. 50609
ANDREW M. GIANNINI, P.E. 46601

DESIGNED		DATE		SCALE AS SHOWN
DRAWN		DATE		SHEET NO.
CHECKED		DATE		x OF x
APPROVED		DATE		

0835 water supply facilities_POTABLE WATER COMPONENTS.mxd

Section II

Existing and Alternative Water Sources

A. Historic Dependence on Ground Water for Public Use

(1) Hydrogeologic Setting

From its inception, the City of Ormond Beach's Utilities Division has obtained its raw water from groundwater in the Floridan Aquifer. There are no fresh water rivers within 10 miles which could be used as a source. The Tomoka River is brackish and subject to tidal influences.

Geology

The County is underlain by a relatively thin sequence of unconsolidated deposits of Holocene to Miocene age, which in turn are underlain by a thick sequence of consolidated limestone's and dolomites that are mainly of Eocene age. The youngest deposits, of Holocene to Pleistocene age, blanket the County, and range in thickness from about 20 to more than 50 feet. These materials are mainly fine to medium grained quartz sand, locally mixed with shells. In many areas, these sediments are stained yellow orange by iron oxides. Locally, the sands have been cemented into "hardpan" by deposition of iron oxide at the water table. The Holocene to Pleistocene age deposits are underlain by materials of Pliocene to Miocene in age, which range in thickness from about 20 to 70 feet, and consist of shells, fine sands, and calcareous clays.

The youngest materials of Eocene age in the County are consolidated rocks of the Ocala Limestone. This formation occurs at depths of less than 100 feet in

eastern Volusia County, but is thin or absent in the western part of the County due to erosion. The Ocala Limestone is composed of white to gray fossiliferous limestone, which may be slightly dolomitized in some areas. The formation may be up about 200 feet thick in parts of eastern Volusia County. The Ocala Limestone is not always easy to distinguish from the Avon Park formation, by which it is immediately underlain.

The Avon Park Formation, of middle Eocene age, varies in color from chalky white or dark brown or gray, and consists of layers of dark brown dolomite separated by layers of chalky limestone. The Avon Park formation is extensively dolomitized. The dolomite is separated by layers of chalky limestone. The dolomite is crystalline and contains few fossils, but the limestone is fossiliferous. Depths to the top of the Avon Park Formation ranges from less than 100 feet in western Volusia County to several hundred feet in eastern Volusia County. The Avon Park formation is more than 1,000 feet in thickness over much of the County.

Hydrogeology

The thin clay layer serves as an intermediate confining unit which hydraulically separates the potentiometric heads of the Upper Floridan Aquifer (UFA) from the surficial aquifer system (Phelps, 1990). The potentiometric surface represents the water surface elevation in the aquifer, in an unconfined condition. Based on data obtained annually by St. Johns River Water Management District typical potentiometric water surface elevations of the UFA in the vicinity of the Rima Ridge wellfield range from 20 to 30 feet NGVD. The hydraulic gradient is towards the east. The potentiometric surface at the Division Avenue well field ranges from 2 to 10 feet NGVD.

Ground surface elevations at the Rima Ridge wellfield and corresponding water table/surficial aquifer elevations range between 40 to 50 feet NGVD. As a result

of the net downward gradient between the surficial aquifer and UFA, and leakance through the confining layer, the terrace and ridge area provide some recharge to the UFA. Recharge rates are estimated at 8 or 9 inches per year (Phelps, 1990).

The source of water for the surficial aquifer is primarily local rainfall. Water is stored in the pore space of the soils. Water exists in the surficial aquifer via downward leakance and horizontal flow to drainage ways. The volume available for withdrawal from the Volusia Floridan Aquifer is dependent upon the surficial system. Any discussion of the surficial aquifer in the Ormond Beach service area should point out the positive aspects of the Miocene Age clay. This clay helps assure the water quality of the municipal supply. The ion exchange potential of the material forms a protective barrier to the downward migration of pollutants. Nevertheless, improper waste disposal including toxic chemicals and landfill leachate must be isolated from the surficial aquifer. The groundwater resources must be protected.

It should be noted that the confining layer exhibits leakance and as such, promotes recharge. This characteristic is valuable as it renews water supplies withdrawn from consumption; however, leakance creates a hydraulic connection from the Surficial Aquifer to the UFA. If contamination of the surficial aquifer occurs, it is possible to compromise the City's water supply.

(2) Ground Water Quality

The City obtains all raw water supply from groundwater production wells drilled into the upper producing zones of the Floridan aquifer. The Floridan aquifer is a limestone aquifer which serves as the main groundwater production aquifer in North and Central Floridan. The City operates a total of five separate wellfields. Three of these wellfields are located east of I-95: Water Plant Wellfield, Division

Avenue Wellfield, and SR 40 Wellfield, presented in an east to west order. Two wellfields are located west of I-95: the Hudson Wellfield near the junction of southeast Flagler County and Volusia County, and the Rima Ridge Wellfield located southwest of the Hudson Wellfield. The location and approximate boundaries of these wellfields are shown on **Figure 2-1**.

The Water Plant wellfield consists of 6 wells (Nos. 1 through 6), the Division Avenue wellfield consists of 14 wells (Nos. 7 through 21), the SR 40 wellfield consists of 4 wells (Nos. 22 through 28), the Hudson wellfield consists of 13 wells (Nos. 30 through 42), and the Rima Ridge wellfield consists of 4 wells (Nos. 50 through 53). **Table 3-1** summarizes the current status of all 41 wells, including 26 active primary and secondary water production wells, 6 stand-by-wells, 2 irrigation wells, 5 wells not equipped with pumps, and 2 abandoned wells. Water quality characteristics of each wellfield are presented in **Table 2-1**.

Table 2-1
Wellfield Water Quality

	Wellfield					
Parameter	**Water Plant (Well 6)**	**Division Ave. (Well 15)**	**SR 40 (Well 26)**	**SR 40 (Well 28)**	**Hudson (Well 32)**	**Rima Ridge (Well 51)**
Anion (meq/L)	21	9.2	4	8	7.4	5.9
Cation (meq/L)	21	9.8	4.4	8.1	7.9	6.5
Total Hardness (mg/L as $CaCO_3$)	480	350	200	320	320	300
pH	6.88	6.81	7.52	6.91	6.95	6.8
Total Alkalinity (mg/L as $CaCO_3$)	260	290	180	300	280	270
*Chloride (mg/L)	540	120	16	70	65	18
Sulfate (mg/L)	44	2	0.1	0.53	0.09	ND
Calcium (mg/L)	130	120	72	110	110	110
Magnesium (mg/L)	39	14	3.7	12	11	5.2
Potassium (mg/L)	8.5	2.4	5.9	2	2.2	1.2
Sodium (mg/L)	260	60	8.1	36	35	12

ND = Not Detected
* 250 mg/L is the primary drinking water standards for chloride, <100 is the aesthetic limit.

(3) Recharge

The Floridan Aquifer in Volusia County has been designated a sole source aquifer by the USEPA. The limits of the sole source aquifer roughly equate to the boundaries of the County. Therefore it is replenished only by rainfall which falls within its borders. The rate of recharge is dependent upon 1) difference in head between the surficial aquifer and the Floridan Aquifer and 2) the presence and continuity of confining clay layers between the aquifers. The City's wells in the Rima Ridge wellfield are in an area of moderate recharge and represent the most favorable area for new well development.

B. Regional Water Supply Planning Implications for Future Ground Water Usage

(1) Alternative Sources

Deficit Projections

Currently, SJRWMD has not officially identified groundwater deficits associated with future aquifer withdrawals from the Ormond Beach wellfields. Implementation of Minimum Flow and Level (MFL) Legislation has the potential to change regional deficit projections. Current 'draft' proposals by SJRWMD identify potential groundwater deficits for Ormond Beach.

SJRWMD has the legislative authority to limit C.U.P. allocations for individual permit holders based upon cumulative groundwater withdrawals, and their potential effect upon spring flows. Therefore, future regional groundwater deficits may be assigned countywide, not on a utility-by-utility basis. In the event that

this occurs, Ormond Beach should be prepared to meet future demands utilizing alternative sources.

Alternative Water Supply Sources and Options

At the time of this writing, the City of Ormond Beach has existing firm raw water supply capacity to meet peak day flows of 9.08 MGD. Firm water supply capacity is the production capacity with the largest well out of service. A well development program is currently permitted and programmed to increase Ormond's production capacity by 3.9 MGD by 2009. Seven (7) new well sites have been identified and are permitted under the current CUP. Three (3) of the wells are in the Rima Ridge wellfield and four (4) are in the Division Avenue wellfield.

Some future alternative sources which may be applicable for Ormond Beach are:

(a) Surface Water (St. Johns River)
(b) Brackish Groundwater, (Upper Floridan Aquifer)
(c) Brackish Groundwater, (Lower Floridan Aquifer)
(d) Artificial Recharge
(e) Conservation, Reclaimed and Demand Reduction Strategies

Detailed review and analysis of each source is outside the scope of the report; however, a brief description is included for reference purposes. Specific emphasis is placed upon supply sources which can be treated with R/O technology currently available at the City's recently upgraded water plant.

(a) <u>Surface Water, (St. Johns River)</u>

As previously indicated, proposed Blue Spring MFL Legislation will impact all Volusia County utility providers withdrawing groundwater from the Upper Floridan Aquifer (UFA). The primary reason for wide ranging impacts has to do with

cumulative effects of groundwater pumping. As such, utility providers in western Volusia County will ultimately rely on a surface water plant withdrawing water from the St. Johns River.

The future surface water plant will ultimately supply the majority of potable water consumed in western Volusia County, approximately 20 – 30 MGD by 2025.

Cumulative groundwater withdrawals from the Upper Floridan Aquifer (UFA) may reduce the potentiometric surface elevation in the aquifer and simultaneously may reduce flow in Blue Springs. Under the current Consumptive Use Permitting (CUP) process, water providers must model the cumulative impacts of not only their groundwater withdrawals, but also the anticipated withdrawals of others. In virtually every circumstance, cumulative withdrawals serve to limit CUP groundwater allocations.

The most effective mechanism for reducing the effects of cumulative withdrawals is by reducing the quantity of groundwater withdrawn. In the vicinity of Blue Spring, doing so may potentially increase the volume of groundwater that can be withdrawn by utilities in other portions of the County.

It is probable that utilities in western Volusia County will take the lead role in constructing a surface water plant on the St. John's River. The Ormond Beach water system may never directly receive water from the facility; however, the City may still derive a benefit from the water it produces.

(b) Brackish Groundwater, (Upper Floridan Aquifer)

The City of Ormond Beach operates five (5) wellfields. Two (2) of the five provide water which is currently brackish. Both the Division Avenue and the Water Plant Wellfields have permitted wells which withdraw groundwater from the Upper Floridan Aquifer (UFA).

Groundwater is considered 'brackish' if chlorides exceed 250 mg/L. The water plant wells currently exceed this standard as well as some of the Division Avenue wells. Others have the potential to become brackish, over time. Four (4) new wells are proposed for construction in the Division Avenue wellfield. These will replace existing, deteriorated wells. Approximately 30% of the raw water supply will be obtained from this source.

The City has constructed a 4.0 MGD low pressure reverse osmosis (LPRO) treatment facility. The plant will enable treatment of lower quality raw water which may be expected from these wells.

Therefore, brackish groundwater from the UFA is an alternative water supply currently being developed by Ormond Beach. Funds have been expended for construction of plant capacity to treat this source. Construction of the new R/O plant is complete.

(c) Brackish Groundwater, (Lower Floridan Aquifer)

Brackish groundwater may be withdrawn from the Lower Floridan Aquifer (LFA) without affecting the Upper Floridan Aquifer (UFA). The Lower Floridan Aquifer is hydraulically separated from the Upper Floridan Aquifer by hard, dense dolomite and layers of chalky, low permeable limestone, which act as a confining layer. The water quality in the Lower Floridan Aquifer ranges from 2,000 to 5,000 mg/L TDS. Wells drilled into this zone, which occurs at >500 feet below land surface in the Study Area could be used to blend with waters from either Upper Floridan Aquifer or the Surficial Aquifer.

Wells drilled into the Lower Floridan Aquifer would not be limited by well yield, since this zone is highly transmissive, but by water quality. The water could be treated using membrane processes or blended with water from the UFA. If used

as blend wells, the amount of water from this source would be limited by an acceptable blend ratio which is compatible with the City's R/O system currently under construction.

The brackish waters of the Lower Floridan Aquifer can be treated using membrane treatment technology to produce high quality drinking water. Recent upgrades at the City's water plant provide for 4 MGD R/O treatment capacity. Again, well yield from the Lower Floridan Aquifer would not be the limiting factor, since the wells would produce large quantities of water. The blend ratio with UFA wells is the limiting factor. Blending concentrate with effluent and reuse water in Ormond Beach's system is being permitted subject to limitation of concentrate volumes and water quality for the intended use.

Development of the LFA as an alternative water source (AWS) is currently being pursued by SJRWMD in Clay County and by the SFWMD as part of the everglades restoration program. The City of Palm Coast and Utilities Commission of New Smyrna Beach are also considering this source.

Currently, the City's permitted allocation precludes the need to develop the LFA as an AWS; however, implementation of the previously referenced MFL recommendations may result in a reduction of current groundwater allocations. If this occurs, the LFA may be a viable option for Ormond Beach. With the 4 MGD R/O water plant, the City has the capability to treat a blended supply with chlorides exceeding 250 mg/L.

(d) Artificial Recharge

In Ormond Beach's case, Floridan Aquifer withdrawals are largely constrained by naturally occurring recharge to the Floridan Aquifer and secondary impacts to the surficial aquifer. Secondary impacts in the surficial aquifer, i.e. lowering of the water table, has the potential to alter adjacent wetland hydroperiods and create

unacceptable wetland impacts. To date, this has not occurred and the City continually monitors wetland systems to insure that natural hydroperiods are maintained.

Enhancement of natural recharge by the redirection of stormwater or application of reclaimed water to rapid infiltration basins is discussed below.

RAMP (Regional Aquifer Management Plan) includes multiple projects or initiatives in Volusia County that have the potential to increase the quality of groundwater that can be withdrawn from the aquifer while protecting against unacceptable impacts to wetlands, lake levels, spring flows and groundwater quality. Implementation of these projects will allow utilities to use fresh groundwater to the maximum extent possible.

The following initiatives are currently under design and/or construction:
The Deland project- Western Volusia County

- Develop 5 mgd of additional groundwater
- Increase rate of aquifer recharge by artificial recharge through rapid infiltration basins
- Use reclaimed water, storm water and surface water from the St. Johns River for irrigation and groundwater recharge
- Construct reclaimed water interconnections

The Rima Ridge project - eastern Volusia County

- Develop 5 mgd of additional groundwater
- Augment wetland hydration for impact avoidance and aquifer recharge
- Introduce reclaimed water and storm water to storage/infiltration ponds with overflow to constructed wetlands treatment systems and subsequently to natural wetlands adjacent to wellfields. The ponds will provide supplemental irrigation water and groundwater recharge.
- Construct reclaimed water interconnections

Constructed projects include Port Orange's reservoir/recharge basin, DeLand's reservoir/recharge basin, and the Thayer Canal water control structure in the Tiger Bay area. Additional recharge enhancement projects detailed in the RAMP report are currently under consideration.

The RAMP report identifies potential recharge enhancement and surficial aquifer projects in Ormond Beach. A reclaimed water reservoir/recharge basin in the vicinity of the Rima Ridge wells is identified as a potential RAMP project. Horizontal wells in the vicinity of the Division Avenue wellfield are also detailed as a potential surficial aquifer source for reuse augmentation. These projects are not proposed for construction within the study period. Both projects may serve to mitigate potential MFL reductions and groundwater deficits in the future.

(e) Conservation, Reclaimed, and Demand Reduction Strategies

Existing utility conservation programs, such as low flow showerheads and toilets, rain sensors for lawn irrigation, and education programs, would stay in effect. The use of reclaimed water to supplement and/or replace fresh ground water used for irrigation purposes has been aggressively pursued by the City of Ormond Beach. Current plans to extend reclaimed water to Hunter's Ridge and Breakaway Trails will effectively reduce groundwater withdrawals used for irrigation by 0.8 MGD and provide for approximately 1.5 MGD in reuse demand when the River Bend Golf Course is added to the system. New policies 1.2.5 and 5.3.10 have been developed in the Utilities Element to ensure water conservation, and reuse practices as well as demand reduction strategies. The conservation and reuse practices that are conditions of the current CUP are:

- Leaking or inoperative well casings, valves or controls are repaired or replaced as required to eliminate the leak or make the system fully operational.
- Landscape irrigation is prohibited between the hours of 10:00 a.m. and 4:00 p.m., except as follows:

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

(b) The use of reclaimed water for irrigation is allowed, provided appropriate signs are placed on the property to inform the general public and District enforcement personnel of such use. Such signs must be in accordance with local restrictions.

(c) Irrigation of, or in preparation for planting, new landscape is allowed any time of day for one 30-day period provided irrigation is limited to the amount necessary for plant establishment.

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

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

The City's Code of Ordinance addresses the Landscaping irrigation condition in Section 22-182 Levels of Water Conservation and Water Shortage.

- Whenever feasible, the City must use native vegetation that requires little supplemental irrigation for landscaping within the service area of the project. The City's Land Development Code addresses this condition in Section 3-05, C.2., Landscape Design Standards.
- The City works with WAV to promote water conservation through various methods including conducting presentations to civic groups and school classes within the Ormond Beach Service Area. Information related to water conservation can be viewed on the city's website.
- Either the Annual Reuse Report or monthly wastewater flow records are collected and submitted to the District's Palm Bay Service Center annually. All available reclaimed water and stormwater is distributed for use, or used, by the City in place of higher quality water sources when deemed feasible pursuant to District rules and applicable state law.

- The lowest quality water source, including reclaimed water and surface stormwater is used for each consumptive use supplied by the City when available except when the City demonstrates that the use of the lower quality water source is not economically, environmentally, or technologically feasible.
- The City measures the quantity of water withdrawn from wells: 1WP (17228), 2WP (17249), 3WP(17250), 4WP (17251), 5WP (17252), 6WP (17253), 7WP (17248), 7 (17254), 8A (17255), 9A(17256), 1OA (17257), hA (17258), 12(17259), 12A (34004), 13(17260), 13A (34005), 15A (34006), 16A (34007), 17A (34008), 18 (17265), 19(17266), 21(17268), 21A (34009), 22(17269), 24(17271), 26(17273), 28(17230), 30(17231), 31(17232), 32 (17233), 33 (17234), 34(17235), 35 (17236), 36(17237), 37 (17238), 38(17239), 39 (17240), 40(17241), 41(17242), 42(17243), 50(17244), 51(17245), 52(17246), 53 (17247), 54(34010), 55(34011), 56(34012), 2BT (17799), 3BT (17800), 4BT(17801), 5BT (34013), and BWS1 (34003) by in-line totalizing flow meters. The totalizing flow meters are maintained at 95% accuracy, verifiable, and installed according to manufacturer specifications. Documentation of proper installation of the flow meter (e.g. photograph) is submitted to the District within 30 days of meter placement.

Comprehensive planning policies associated with the above listed CUP conditions can be found in the Utilities Element (policies 1.1.24, 1.2.25, 2.2.23 and 5.3.4). The City continues to implement the reuse of reclaimed water to the maximum extent feasible. The City is on track with programs to utilize at least 70% of reclaimed water flows to meet irrigation demands and other demands by December 31, 2013. The City's current and proposed reuse practices used to implement the use of reclaimed water are listed below:

- Require installation of reuse supply lines in new subdivisions and connection of new development or substantial redevelopment where reclaimed water is available.

- Require installation of dual water distribution lines that will initially use the existing water source until the reclaimed water source is available;
- Use reclaimed water for irrigation and other nonpotable needs in public areas owned by the local government; and
- Partner with wastewater utilities to retrofit existing development with connections to a reuse system, to supply uses that do not require potable water

New policy 5.3.10 in the Utilities Element supports the implementation of water conservation practices that are conditions of the City's CIP.

The City will ensure coordination with the St. Johns River Water Management District with regard to water supply planning. The City will maintain a water supply facilities work plan that is coordinated with St. Johns River Water Management District's District Water Supply Plan by updating the work plan within 18 months of an update to the District's District Water Supply Plan that affects the City. In addition, the City will participate in the development of updates to St. Johns River Water Management District's water supply assessment and District Water Supply Plan and other water supply development-related initiatives facilitated by the District that affect the City.

(f) Alternative Water Supply Projects as Discussed with SJRWMD

Table 14 of the *District Water Supply Plan 2005* (as amended by three addendums) identifies the following alternative water supply development project options that could be implemented by Ormond Beach:

- Intracoastal Waterway at NSB
- St. Johns River near Lake Monroe
- St. Johns River near DeLand
- Nova Canal Reclaimed Augmentation Project (per 3rd Addendum on 5/08)
- Ormond Beach WTP Project

- Ormond Beach North Peninsula Reclaimed Water Storage Project
- Ormond Beach South Peninsula Reuse Improvement Project

In 2007, the City responded to the District regarding alternative water supply project options identified for the City in the *District Water Supply Plan 2005.* On March 15, 2007, in a letter requiring response and water supply entity notification from the City to the District, the Ormond Beach WTP Expansion Project was identified as being able to provide 4.0 mgd of treated water from lower quality brackish water wells (5 mgd raw water to plant that produces 1 mgd of concentrate that will be piped to the WWTP and blended with the wastewater used for irrigation). This project, identified in the 2007 Capital Improvements Plan, will utilize low pressure reverse osmosis to maximize the use of eastern wells that are slightly brackish. The total project cost is $15,786,832 of which $5,847,200 will come from the District. In the City's letter update and water supply entity notification on the Western Ormond Beach Reclaimed Water Distribution project, dated June 1, 2007, the City discussed the following three alternative water supply projects:

- Ormond Beach North Peninsula Reclaimed Water Storage Project (also known as the Reuse Storage and Pumping Facility and identified as RW-1 in Table 5-2 of the Water Supply Work Plan). The proposed storage tank location was changed to the Public Works area due to citizen opposition to a storage tank in their neighborhoods and the tank size increased to 4.0 million gallons. This project is currently denoted in the Capital Improvements Plan as the Reuse Storage and Pumping Facility and is scheduled for completion in March 2009.
- Ormond Beach South Peninsula Reuse Improvements Project - postponed since the western area of the city has greater potential for reclaimed water distribution. A transfer of funds to the Western Ormond Beach Reclaimed Water Distribution Project was requested.
- Western Ormond Beach Reclaimed Water Distribution Project - will result in 2.7 mgd reuse water available via new transmission lines. Design will

begin in 2010; construction completed in 2013. The total project cost of the project is $5,272,000 of which $1,845,520 is being sought from the District. This project is denoted as Reuse System Improvements in the Capital Improvements Plan. It proposes to bring reclaimed water to West Ormond Beach incrementally. As such, the project is covered in items RW-4, RW-5 RW-7 and RW-7 listed in Table 5-2 of the City's Water Supply Work Plan.

The city has proposed Policy 1.2.6 in the Utilities Element in support of the implementation of the aforementioned alternative water supply projects.

Section III

Water and Reclaimed Water Systems

A. Existing Water System

(1) Water Supply and Production Areas

Water supply for the City of Ormond Beach is derived from a series of Upper Floridan Aquifer wells installed throughout the service area. The present and projected growth of the area has required the installation of new wells to meet increased demand. Additional wells are also proposed to increase rotational capacity and provide water supply for new development.

(2) Existing Wells and Capacities

The City of Ormond Beach operates a single water treatment plant with a rated capacity of 8.0 MGD. The Ormond Beach Water Treatment Plant (OBWTP) is located north of Jefferson Street, west of US-1 and east of the F.E.C. Railway adjacent to Tomoka Avenue. It is a conventional lime softening plant, construction of a 4.0 MGD reverse osmosis (RO) plant expansion is currently underway. The new facility is scheduled for completion in March 2008. A tabular listing of each well, casing size, depth, capacity, and status is included as **Table 3-1**.

Table 3-1
Existing Wellfield Capacity

City Well Number	Wellfield	Status	Casing Dia. (in)	Well Depth (ft)	Pump HP	Design Capacity (gpm)	Design Capacity (mgd)	Design TDH (ft)	Drill Date
1	Water Plant	Stand-By	6	186	5	105	0.151		1952
2	Water Plant	Stand-By	6	210	7.5	170	0.245	100	1952
3	Water Plant	Not Equipped	6	202					1952
4	Water Plant	Not Equipped	6	202					1952
5	Water Plant	Not Equipped	8	182					1955
*6	Water Plant	Not Equipped	8	207					1955
7	Division	Abandoned	8	201					1958
8A	Division	Primary	12	201.5	15	300	0.432	110	1999
9A	Division	Secondary	12	190	10	300	0.432	75	1999
10A	Division	Primary	12	206	15	300	0.432	110	1999
11A	Division	Primary	12	225	20	300	0.432	190	1999
12A	Division	Primary	12	220	15	250	0.360	110	2003
13	Division	Primary	6	229	20	200	0.288	222	1969
13A	Division	Primary	12	220	20	300	0.432	190	2001
15	Division	Abandoned							
15A	Division	Primary	12	210	10	300	0.432	110	2001
16	Division	Abandoned							
17	Division	Abandoned							
18	Division	Abandoned	8	200					1976
19	Division	Secondary	8	200	10	180	0.259	100	1976
21A	Division	Primary	12	220	10	250	0.360	110	2003
22	SR 40	Primary	8	200	7.5	250	0.360	64	1979
24	SR 40	Primary	6	200	15	275	0.396	68	1979
*26	SR 40	Not Equipped	8	170					1981
28	SR 40	Primary	6	203	15	200	0.288	130	1982
30	Hudson	Primary	6	270	10	138	0.199	150	1987
31	Hudson	Primary	6	270	10	138	0.199	150	1987
32	Hudson	Primary	6	270	7.5	73	0.105	200	1987

City Well Number	Wellfield	Status	Casing Dia. (in)	Well Depth (ft)	Pump HP	Design Capacity (gpm)	Design Capacity (mgd)	Design TDH (ft)	Drill Date
33	Hudson	Primary	6	270	7.5	73	0.105	200	1987
34	Hudson	Primary	6	270	7.5	73	0.105	200	1987
35	Hudson	Primary	6	270	7.5	73	0.105	200	1987
36	Hudson	Primary	6	271	7.5	73	0.105	200	1987
37	Hudson	Primary	6	270	7.5	73	0.105	200	1987
38	Hudson	Primary	6	270	7.5	138	0.199	150	1987
39	Hudson	Primary	6	270	10	138	0.199	150	1987
40	Hudson	Primary	6	270	10	138	0.199	150	1987
41**	Hudson	Irrigation/ Fire Protection	6	270	10				1987
42**	Hudson	Irrigation/ Fire Protection	6	270	7.5				1987
50	Rima Ridge	Primary	10	300	40	500	0.720	240	1987
51	Rima Ridge	Primary	10	300	40	500	0.720	240	1987
52	Rima Ridge	Primary	10	300	40	500	0.720	240	1994
53	Rima Ridge	Primary	10	300	40	500	0.720	240	1994
BWT-2**	Breakaway Trails	Irrigation/ Fire Protection	8	260	5	215	0.310		1985
BWT-3**	Breakaway Trails	Irrigation/ Fire Protection	8	260	5	260	0.374		1985
BWT-4**	Breakaway Trails	Irrigation/ Fire Protection	8	260	5	225	0.324		1985

Total Installed Raw Water Production Capacity **9.80**** **mgd**

Total Firm Raw Water Production Capacity, (largest single well out of service **9.08**** **mgd**

Note: * Water Treatment Plant Well #6 and #26 is used for salt water monitoring only.

** Wells are used for irrigation and fire protection in Hunters Ridge and Breakaway Trails. These wells are not included in the total or firm raw water capacities.

For all wells, ground water is withdrawn from the Upper Floridan Aquifer.

For all raw water production wells, all groundwater is pumped to the Ormond Beach Water Treatment Plant.

Source: Ormond Beach Utilities, Water Production (Sep. 2003).

Water Supply System Evaluation (BFA, Feb. 1998).

Ormond Beach GIS (October 2003).

The water plant is served by 5 wellfields containing 28 active water supply wells. These wells range in depth from 190' to 300' and withdraw fresh groundwater from the Floridan Aquifer. All raw water is discharged to the OBWTP for subsequent treatment and distribution.

Approximately 30% of the City's raw water supply is derived from its Division Avenue and water plant wells. Water quality in the eastern wells deteriorated over time and chloride concentrations have exceeded 250 mg/L in some eastern wells. The City's wellfield management plan, approved by SJRWMD, requires the use of its eastern wells.

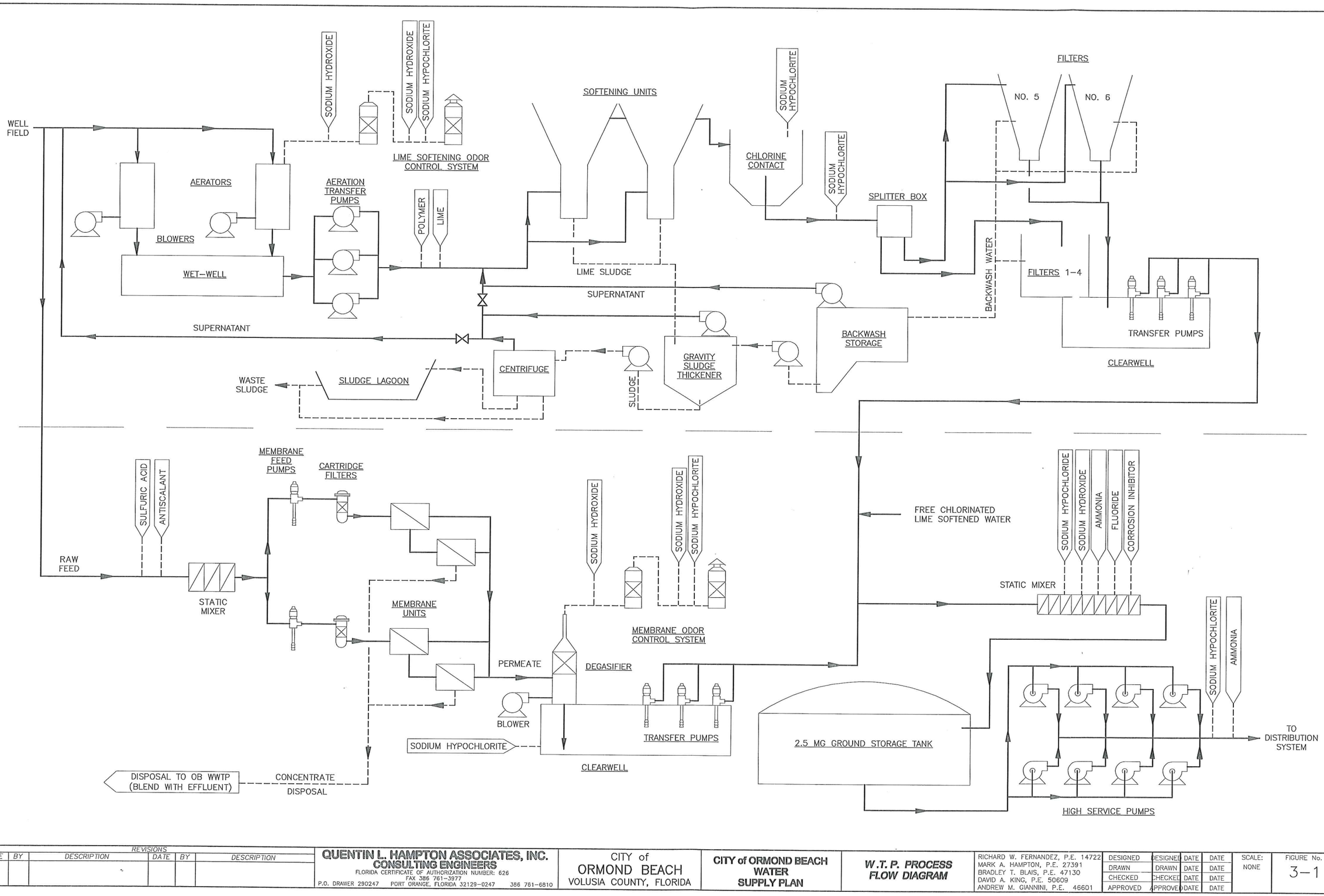
In order to maintain long term utilization of these wells, the City constructed a 4 MGD reverse osmosis (R/O) water treatment facility at the Jefferson Street site. The R/O process will allow continued use of lower quality groundwater and meet primary and secondary standards for it's finished water.

The finished water distribution system serves approximately 56,000 customers and includes approximately 2,000,000 LF of distribution piping, two (2) remote storage tank/pump station sites and three (3) remote booster pump stations.

(3) Treatment/Distribution/Storage Facilities

(a) Existing Treatment Processes

The City of Ormond Beach owns and operates an 8.0 MGD lime softening plant adjacent to Tomoka Avenue. The Ormond Beach lime softening plant includes the following treatment processes: aeration, lime softening, recarbonation, filtration and disinfection. The 4.0 MGD low pressure reverse osmosis (LPRO) membrane filtration expansion was recently completed and placed on-line on March 2008. A schematic process diagram is included as **Figure 3-1.**



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CITY of ORMOND BEACH
VOLUSIA COUNTY, FLORIDA

CITY of ORMOND BEACH WATER SUPPLY PLAN

W.T.P. PROCESS FLOW DIAGRAM

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MARK A. HAMPTON, P.E. 27391
BRADLEY T. BLAIS, P.E. 47130
DAVID A. KING, P.E. 50609
ANDREW M. GIANNINI, P.E. 46601

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CHECKED	CHECKED	DATE	DATE
APPROVED	APPROVED	DATE	DATE

SCALE: NONE

FIGURE No. 3-1

S:\OR\OB35 WATER SUPPLY FACILITIES\Cad\Design\OB35 water supply 'acilities_WTP FLOW PROCESS.dwg, 12/6/2007 4:20:27 PM, 1:1,

(1) Aeration

The first process at the Ormond plant is aeration. In this process, air and water are brought into contact. The objective is to transfer volatile substances from the water to the air. The principal effects of aeration at the Ormond Plant include the following:

- Reduce the concentration of hydrogen sulfide.
- Reduce the concentration of carbon dioxide.
- Reduce the concentration of volatile organic compounds.

(2) Lime Softening Process

The Ormond Plant utilizes chemical precipitation with lime to reduce the raw water's hardness and to enhance clarity before filtration. Hardness is defined as the sum of the concentration of multivalent ions (primarily calcium and magnesium). Hardness is expressed in terms of milligrams per liter of calcium carbonate.

Ormond's raw water typically contains significant amounts of calcium bicarbonate hardness (carbonate hardness) and lesser amounts of non-carbonate hardness, thereby requiring the use of lime for adequate softening. The solids contact reactor/clarifiers, with the trade name "Claricones", include three major unit processes, all of which occur within a single equipment unit. The unit processes include coagulation, flocculation, and sedimentation.

(2a) Low Pressure Reverse Osmosis (LPRO)

Following aeration, a portion of the plant flow is diverted to the LPRO process. It is a membrane softening process which also has the capability remove specific ions, including chlorides, to treat lower quality groundwater. The plant has (4) 1.0 MGD process trains with a total average daily treatment capacity of 4.0 MGD.

This process is run in parallel with the lime softening process. Effluent from the LPRO process is blended with filtered effluent prior to discharge to the ground storage tank.

(3) Recarbonation Process

At the Ormond Plant recarbonation is not performed due to equipment which is out of service. Recarbonation is typically utilized to control the pH of the finished water and achieve stabilization. Previously, carbon dioxide was added to lower the softened water pH to approximately 8.5 prior to filtration. Currently carbon dioxide is not added to the treated water and the basin is used for free chlorine contact and subsequent ammonia addition to form chloramines. Adjustment of pH is now accomplished by blending raw water with softened water.

Plans are currently under way to construct new CO_2 storage and feed facilities at the WTP. This work will be constructed with the improvements proposed for the claricones. Construction is scheduled for 2007 and completion in 2008.

Accomplishing pH adjustment by blending waters has proven insufficient as recent maintenance efforts have shown excessive calcium scaling of the filters. Therefore, the Ormond Plant is re-instating carbon dioxide addition for pH adjustment. Construction has commenced for a new carbon dioxide feed and storage system, adjacent to the recarbonation basin. Carbon dioxide addition will occur in the proposed piping that will convey softened water from the claricones to the recarbonation basin. Funding is further detailed in Section 6.3.2-3.

(4) Filtration Process

Filtration provides two functions. It removes suspended material and provides a second barrier against the transmission of waterborne disease. It is the oldest of the treatment processes dating back to 4000 B.C.

The City completed replacement of four (4) filters. The new filters improve treatment efficiency, increase capacity and replace equipment which has exceeded its useful life. The $3.38 million project was funded in FY 2006-07 and was complete in September 2007 (FY 2007-08).

(5) Disinfection

Disinfection of water refers to the removal or inactivation of pathogenic organisms. Disinfection does not mean sterilization. The result of effective disinfection is the production of potable water. Chlorine has long been recognized as an effective and efficient disinfection agent.

Liquid sodium hypochlorite (NaOCl) is fed prior to filtration. NaOCl is a powerful oxidant and it serves as a disinfectant to reduce bacteria and viruses. Ammonia (NH_3) is fed after NaOCl to form chloramines. Chloramines are a weak disinfectant, but they maintain a stable residual and reduce trihalomethane formation (THM) potential. The recently completed LPRO project includes on-site NaOCl generation facilities for production of NAOCl from brine.

The EPA has implemented new minimum standards for disinfection and chlorine contact time (CT) in order to reduce the potential for cryptosporidia, gardia and other enteric viruses in treatment plants which treat groundwater. The groundwater disinfection rule specifically targets water plants with exposed or

open process basins. Ormond Beach's facility is subject to this rule and covering the filters is a proposed improvement. Funding details are included within Section IV.

(b) High Service Pumping and Storage

The high service pump station at Ormond's WTP is outfitted with two 200 HP, two 100 HP and one 75 HP high service pumps. The piping and controls have been configured to allow for future outfitting of three additional pumps. Three additional 125 HP high service pumps were provided with the 4.0 mgd LPRO membrane expansion. These pumps are located in the existing high service pump building and connected to the existing 24-inch suction and discharge pipes. Each of the new pumps deliver 1,750 gpm at a TDH of 170 ft. These three additional high service pumps increase the total installed high service pumping capacity from 11,000 gpm (15.9 mgd) to 16,250gpm (23.4 mgd) and the firm pumping capacity from 7,500 gpm (10.8 mgd) to 12,750 gpm (18.4 mgd).

(c) Water Distribution

The piping system is composed of a series of looped major distribution lines, a series of smaller loops and some individual dead end lines. **Table 3-2** is a tabulation by pipe size of the City's distribution lines. **Figure 3-2** is a schematic of the City's water distribution pipelines.

N

N.T.S

ORMOND BEACH WTP

Legend

- City Limits
- Current Service Area

Water Facilities

- Potable Elevated Tank
- Ground Storage Tank
- Tank/Pump Station
- Potable Pump Station

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CITY OF ORMOND BEACH WATER SUPPLY PLAN

POTABLE WATER NETWORK

FIGURE 3-2

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File: OB35 water supply facilities_POTABLE WATER

Table 3-2
Potable Water Distribution Inventory

Pipe Diameter	Mainland Length (ft)	Peninsula Length (ft)	Total Length (ft)
2" and less	277,372	202,430	479,802
2.5"	671		671
3"	1,628	365	1,993
4"	59,738	8,817	68,555
6"	382,419	239,667	622,086
8"	401,191	128,626	529,817
10"	68,604	11,064	79,668
12"	131,428	25,061	156,489
14"	689		689
16"	63,884	6,540	70,424
18"	3,525		3,525
24"	2,764		2,764
Total Lengths	**1,393,913**	**622,570**	**2,016,483**

B. Reclaimed Water Facilities

The City of Ormond Beach operates a public access reclaimed water system. The source of all reclaimed water produced and distributed in the system is treated effluent generated at the City's Regional Wastewater Treatment Plant (WWTP) at 550 N. Orchard Street. The reclaimed water system is regulated by the Florida Department of Environmental Protection (FDEP) under the terms of operating permit # FL0020532, expiring August 17, 2008.

The reclaimed water system includes the following primary components:

- One (1) 3.0 MG pre-stressed concrete ground storage tank (GST)
- One (1) WWTP high service pump station
- One (1) 'Melrose' booster pump station
- 80,000 LF+/- distribution piping

A 4.0 MG ground storage tank and new high service pump station is under construction adjacent to the existing 3.0 MG GST located at Public Works. The Melrose pump station will be demolished after the new high service pump station is constructed. Details of the facility are included in Section 5.5. A map depicting the primary system components, for the existing system is included herein as **Figure 3-3.**

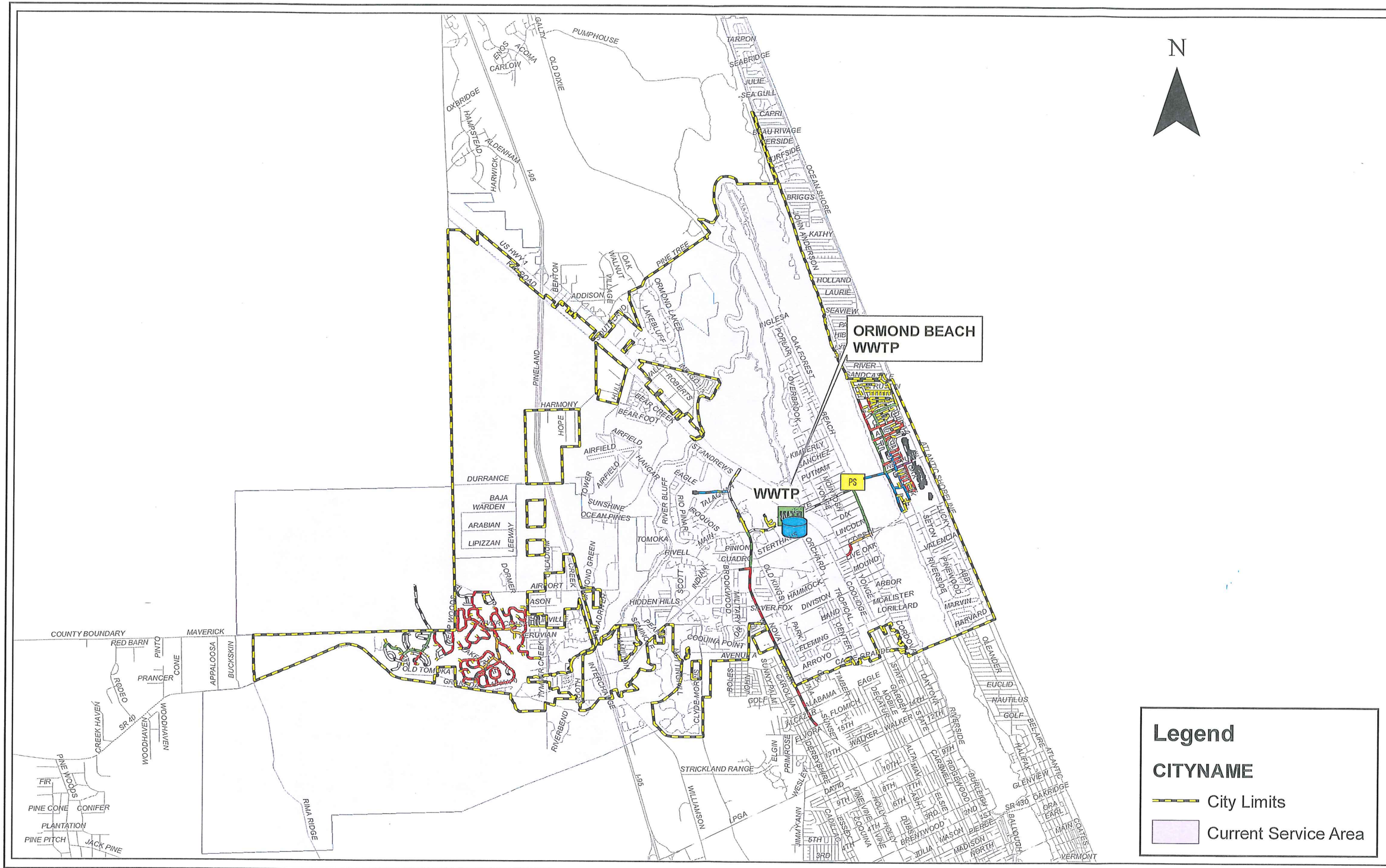
(1) Historical Flows and Available Reclaimed Water Supply

The City of Ormond Beach currently provides reclaimed water service to Oceanside Country Club, Tomoka Oaks Country Club and beachside residents. As of June 2007, the City had 2,283 active reclaimed water connections. During 2006, average reuse flows were 1.63 MGD and the peak month reuse flow was 2.71 MGD. Peak month wastewater flow was 4.21 MGD in February 2006.

Table 3-3 2006 Wastewater and Reuse Flow indicates influent flow and reclaimed water utilization for 2006.

Table 3-3
Wastewater and Reuse Flow

Month	Total Influent Flow	Flow to Reuse	Flow to Surface	% Reused
January	3.628	1.33	2.298	37%
February	4.214	0.88	3.334	21%
March	3.455	1.3	2.155	38%
April	3.507	1.43	2.077	41%
May	3.565	1.97	1.595	55%
June	3.455	1.52	1.935	44%
July	3.774	1.91	1.864	51%
August	3.575	2.05	1.525	57%



File: 0835 water supply facilities_RECLAIMED WATER

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CITY OF
ORMOND BEACH
WATER SUPPLY PLAN

RECLAIMED WATER
NETWORK

FIGURE 3-3

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DESIGNED		DATE		SCALE AS SHOWN	SHEET NO.
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APPROVED		DATE			

Month	Total Influent Flow	Flow to Reuse	Flow to Surface	% Reused
September	3.759	1.63	2.129	43%
October	3.13	1.1	2.03	35%
November	3.31	1.67	1.64	50%
*December	3.88	2.71	1.17	70%
TOTAL	43.252	19.5	23.752	
Average	**3.60**	**1.63**	**1.98**	**45%**
Maximum		2.71	3.334	
Minimum		0.88	0.931	

* Tomoka Oaks G.C. began using reuse

Current average annual reclaimed water demand (2006) is approximately 1.63 MGD, representing 45% of the influent flow. Average daily flows during peak months are 30% higher, approximately 2.1 MGD. Influent flows during peak irrigation months are typically 20% lower than average; Therefore, peak reuse demand occurs during months with the lowest WWTP influent flow.

Current reclaimed water availability is calculated as follows:

Average annual reuse demand =	1.63 MGD
Peak period reuse demand =	2.1 MGD
2006 average annual WWTP influent =	3.6 MGD
Average annual available reclaimed water =	3.6 MGD – 1.6 MGD = 2.0 MGD
'Peak Month' available reclaimed water =	3.6 MGD – 2.1 MGD = 1.5 MGD

Review of existing customer records indicated that average reclaimed water irrigation, per account, is approximately 500 GPD – 900 GPD. This is based upon water use records for beachside residents and irrigation data for Hunter's Ridge. For example, 2,282 beachside reuse customers used approximately 1.1 MGD (annual average). Resultant annual average demand is 482 GPD/account. In Hunter's Ridge and Breakaway Trails, there are 1,285 customers and average annual irrigation demand in 2006 was 1.34 MGD. Resultant per capita demand

is 933 GPD/account. Note: Customers in Hunter's Ridge and Breakaway Trails are currently using raw water and stormwater, not reuse.

Two (2) other sources of reuse which will become available are:

1. Holly Hill Interconnect, 0.5 MGD
2. Water Plant Concentrate, 0.5-1.0 MGD
   Total new sources = 1.0-1.5 MGD

The City connected Tomoka Oaks Golf Course to the reuse distribution system. This customer is using 0.25 MGD (annual average) and 0.35 MGD (peak month). Additional demand from Tomoka Oaks reduces average and peak month reuse availability to 1.75 MGD and 1.15 MGD, respectively.

The conclusion to be drawn is that the customer base needs to be expanded in order to decrease the amount of surface water discharge to the Halifax River decisions were made regarding the most cost effective areas to serve. These decisions are a pre-requisite to establishing short term (1-5 years) project recommendations.

We have evaluated two (2) options for reclaimed water system expansion. The two (2) options are:

- Option 'A' South Peninsula Reclaimed Water Distribution
- Option 'B' Western Service Area Reuse Expansion, (selected option)

(2) Reclaimed Water Service Options

(a) Option 'A' South Peninsula Reclaimed Water Distribution

Reclaimed water service is currently provided to beachside customers north of Granada Boulevard up to Sandcastle Drive. The 'South Peninsula' project

involves retrofitting existing residential and business areas south of Granada Boulevard to Harvard Drive. Approximately 1,700 potential customers are located in the service area. Estimated annual average demand from the area is approximately 820,000 GPD. Estimated peak, month reuse demand in the area is 1.1 MGD.

Retrofitting reclaimed water within existing areas is costly. An estimated cost to serve the area is approximately $11 million. The estimated unit cost for this project is $13.41/GPD.

(b) Option 'B' Breakaway Trails and Hunter's Ridge Reuse Extension

This project involves construction of new reuse transmission mains, and conversion of old force mains, to serve existing and new irrigation customers in Breakaway Trails, Hunter's Ridge, and Riverbend Golf Course.

There are currently 1,285 irrigation customers in Breakaway Trails and Hunter's Ridge. The customers are currently served using raw water (groundwater) which is pumped from storage tanks into a dedicated irrigation pipe network. Average annual use in 2006 was 1.34 MGD, peak use is significantly higher. In many cases, peak use exceeds the raw water supply capability. In these cases, irrigation service is suspended until adequate storage volume is recovered. It is significant to note that the irrigation pipe network also provides fire protection for this area. Reclaimed water is necessary to reduce groundwater demand and comply with CUP conditions that limit withdrawals to 0.51 MGD.

Another significant customer in the area is Riverbend Golf Course. The estimated irrigation demand for Riverbend is approximately 0.3 MGD. Total estimated annual average demand in the area is 1.5 MGD, estimated peak month demand is 2.25 MGD.

In order to serve the area, a series of improvements are required. Two (2) project phases are recommended. Phase I involves extension of a reuse main to Riverbend Golf Course, a Booster pump at Riverbend, conversion of the existing force main to reuse and new transmission mains to Breakaway Trails and Hunter's Ridge. Estimated Phase I costs are **$4.1 million**. Phase II is a parallel 12" transmission main on Airport Road from Riverbend to Breakaway Trails. It will increase transmission capacity to satisfy peak demands. Estimated Phase II costs are **$1.8 million**. The estimated unit cost for this project is $3.93/GPD. A comparison of the projects is detailed below:

OPTION	DESCRIPTION	AVG ANNUAL DEMAND (GPD)	ESTIMATED COST ($)	UNIT COST ($/GPD)
A	S. Peninsula Reuse Distribution	850,000	$11,000,000	$12.94
B	Western Service Area Reuse Transmission,(I & II)	1,500,000*	$5,900,000	$3.93

* This number will be reduced if customers are charged based on demand.

Conclusion: Option 'B' was approved by the City Commission.

Section IV

Water Use and Capital Needs

A. Historic Water Use

In Section I of this report we summarized historical water use in terms of total flow and per capita usage. In 2006, an approximate service area population of 55,667 used an average of 7.59 MGD.

This year was an anomaly and represents significantly higher per capita consumption than previous years. Table 4-1, below, details flows for the previous 10 years. Average gross per capita demand since 2001 is 122 GPCD.

Table 4-1
Historical Population and Flow Data

Year	Service Area Population	Treated Water Pumped (mgd)	Raw Water Flow (mgd)	HR & BT Flow (mgd)	Total Ground Water Flow (mgd)	Average Per Capita Treated (gpcd)	Average Per Capita Ground (gpcd)
1997	48,396	5.09	5.01	0.63	5.64	105	118
1998	50,236	5.41	5.34	0.81	6.15	108	127
1999	51,373	5.59	5.61	0.64	6.25	109	127
2000	51,673	5.76	5.72	0.82	6.26	111	123
2001	52,373	5.50	5.50	0.72	6.22	105	120
2002	52,976	5.60	5.56	0.66	6.22	106	119
2003	53,698	5.65	5.61	0.58	6.19	105	116
2004	54,373	6.30	5.89	0.59	6.48	116	120
2005	55,056	6.42	5.92	0.75	6.67	117	122
2006	55,667	6.98	6.25	1.34	7.59	125	136
Averages						**110**	**122**

1. Treated water pumped includes plant recirculation flows
2. HR & BT Flow represents groundwater used for irrigation in Hunter's Ridge and Breakaway Trails
3. Historical population based upon CUP and TAZ data.

Projected population and demand growth through 2025 includes SJRWMD population and BEBR demand projections through 2025. The projections come from SJ2004-SP19, 'Population and Water Usage Projection for Volusia County' by Burton & Associates. The Burton & Associates (B&A) study used census data, BEBR data, land use, historic growth trends, discussions with cities about anticipated developments of regional impact (DRIs), and potential new job centers to generate population projections for each utility service area. These population projections were then modified to reflect additional demand associated with the southwest service area and Ormond Crossings D.R.I. The population data was then multiplied by the per capita water usage to obtain demand projections. The projected population is higher than the B & A report; however, the estimated water demand is consistent with both the SJRWMD data and the City's C.U.P. allocations. Per capita use also increases due to concentrate waste associated with the R/O process. Population and flow projections are detailed in Table 4-3.

B. Demand Analysis and Projections

(1) Current CUP Status

The primary constraint limiting the City's groundwater withdrawals is defined in Ormond Beach's Consumptive Use Permit, (C.U.P.). St. Johns River Water Management District issued CUP #8932 in May 2004. It expires May 2024; conditions in the permit allow for evaluation and updating by SJRWMD at five (5) year increments. Maximum annual groundwater withdrawals and maximum daily withdrawals are specified in the permit. The permitted allocations are adequate to satisfy projected demands, with certain constraints. The constraints relate to irrigation demand and concentrate withdrawals associated with the new R/O process.

As detailed within Table 4-3, the projected withdrawals are dependent upon reducing irrigation demand in Breakaway Trails and Hunter's Ridge and limiting the volume of concentrate required for water treatment. A tabular listing of permitted and projected withdrawals is detailed below:

Table 4-2
Projected Water Demand and Supply

Year	Utility Service Area Population		Water Demand (mgd)			Water Supply (mgd)			Surplus/ Deficiency
			Potable	Non-Potable	Total	Traditional	Alternative	Reclaimed	
2008	In City	-	4.77	0.60	5.27	7.25	-	-	0.05
	Outside	-	1.86	-	1.86				
	Total	57,911	6.63	0.60	7.23				
2009	In City	-	5.00	0.40	5.40	7.39	-	-	0.09
	Outside	-	1.95	-	1.95				
	Total	59,033	6.95	0.40	7.35				
2010	In City	-	5.13	0.40	5.53	7.53	*0.05	-	0.06
	Outside	-	1.99	-	1.99				
	Total	60,546	7.12	0.40	7.52				
2011	In City	-	5.31	0.20	5.51	7.55	*0.05	-	0.02
	Outside	-	2.07	-	2.07				
	Total	61,391	7.38	0.20	7.58				
2012	In City	-	5.38	0.20	5.58	7.69	*0.05	-	0.07
	Outside	-	2.09	-	2.09				
	Total	62,236	7.47	0.20	7.67				
2013	In City	-	5.52	0.20	5.72	8.08	**0.55	-	0.71
	Outside	-	2.15	-	2.15				

Year	Utility Service Area Population		Water Demand (mgd)			Water Supply (mgd)			Surplus/ Deficiency
			Potable	Non-Potable	Total	Traditional	Alternative	Reclaimed	
	Total	63,081	7.67	0.20	7.87				
2014	In City	-	5.59	0.20	5.79	8.22	**0.55	-	0.76
	Outside	-	2.18	-	2.18				
	Total	63,926	7.77	0.20	7.96				
2015	In City	-	5.65	0.20	5.85	8.36	**0.55	-	0.81
	Outside	-	2.20	-	2.20				
	Total	64,771	7.85	0.20	8.05				
2016	In City	-	5.72	0.20	5.92	8.51	**0.55	-	0.86
	Outside	-	2.23	-	2.23				
	Total	65,616	7.95	0.20	8.15				
2017	In City	-	5.79	0.20	5.99	8.6	**0.55	-	0.86
	Outside	-	2.25	-	2.25				
	Total	66,461	8.04	0.20	8.24				

(1) Traditional is based on CUP groundwater allocation. CUP issues on 5//11/04; expires 5/11/24.
(2) Supply from Western Ormond Beach Reclaimed Water Distribution Project
(3) Supply from reclaimed projects not considered AWS.

* Alternative water supply project Reuse Storage and pumping (2009-2012) realizes a 0.05 MGD resource for irrigation due to increase in system reliability and storage capacity.
** Alternative water supply project Western Reclaimed Water Distribution (2013-2017) results in alternate irrigation resource for 0.50 MGD on existing allocation based on areas served at Hunter's Ridge and Breakaway Trails.

In addition to annual average and maximum groundwater withdrawals, the permit specifies average and maximum withdrawal rates from the six (6) wellfields. The following **Table 4-4**, details permitted withdrawals.

Table 4-3

City of Ormond Beach
Permitted Average Daily Withdrawals From Each Wellfield

Year	Division Avenue	State Route 40	Hudson	Rima Ridge	Water Plant	Breakaway Trails
2004	2.48	0.51	1.30	2.16	0.12	0.51
2005	2.49	0.48	1.30	2.55	0.12	0.51
2006	2.50	0.50	1.30	2.66	0.12	0.51
2007	2.50	0.50	1.30	2.74	0.12	0.51
2008	2.50	0.52	1.30	2.82	0.12	0.51
2009	2.50	0.53	1.30	2.88	0.12	0.51
2010	2.50	0.54	1.30	2.95	0.12	0.51
2011	2.50	0.55	1.30	3.01	0.12	0.51
2012	2.50	0.56	1.36	3.04	0.12	0.51
2013	2.50	0.57	1.42	3.08	0.12	0.51
2014	2.50	0.58	1.48	3.15	0.12	0.51
2015	2.50	0.59	1.54	3.22	0.12	0.51
2016	2.50	0.60	1.60	3.30	0.12	0.51
2017	2.50	0.61	1.68	3.30	0.12	0.51
2018	2.50	0.62	1.76	3.30	0.12	0.51
2019	2.50	0.63	1.84	3.30	0.12	0.51
2020	2.50	0.64	1.92	3.30	0.12	0.51
2021	2.50	0.65	2.00	3.30	0.12	0.51
2022	2.50	0.65	2.00	3.30	0.12	0.51
2023	2.50	0.65	2.00	3.30	0.12	0.51
2024	2.50	0.65	2.00	3.30	0.12	0.51

Current permit allocations are adequate to satisfy projected demands through 2021. Implementation of reclaimed water service to Hunter's Ridge and Breakaway Trails will allow a reduction in groundwater withdrawals to satisfy system demand without exceeding permitted allocations.

It should be noted that a modification of interim CUP allocations may be necessary to meet demand associated with R/O concentrate. The original CUP only assumed a total concentrate demand of 0.4 MGD. The plant size was increased to 4.0 MGD, estimated recovery is 80% with concentrate flows of 20% or 0.8 MGD at 4.0 MGD flow. Therefore, modification of the City's CUP may be required. The modification request would be limited to a change of interim allocations, not the total permitted allocation.

C. Source Needs Assessment

Currently, SJRWMD has not identified groundwater deficits associated with future aquifer withdrawals from the Ormond Beach wellfields through 2020. Implementation of MFL Legislation has the potential to change regional deficit projections. Another potential constraint associated with the MFL issue is the cumulative effect of groundwater withdrawals.

SJRWMD has the legislative authority to limit Consumptive Use Permit (CUP) allocations for individual permit holders based upon cumulative groundwater withdrawals, and their potential effect upon MFL's. Therefore, future regional groundwater deficits may be assigned countywide, but not on a utility-by-utility basis. In the event that this occurs, Ormond Beach should be prepared to meet future demands utilizing traditional and alternative sources as detailed below.

(1) Groundwater

At the time of this writing, the City of Ormond Beach has existing, firm raw water supply capacity of 9.08 MGD. Permits have been obtained and funds budgeted to construct seven (7) new wells during FY'07, FY'08, and FY'09. Upon completion of the new wells, the City will have a firm capacity of 12.9 MGD, sufficient to satisfy peak demands for the duration of the study period.

Similarly, the City's C.U.P. establishes groundwater withdrawal allocations through 2024. Review of projections indicates that currently permitted allocations are sufficient to satisfy groundwater demands through 2022. Therefore, the City has a combination of existing and proposed groundwater sources which are capable of satisfying existing and proposed raw water supply needs.

(2) Brackish Groundwater

The new 4.0 MGD water treatment plant expansion will enable full utilization of existing and proposed wells, including those with elevated chlorides. Current C.U.P. conditions require utilization of lower quality water sources. Four of the City's proposed wells are in the Division Avenue wellfield. Potential exists for a gradual decline in water quality from these wells. Additional wells will provide rotational capacity. Wells constructed into the LFA have potential to provide significant yield. Water from the LFA is expected to be brackish, 2,000 – 5,000 mg/L chlorides, but it may be blended to produce a raw water which is compatible with the City's new membrane process. Further evaluation of the alternative water source (AWS) is warranted. A test well program is recommended to accomplish this goal.

(3) Conservation and Demand Reduction

Existing WAV sponsored conservation programs such as low-flow showers and toilets, rain sensors for lawn irrigation, xeriscape and educational programs will stay in effect. The use of reclaimed water to supplement and replace groundwater usage is proposed.

Currently, groundwater is used for irrigation in Hunter's Ridge and Breakaway Trails. Extension of reuse mains to satisfy this need will reduce groundwater usage by approximately 0.5 MGD. This project is contained in the Western Ormond Beach Reclaimed Water Distribution Project scheduled for completion in

FY'12-'13. A low interest State Revolving Fund (SRF) loan is proposed to fund this work.

(4) Facility Work Plan Capital Needs

A series of raw water supply, potable treatment and reclaimed water projects have been identified to meet the City's existing and future water supply needs. All projects detailed herein have a dedicated funding source.

Section V

Listing of Projects

A. Water Supply Projects

Ormond Beach will rely on a combination of fresh and brackish groundwater throughout the study period. Construction of its new 4.0 MGD R/O treatment plant represents a long term commitment to utilizing this raw water source. New wells are necessary to provide additional raw water for new development and rotational purposes. The following projects are proposed for construction during this study period.

(1) Project WS-1, Rima Ridge Wells

Construction of three (3) additional wells within the Rima Ridge wellfield. One (1) new emergency power generator for all three wells. The City's existing Consumptive Use Permit provides for the new wells.

Proposed new wells #54, 55, and 56 are 12" diameter with a cased depth of 120' and total depth of 300'. Estimated withdrawal capacity from each is approximately 450 GPM (0.65 MGD) for a total additional capacity of 1.94 MGD. The project is funded for construction in FY'08-'09. **Estimated project cost is $1,020,000**, this amount is included in the FY '08-'09 C.I.P.

(2) Project WS-2, Division Avenue Wellfield Replacement Wells

The City's CUP issued by the St. John's River Water Management District (District) requires the City to continue operation of the Division wellfield. It is

projected that 2.5 million gallons per day (annual average) will be withdrawn from the Division wells through the duration of the 20 year CUP. Although the eastern wells are lower in quality, by blending the higher quality western wells in the Rima Ridge wellfield and Hudson wellfield the City's water quality goals can be achieved and the investment in the eastern wellfields can be maximized.

Furthermore, the City would satisfy the Water Management District's desire to use alternate, lower quality water supplies. The expansion of the water plant by 4 million gallons per day using low pressure reverse osmosis (LPRO) technology will allow better utilization of this lower quality source. Due to their age (constructed between 1969 and 2003) and deterioration, new wells must be drilled and equipped to replace the old, deteriorated wells. Two wells, 16 and 17, had to be abandoned due to the Division Avenue resurfacing and Nova Road widening projects and were replaced. Well 18 is currently not in production. The well does not meet the setbacks required in our well protection ordinance and is scheduled to be abandoned this year. Well 7 is no longer in use and is scheduled to be abandoned as well.

Wells 7A and 18A will be constructed in FY '08-'09 to replace Well 7 and Well 18 at the Division Avenue Wellfield and Wells 1 and 2 at the water plant. An amount of $880,000 is allocated in FY '08-'09 to construct these wells. These two wells are included in the five year Capital Improvements Program.

Table 5-1
Proposed Wells

City Well #	Wellfield	Status	Casing Dia.	Well Depth	Pump HP	Design Cap. (GPM)	Design Cap. (MGD)
7A	Division	Proposed	12"	200'	15	320	0.46
18A	Division	Proposed	12"	200'	15	320	0.46
54	Rima Ridge	Proposed	12"	300'	40	450	0.65
55	Rima Ridge	Proposed	12"	300'	40	450	0.65
56	Rima Ridge	Proposed	12"	300'	40	450	0.65
			Total Proposed Capacity			**2,630**	**3.79**

B. Treatment Plant Projects

(1) Project WT-1, 4.0 MGD R/O Expansion

Timing of the expansion of the water plant is related to the necessity of meeting the maximum day demand. Maximum day demands have consistently exceeded 75% of capacity (6MGD) since 1998. A recently completed sanitary survey of the water system by the Volusia County Environmental Health Department stressed the need to plan and implement capacity expansion in accordance with Chapter 62-555.348 F.A.C..

Based upon projected growth and related consumption trends, the 4.0 MGD expansion will provide necessary capacity beyond 2025. The Master Plan identified the need to upgrade both the sludge handling and aeration systems in order to maintain efficient and cost effective operation of the Water Plant, prevent undue corrosion impacts on the treatment plant structures, and prevent odor complaints from the surrounding community. The rehabilitation of the aerator structure and retrofitting with an off-gas odor scrubber will maximize operator safety, minimize corrosion, and prevent offsite odor generation. The sludge

handling improvements include a centrifuge to dewater lime sludge; a byproduct of the lime softening process. This centrifuge provides needed redundancy and reliability.

The Ormond Beach Consumptive Use Permit directs the City to continue to withdraw water from the Division wellfield. There has been a slow deterioration of water quality in this wellfield. Using a low pressure RO process provides the treatment necessary to remove salt from this slightly brackish wellfield and allows maximum operational flexibility in overall wellfield operation. A by-product of the low pressure RO process is concentrate, a liquid waste steam containing a high concentration of the minerals and salts present in the ground water treated in the RO process that must be disposed of.

Existing, abandoned pipelines are used to transport the concentrate from the water plant to the wastewater plant where it is blended with the reclaimed water for augmentation of the reuse system. Excess blended reclaimed water is discharged to the Halifax River which is the current practice.

The project has been constructed and was funded utilizing a variety of funding sources: SJRWMD Grants, Utility Revenue Bonds, and Water Impact Fees. Funding spans two budget years, FY '06-'07 – FY '07-'08. **Total construction cost was $15,317,434.**

(2) Project WT-2, Lime Softening Area Upgrades

The lime softening process at the water plant has a rated treatment capacity of 8.0 MGD. There are 2 softening basins. These are steel 'claricone' units which have been in continuous service for nearly 20 years. The structures are in need of rehabilitation and painting.

Effluent launders which convey softened water from the claricones to the recarbonation basin is severely deteriorated. The support platforms and access stairs are also severely corroded. Replacement of both the launders and platforms is required.

Recarbonation is not currently used. CO_2 storage and feed facilities were taken out of service and never replaced. A new 30 ton CO_2 storage and feed system is proposed under the scope of this project. The system will improve the efficiency of the lime softening process, increase filter media longevity and decrease backwash frequency.

Bids were received for the project in June 2006. The low bid was $2,691,000. A 'Notice to Proceed' was issued August 1, 2007. The project was completed.

C. Reclaimed Water Projects

Ormond Beach has potential reclaimed water customers who are currently using groundwater for irrigation. Reclaimed water main extensions are proposed to serve customers at Hunter's Ridge, Breakaway Trails, and Riverbend Golf Course. Estimated annual average demand from these sites is approximately 1.5 MGD. In addition to reclaimed water mains, the City is constructing a 4 million gallon storage tank and pump station to better serve existing and future customers. Descriptions, estimated costs, and funding sources are listed below:

(1) Project RW-1, Orchard Street Reuse Storage Tank and Pump Station

This project was previously identified as the Ormond Beach North Peninsula Reclaimed Water Storage Project (also known as the Reuse Storage and Pumping Facility) The proposed storage tank location was changed to the Public Works area due to citizen opposition to a storage tank in their

neighborhoods and the tank size increased to 4.0 million gallons. This project is currently denoted in the Capital Improvements Plan as the Reuse Storage and Pumping Facility and is scheduled for completion in March 2009.

The project includes a 4 MG ground storage tank, high service pump station, and piping modifications. The new pump station will have a firm capacity of 6,800 GPM (9.8MGD) and may be expanded by an additional 9,800 GPM (14.1 MGD) with the addition of a fourth high service pump. Project is scheduled for completion in FY '08-'09. It is listed in the FY '08-'09 C.I.P. as a budgeted expense. **Total estimated project cost is $2,910,000.**

The Western Ormond Beach Reclaimed Water Distribution Project scheduled for completion in FY'12-'13 contains the elements listed in projects RW-4, RW-5, RW-6 and RW-7 A low interest State Revolving Fund (SRF) loan is proposed to fund part of this work. Specifics of the projects are identified below.

(2) Project RW-4, Airport Road Force Main Reuse Conversion

Upon completion of the Airport Road force main extension, the existing 10"diameter force main from Breakaway Trails to Nova Road will become inactive. The Airport Road Force Main is presently scheduled for completion in FY '08-'09 at an estimated cost of $3,200,000. Conversion of the force main to reuse service will enable service to Breakaway Trails and Hunter's Ridge. The project should be constructed in parallel with projects RW-6, RW-7, and RW-8 as a 'short term' project. Estimated costs for the force main conversion are indicated below. The project will be funded in FY '09-'10 using an SRF loan. **Total estimated project cost is $230,000.**

(5) Project RW-5, US-1 Reuse Transmission Main

In order to convey reclaimed water to the Western Service Area, a 20" diameter transmission main is necessary. Peak flows in excess of 3,000 GPM are estimated to serve future needs. The proposed reuse main will operate in parallel with the existing 10" force main being converted to reuse service. It is a 'short term' project. Estimated project costs are detailed below:

ITEM	DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
1	20" PVC or DIP Reuse Main	5,000	LF	$130/LF	$650,000
2	20" HDPE Directional Drill	1000	LF	$250/LF	$250,000
3	Valves and Fittings	1	LS	$60,000	$60,000
4	Tie-Ins	2	EA	$15,000	$30,000
				Construction Sub-Total	$990,000
				Engineering, C.A., and Inspection @ 15%	$148,500
				Contingency @ 30%	$301,500
				TOTAL ESTIMATED COST	**$1,440,000**

(6) Project RW-6, Riverbend Golf Course Tie-In and Booster Pump

A 16" reuse main is proposed to service Riverbend Golf Course. The pipeline can feed a Golf Course irrigation pond or tie-in directly to the suction of the Golf Course irrigation pumping system. It is recommended that an irrigation pond or storage tank be provided at the Golf Course. A separate 'in-line' Booster pump is recommended the serve Breakaway Trails and Hunter's Ridge. It should be constructed as a 'short term' project. The Booster pump is an interim measure until the Airport Road Reuse Support Main (Project RW-13) is constructed. The project will be funded through the SRF loan program.

ITEM	DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
1	16" Reuse Main	6,000	LF	$100/LF	$600,000
2	Tie-Ins	2	EA	$15,000	$30,000
3	Valves and Fittings	1	LS	$50,000	$50,000
4	Booster Pump	1	LS	$120,000	$120,000
				Construction Sub-Total	$800,000
				Engineering, C.A., and Inspection @ 15%	$120,000
				Contingency @ 35%	$280,000
				TOTAL ESTIMATED COST	**$1,120,000**

(7) Project RW-7, Breakaway Trails and Hunter's Ridge Reuse Tie-In

Utilizing the converted 10" force main necessitates separate tank fill lines. The proposed reuse mains will allow the storage tanks to be filled from an independent transmission main. It should be constructed as a 'short term' project. Both Breakaway Trails and Hunter's Ridge have dedicated storage tanks and pump stations. The project will be funded through the SRF loan program.

ITEM	DESCRIPTION	QTY	UNIT	UNIT COST	TOTAL
1	12" PVC Reuse Main	3,000	LF	$85/LF	$255,000
2	10" PVC Reuse Main	6,500	LF	$60/LF	$390,000
3	12" HDPE Directional Drill	500	LF	$200/LF	$100,000
4	10" HDPE Directional Drill	500	LF	$150/LF	$75,000
5	Valves and Fittings	1	LS	$60,000	$60,000
6	Tie-Ins	3	EA	$15,000	$45,000
7	Driveway Replacement	1	LS	$100,000	$100,000
				Construction Sub-Total	$1,025,000
				Engineering, C.A., and Inspection @ 15%	$153,750
				Contingency @ 31%	$321,250
				TOTAL ESTIMATED COST	**$1,500,000**

D. Funding Sources

The City of Ormond Beach can utilize several revenue sources to meet system maintenance and upgrade requirements. The revenue sources include the following:

1. Retail user charges
2. Wholesale user charges
3. Service charges
4. Interest income
5. Bond Proceeds
6. SJRWMD Grants
7. Hydrant rental
8. Reclaimed water user charges
9. Connection fees
10. Development fees
11. Loans

These revenue sources have been tracked over a long period and can be reliably projected through the next three (3) fiscal years. The retail user charge is the primary revenue source that must be adjusted to meet the revenue required by the utility.

The City's Water and Sewer Operating Budget for FY '07 is approximately $14 million. The budget includes a capital improvement program (CIP) of $9,130,000 in FY '07.

The City's utility budget includes an extensive Capital Improvement Program (CIP) each year. Estimated expenditures for the next five (5) years (FY '07-'08 – FY '09-'10 are listed below:

YEAR	WATER AND SEWER PROJECTS	WATER PROJECTS	WASTEWATER AND RECLAIMED WATER PROJECTS *
FY '07-'08	$9,133,000	$3,218,000	$5,915,000
FY '08-'09	$14,471,500	$2,741,500	$11,730,000
FY '09-'10	$5,009,000	$1,419,000	$3,590,000
FY '10-'11	$6,079,000	$799,000	$5,280,000
FY '11-'12	$5,149,000	$799,000	$4,350,000

* SRF loan funding proposed for reclaimed water projects RW-4,5, 6, and 7 are not included in the current CIP.

The Summary of Water Supply Projects list is compiled from the 5-year Capital Improvement Program. All of the projects needed to satisfy the 10-year planning horizon are included in the 5-year Capital Improvements Program. Population and future projections are provided through 2025 in order to be consistent with regional planning groups.

The current CIP and proposed committed funding includes projects identified herein. A listing of major water supply related projects, estimated costs and proposed budget year is included as **Table 5-2**.

Table 5-2
City of Ormond Beach
Summary of Water Supply Projects

Project #	Name of Project	Estimated Cost	Funding Schedule
WS-1	Rima Ridge Wells	$1,020,000	FY'08/'09
WS-2	Division Avenue Wellfield Replacement Wells	$880,000	FY '08/'09
WT-1	4.0 MGD R/O Expansion	$15,317,434	Completed
WT-2	Lime Softening Area Upgrades	$2,691,000	Completed

Project #	Name of Project	Estimated Cost	Funding Schedule
[1]RW-1	Reuse Storage and Pumping Facility	$2,910,000	FY '08/'09
RW-2	Holly Hill Reuse Interconnect	-	Completed
RW-3	US-1 Medians	-	Completed
[2]RW-4	Airport Road Force Main Reuse Conversion	$230,000	FY '09/'10 – FY '10/'11
[2]RW-5	US1 Reuse Transmission Main	$1,440,000	FY '09/'10
[2]RW-6	Riverbend Golf Course Tie-In and Booster Pump	$1,200,000	FY '11/'12
[2]RW-7	Breakaway Trails and Hunter's Ridge Reuse Tie-In	$1,500,000	FY '12/'13
	TOTAL	**$27,188,434**	

(1) A SJRWMD Grant was received for this project.
(2) A SRF Loan for $4.7 million is proposed to fund projects RW-4, 5, 6 and 7.