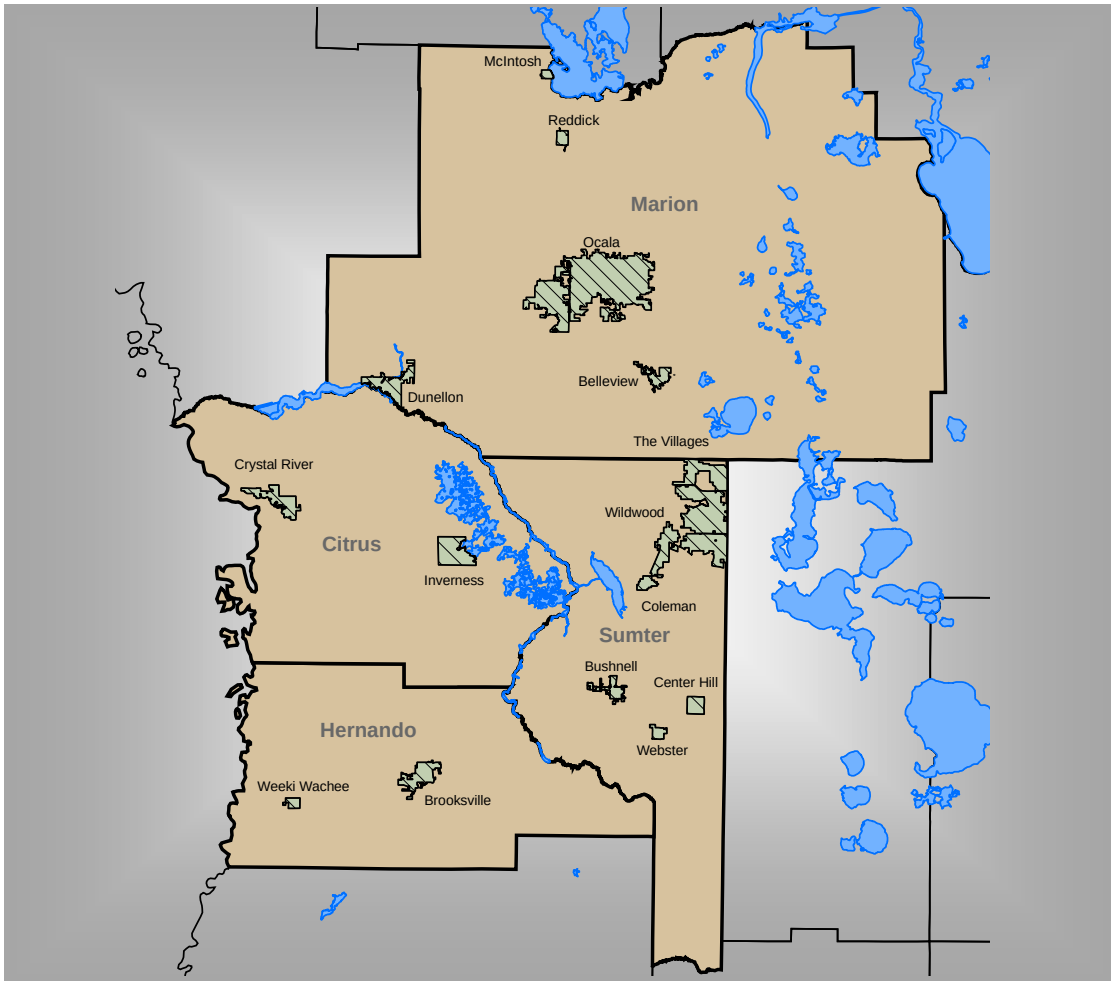
Withlacoochee Regional Water Supply Authority

Regional Framework Initiative



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Prepared for

Withlacoochee Regional Water Supply Authority

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Table of Contents

Chapter 1 – Introduction

Chapter 2 – Regional Framework Population and Water Demand

Chapter 3 – Water Resource Minimum Flows and Levels

Chapter 4 – Regional Framework Water Supply Project Options

Chapter 5 – Regional Framework Partnerships

Chapter 6 – Regional Framework Transmission Routes

Chapter 7 – Regional Framework Recommendations

Chapter 1 – Regional Framework Introduction

Water supply planning and development within the State of Florida has too often been a reactive process in recent years. Utilities and water supply authorities responding to increasing water demands have had to deal with environmental or water resource constraints when developing new sources of both traditional and alternative water. This has forced many to "play catch-up" with regard to water resource development to meet both existing and future water supply demands. This is particularly evident within the Southwest Florida Water Management District (SWFWMD) in which approximately two-thirds of its 10,200-square mile jurisdiction has been declared Water Use Caution Areas (WUCAs). The Southern Water Use Caution Area (SWUCA) covers all or parts of eight counties and is approximately 5,200-square miles. The Northern Tampa Bay Water Use Caution Area (NTBWUCA) covers all or parts of 3-counties and is approximately 1,500-square miles. (Figure 1-1)

Figure 1-1. SWFWMD - 2007

Water Use Caution Areas (WUCAs) are generally declared when existing or proposed water supply development is causing or could cause adverse environmental and/or water resource impacts (40D-2.801). Within SWFWMD overpumpage of groundwater has led to both environmental and water resource impacts that have severely curtailed the development of traditional water supplies, predominantly groundwater. Within the SWUCA, drawdown from groundwater pumpage within the Floridan aquifer has caused saltwater intrusion along the coastline and impacts to lake levels in the Highlands Ridge area of the District. Groundwater pumpage within the SWUCA is primarily due to agricultural and industrial uses (SWUCA Recovery Strategy, 2006). The NTBWUCA issues center on impacts to wetlands, lakes and base flow to rivers due primarily to groundwater pumpage from public supply wellfields. Historically the reliance on groundwater as the primary source of potable water for the Tampa Bay area has had significant and long lasting impacts to the environmental features of the region (SWFWMD RWSP, 2010).

In both the SWUCA and NTBWUCA examples, new water allocation rules, water management strategies, significant public investment in alternative water supplies and efforts to mitigate environmental impacts have and continue to occur. In both WUCAs a reactive response to water resource planning and water supply development has occurred and costs to the public, the water resource and the environment have been significant.

Fortunately the Withlacoochee Regional Water Supply Authority (WRWSA) has taken a proactive approach to future water supply development. The WRWSA consists of Citrus, Hernando, Marion and Sumter Counties and major municipalities within those counties. The majority of this area is within the Northern Planning Region of the SWFWMD (SWFWMD RWSP, 2010). The south-eastern portion of Marion County is located within the Priority Water

Resource Cautionary Area (PWRCA) of the St. Johns River Water Management District (SJRWMD) (SJRWMD RWSP, 2005).

In 2005 the WRWSA adopted a long range planning and water supply development plan titled, "Withlacoochee Regional Water Supply Authority Master Regional Water Supply Planning & Implementation Program" (MRWSP&IP). Increasing population projections and the resulting water demand at the time led the WRWSA Board of Directors to undertake a long range and comprehensive review of water demands, the availability of water and the development of an approach to meet future water demands based on the anticipated population growth. The MRWSP&IP was developed as a comprehensive approach to meeting the Northern Planning Region's future water supply demand in a coherent and comprehensive fashion.

The MRWSP&P was approved as the roadmap for water supply planning and development by the Authority. The basis of the program and the recommendation to the Board was as follows:

> **Background:** Rapidly growing areas throughout Florida are challenged to ensure that safe, adequate and sustainable water supplies are planned for and developed. It has become apparent to water managers and legislators alike that regionalizing water supply development in many cases can address water supply development in an environmentally sustainable and economically viable manner. Tampa Bay Water and the Peace River / Manasota Regional Water Supply Authority have demonstrated this. On-going, comprehensive master water supply planning and implementation processes have been undertaken in these regions of Florida to ensure adequate supplies and lessen the competition for water.
>
> **Issue:** The Withlacoochee region which includes the northern-most counties of the Southwest Florida Water Management District (District) is experiencing tremendous population growth, competition among major water users and demand on the area's remaining water resources. At the same time, the District is establishing Minimum Flows and Levels (MFLs) on waterbodies, watercourses and springs in the region, which will make the development of water supplies in the future ever more challenging. Fortunately, the region is still considered to be "ahead of the curve" in terms of water supply availability and if approached correctly and comprehensively, water supplies can be planned and developed in a manner to meet these demands.
>
> **Recommendation:** The Authority is proposing an on-going, comprehensive, multi-year planning, design and construction program to ensure that the region is engaged in a long-term water supply development process that meets growing demand, protects water resource and environmental attributes, and is completed in a cost-effective and timely manner. This comprehensive program is entitled, Withlacoochee Regional Water Supply Authority (WRWSA) Master Regional Water Supply Planning & Implementation Program (Program). The Program would be comprised of the following phases:

- Phase I – WRWSA 2005 Master Regional Water Supply Plan Update;
- Phase II – Feasibility Analysis of Proposed Water Supply Projects, Reclaimed Water Optimization and Water Conservation within the WRWSA;
- Phase III – Detailed Design of Selected Water Supply, Reclaimed Water and Water; Conservation Projects within the WRWSA;
- Phases IV & V – Construction and Implementation of Recommended Projects;

- Phase VI - Maintenance of the WRWSA Regional Water Supply Plan; and
- Phase VII - Northern District Modeling & Technical Support for Local Communities.

Phase I of the MRWSP&IP, completed in March 2007, was entitled, "Phase I – WRWSA 2005 Master Regional Water Supply Plan Update" Its purpose was to update the most recent WRWSA regional water supply plan that was completed in 1996. Phase I analyzed existing water use and projected future water demand. It also reviewed potential water supply projects and the impact of water conservation in the list of options to meet water demand.

Phase II of the MRWSP&IP was completed in April 2010 and entitled, "Phase II – Detailed Water Supply Feasibility Analyses." Its purpose was to update regional population and water demands and determine potential water supply projects to supply these needs. This was an effort to better understand the availability of traditional groundwater supplies, narrow the potential list of alternative water supply projects from the Phase I report and determine from different planning horizons when these projects would require implementation. Phase II also included conceptual designs and associated costs for the water supply projects.

The Phase II report contained over 30-recommendations that were organized into eight major categories including;

- Population and Water Demand;
- Data Collection and Monitoring;
- Regional Groundwater Assessment;
- Water Conservation;
- Reclaimed Water;
- Water Supply Options;
- Water Supply Partnership Opportunities; and
- WRWSA Regional Framework Initiative.

From these recommendations the WRWSA Regional Framework Initiative has been designated as priority work effort by the WRWSA Board of Directors. It was determined that the Regional Framework was a rational approach to current and future water supply planning and development. The objective of the Regional Framework is to develop a roadmap for water supply development within the region for WRWSA member governments. It also allows for the future introduction of Alternative Water Supplies (AWS) into the Northern Planning Region efficiently, economically and in an environmentally sensitive manner. The Regional Framework concept is the planning tool for the development of remaining traditional groundwater supplies in a manner that will allow the efficient introduction of regionally developed AWS.

Another objective of the Regional Framework is to begin the implementation of recommendations included in the Phase II report regarding short-term water supply development. This includes coordination with WRWSA members in developing water supply projects in a regional or sub-regional manner.

This Regional Framework Initiative report also looks at any potential changes that have occurred since the Phase II report was published. This includes:

- Population and water demand changes based on additional data, revised per capita rates and mandatory compliance per capita limits;

- Proposed or established MFLs compared to what was used as “proxy MFLs” in the Phase II report;
- Changes that may have occurred in proposed water supply projects including new alternatives;
- Summary of potential regional and sub-regional partnerships;
- Potential connections and routes for the Regional Framework; and
- A series of recommendations for the continued refinement and implementation of the Regional Framework.

Chapter 2 – Regional Framework Population and Water Demand

2.0 Key Points

Key Points

- This chapter analyzes and characterizes existing water and future water demand within the WRWSA compared to the Phase II report based on new computation methodology.
- New methodology includes updated average per capita rates and impacts due to compliance per capita limits.
- Water demand projections are evaluated on a planning horizon of twenty (20) years from 2010-2030.
- These demand projections provide critical input to capital improvement plans and long-range water supply policy.
- The majority of the water withdrawn in the WRWSA continues from groundwater sources.
- All water use categories are reflected in this chapter including public supply; domestic self-supply; industrial/commercial; mining/dewatering; power generation; agricultural; and recreational/aesthetic. These provide a comprehensive picture of current and future water demands in the region.
- When updated per capita rates and compliance per capita requirements are utilized WRWSA public supply usage within the WRWSA is reduced from 147.8 mgd to 126.3 mgd, a reduction of 21.5 mgd or 15% when compared to the Phase II projections.
- Public supply demands will continue to dominate compared to other water uses within the WRWSA representing 63% of the increase in 2030.
- Citrus County projected water use in 2030 decreased from 48.50 mgd to 42.90 mgd, or a 12% reduction.
- Hernando County projected water use in 2030 decreased from 62.48 mgd to 58.21 mgd, or a 7% reduction.
- Marion County projected water use in 2030 decreased from 106.66 mgd to 102.02 mgd, or a 4% reduction.
- Sumter County reflected a decrease in projected water use in 2030 dropping from 51.44 mgd to 44.48 mgd, or a 14% reduction.
- Total WRWSA current demand from all uses is estimated at 171.84 mgd. Total demand is expected to increase to 247.60 mgd in 2030. This total demand decreased by 21.5 mgd or 8% based on the new water demand computation method when compared to the Phase II report.

2.1 Introduction

The Phase II – Detailed Water Supply Feasibility Analyses updated the population and water demands that were published In the RWSPU, and extended the analysis from 2025 to 2030. The purpose of the Regional Framework Initiative is to further update the public supply water demands based on new projections, and the SWFWMD's requirement of utilities to maintain an average compliance per capita at or below 150 gallons per capita per day (gpcd) by December 31, 2019.

This update of population and water demand from the Phase II report includes existing and projected population and water demand for the designated planning horizon of 2030. A critical component of the WRWSA – RWSPU was existing (2005) and projected water demands (2025) which were used for determining the availability of water resources in the region.

Water use within the SWFWMD continues to increase at rate that potentially outstrips the availability of both traditional and AWS water. As mentioned, approximately two-thirds of SWFWMD is designated as a WUCA where alternative strategies for water management and water supply development are required. Addressing per capita water demand has been one tool that SWFWMD and SJRWMD have used to temper existing and future water demands. Water demand reduction through conservation has been a priority at the Districts for many years. They have encouraged water conservation through educational programs and by funding projects cooperatively with local governments and water utilities.

Target per capita rates, determined to be efficient water usage, were established by the Districts as goals for water users to meet. Now SWFWMD has taken the concept a step farther by making compliance per capita rates required through the District's regulatory program. Water conservation initiatives that target both indoor and outdoor water use and encourage the use of reclaimed water are incorporated in rules of SWFWMD. For the WRWSA member these requirements include:

- Calculation of per capita water use according to adopted Southern Water Use Caution Area rules, including service area population estimation methodology;
- Required submission of an annual per capita water use reports and associated data through an annual public supply survey;
- Refined service area delineation requirements and reporting for the enhanced use of GIS technology and accurate population estimation and projections;
- Utilities' per capita compliance of 150 gallons per person per day phased in over time (December 31, 2019); and
- Calculation of reclaimed and stormwater credits.

The Phase II report was developed using water demand projections that did not consider this compliance per capita conservation tool. The District's required water demand projections based upon estimated population multiplied by historical average per capita rates. Even though compliance per capita requirements were instituted by SWFWMD at the time Phase II was published they were not considered within the water demand projections. This artificially inflated the water demands within the WRWSA. Water conservation was discounted and the impact that the compliance per capita requirements would have on water demand was not used to calculate water demands over the short, mid and long-term water supply development horizons.

This chapter will incorporate and apply the SWFWMD public supply compliance per capita requirement for utilities. This will be used in lieu of average historical per capita rates to determine the difference in water demand estimated in the Phase II report. Water demands based on these conservation requirements will give a more accurate representation of potential future water demands because they are being enforced by the District's regulatory program.

Although the WRWSA is mainly concerned with public water supply, the analysis also summarizes water demands from other users in the area. Existing and projected water demands were determined for all water use categories, in the previous RWSPU and Phase II report. These numbers are also reflected in Chapter 2 Figures and Tables for reference purposes and use in determining potential impacts to the Regional Framework. These projections are consistent with the SWFWMD and SJRWMD Regional Water Supply Plans completed in 2010.

Demands from other users were determined on a county-by-county basis and projected over the planning horizon. This is important to gain a better understanding of overall water demand in the region and where this use will take place. Competition for traditional water and alternative water supply (AWS) development is not just between municipalities but will occur between all water users in the region. This includes the following water uses:

- Domestic Self-Supply;
- Industrial/Commercial;
- Recreation/Aesthetic; and
- Agricultural.

2.2 General Assumptions

The following are the general assumptions for the analyses of population and water demand for this chapter which are consistent with assumptions from the Phase II report. Exceptions include compliance per capita and updated member per capita rates.

- The Phase II used 2005 as the base year used for future population and water demands projections. The Regional Framework Initiative report also uses 2005 as the base year, with an updated 5 year average per capita (2005-2009), within SWFWMD;
- Water demand projections are evaluated through a 20 year planning horizon from 2010 to 2030. These values were provided by SWFWMD and SJRWMD in technical memoranda that were used for the district's regional water supply assessments. The year 2005 was also used as the base year by the water management districts;
- Only public supply water demands have been updated in this report. Domestic Self-Supply, Agricultural, Industrial/Commercial, and Recreational water use demands from the Phase II report have been included to demonstrate the potential impact of the updated public supply water demands on the total water use estimated for the WRWSA;
- Public supply water demands for Marion County have not been updated by the SJRWMD. The demands represented here reflect the same values that were published in the Phase II report;
- Water demands are reported in this document for the average annual effective rainfall conditions. The analysis of a one-in-ten (1-in-10) drought-year scenario (an event that

results in an increase in water demand of a magnitude that would have a 10 percent probability of occurring during a given year) for the Regional Framework was not considered;

- Public supply water demands in 2015 incorporate the SWFWMD's requirement for utilities to be at a midpoint in their per capita reduction of 150 gpcd by December 31, 2014. Public Supply water demands for utilities in 2020 will all be calculated at or below the required compliance per capita of 150 gpcd; and
- The majority of the water withdrawn in the WRWSA is from groundwater sources, with minimal surface water withdrawals or other AWS sources. Therefore, no analysis of the difference between groundwater and surface water demands is provided in this section. Potential future surface water sources are assessed in later sections.

2.3 Public Supply Water Demand

2.3.1 Introduction

Existing public supply water use accounts for the greatest share of water demand in the WRWSA region. Public supply accounts for 46% of the total water demand in the WRWSA. The Public Supply category includes water distributed by public water systems and private water utilities. Some non-residential use (such as commercial and industrial operations) is also included in this category, as they are not self-supplied and do not report their individual water use to the districts. Table 2-1A depicts the methodologies and assumptions employed to determine public supply water demand values.

SWFWMD and SJRWMD calculated water demand projections for the years 2005, 2010, 2015, 2020, 2025, and 2030 based on population projections and average per capita rates for each utility. For the Phase II report, SWFMWD used a 5-year average per capita rate (2003-2007). This methodology is still used for this report, but the 5-year average per capita rate has been updated for the years 2005-2009. The SJRWMD has not been updated and maintains the 11-year average per capita rate (1995-2005) that was used in the Phase II report to calculate public supply water demand projections.

2.3.2 Base Year Populations

The base year utilized for the population projections is 2005. Population information was obtained from historical data provided as part of the SWFWMD RWSP, and the SJRWMD Water Supply Assessment process to determine the Public Supply water use projections through the year 2030.

2.3.3 Base Year Water Use

A base year of 2005 was used for the Phase II WRWSA – Detailed Water Supply Feasibility Analyses. In SWFWMD, the base year water use was derived by multiplying the average 2005 – 2009 unadjusted gross per capita rates by the 2005 estimated population for each individual utility.[1] Within the SJRWMD, base year water use was derived by multiplying the utilities 11-year average per capita water use (1995-2005) by the 2005 estimated population.[2]

[1] Public supply base year water use methodology is taken from Bader (2009).
[2] Public supply base year water use methodology is taken from SJRWMD (2008).

2.3.4 Population Projections

Within SWFWMD, small-area population projections were developed and apportioned using a parcel based methodology (GIS Associates, 2009).

The population projections developed by University of Florida Bureau of Economic & Business Research (BEBR) are generally accepted as the standard throughout the State of Florida. However, these BEBR projections are made at the county-level only. Accurately projecting future water demand requires more spatially precise data than the county-level BEBR projections. SWFWMD projections are based on census block-level data, which is developed using the smallest level of census geography. They are then disaggregated to land parcel data, which is the smallest area of geography possible for population studies.[3]

Within the SJRWMD, the 2006 projections of population growth published by BEBR were used as its control for population projections within each county. BEBR projections were then applied to a parcel based methodology (GIS Associates, 2009).[4]

2.3.5 Public Supply Water Demand Projections

The following sections describe the methodology used to develop public supply water projections for the planning horizon and the reference projection period, and the subsequent results.

2.3.5.1 Planning Horizon (2010 – 2030)

As stated water demand projections were calculated for the years 2010, 2015, 2020, 2025, and 2030. SWFWMD derived public supply water demands by multiplying 2005-2009 average per capita rates by the projected populations on a county-wide basis to develop these projections. SJRWMD used the 11-year per capita average (1995-2005) multiplied by the projected population to calculate the water demand projections in 5 year increments.

2.3.6 Results

The Phase II report projected the total WRWSA public supply water demand to be approximately 81.40 mgd in 2005. These demands were expected increase to 147.77 mgd in 2030. However, based on the new daily average per capita rates (2005-2009), and the new compliance per capita requirement in SWFWMD, the public supply water demand in 2005 was approximately 78.88 mgd. These demands are expected to increase to 126.30 mgd in 2030. These demands equate to approximate increases of 47.42 mgd (60%) for the planning horizon. The 2030 water demand published in the Phase II report is 21.47 mgd greater than the water demand in this report, due to the mandatory reduction in per capita rates by 2019. Refer to Table 2-2 for the incremental public supply water demand increases.

The water demands presented in this chapter reflect a significant drop in the public supply water demands that were published in the Phase II report. The updated per capita averages (2005-2009) for each utility, as well as the required public supply compliance per capita significantly reduce the water supply projections that have been estimated by the SWFWMD. The updated per capita averages reduce the water demand quantities in the base year, but the largest

[3] Population projections methodology taken from Bader (2009).
[4] Population projections methodology taken from SJRWMD (2008).

reduction in water demands occurs in 2020, when the required compliance per capita of 150 gpcd is implemented. As shown in the following sections, water demand is significantly reduced throughout all of the counties in the WRWSA using this compliance per capita requirement.

Citrus County

The public supply water demand for the Phase II report in Citrus County in 2005 was approximately 16.12 mgd, and was anticipated to increase by 14.58 mgd (90%) to 30.70 mgd over the 2030 planning horizon. The updated water demand shows the public water supply in 2005 as approximately 15.76 mgd, and is anticipated to increase by 9.34 mgd (59%) to 25.10 mgd over the planning horizon. (Table 2-3A and Figures 2-1A and 2-1B.)

As demonstrated in Figure 2-1A, the water demand differences between the Phase II report and the Framework Initiative are much more evident by 2020. For Citrus County the public supply water demand drops 4.81 mgd when compared to the Phase II report. This reduction occurs in this period because of the requirement for utilities to have reached the midpoint in their per capita reduction requirement. The demand further drops by 2019, when the utilities are required to have met the 150 compliance per capita requirement.

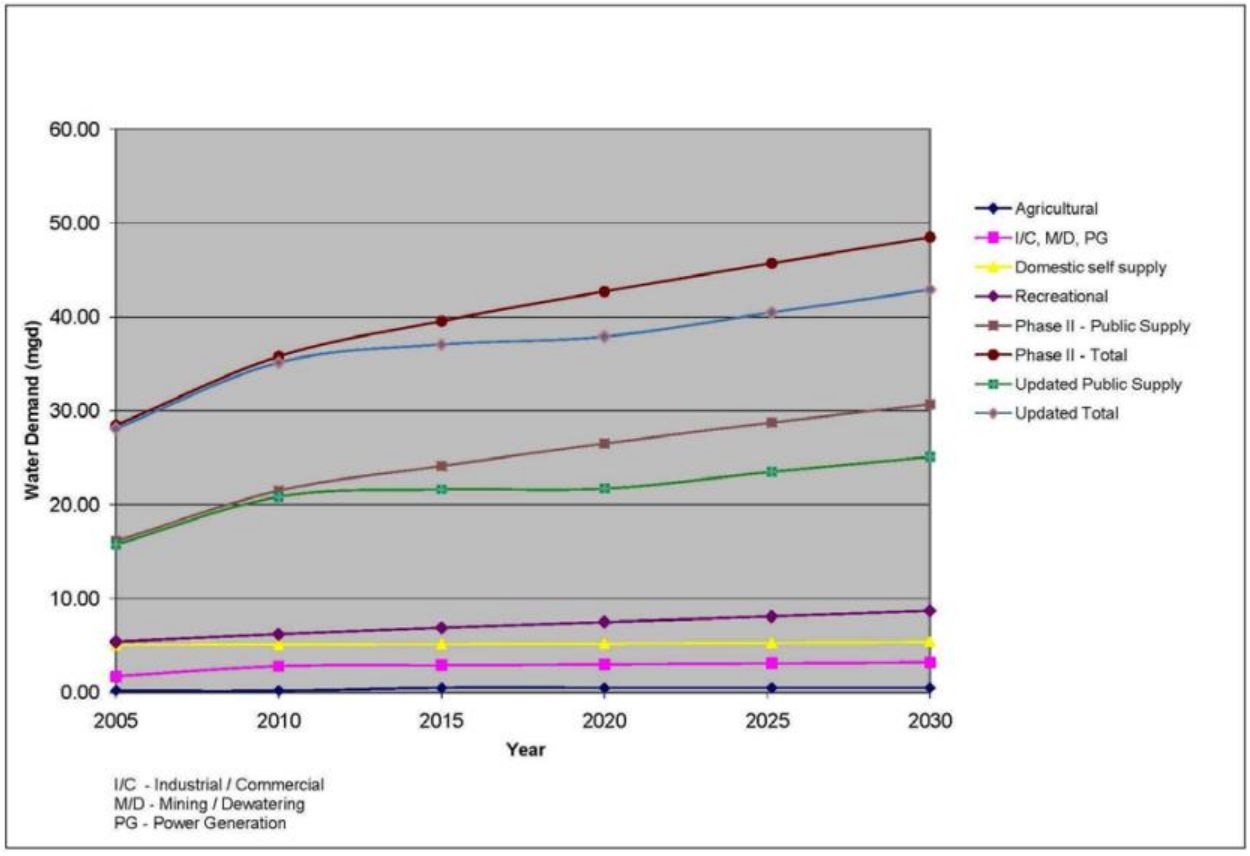


Figure 2-1A. Incorporated / Unincorporated Citrus County Projected Water Demand.

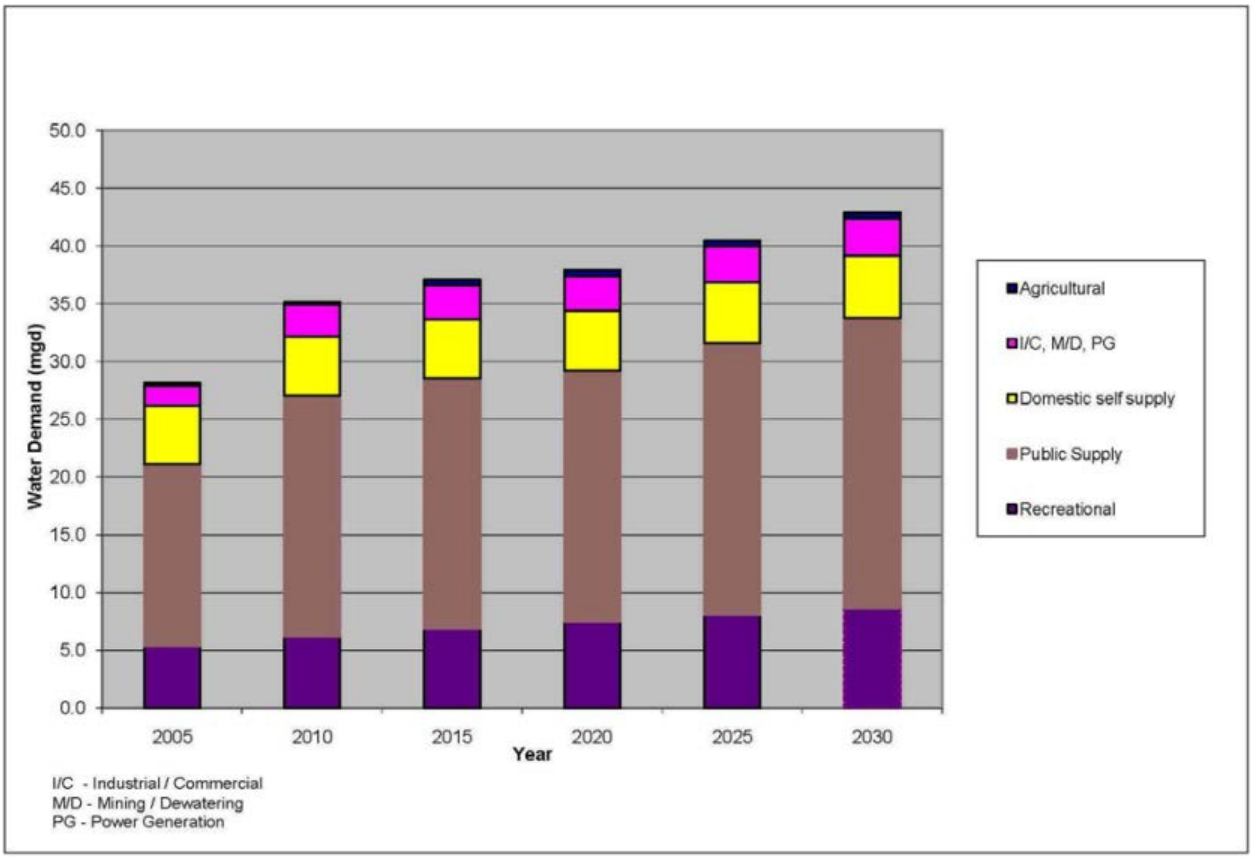


Figure 2-1B. Incorporated / Unincorporated Citrus County Projected Water Demand.

Hernando County

The public supply water demand for the Phase II report for Hernando County in 2005 was approximately 24.09 mgd, and was anticipated to increase by 9.17 mgd (38%) to 33.26 mgd over the planning horizon. The updated water demand shows the public water supply in 2005 as approximately 21.04 mgd, and is anticipated to increase by 7.95 mgd (38%) to 28.99 mgd over the planning horizon. (Table 2-3B and Figures 2-2A and 2-2B.)

When compared to the rest of the WRWSA, Hernando County demands presented in this chapter are the closest to the Phase II demands than any of the other counties in the WRWSA. The public supply water demand Hernando County in 2030, drops 4.27 mgd when compared to the Phase II report. This is due to the utilities in Hernando County being close to achieving their compliance per capita requirements. The water demand reductions for Hernando County are mainly influenced by the updated per capita averages.

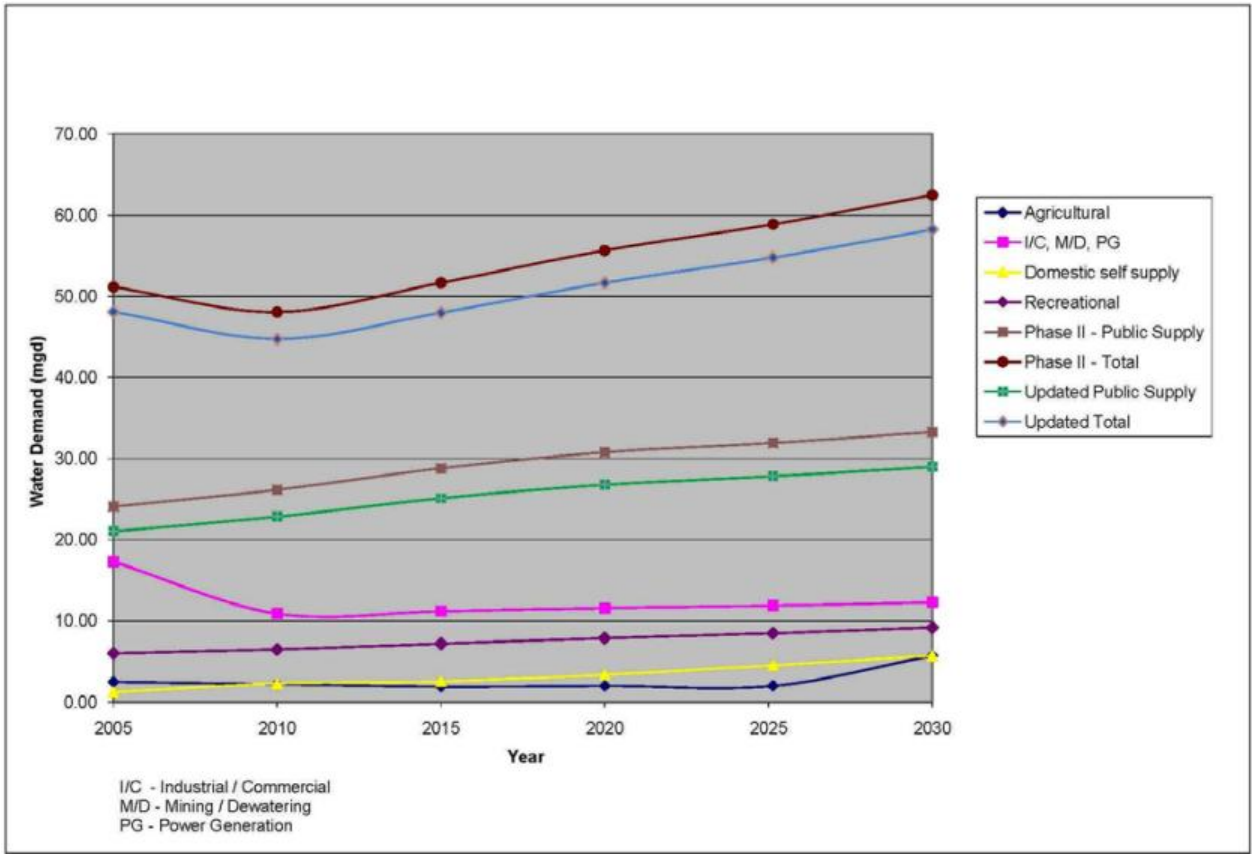


Figure 2-2A. Incorporated / Unincorporated Hernando County Projected Water Demand.

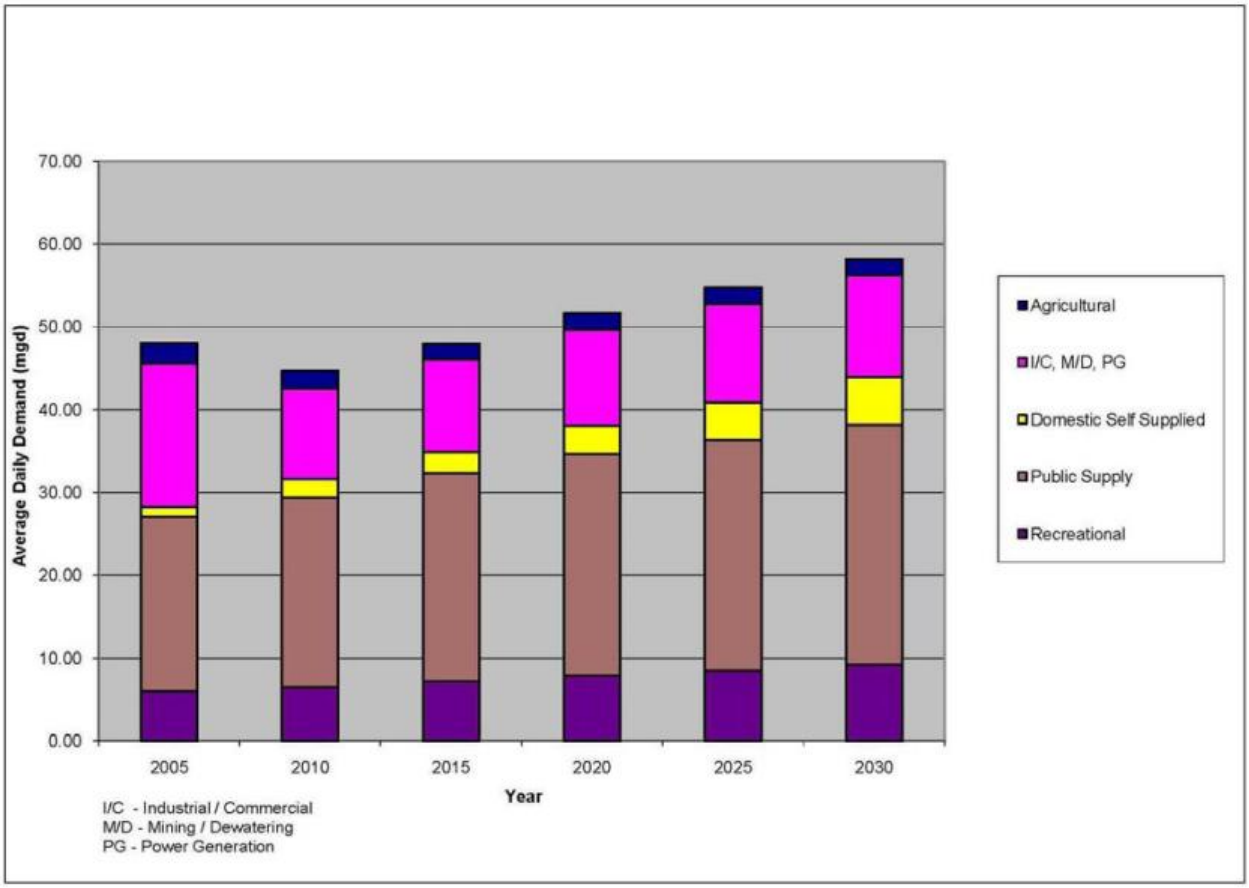


Figure 2-2B. Incorporated / Unincorporated Hernando County Projected Water Demand.

Sumter County

Sumter County public supply water demand for the Phase II report for 2005 was approximately 11.06 mgd and was anticipated to increase by 16.71 mgd (151%) to 27.77 mgd over the planning horizon. The updated water demand shows the public water supply in 2005 as approximately 11.11 mgd, and is anticipated to increase by 9.7 mgd (87%) to 20.81 mgd over the planning horizon. (Table 2-3B and Figures 2-3A and 2-3B.)

As demonstrated in Figure 2-3A, the water demand differences between the Phase II report and the Framework Initiative are much more evident by 2015 for Sumter County. The Sumter County 2020 public supply water demand drops to 6.82 mgd when compared to the Phase II report. This reduction occurs in this period because of the requirement for utilities to have reached the midpoint in their per capita reduction requirement. The demand further drops by 2019 when the utilities are required to have met the 150 compliance per capita requirements.

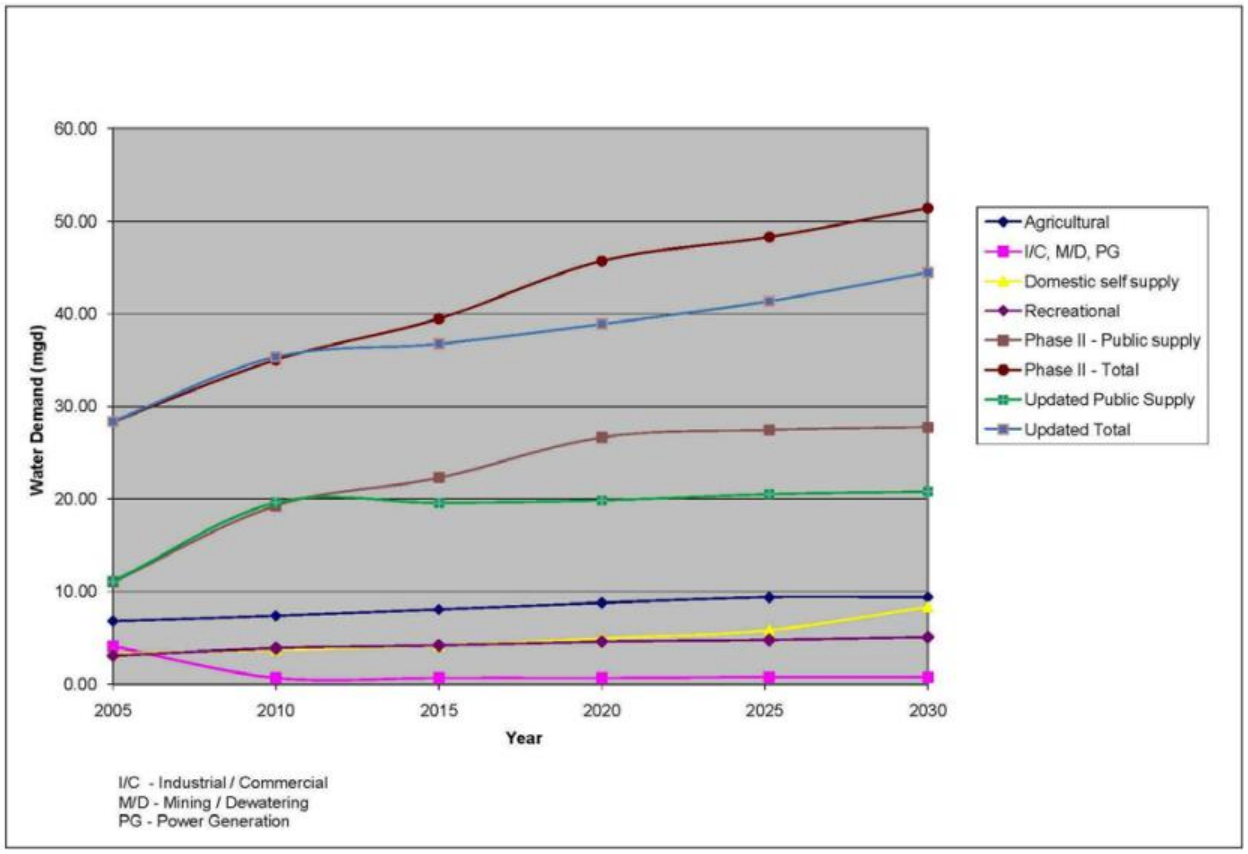


Figure 2-3A. Incorporated / Unincorporated Sumter County Projected Water Demand.

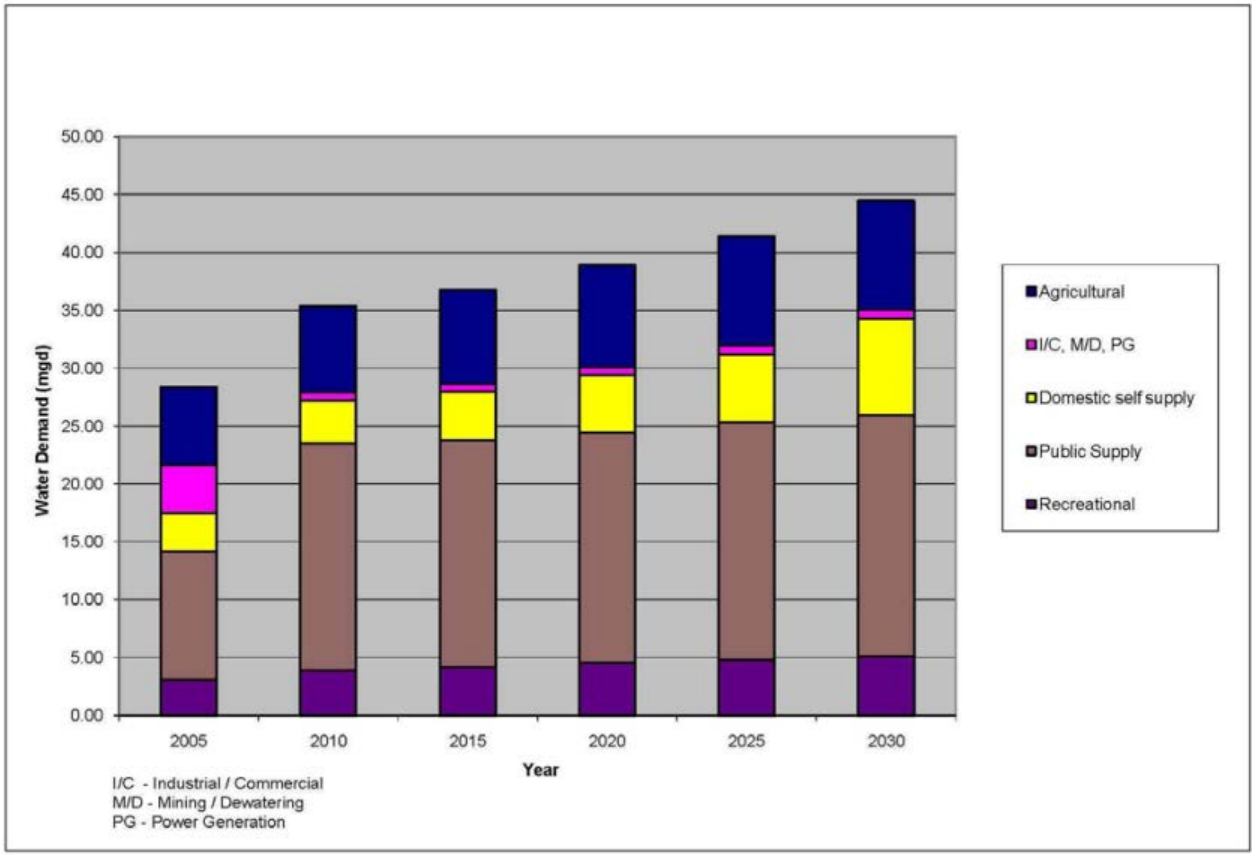


Figure 2-3B. Incorporated / Unincorporated Sumter County Projected Water Demand.

Marion County

The public supply water demand for the Phase II report for Marion County in 2005 was approximately 30.13 mgd, and was anticipated to increase by 25.91 mgd (86%) to 56.04 mgd over the planning horizon. The updated water demand shows the public water supply in 2005 as approximately 30.97 mgd, and is projected to increase by 20.43 mgd (66%) to 51.40 mgd over the planning horizon. (Table 1-3B and Figures 1-4A and 1-4B.)

As demonstrated in Figure 2-4A, the Marion County was the only member in the WRWSA that demonstrated a slight increase in water supply demands in the base year. After 2015 and 2020 water demands in Marion County drop 4.32 mgd below the Phase II projections due to the required milestones in compliance per capita rates within SWFWMD. However as was mentioned above, Marion County projections include water demands from the SJRWMD which have not been updated, and do not require compliance per capita rates.

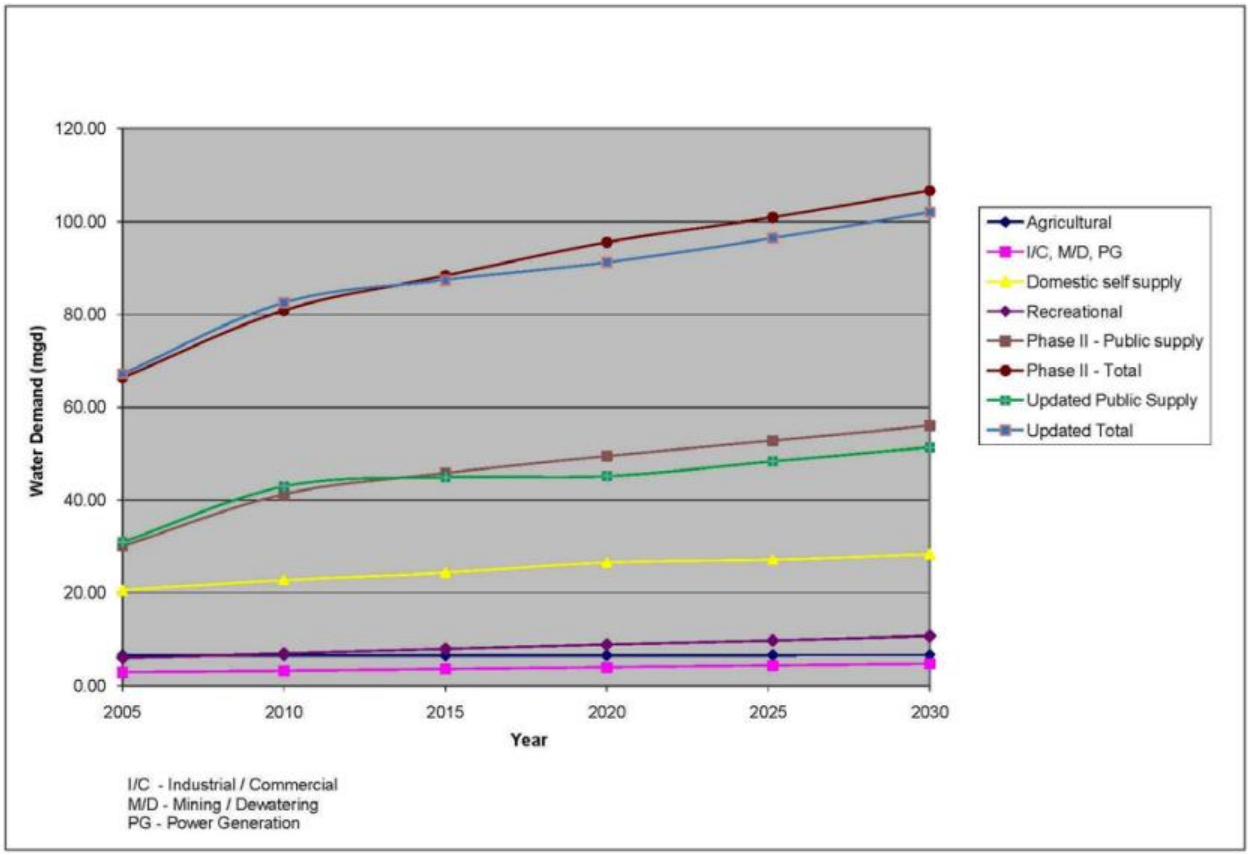


Figure 2-4A. Incorporated / Unincorporated Marion County Projected Water Demand.

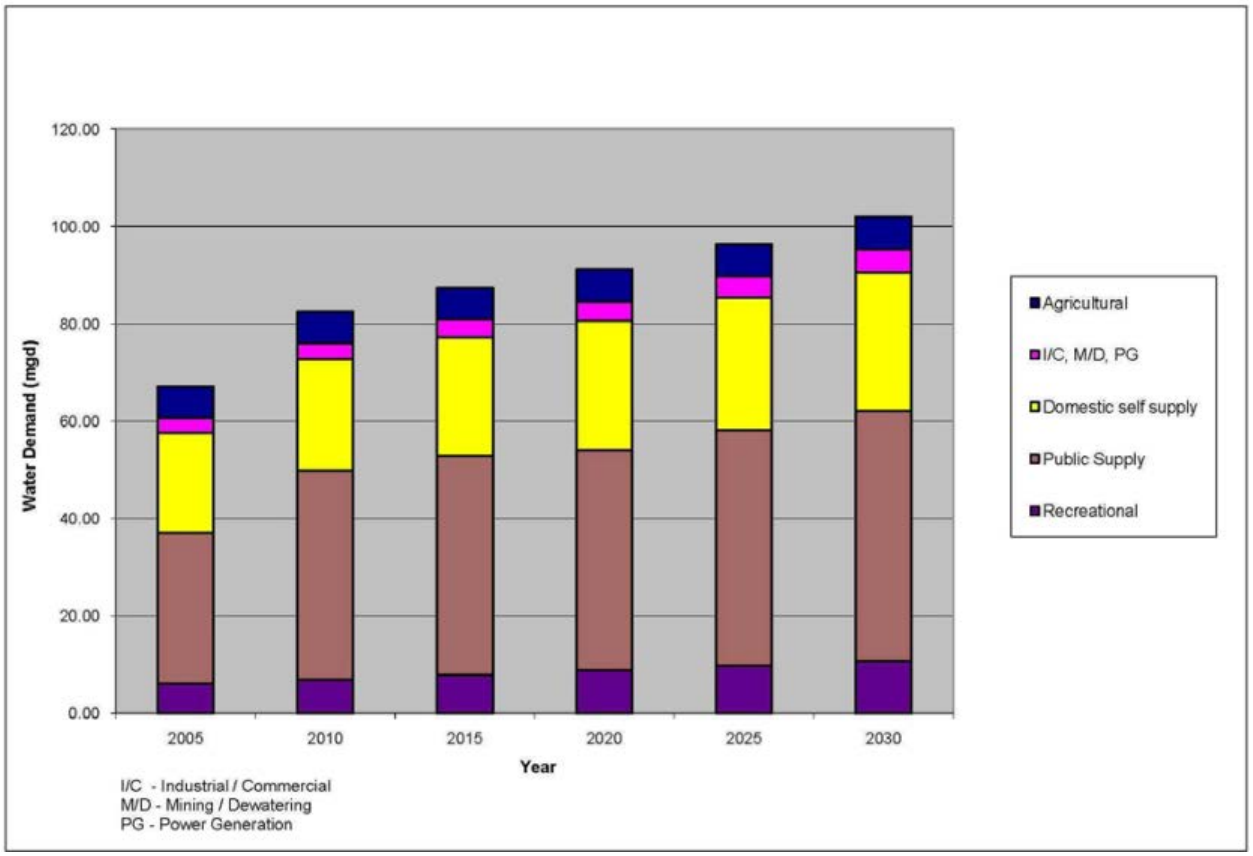


Figure 2-4B. Incorporated / Unincorporated Marion County Projected Water Demand.

2.3.7 Summary

Public supply water demand projections in this report are significantly lower than the public supply projections presented in the Phase II report. The total public supply water demand for the WRWSA dropped from 147.77 mgd in 2030 (Phase II), to 126.30 mgd. This equates to a reduction of 21.47 mgd or a 15% in 2030.

Public supply water use continues to have the greatest expected water demand increase over the planning horizon of all the water use categories. These demand numbers were reached based on SWFWMD, and SJRWMD methodologies, including per capita determination and population projections. Public supply now contributes 63% of the total WRWSA increase in water use over the planning horizon utilizing the new methodology for computation compared to a total percentage water usage of 70% in the Phase II report. Total water usage within the WRWSA decreases from 269.07 mgd to 247.60 mgd as reflected in Figure 2-5A.

2.4 Total WRWSA Water Demand

2.4.1 Summary

Existing and future public supply water demands were analyzed for the WRWSA region. Also included are the existing and future water demands for all other water uses provided in the Phase II report to provide a comparison of the total projected water supply demands within the WRWSA.

Total WRWSA water demand for all water use categories together with the updated public supply demands was approximately 171.84. This is a total difference of 2.52 mgd from what was estimated in the Phase II report for 2005. Using the methods described, the demand was expected to increase to 247.60 mgd in 2030. These demands equate to an approximate increase of 75.76 mgd (63%) during the planning horizon timeframe. (Figures 2-5A and 2-5B). This represents a decrease of 21.47 mgd (8%) from what was projected in the Phase II report for 2030.

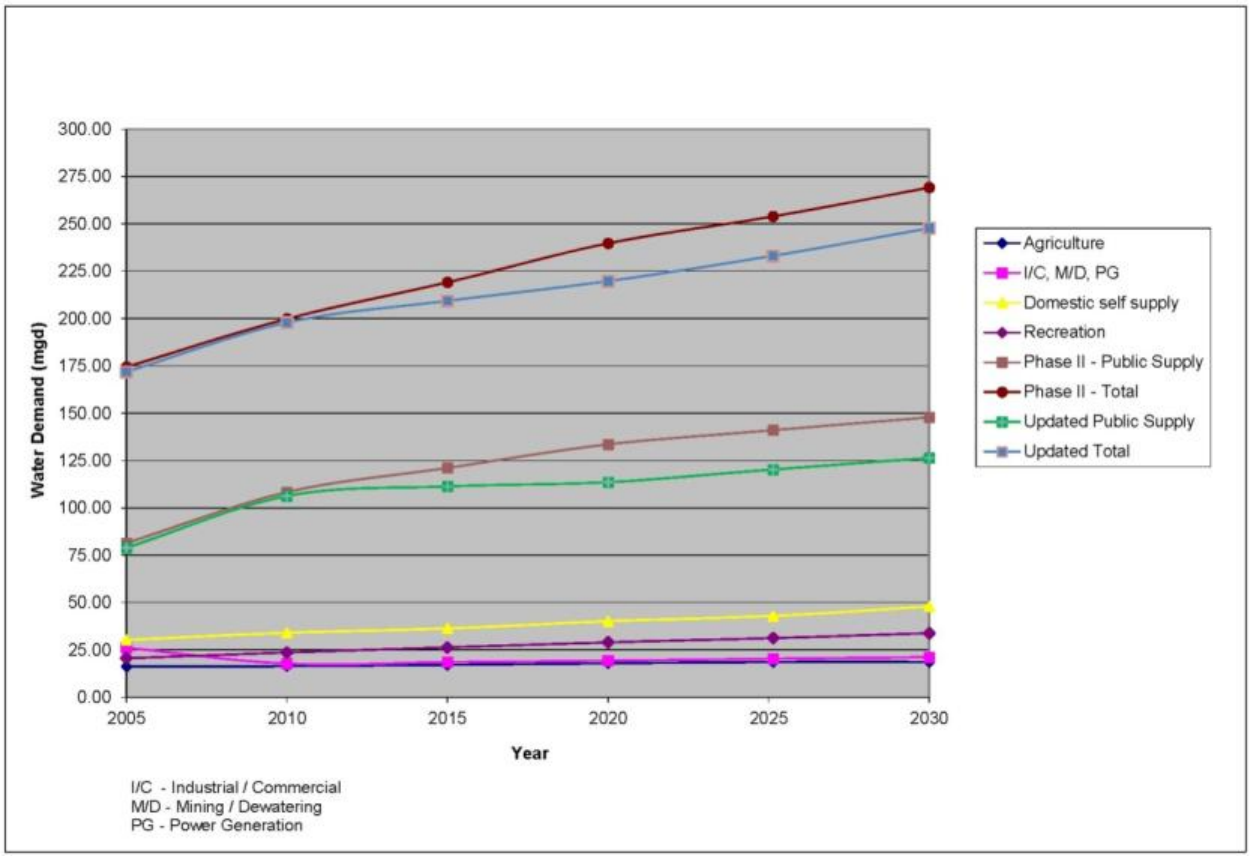


Figure 2-5A. Total Existing and Projected Water Demand for the WRWSA.

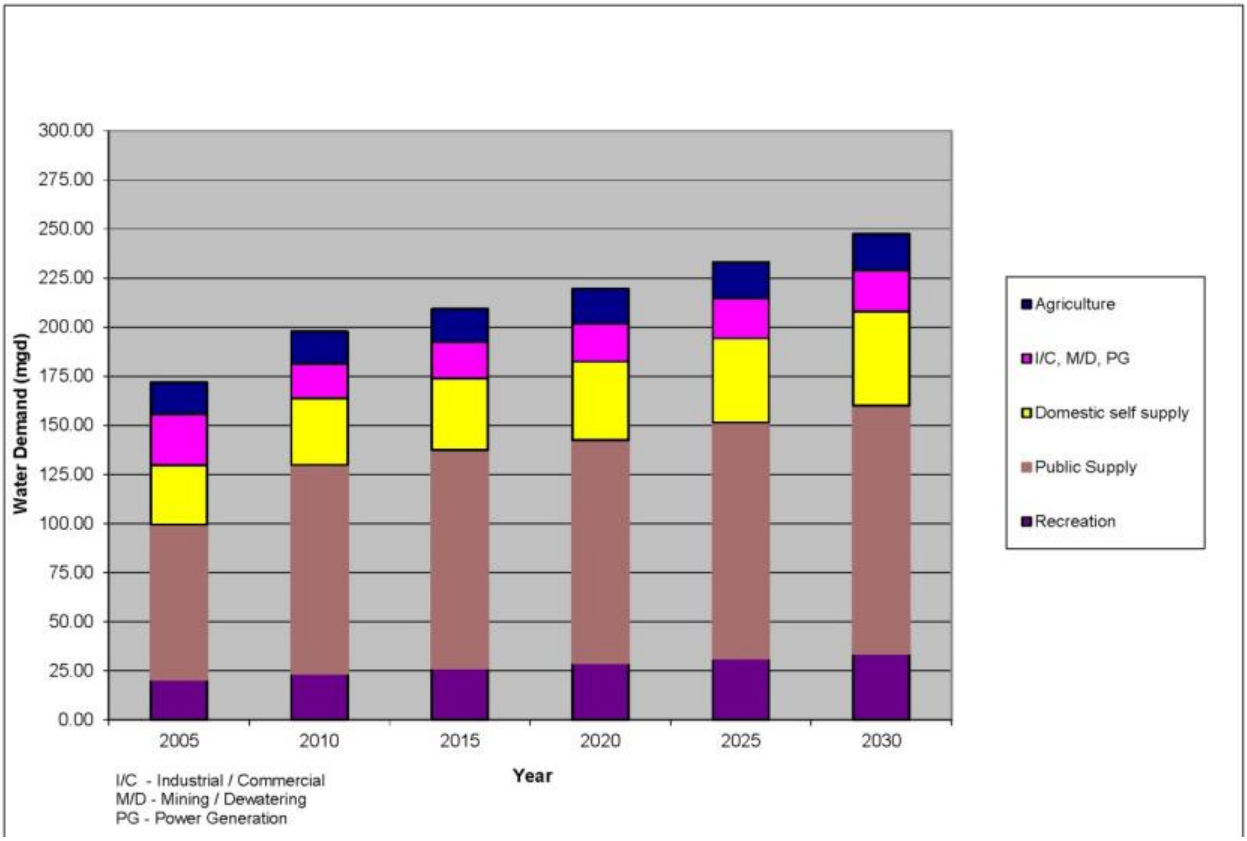


Figure 2-5B. Total Existing and Projected Water Demand for the WRWSA.

Marion County

Marion County has the highest water use increase during the planning horizon, of all the members of the WRWSA. This demand increases by 34.78 mgd (46%) over the planning horizon to approximately 102.02 mgd. Public supply is projected to increase the most for Marion County and is 59% of the total water demand increase. Domestic self-supply is the second highest water use for Marion County. Domestic self-supply in Marion County is much greater than any other county within the WRWSA. Domestic self-supply in Marion County is 68% of the total domestic self-supply for the entire WRWSA in 2005 and will increase to 28.37 mgd in 2030.

Sumter County

Sumter County has the second highest water use increase during the planning horizon within the WRWSA. Sumter County water demand in 2005 was 28.40 mgd. This demand increases by 16.08 mgd (57%) over the planning horizon to about 44.48 mgd. Public supply has the greatest increase, totaling 60% of the increase in water demand for Sumter County. Industrial/Commercial water use in Sumter County, unlike most categories in the WRWSA, actually decreased in water demand. In 2005 the industrial/commercial water use for Sumter County was 4.10 mgd, and is projected to decrease significantly to 0.80 mgd in 2030.

Citrus County

Citrus County's water demand in 2005 was 28.12 mgd. This demand increases approximately 14.78 mgd (53%) over the planning horizon to 42.90 mgd. Public supply water use was the highest increase for Citrus County nearly doubling during the planning horizon. Unlike other counties in the WRWSA, domestic self-supply for Citrus County had a minimal increase. During the planning horizon domestic self-supply increased 0.34 mgd, or a 6% increase.

Hernando County

Hernando County has the lowest total projected demand increase of any county in the WRWSA. Hernando County water demand in 2005 was 48.09 mgd, and is expected to increase by 10.12 mgd (21%) over the planning horizon to about 58.21 mgd. Domestic self-supply in Hernando County has the second highest rate of increase, when compared to all other counties in the WRWSA. Domestic self-supply is expected to increase from 1.25 mgd to 5.72 mgd in 2030. This is a 4.47 mgd (358%) increase over the planning horizon.

Table 2-1 Public Supply Methodology and Assumptions

Category	Year(s)	Reporting Category	Methodology	Sources
Population SWFWMD	2005 (base year)	-	Utility populations were taken from the Estimated Water Use report (2005).	"Estimated Water Use, 2005", Southwest Florida Water Management District, and Utility-submitted information
	2010-2030	-	2008 BEBR Medium population projections applied to a GIS Population Projection Model. The model projects future permanent population growth at the census block level, distributes that growth to parcels within each block, and normalizes those projections to BEBR county projections.	"Projections of Florida Population by County, 2007 – 2035", Bureau of Economic and Business Research, March 2008, and "The Small-Area Population Projection Methodology of The Southwest Florida Water Management District", September 29, 2008.
Population SJRWMD	2005 (base year)	-	Populations were taken from the 2006 BEBR population projections.	"Projections of Florida Population by County, 2006", Bureau of Economic and Business Research.
	2010-2030	-	2006 BEBR Medium population projections applied to a GIS Population Projection Model. The model projects future permanent population growth at the census block level, distributes that growth to parcels within each block, and normalizes those projections to BEBR county projections.	"Projections of Florida Population by County, 2006", Bureau of Economic and Business Research, March 2008, and "The small area population projection and distribution methodology of the St. Johns River Water Management District for the 2008 District Water Supply Assessment and the 2010 District Water Supply Plan", GIS Associates, 2009.
Water Demand SWFWMD	2005	Large Utilities	Water use is defined as the utilities' (with greater than 0.1 mgd withdrawal) permitted withdrawals, plus imports, minus exports. Individually reported base year water use for large utilities. "Estimated Water Use 2005," Table A-1.	"Estimated Water Use, 2005", Southwest Florida Water Management District, 2006.
Water Demand SJRWMD	2005	Large Utilities	Water demand from publicly and privately owned public water supply utilities that had a 2005 annual average daily flow of at least 0.1 mgd. Public supply water use includes any uses of water from a public supply system.	"2008 Draft Water Supply Assessment", St. Johns River Water Management District, 2008.
Water Demand SWFWMD	2005	Small Utilities	Water use for small utilities is the sum of all small utilities' water use in the county identified in "Estimated Water Use 2005," plus the additional estimated water use associated with those non-reporting utilities.	"Estimated Water Use, 2005", Southwest Florida Water Management District, 2006.
		N/A	The 2005-2009 average per capita water use rate from SWFWMD was used used and multiplied by projected populations for each entity.	Provided by the SWFWMD
	2010-2030	N/A	The 2005-2009 average per capita water use rate from SWFWMD was used used and multiplied by projected populations for each entity.	Provided by the SWFWMD
		N/A	The District used the 2005-2009 average per capita water use rate and multiplied it by projected populations for each entity, for 2010. Beyond 2010, the midpoint compliance per capita is placed in effect in 2015, and the required 150 gpd compliance per capita is used beyond.	"2003-2007 Estimated Water Use Reports", Southwest Florida Water Management District.
Water Demand SJRWMD	2010-2030	N/A	The District used the 1995-2005 per capita water use rate and multiplied it by projected populations for each entity.	"2008 Draft Water Supply Assessment", St. Johns River Water Management District, 2008.

Table 2-2 - Existing and Projected Water Demand

			2005			
	Public Supply	Domestic Self Supply	Agricultural MGD	I/C, M/D MGD	Recreational MGD	Yearly Total MGD
Citrus	15.76	5.06	0.20	1.70	5.40	**28.12**
Hernando	21.04	1.25	2.50	17.30	6.00	**48.09**
Sumter	11.11	3.29	6.80	4.10	3.10	**28.40**
Marion	30.97	20.62	6.62	2.93	6.09	**67.23**
TOTAL	**78.88**	**30.22**	**16.12**	**26.03**	**20.59**	**171.84**

			2010			
	Public Supply	Domestic Self Supply	Agricultural MGD	I/C, M/D MGD	Recreational MGD	Yearly Total MGD
Citrus	20.84	5.10	0.20	2.80	6.20	**35.14**
Hernando	22.85	2.29	2.20	10.90	6.50	**44.74**
Sumter	19.60	3.75	7.40	0.70	3.90	**35.35**
Marion	42.96	22.79	6.57	3.28	6.96	**82.56**
TOTAL	**106.25**	**33.93**	**16.37**	**17.68**	**23.56**	**197.79**

			2015			
	Public Supply	Domestic Self Supply	Agricultural MGD	I/C, M/D MGD	Recreational MGD	Yearly Total MGD
Citrus	21.63	5.15	0.50	2.90	6.90	**37.08**
Hernando	25.12	2.56	1.90	11.20	7.20	**47.98**
Sumter	19.58	4.19	8.10	0.70	4.20	**36.77**
Marion	44.95	24.40	6.53	3.64	7.94	**87.46**
TOTAL	**111.28**	**36.29**	**17.03**	**18.44**	**26.24**	**209.28**

			2020			
	Public Supply	Domestic Self Supply	Agricultural MGD	I/C, M/D MGD	Recreational MGD	Yearly Total MGD
Citrus	21.71	5.20	0.50	3.00	7.50	**37.91**
Hernando	26.78	3.37	2.00	11.60	7.90	**51.65**
Sumter	19.85	4.95	8.80	0.70	4.60	**38.90**
Marion	45.18	26.56	6.58	3.99	8.91	**91.22**
TOTAL	**113.52**	**40.08**	**17.88**	**19.29**	**28.91**	**219.68**

			2025			
	Public Supply	Domestic Self Supply	Agricultural MGD	I/C, M/D MGD	Recreational MGD	Yearly Total MGD
Citrus	23.50	5.28	0.50	3.10	8.10	**40.48**
Hernando	27.83	4.54	2.00	11.90	8.50	**54.77**
Sumter	20.53	5.85	9.40	0.80	4.80	**41.38**
Marion	48.35	27.23	6.63	4.45	9.79	**96.45**
TOTAL	**120.21**	**42.90**	**18.53**	**20.25**	**31.19**	**233.08**

			2030			
	Public Supply	Domestic Self Supply	Agricultural MGD	I/C, M/D MGD	Recreational MGD	Yearly Total MGD
Citrus	25.10	5.40	0.50	3.20	8.70	**42.90**
Hernando	28.99	5.72	2.00	12.30	9.20	**58.21**
Sumter	20.81	8.37	9.40	0.80	5.10	**44.48**
Marion	51.40	28.37	6.69	4.80	10.76	**102.02**
TOTAL	**126.30**	**47.85**	**18.59**	**21.10**	**33.76**	**247.60**

All Values shown are mgd
I/C - Industrial/Mining
M/D - Mining/Dewatering

Table 2-3A Citrus County Public Supply Water Demand and Population

Utility	5-Year Per Capita Average (2005-2009)	Midpoint GPCD Requirement Target (1/1/2015)	GPCD Requirement Target [1],[2]	Population Projections						Water Demand (MGD)					
				2005	2010	2015	2020	2025	2030	2005	2010	2015[3]	2020	2025	2030
Citrus County / Sugarmill Woods	243	197	150	9,659	9,743	11,552	13,769	15,373	15,903	2.35	2.37	2.27	2.07	2.31	2.39
Citrus County & WRWSA	190	170	150	23,917	27,851	33,977	38,126	41,608	44,462	4.53	5.28	5.77	5.72	6.24	6.67
Ctirus Springs / Pine Rridge	181	166	150	13,080	14,894	17,567	21,036	25,031	29,119	2.37	2.70	2.91	3.16	3.75	4.37
Walden Woods	179	164	150	752	832	945	1,058	1,171	1,284	0.13	0.15	0.16	0.16	0.18	0.19
City of Inverness	164	157	150	9,300	24,457	26,126	27,628	29,324	31,368	1.53	4.01	4.10	4.14	4.40	4.71
Rolling Oaks Utilities	157	154	150	12,242	12,653	12,700	12,704	12,726	12,777	1.92	1.99	1.95	1.91	1.91	1.92
City of Crystal River	149	149	149	3,685	12,132	12,582	12,915	13,332	13,773	0.55	1.81	1.87	1.92	1.99	2.05
Homosassa Special Water District	137	137	137	6,075	6,488	7,013	7,588	7,972	8,353	0.83	0.89	0.96	1.04	1.09	1.14
Citrus County/ Lakeside Estates	132	132	132	574	619	623	623	624	624	0.08	0.08	0.08	0.08	0.08	0.08
Gulf Highway Land / Cinnamon Ridge Ut.	132	132	132	578	590	646	760	816	819	0.08	0.08	0.09	0.10	0.11	0.11
Citrus County / Oak Forest	104	104	104	415	424	426	426	430	440	0.04	0.04	0.04	0.04	0.04	0.05
Floral City	55	55	55	5,668	6,876	7,169	7,371	7,574	7,850	0.31	0.38	0.39	0.41	0.42	0.43
Small Utilities[4]	177	164	150	5,842	6,035	6,317	6,441	6,547	6,665	1.03	1.07	1.03	0.97	0.98	1.00
County Total				**91,787**	**123,594**	**137,643**	**150,445**	**162,528**	**173,437**	**15.76**	**20.84**	**21.63**	**21.71**	**23.50**	**25.10**

Notes:
1. The SWFWMD has set a 150 gpcd compliance per capita requirement for all utilities within the District. Based on their 5 year per capita averages, utilities will have until January 1, 2015 to achieve half of the required reduction. All utilities within the SWFMWD must be at a compliance per capita of 150 gpcd by January 1, 2018.
2. Utilities whose 5 year average per capita is at or below 150 gpcd, will use the 5 year average per capita (2005-2009) to calculate the water demand through the planning horizon.
3. 2015 estimated water use for utilities that have met the 150 gpc compliance requirement based on the 5 year per capita average (2005-2009).
4. Small utilities within the SWFWMD use a 5 year average per capita from 2003-2007.

Table 2-3B Hernando County Public Supply Water Demand and Population

Utility	5-Year Per Capita Average (2005-2009)	Midpoint GPCD Requirement Target (1/1/2015)	GPCD Requirement Target [1],[2]	Population Projections						Water Demand (MGD)					
				2005	2010	2015	2020	2025	2030	2005	2010	2015[3]	2020	2025	2030
Hernando County[5], [6]	149	149	149	129,476	138,820	153,193	163,548	169,451	176,076	19.29	20.68	22.83	24.37	25.25	26.24
City of Brooksville	95	95	95	12,590	16,240	17,200	18,074	19,234	20,528	1.20	1.54	1.63	1.72	1.83	1.95
Small Utilities[4]	163	157	150	3,405	3,819	4,241	4,632	5,011	5,365	0.56	0.62	0.66	0.69	0.75	0.80
County Total				**145,471**	**158,879**	**174,634**	**186,254**	**193,696**	**201,969**	**21.04**	**22.85**	**25.12**	**26.78**	**27.83**	**28.99**

Notes:
1. The SWFWMD has set a 150 gpcd compliance per capita requirement for all utilities within the District. Based on their 5 year per capita averages, utilities will have until January 1, 2015 to achieve half of the required reduction. All utilities within the SWFMWD must be at a compliance per capita of 150 gpcd by January 1, 2018.
2. Utilities whose 5 year average per capita is at or below 150 gpcd, will use the 5 year average per capita (2005-2009) to calculate the water demand through the planning horizon.
3. 2015 estimated water use for utilities that have met the 150 gpc compliance requirement based on the 5 year per capita average (2005-2009).
4. Small utilities within the SWFWMD use a 5 year average per capita from 2003-2007.
5. Hernando County Utilities includes the following permits: 2983, 12011, 2179, and 5789.
6. Hernando County Utilities per capita was calculated as the average of all of the 2015 per capitas. This was done to allow the comparison of the compliance per capita quantities with the Phase II WRWSA report.

Table 2-3C Sumter County Public Supply Water Demand and Population

Utility	5-Year Per Capita Average (2005-2009)	Midpoint GPCD Requirement Target (1/1/2015)	GPCD Requirement Target [1],[2]	Population Projections						Water Demand (MGD)					
				2005	2010	2015	2020	2025	2030	2005	2010	2015[3]	2020	2025	2030
Villages WCA / N & C Sumter Utilities	228	189	150	33,420	65,145	75,443	88,069	88,069	88,069	7.63	14.88	14.27	13.21	13.21	13.21
City of Bushnell	180	165	150	2,119	4,639	4,790	5,182	6,218	6,828	0.38	0.83	0.79	0.78	0.93	1.02
City of Wildwood	148	148	148	12,450	16,764	21,027	29,781	32,545	33,274	1.84	2.48	3.11	4.41	4.82	4.92
Continental Country Club RO Inc.	143	143	143	2,906	2,906	2,921	2,961	3,122	3,204	0.42	0.42	0.42	0.42	0.45	0.46
City of Webster	119	119	119	819	1,364	1,431	1,627	1,702	1,800	0.10	0.16	0.17	0.19	0.20	0.21
City of Center Hill	70	70	70	983	1,621	1,666	1,816	2,081	2,526	0.07	0.11	0.12	0.13	0.15	0.18
Cedar Acres Inc.	66	66	66	637	649	707	915	1,203	1,293	0.04	0.04	0.05	0.06	0.08	0.09
Lake Panasoffkee Water Association	61	61	61	4,380	5,008	5,202	5,770	6,570	6,816	0.27	0.31	0.32	0.35	0.40	0.42
Small Utilities[4]	184	167	150	1,962	1,997	1,997	1,997	1,997	1,997	0.36	0.37	0.33	0.30	0.30	0.30
County Total				**59,676**	**100,093**	**115,184**	**138,118**	**143,507**	**145,807**	**11.11**	**19.60**	**19.58**	**19.85**	**20.53**	**20.81**

Notes:
1. The SWFWMD has set a 150 gpcd compliance per capita requirement for all utilities within the District. Based on their 5 year per capita averages, utilities will have until January 1, 2015 to achieve half of the required reduction. All utilities within the SWFMWD must be at a compliance per capita of 150 gpcd by January 1, 2018.
2. Utilities whose 5 year average per capita is at or below 150 gpcd, will use the 5 year average per capita (2005-2009) to calculate the water demand through the planning horizon.
3. 2015 estimated water use for utilities that have met the 150 gpc compliance requirement based on the 5 year per capita average (2005-2009).
4. Small utilities within the SWFWMD use a 5 year average per capita from 2003-2007.

Table 2-3D Marion County Public Supply Water Demand and Population

Utility	5-Year Per Capita Average (2005-2009)	Midpoint GPCD Requirement Target (1/1/2015)	GPCD Requirement Target [1],[2]	Population Projections						Water Demand (MGD)					
				2005	2010	2015	2020	2025	2030	2005	2010	2015[3]	2020	2025	2030
MCU Dept. / Golden Ocala	615	382	150	80	1,833	1,886	1,950	2,038	2,149	0.05	1.13	0.72	0.29	0.31	0.32
Windstream Utilities Company	309	230	150	1,440	2,333	2,518	2,700	2,903	3,152	0.45	0.72	0.58	0.41	0.44	0.47
On Top of the World	270	210	150	5,824	8,443	9,100	9,603	10,023	10,645	1.57	2.28	1.91	1.44	1.50	1.60
Rainbow Springs Utilities	260	205	150	2,774	3,013	3,448	3,807	4,107	4,424	0.72	0.78	0.71	0.57	0.62	0.66
MCU Dept. / Spruce Creek Preserve	253	202	150	1,200	1,430	1,530	1,662	1,802	1,914	0.30	0.36	0.31	0.25	0.27	0.29
Marion Utilities inc / Spruce Creek	234	192	150	3,000	5,533	6,469	6,903	7,100	7,246	0.70	1.29	1.24	1.04	1.07	1.09
MCU / Summerglen and Marion Oaks	225	187	150	9,248	16,883	24,142	29,103	34,399	39,787	2.08	3.80	4.52	4.37	5.16	5.97
Upchurch Marinas / Sweetwater Oaks MHP	222	186	150	249	452	452	452	452	452	0.06	0.10	0.08	0.07	0.07	0.07
MCU Dept.	219	185	150	9,093	12,603	13,718	14,506	15,264	15,870	1.99	2.76	2.53	2.18	2.29	2.38
Marion Utilities inc	180	165	150	807	954	1,055	1,109	1,138	1,166	0.15	0.17	0.17	0.17	0.17	0.17
Marion Utilities inc / Rainbow Lake Estates	172	161	150	681	681	681	681	681	681	0.12	0.12	0.11	0.10	0.10	0.10
Century Fairfield Village LTD.	165	158	150	513	513	513	513	513	513	0.08	0.08	0.08	0.08	0.08	0.08
MCU / Quail Meadow & A. Farms	163	157	150	500	1,009	1,051	1,107	1,189	1,295	0.08	0.16	0.16	0.17	0.18	0.19
Sun Communities / Saddle Oak Club MHC	154	152	150	845	845	845	845	845	845	0.13	0.13	0.13	0.13	0.13	0.13
Marion Landing HOA	151	150	150	1,144	1,196	1,196	1,196	1,196	1,196	0.17	0.18	0.18	0.18	0.18	0.18
City of Dunnellon	129	129	129	2,770	6,135	7,064	8,166	9,255	10,151	0.36	0.79	0.91	1.05	1.19	1.31
Utilities Inc. of Florida / Golden Hills	111	111	111	1,785	1,841	1,945	2,063	2,217	2,449	0.20	0.20	0.22	0.23	0.25	0.27
Sateke Village Utilities HOA inc.	107	107	107	76	87	87	87	88	88	0.01	0.01	0.01	0.01	0.01	0.01
Small Utilities [4]	177	164	150	4,925	6,657	7,776	8,724	9,541	9,973	0.87	1.18	1.27	1.31	1.43	1.50
Marion County SJRWMD [5], [6]															
City of Ocala (50324)	185	-	-	52,760	66,121	75,293	84,447	93,525	102,604	9.74	12.52	13.97	15.54	16.96	18.60
Aqua Utilities of Florida Inc	104	-	-	3,414	3,570	3,638	3,663	3,673	3,673	0.35	0.46	0.46	0.47	0.47	0.47
City of Belleview (3137)	77	-	-	10,227	12,802	14,895	16,723	17,691	17,691	0.79	1.00	1.16	1.30	1.38	1.38
Marion County Utilities Department SJRWMD															
Deerpath (50381)	64	-	-	1,936	2,452	2,706	2,960	3,215	3,489	0.12	0.20	0.22	0.24	0.26	0.28
Raven Hill Subdivision (51172)	159	-	-	686	689	689	689	689	689	0.11	0.14	0.14	0.14	0.14	0.14
Silver Springs Regional Water & Sewer (4578)	272	-	-	1,025	1,230	1,233	1,253	1,335	1,335	0.28	0.34	0.34	0.34	0.36	0.36
Silver Springs Shores (3054)	76	-	-	16,908	24,849	30,348	34,081	36,010	36,010	1.29	1.60	1.74	1.83	1.91	1.91
Southoak Subdivision (51173)	140	-	-	953	971	974	974	974	974	0.13	0.18	0.18	0.18	0.18	0.18
Spruce Creek Golf and Country Club (399)	394	-	-	4,899	6,730	6,758	6,759	6,759	6,759	1.93	2.97	3.12	3.24	3.32	3.35
Spruce Creek South (82827)	260	-	-	2,733	2,751	2,751	2,752	2,752	2,752	0.71	0.91	0.91	0.91	0.91	0.91
Stonecrest Utilities	99	-	-	10,200	13,983	16,566	17,837	20,339	20,339	1.01	1.65	2.01	2.01	2.01	2.01
Marion Utilities Inc	153	-	-	4,979	5,043	5,058	5,074	5,089	5,089	0.76	0.77	0.77	0.77	0.78	0.78
Ocala East Villas	328	-	-	0	458	459	461	461	461	0.00	0.15	0.15	0.15	0.15	0.15
Sunshine Utilities	343	-	-	4,342	4,977	5,277	5,579	5,770	5,770	1.49	1.71	1.81	1.91	1.98	1.98
The Villages of Marion [7]	245	-	-	8,863	8,890	8,890	8,890	8,890	8,890	2.17	2.13	2.13	2.13	2.13	2.13
County Total				**170,879**	**227,957**	**261,011**	**287,319**	**311,923**	**330,521**	**30.97**	**42.96**	**44.95**	**45.18**	**48.35**	**51.40**

Notes:
1. The SWFWMD has set a 150 gpcd compliance per capita requirement for all utilities within the District. Based on their 5 year per capita averages, utilities will have until January 1, 2015 to achieve half of the required reduction. All utilities within the SWFMWD must be at a compliance per capita of 150 gpcd by January 1, 2018.
2. Utilities whose 5 year average per capita is at or below 150 gpcd, will use the 5 year average per capita (2005-2009) to calculate the water demand through the planning horizon.
3. 2015 estimated water use for utilities that have met the 150 gpc compliance requirement based on the 5 year per capita average (2005-2009).
4. Small utilities within the SWFWMD use a 5 year average per capita from 2003-2007.
5. The SJRWMD projections have not been updated since the Phase II report. The projections have been included to provide a view of the total public supply water use in the WRWSA, and to allow the comparison of water demand between the phase II demands and the new projections based on compliance per capita's.
6. The SJRWMD has not established a compliance per capita requirement for utilities within their district. Based on SJRWMD methodology, the 11 year per capita averages (1995-2005), was used to determine the water demand through
7. this utilitiy is owned and served by The Villages in Sumter County

Chapter 3 – Water Resource Minimum Flows and Levels (MFLs)

3.0 Key Points

Key Points

- MFLs are required to be developed by Florida statutes to protect the water resources or ecology of an area.
- Water management districts are required to establish MFL priority lists; develop MFLs; and adopt them to ensure that significant harm to the environment or resource does not occur.
- MFLs are also a constraint to water supply development of both groundwater and surface water sources.
- In order to more accurately determine water supply availability for planning purposes, MFLs are an important "constraint" factor in the process.
- In the Phase II report "Proxy MFLs" were developed for sources on the MFL priority list that were not yet completed.
- The purpose of this chapter is to compare the proxy MFLs used in the Phase II report to determine water availability to MFLs that are now developed by SWFWMD.
- This comparison is to determine if the availability of water that was presented in Phase II was too restrictive (i.e. under predicted availability) or not restrictive enough (i.e. over predicted availability).
- For the most part, the proxy MFLs were reasonably close to what SWFWMD has proposed with the exception of Gum Springs and the Middle Withlacoochee River.
- MFLs and their effect on water supply need to be continually monitored and an updated analyses of water supply availability should be completed in the RWSP update.

3.1 Introduction

The establishment of MFLs by Florida's water management districts is a complex and important requirement set forth in Florida law (Chapter 373.042, Florida Statutes). MFLs are designed to protect water resources and the environment from overproduction of a water source. An MFL is based on the concept of "significant harm" versus the water use permitting rules that will not allow withdrawals that cause "harm" to the water resource or the environment. So an MFL becomes the "backstop" in the water allocation process. It is the point where, "…groundwater in the aquifer and surface watercourses at which further withdrawals would be significantly harmful to the water resources or ecology of the area."

MFLs are also part science and part policy. Science plays a significant role in their development. Rivers springs, lakes and aquifers are complex and impacts to their levels and flows can be driven by manmade or natural influences. The differentiation between the causes and the significance of impacts is an important part of the MFL development process. Allowable withdrawals of water must be based on the scientific relationship between natural conditions and manmade impacts. Also MFLs are developed using the best available information, they

may consider seasonal variations and protection of non-consumptive uses in their establishment.

Policy can also influence the establishment of MFLs. FDEP rules and Chapter 62.40 F.S. outlines a far ranging array of environmental and water resource values that the governing boards of the water management districts may consider when establishing MFLs. These can include:

- Recreation in and on the water;
- Fish and wildlife habitats and the passage of fish;
- Estuarine resources;
- Transfer of detrital materials;
- Maintenance of freshwater storage and supply;
- Aesthetic and scenic attributes;
- Filtration and absorption of nutrients and other pollutants;
- Sediment loads;
- Water quality; and
- Navigation.

Apparent in the list are the scientific and policy considerations that can play an important factor in the development of MFLs. An MFL can be considered based on social and economic influences which can be important in the final determination of resource availability and its impact on the Regional Framework.

Required annually under Chapter 373.042, F.S., a priority list and schedule for the establishment of MFLs is required to be submitted to FDEP by the water management districts. The priority list and schedule is to be based on "the importance of the waters to the state and region and the….existence of or potential for significant harm to the water resources or ecology of the state or region". The WRWSA region has a number of systems included on the list that have been adopted, are in the development process or will be scheduled for completion in the foreseeable future Table 3-1.

MFLs for priority water bodies are not the only resource constraint to water supply development. SWFWMD and SJRWMD water use permitting criteria generally prevents unacceptable adverse impacts from withdrawals to water resources which do not have a MFL. The water use permitting criteria prevents unacceptable impacts to wetlands, lakes, and springs as well as water quality (i.e., saline water intrusion).

3.2 Proxy Minimum Flows and Levels

The establishment of MFLs is important for water resource and environmental protection and at the same time is a critical component in understanding the availability of water sources for allocation. An MFL can be a constraint to water supply development and for planning purposes must be a factor in determining the availability of the resource.

As part of the Phase II report, proxy MFL's were developed on water systems that do not have completed MFL requirements from the water management districts. The purpose of the proxy thresholds in the report was to ensure that the proposed water supply projects recognize the

potential future MFL constraints on these water systems. MFLs may have a significant effect on groundwater and surface water development within the WRWSA when withdrawals from the aquifer or river systems are considered.

The goal of the development of proxy MFLs was to estimate a threshold for each of these watercourses and waterbodies at which significant harm was reached. The proxy MFL functioned as a predictive tool intended to estimate a potential and plausible minimum flow on a watercourse or waterbody slated for future MFL development. Figure 3-1 shows the location of proxy MFLs.

Fundamentally, a proxy threshold is non-binding and did not incorporate the usual field data and model-based methods of MFL determination (due to factors such as cost and time constraints). It also does not address potential future changes to historic flow patterns, which may occur due to anthropogenic changes in the watershed or global climate change. Rather, the proxy MFL is a compendium of previously completed scientific work that has close similarity to the water body being studied. A proxy threshold assumes that climatological and biological similarities amongst the watercourses and waterbodies are such that the water resource values observed elsewhere are also applicable to the target waterbody, and thus be used to approximate the potential yield of water supply projects where MFLs have not yet been adopted.

Due to the fact that a proxy threshold does not incorporate data gathered in the field, but rather relies on analyses performed on other systems to be applied within the WRWSA, it is inherently subject to error. In order to correct for a portion of that error, a range for a potential proxy threshold is estimated, based on the MFLs determined for other systems of similar geographical location and precipitation regime. It is assumed that, by determining the frequency of occurrence of other minimum flows within their long-term periods of record, a reasonable range for potential thresholds within the WRWSA may be developed. The Phase II report provided a only a range, and these proxy ranges are subject to complete re-evaluation with the recently adopted MFLs for the gages on the Withlacoochee River and other watercourses and springs within the WRWSA.

The purpose of this chapter is to determine whether the proxy MFLs used in the Phase II report were relatively consistent with the ultimate MFLs established by the water management districts all currently in draft form. If proxy MFLs whether either too restrictive or not restrictive enough, the availability of the resource may have been inaccurately portrayed in the Phase II report. The following comparison, summarized in Table 3-2, is to determine the differences, if any, and whether any substantive impact to the availability of the resource is a potential result.

3.3 Updated District Minimum Flows and Levels

For the Phase II report, springs and rivers had to meet certain criteria to be able to set a guidance level. Following the survey of established MFLs for springs within SWFWMD, as well as for those in the adjacent districts, SRWMD and SJRWMD, a comparison of the magnitudes of these springs was performed. Also, key water resource values used to develop minimum flows, were then performed with the priority springs slated for MFL development in the WRWSA. Using shared attributes such as magnitude and ecological function, proxy thresholds were then estimated for the WRWSA springs based on similarity with existing springs MFLs.

Since the development of the Phase II report, SWFWMD has developed MFL levels for water systems which had been given proxy MFLs. The Chassahowitzka Spring System, Gum Springs, Homosassa Springs and the Withlacoochee River MFLs have been proposed and are

undergoing public workshops. Table 3-2 outlines the MFL schedules for water systems in the WRWSA, the proxy MFL reductions that were used in the Phase II report, and the newly adopted or recommended percent reductions for those water systems.

3.3.1 Chassahowitzka Spring System

As presented in the Phase II report, Chassahowitzka Spring is a 1st magnitude coastal spring located in the Chassahowitzka National Wildlife Refuge in Citrus County. It is the largest spring of a group of springs that form the headwaters of the Chassahowitzka River, which then flows approximately six (6) miles into the Gulf of Mexico. The entire river is tidally-influenced, and the spring functions in maintaining the salinity regime of the river and spring run. The maximum discharge recorded is 197 cfs while the minimum discharge is 31.8 cfs has been observed. Its long-term average flow is 138.5 cfs (Scott et al., 2004).

Due to its proximity to Weeki Wachee Spring and the Gulf of Mexico, as well as its discharge magnitude, the proxy threshold for Chassahowitzka Springs that was completed for the Phase II report was taken from the MFL established for the Weeki Wachee Spring. The Phase II report presented a proxy MFL range of 5% to 10% flow reduction from historic flow regimes.

Since the Phase II report however, SWFWMD has evaluated the MFL for the Chassahowitzka and has recommended for the river system an allowable 11% reduction in spring flow to the river. This compares to a recommended range used in the Phase II report as a constraint of 5-10%.

3.3.2 Gum Springs

Gum Spring is a 3rd magnitude spring, located in northwest Sumter County, and is the largest of a group of at least seven individual springs that discharge into Gum Slough. Gum Slough in turn discharges into the Withlacoochee River. The average discharge at Gum Spring is 8.6 cfs (Scott et al., 2004). The importance of the Gum Springs system is its contribution to the Withlacoochee River during its low-flow periods and the maintenance of habitats in the respective spring runs.

The Phase II report used the minimum flows at Buckhorn Spring in SWFWMD and Rock and Wekiwa Springs in SJRWMD to estimate the proxy thresholds for Gum Springs. These springs were selected due to the similarities of importance and ecological role. The recommended flow reduction for Buckhorn Spring MFL is 15%, while the MFL established for Rock and Wekiwa Springs has a recommended flow reduction is 18.5% below the long-term mean of flows and 16.3% below the long-term mean of flows, respectively. The average of the three minimum flows for these springs is 16.6%, which was applied to Gum Springs as a Proxy MFL threshold. Since the Phase II report, Gum Springs has been evaluated by the SWFWMD and has released a peer review draft.

The MFL developed by the SWFWMD for Gum springs is a 9% flow reduction of the historic flows, year round. This is more restrictive when compared to the proxy MFL used in the Phase II report at approximately a 17% reduction in flow. This reduction could also impact the amount of groundwater withdrawals in the area. Particularly, the Sumter Upper Floridan aquifer wellfield conceptualized in the Phase II report.

3.3.3 Homosassa Spring

Homosassa Spring is a coastal spring located in Citrus County. It is a 1st magnitude spring and the largest of a group of springs that form the headwaters of the Homosassa River. The Homosassa River flows approximately six (6) miles towards the Gulf of Mexico. The entire system is tidally-influenced, and therefore, Homosassa Spring functions in maintaining salinity regimes in the river and spring run with its freshwater inflows. The maximum observed discharge of the spring is 165 cfs while the minimum flow is 80 cfs. The long-term average discharge of Homosassa Springs is 106 cfs (Scott et al., 2004).

The Phase II report based the proxy MFL for Homosassa Spring on Weeki Wachee Springs, because of their close proximity as well as the similar characteristics of the receiving waters (e.g., length of the receiving stream and distance of the spring from the Gulf of Mexico). The proxy MFL that was developed for the Phase II report was a 5% to 10% flow reduction range from historic conditions, observed year-round.

Since the Phase II report, the SWFWMD has evaluated the MFL for the Homosassa River system and is in the process of going through public workshops to discuss the results. The percent of flow reduction that was established by SWFWMD for the Homosassa River system is a 5% yearly flow.

3.3.4 Withlacoochee River

The Withlacoochee River and its drainage basin are located in the northern portion of the SWFWMD. It is considered to be the largest surface water source within the Northern Planning Region. Estimation of minimum flows for the river in the Phase II report was based on a range of flows intended to bracket a likely MFL. This range was developed to allow for error in the estimation of a proxy threshold, recognizing the inherent uncertainty that a transfer of water resource values from one or more systems to another entails.

These ranges created for the Phase II report included a low-flow and high-flow approximations. The ranges of flows were applied to seasonal flow blocks for the Withlacoochee River in an attempt to simulate the short-term and seasonal hydrologic variations that are observed in the period of record flows. For the Withlacoochee River, Block 1 (May 10 to July 26) represents the low flow period. Block 3 (July 27 to November 2) is the highest flow period. Block 2 is the remaining days and corresponds to the medium flow.

The Phase II report presented the following proxy MFL thresholds for both the Upper and Middle Withlacoochee River: Block 1 flows allowed for a 12% reduction during the low-flow range, and a 13% reduction through the high-flow range of this block. Block 2 allowed a 12% flow reduction in the low-flow range, and a 13% flow reduction during the high-flow range of this block. Block 3 allowed an 8% reduction during the low-flow range, and a 15% flow reduction during the high-flow range of this block.

Since the Phase II report, SWFWMD has developed draft MFLs on the Upper and Middle Withlacoochee River. For the Upper Withlacoochee River, the draft MFL for Block 1 allows for an 11% flow reduction; Block 2 allows for a 16% flow reduction; and Block 3 allows for a 9% flow reduction when discharge is above 400 cfs and a 16% flow reduction when discharge is below 400 cfs.

The draft MFL for the Middle Withlacoochee River is; Block 1 allows for a 13% flow reduction; Block 2 allows for a 16% flow reduction; and Block 3 allows for a 7% flow reduction when discharge is above 1,250 cfs and a 9% flow reduction when discharge is below 1,250 cfs.

Table 3-2 also reflects the difference from the Proxy MFL reductions from the Phase II report, and the MFL reductions established by the SWFWMD.

3.4 Summary

As depicted in Table 3-2, the comparison between the proxy MFLs utilized in the Phase II report and those that are either adopted or proposed by SWFWMD are relatively close from a percentage standpoint. They vary between 1 or 2 percentage points, up to 6 or 7 percentage points on flow reductions, the largest variations being the Gum Springs and the Middle Withlacoochee River.

Gum Springs was a proxy MFL that was utilized to determine the yield for the North Sumter Wellfield. Based on the SWFWMD recommendation of a 9% reduction of flow versus a proxy used in the Phase II report of 16.6%, a potential impact leading to a lower yield of the upper Floridan aquifer wellfield may be experienced. The Phase II report determined a wellfield yield of 10 mgd annual average based on a configuration of 5-wells uniformly space a 1.25-miles apart along a 5-mile east-west line.

Another source that is worth noting is the low flow of the Middle Withlacoochee. The proxy MFL for the Block 3 low flow was a 15% reduction in flow. The recommended SWFWMD MFL for this reach of the river is 9%, making for a more restrictive withdrawal schedule. This MFL would affect the surface water withdrawal project near Holder. This project requires an offstream reservoir and was projected for a 25 mgd annual average yield.

It is recommended that during the update of the RWSP these projects in conjunction with the MFLs are readdressed to determine the potential impact to water supply yields. Also, that the WRWSA tracks closely the MFL process for both the SWFWMD and SJRWMD to determine if proposed MFLs will impact water supply projects that will potentially supply Authority members in the future.

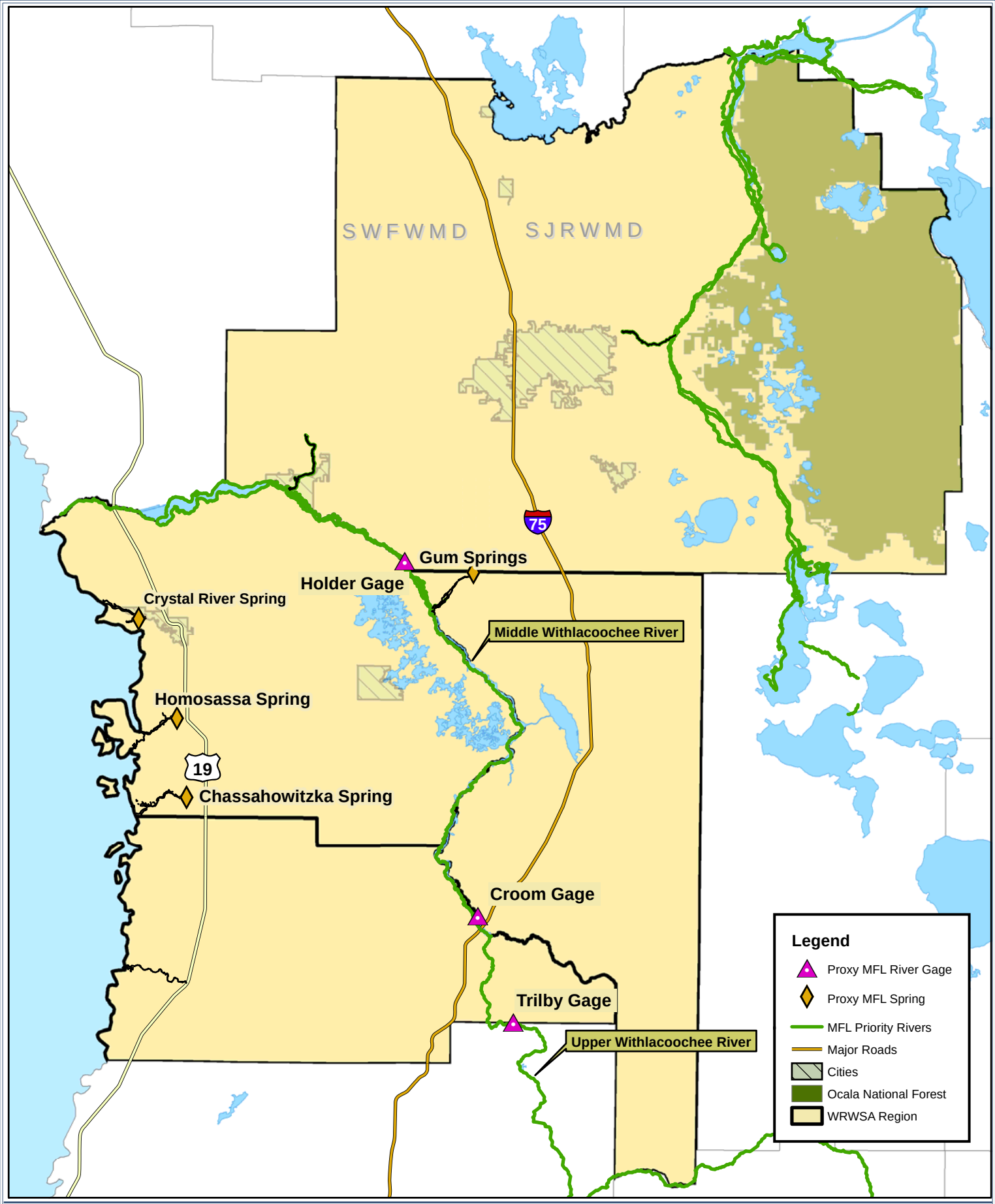
Table 3-1. Adopted MFL's in the WRWSA

Watercourse	Type	Schedule	County	Water Management District
Big Gant Lake	Lake	Adopted	Sumter	SWFWMD
Bowers Lake	Lake	Adopted	Marion	SJRWMD
Charles Lake	Lake	Adopted	Marion	SJRWMD
Deaton Lake	Lake	Adopted	Sumter	SWFWMD
Halfmoon Lake	Lake	Adopted	Marion	SJRWMD
Hopkins Prairie	Lake	Adopted	Marion	SJRWMD
Hunters Lake	Lake	Adopted	Hernando	SWFWMD
Lake Fort Cooper	Lake	Adopted	Citrus	SWFWMD
Lake Kerr	Lake	Adopted*	Marion	SJRWMD
Lake Panasoffkee	Lake	Adopted	Sumter	SWFWMD
Lindsey Lake	Lake	Adopted	Hernando	SWFWMD
Miona and Black Lake	Lake	Adopted	Sumter	SWFWMD
Mountain Lake	Lake	Adopted	Hernando	SWFWMD
Neff Lake	Lake	Adopted	Hernando	SWFWMD
Nicotoon Lake	Lake	Adopted	Marion	SJRWMD
Okahumpka Lake	Lake	Adopted	Sumter	SWFWMD
Smith Lake	Lake	Adopted	Marion	SJRWMD
Spring Lake	Lake	Adopted	Hernando	SWFWMD
Tsala Apopka Chain	Lake	Adopted	Citrus	SWFWMD
Weekiwachee Prairie Lake	Lake	Adopted	Hernando	SWFWMD
Weekiwachee Spring System	Spring	Adopted	Hernando	SWFWMD
Weir Lake	Lake	Adopted	Marion	SJRWMD

* Re-evaluate 2012

Table 3-2. MFL Schedule for Priority Waterbodies with the Withlacoochee Regional Water Supply Authority.

Watercourse	Type	Schedule	County	Water Management District	Update (Expected Schedule)	Proxy MFL Reduction		District Recommended Reduction
Chassahowitzka Spring System	Spring	2010	Citrus	SWFWMD	2011	5-10%		11%
Gum Springs	Spring	2010	Sumter	SWFWMD	2011	16.6%		9%
Homosassa Spring System	Spring	2010	Hernando	SWFWMD	2011	5-10%		5%
Rainbow Springs	Spring	2010	Marion	SWFWMD	2012			
Upper Withlacoochee River	River	2010	Hernando	SWFWMD	2012	Block 1 (Low)	12%	Block 1 - 11%
						Block 1 (High)	13%	
						Block 2 (Low)	12%	Block 2 - 16%
						Block 2 (High)	13%	
						Block 3 (Low)	8%	9%
						Block 3 (High)	15%	16%
Middle Withlacoochee River	River	2010	Sumter	SWFWMD	2012	Block 1 (Low)	12%	Block 1 - 13%
						Block 1 (High)	13%	
						Block 2 (Low)	12%	Block 2 - 16%
						Block 2 (High)	13%	
						Block 3 (Low)	8%	7%
						Block 3 (High)	15%	9%
Silver Springs	Spring	2011	Marion	SJRWMD	2011			
Ocklawaha River	River	2011	Marion	SJRWMD	2011			
Silver River	River	2011	Marion	SJRWMD	2011			
Bonable Lake	Lake	2011	Marion	SWFWMD	2011			
Little Bonable Lake	Lake	2011	Marion	SWFWMD	2011			
Tiger Lake	Lake	2011	Marion	SWFWMD	2011			
Crystal River Springs System	Spring	2011	Citrus	SWFWMD	2012	5-10%		
Lower Withlacoochee River	River	2011	Citrus	SWFWMD	2012			
Kerr Lake	Lake	2012	Marion	SJRWMD	2012			
Silver Glen Springs	Spring	2013	Marion	SJRWMD	2013			
Lake Tooke	Lake	2013	Hernando	SWFWMD	2012			
Whitehurst Lake	Lake	2013	Hernando	SWFWMD	2012			



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PROJECT: 0719 - Regional Framework Initiative

Figure 3-1
Proxy MFL Locations

ORIGINAL DATE: 12-14-09
REVISION DATE: NA
JOB NUMBER: 0719
FILE NAME: Figure 3-1.mxd
GIS OPERATOR: DR

N W E S
1 inch = 9 miles

Chapter 4 – Regional Framework Water Supply Project Options

4.0 Key Points

Key Points

- Water supply options from the Phase II report are summarized in this chapter for continuity with respect to the implementation of the Regional Framework Initiative.
- Summaries of the projects include project descriptions; transmission systems; capital costs; O&M estimates; and unit production costs.
- Projects include traditional supplies from groundwater wellfields and AWS projects utilizing surface water and desalination advanced water treatment of seawater.
- Since the completion of the Phase II report, the Lower Floridan Aquifer (LFA) has been investigated as a potential source of water by the Cities of Wildwood and Ocala.
- Investigation of the LFA is ongoing and cost estimates for the LFA sources have not been calculated.
- Water supply options were prioritized in the Phase II report by short, mid and long term horizons.
- Groundwater projects and sub-regional connections were considered short-term project options.
- Interconnections both sub-regionally and regionally were considered mid-term projects as utilities attempt to maximize traditional groundwater supplies.
- AWS projects were considered late mid-term and long-term projects due to the lower projected water demands; the higher unit cost of production; and the need for the Regional Framework Initiative implementation for the efficient and economical delivery of water to the required customer base.

The Phase II report provided conceptual water supply projects to assist in meeting the needs to develop alternative or non-local water supplies for the WRWSA. The projects identified as possible options to supply the WRWSA future water demands included: groundwater wellfields, surface water withdrawals, and a seawater desalination project. The report also provided the conceptual engineering designs and transmission routing for these projects.

This chapter summarizes these projects for continuity and puts them in the context of the Regional Framework Initiative. It provides project descriptions; details on the transmission requirements; capital costs; and a unit cost of the project water supply. The chapter also updates the current status of the projects and includes a new water supply option, the LFA System.

4.1 Regional Framework Water Supply Project Option Descriptions

The following provides a general overview of the water supply project options developed in the Phase II report. This is synopsis of the projects but is important to identify them to the reader to put the water supply options in context to the remainder of the report. These projects are generally of a size and cost that require partnerships between local governments and utilities and will be important to the future development of the Regional Framework.

4.1.1 Holder Gage Surface Water Project

The Holder Gage Surface Water Project is conceptually designed to withdraw water from the Withlacoochee River in the vicinity of the Holder USGS recording gage. The withdrawal point is located 20 miles downstream from the Lake Panasoffkee Outlet River. This project is designed to withdraw water at higher flows and requires raw water offstream storage.

The proposed site for the offstream reservoir is property owned by SWFWMD and is located in Marion County, northeast of the town of Holder. The parcel is adjacent to the Withlacoochee River and has access to SR 200. The property is approximately 8,250 acres in size and is sufficient to accommodate the 25 mgd annual daily average and related water supply facilities. Figure 4-1 depicts the location of the proposed site and water supply facilities.

4.1.2 Lake Rousseau Surface Water Project

The Lake Rousseau Surface Water project presented in the Phase II report is designed to withdraw water from Lake Rousseau which is formed by the Inglis Dam and is immediately downstream of the confluence of the Withlacoochee River and the Rainbow River. This project is subject to the MFLs adopted for the Lower Withlacoochee River, which will ultimately determine the yield of Lake Rousseau and whether additional offstream storage is required. Chapter 3 of this report reviews the current MFL priority list, and the possible schedule of an MFL adoption for the Lower Withlacoochee River.

The site near Lake Rousseau for the offstream storage is located in Levy County. Lake Rousseau is approximately 3 miles to the south of the proposed location. The site consists of more than 10 parcels owned by the Florida Department of Agriculture and Consumer Services (FDACS) with a total area of approximately 7,200 acres. The site has access to SR 336 and is sufficient to accommodate and store the planned 25 mgd annual daily average and the associated water supply facilities. Figure 4-2 depicts the location of the proposed site and water supply facilities.

4.1.3 Crystal River Desalination Project

The Crystal River desalination project conceptualized in the Phase II report will use seawater as its water source. The seawater would require advanced reverse osmosis treatment for potable water supply. The reject concentrate from the reverse osmosis process would then be mixed with cooling water from the Crystal River Power Plant (Figure 4-3) and safely discharged back into the Gulf of Mexico. At a projected 16:1 dilution ratio (cooling water to reject concentrate) the total capacity of the desalination facility based on available cooling water could be as high as 85 mgd of potable water production. The initial desalination project is conceptually designed for 25 mgd annual daily average.

4.1.4 Sumter County Upper Floridan Aquifer (UFA) Groundwater Wellfield Project

This wellfield option identified in the Phase II report is located in northern Sumter County (Figure 4-4). Groundwater flow modeling with the Northern District Model was used to locate and disperse the wellfield withdrawals. The criteria used to locate the withdrawal were:

- Location in a transmissive UFA setting to minimize withdrawal drawdown;
- Minimize or eliminate drawdown impact to the MFL-priority lakes in the Villages area, and minimize spring flow reduction at Gum Springs and Fenney Springs;
- Minimize transmission costs to proposed users, the City of Wildwood and The Villages; and
- Locate in proximity to an alternative water supply source. The Withlacoochee River could provide future conjunctive or potable alternative supply through a project hub.

The wellfield modeling consists of 5 wells, uniformly spaced at 1.25 miles between wells, along a 5-mile long East-West line shown in Figure 4-5. The modeled extraction rate for each well is 2 mgd from the UFA, for a total of 10 mgd of annual daily average withdrawal.

4.1.5 Citrus County Groundwater Wellfield Project

The Citrus County wellfield identified in the Phase II report is located in south-central Citrus County (Figure 4-4). The criteria used to locate the withdrawal in the Phase II report were:

- Location in a transmissive UFA setting to minimize withdrawal drawdown and impacts to existing Citrus County water supply facilities and domestic wells;
- Proximity to publicly-owned lands in the Withlacoochee State Forest;
- Location with respect to future demands in western and southern Citrus County; and
- Proximity to an alternative water supply source. Surface water from Lake Rousseau or desalinated water at Crystal River could provide future conjunctive or alternative supply through a project hub.

The wellfield modeling for the Citrus County wellfield consisted of 3 wells, uniformly spaced at 1.25 miles along a North-South line shown in Figure 4-5. The modeled extraction rate for each well is 2.5 mgd from the UFA, for a total of 7.5 mgd of annual daily average withdrawal.

4.1.6 Northwestern Marion County Groundwater Wellfield Project

This wellfield option is located in northwestern Marion County (Figure 4-4). The criteria used to locate the withdrawal in the Phase II report were:

- Location in a transmissive UFA setting to minimize withdrawal drawdown;
- Minimize flow reductions to MFL-priority springs at Rainbow and Silver, and minimize or eliminate drawdown at the City of Ocala, existing Marion County water supply facilities, and domestic wells;
- Proximity to demand areas in central and southern Marion County; and
- General proximity to an alternative water supply source. The Withlacoochee River system or seawater desalination at Crystal River could provide future conjunctive or potable alternative supply through a project hub.

The wellfield modeling for the Northwestern Marion wellfield consisted of 5 wells, uniformly spaced at 1.25 miles along a North-South line shown in Figure 4-5. The modeled extraction rate for each well is 3 mgd from the UFA, for a total of 15 mgd of average daily withdrawal.

4.1.7 Northeastern Marion County Groundwater Wellfield Project

The wellfield option that was identified in the Phase II report is located in northeastern Marion County (see Figure 4-4). The criteria used to locate the withdrawal in the Phase II report were:

- Location in a hydrogeologic setting with strong surficial confinement;
- Reduced distance to demand areas in central Marion County (when compared with an Ocala National Forest location);
- Minimize flow reductions to MFL-priority springs at Rainbow and Silver; and
- Proximity to an alternative water supply source. The Lower Ocklawaha River could provide future conjunctive or potable alternative supply through a project hub.

The wellfield modeling consisted of 5 wells, uniformly spaced at 1.25 miles along a North-South line shown in Figure 4-5. The modeled extraction rate for each well is 3 mgd from the UFA, for a total of 15 mgd annual daily average withdrawal.

4.1.8 City of Wildwood LFA Groundwater Wellfield

The City of Wildwood has been investigating the potential of developing the LFA as a future water supply. Aquifer performance tests and water quality sampling at their proposed wellfield located at Champagne Farms (Figure 4-4) have provided positive results for the eventual development to meet future water supply demands. This option was “a work in progress” during the development of the Phase II report and was not included. The LFA was chosen for investigation by Wildwood for the following reasons:

- The City has an AWS condition on their WUP that requires the identification of an alternative water source to offset groundwater withdrawals;
- The natural confinement between the LFA and UFA systems will protect surficial environmental resources from withdrawal drawdown impacts; and

- The location is in a reasonable distance to existing City water infrastructure.

This LFA wellfield also has the possibility of becoming a sub-regional water source. The Villages and the City of Wildwood have ongoing discussions of potentially developing this water source collaboratively.

4.1.9 North Sumter Surface Water Project

The North Sumter surface water project that was identified in the Phase II report is designed to withdraw water from the Withlacoochee River. The site in northern Sumter County is a property consisting of multiple parcels owned by the SWFWMD. The parcel is adjacent to the Withlacoochee River and has access to SR 315A. The property is approximately 750 acres in size and is sufficient to accommodate the water supply facilities for this 10 mgd annual daily average conjunctive use project. The Wysong-Coogler Water Conservation structure is about 1.8 miles downstream of the intake. Figure 4-6 depicts the location of the proposed site and water supply facilities.

The project is designed to access high flows on the Withlacoochee River to supplement groundwater quantities withdrawn from the North Sumter Wellfield. It is anticipated that withdrawals from the river would only occur after groundwater in the northern Sumter and southern Marion Counties is exhausted and the surface water would supplement supplies as a conjunctive use.

4.2 Water Supply Project Transmission

For the Phase II report, a conceptual transmission system for each water supply project was prepared. The transmission route typically assumes that water will be providing water to utilities at an approximate location within the respective service area, via easements acquired along public rights-of-way. County and state roads were targeted for the proposed transmission routes.

Careful consideration was given in the Phase II report to the location where the finished water supply would be used and connected into the existing water distribution systems that were currently in place in these water demand areas. This was determined by the actual need for water based on projections and those utilities that were required to develop AWS as part of their WUPs. Actual pipeline routes and points of connection will be identified during design and permitting phases of these projects through coordination with participating utilities.

The conceptual design of the transmission piping sizes is based on the planning demands presented and the overall potential capacity of the projects. Hydraulic modeling and coordination with participating utilities will be performed during design and permitting to determine the actual transmission requirements. Actual transmission sizes will be based on maximum daily flows determined by participating utilities.

Since these proposed pipe routes run along county or state roads, consideration should be given to potential road upgrades in the future. In order to avoid future pipe relocation, easement along the pipeline corridors should be acquired. Easement widths will be a minimum of 30 feet for pipes 16 inches or larger and 20 feet for smaller diameter pipes.

4.2.1 Lake Rousseau

Figure 4-7 depicts the conceptual transmission route for the Lake Rousseau surface water project identified in the Phase II report. The locations of the connection points to the distribution systems of the different municipalities are approximate. As stated above, the actual alignment will be determined during design and permitting. Finalizing the locations of the points of connection in later phases of the project could result in different pipe lengths and would also impact the conceptual cost estimate described in the following section. End users would be responsible for interconnection and distribution of combined water to their respective users.

For this project, a raw water transmission system would also be required to deliver raw water from the intake location to the treatment plant along with a finished water transmission line. Tables 4-1 and 4-2 summarize the conceptual transmission systems for the Lake Rousseau project. As mentioned, MFLs are being established on the river and will determine the need for offstream storage which will ultimately impact the need for additional transmission lines.

Table 4-1. Conceptual Lake Rousseau Raw Water Transmission System.

Pipeline Size	Pipeline Length		Easement Area
inches	feet	miles	acres
48	22,704	4.3	13.6
Total:	**22,704**	**4.3**	**13.6**

Table 4-2. Conceptual Lake Rousseau Finished Water Transmission System.

Pipeline Size	Pipeline Length		Easement Area
inches	feet	miles	acres
48	36,615	6.9	25.2
42	69,990	13.3	48.2
36	109,230	20.7	75.2
24	104,415	19.8	71.9
12	13,090	2.5	6.0
Total:	**333,340**	**63.2**	**226.5**

4.2.2 Holder

Figure 4-8 outlines the conceptual transmission route for the Holder surface water project identified in the Phase II report. The locations of the connection points to the distribution systems of the different municipalities are approximate. Table 4-3 summarizes the conceptual transmission system for the Holder project.

Table 4-3. Conceptual Holder Finished Water Transmission System.

Pipeline Size	Pipeline Length		Easement Area
inches	feet	miles	acres
48	8,440	1.6	5.8
42	69,460	13.2	47.8
36	109,230	20.7	75.2
24	69,660	13.2	48.0
12	13,090	2.5	6.0
Total:	**269,880**	**51.2**	**182.8**

4.2.3 Crystal River Desalination

Figure 4-9 depicts the conceptual transmission route for the Crystal River Desalination project identified in the Phase II report. The raw water pipeline material was assumed to be a large diameter concrete pipe. Other alternatives such as specially coated DIP, fiberglass, and HDPE could be considered during design.

DIP is assumed as the finished water pipeline material for the purposes of this report; other pipeline materials including cement-lined reinforced concrete and PVC may be evaluated during preliminary design. The pipe routes and sizes are presented in Tables 4-4 and 4-5 for the conceptual transmission system.

Table 4-4. Conceptual Seawater Desalination Raw Water Transmission System.

Pipeline Size	Pipeline Length		Easement Area
inches	feet	miles	acres
42	19,708	3.7	13.6
Total:	**19,708**	**3.7**	**13.6**

Table 4-5. Conceptual Seawater Desalination Finished Water Transmission System.

Pipeline Size	Pipeline Length		Easement Area
inches	feet	miles	acres
42	67,665	12.0	46.6
36	115,320	21.8	79.4
12	2,125	0.4	1.0
Total:	**185,110**	**34.2**	**127.0**

4.2.4 Sumter County UFA Wellfield

Figure 4-10 outlines the conceptual transmission route for the Sumter UFA wellfield identified in the Phase II report. The locations of the connection points to the distribution systems of the different municipalities are approximate. The actual alignment will be determined during design and permitting. Finalizing the locations of the points of connection in later phases of the project would result in different pipe lengths and would also impact the conceptual cost estimate described in the following section.

End users would be responsible for interconnection and distribution of combined water to their respective users. Table 4-6 summarizes the conceptual transmission system for the Sumter Wellfield.

Table 4-6. Conceptual Sumter Wellfield Transmission System.

Pipeline Size	Pipeline Length		Easement Area
inches	feet	miles	acres
36	42,530	8.1	29.2
20	37,400	7.8	25.8
Total:	**79,930**	**15.9**	**55.0**

4.2.5 Citrus County Wellfield

The conceptual transmission route for the Citrus Wellfield identified in the Phase II report is shown in Figure 4-11. The transmission system included in this section is not sufficient to convey the full design capacity of the project. Additional users would need to be identified for the full capacity of the project to be realized. End users would be responsible for interconnection and distribution of combined water to their respective users. Table 4-7 summarizes the conceptual transmission system for the Citrus wellfield

Table 4-7. Conceptual Citrus Wellfield Transmission System.

Pipeline Size	Pipeline Length		Easement Area
inches	feet	miles	acres
6	35,810	6.8	16.4
10	21,510	4.1	9.9
Total:	**57,320**	**10.9**	**26.3**

4.2.6 Northwestern Marion County Wellfield

Figure 4-12 depicts the conceptual transmission route for the Northwestern Marion Wellfield identified in the Phase II report. As mentioned on the other projects the locations of the connection points to the distribution systems of the different municipalities are approximate. The actual alignment will be determined during design and permitting. Finalizing the locations of the points of connection in later phases of the project would result in different pipe lengths and would also impact the conceptual cost estimate described in the following section. End users would be responsible for interconnection and distribution of combined water to their respective users. Table 4-8 summarizes the conceptual transmission system for the Northwestern Marion Wellfield.

Table 4-8. Conceptual Northwestern Marion Wellfield Transmission System.

Pipeline Size	Pipeline Length		Easement Area
inches	feet	miles	Acres
36	59,485	11.3	41.0
8	34,725	6.6	15.9
Total:	**104,210**	**17.9**	**66.9**

4.2.7 Northeastern Marion County Wellfield

The conceptual transmission route for the Northeastern Marion Wellfield identified in the Phase II report is shown in Figure 4-13. The transmission system included in this section is unlikely to be sufficient to convey the full design capacity of the project. Additional users may need to be identified for the full capacity of the project to be realized. End users would be responsible for interconnection and distribution of combined water to their respective users. Table 4-9 summarizes the conceptual transmission system for the Northeastern Marion wellfield.

Table 4-9. Conceptual Northeastern Marion Wellfield Transmission System.

Pipeline Size	Pipeline Length		Easement Area
inches	feet	miles	acres
36	100,000	19.8	68.9
6	31,200	5.9	14.3
Total:	**227,750**	**25.7**	**83.2**

4.2.8 North Sumter Surface Water Project

Figure 4-14 depicts the conceptual transmission route for the North Sumter surface water project identified in the Phase II report. The locations of the connection points to the distribution systems of the different municipalities are approximate. The actual alignment will be determined during design and permitting. Finalizing the locations of the points of connection in later phases of the project could result in different pipe lengths and would also impact the conceptual cost estimate described in the following section. End users would be responsible for interconnection and distribution of combined water to their respective users. Table 4-10 summarizes the conceptual transmission system for the North Sumter project.

Table 4-10. Conceptual North Sumter Finished Water Transmission System.

Pipeline Size	Pipeline Length		Easement Area
inches	feet	miles	acres
36	68,145	12.9	46.9
20	46,245	8.8	31.8
Total:	**114,390**	**21.7**	**78.7**

4.3 Water Supply Project Cost Estimates

The Phase II report provided individual conceptual cost estimates according to the methodology established in CH2M Hill (2004) and accepted by SWFWMD. Section 4.3.1 presents the projected capital cost estimates for each individual water supply project. Water Supply Project Operation and Maintenance Cost Estimates are presented in 4.3.2 of this section. Water Supply Projects Unit Production Cost Estimates or the cost per 1,000 gallons produced is depicted in 4.3.1 of this section.

4.3.1 Water Supply Project Capital Cost Estimates

A summary of the conceptual capital cost for each water supply project option is presented in Tables 4-11 through 4-18, according to methodology and values established in CH2M Hill (2004). The non-construction capital cost was applied at 45% of the construction cost. This

includes a 20% allowance for construction contingency (unknown conditions and/or changed field conditions) and a 25% allowance for engineering design, permitting, and administration. Easement acquisition costs of $0.75 per square foot (e.g., $32,760 per acre) are included in the capital cost. Land costs of $5,000 per acre are included for a 20-acre footprint for each water treatment facility, plus 18% acquisition cost.

Table 4-11. Lake Rousseau Surface Water: 25 mgd Capital Cost Estimate.

Item No.	Description	Total Cost (2009 dollars)
1	Raw Water Intake and Pump Station	$16,682,000
2	Raw Water Transmission	$8,725,000
3	Water Treatment and Offstream Storage Facility	$61,425,000
4	Transmission System	$80,993,000
5	Land and Easement Acquisition	$8,025,000
	Subtotal construction capital cost	$175,850,000
	Non-construction capital cost (45%)	$79,132,000
	Total:	**$254,982,000**

Table 4-12. Holder Surface Water: 25 mgd Capital Cost Estimate.

Item No.	Description	Total Cost (2009 dollars)
1	Raw Water Intake, Pump Station and Transmission	$18,222,000
2	Raw Water Storage Reservoir	$93,081,000
3	Water Treatment and Storage Facility	$61,425,000
4	Transmission System	$64,877,000
5	Land and Easement Acquisition	$8,810,000
	Subtotal construction capital cost	$246,415,000
	Non-construction capital cost (45%)	$110,887,000
	Total:	**$357,302,000**

Notes:
1) The construction cost assumes the reservoir will be lined.
2) Actual MFL adoption and consideration of supplemental sources will affect reservoir costs.

Table 4-13. Seawater Desalination: 15 mgd Capital Cost Estimate.

Item No.	Description	Total Cost (2009 dollars)
1	Raw Water Intake and Pump Station	$8,285,000
2	Raw Water Transmission	$4,498,000
3	Water Treatment and Storage Facility	$48,301,000
4	Finished Water Transmission	$51,727,000
5	Land and Easement Acquisition	$4,652,000
	Subtotal construction capital cost	$117,463,000
	Non-construction capital cost (45%)	$52,858,000
	Total:	**$170,321,000**

Table 4-14. Sumter UFA Wellfield: 10 mgd Capital Cost Estimate.

Item No.	Description	Total Cost (2009 dollars)
1	Dispersed Wellfield (5 wells) and Raw Water Discharge Piping	$4,230,000
2	Water Treatment and Storage Facility	$3,814,000
3	Transmission System	$13,932,000
4	Land and Easement Acquisition	$1,828,000
	Subtotal construction capital cost	$23,804,000
	Non-construction capital cost (45%)	$10,712,000
	Total:	**$34,516,000**

Table 4-15. Citrus Wellfield: 7.5 mgd Capital Cost Estimate.

Item No.	Description	Total Cost (2009 dollars)
1	Dispersed Wellfield (3 wells) and Raw Water Discharge Piping	$2,904,000
2	Water Treatment and Storage Facility	$3,051,000
3	Transmission System[(1)]	$2,565,000
4	Land and Easement Acquisition	$661,000
	Subtotal construction capital cost	$9,181,000
	Non-construction capital cost (45%)	$4,131,000
	Total:	**$13,312,000**

[(1)] *The transmission system included in the cost estimate is not sufficient to convey the full design capacity of the project.*

Table 4-16. Northwestern Marion Wellfield: 15 mgd Capital Cost Estimate.

Item No.	Description	Total Cost (2009 dollars)
1	Dispersed Wellfield (5 wells) and Raw Water Discharge Piping	$4,859,000
2	Water Treatment and Storage Facility	$5,640,000
3	Transmission System	$15,626,000
4	Land and Easement Acquisition	$2,216,000
	Subtotal construction capital cost	$28,341,000
	Non-construction capital cost (45%)	$12,753,000
	Total:	**$41,094,000**

Table 4-17. Northeastern Marion Wellfield: 15 mgd Capital Cost Estimate.

Item No.	Description	Total Cost (2009 dollars)
1	Dispersed Wellfield (5 wells) and Raw Water Discharge Piping	$4,859,000
2	Water Treatment and Storage Facility	$5,640,000
3	Transmission System[(1)]	$24,698,000
4	Land and Easement Acquisition	$2,748,000
	Subtotal construction capital cost	$37,945,000
	Non-construction capital cost (45%)	$17,075,000
	Total:	**$55,020,000**

(1) The transmission system included in the cost estimate is unlikely to be sufficient to convey the full design capacity of the project.

Table 4-18. North Sumter Surface Water: 10 mgd Capital Cost Estimate.

Item No.	Description	Total Cost (2009 dollars)
1	Raw Water Intake, Pump Station and Transmission	$7,916,000
2	Water Treatment and Storage Facility	$30,780,000
3	Transmission System	$22,902,000
4	Land and Easement Acquisition	$2,758,000
	Subtotal construction capital cost	$64,356,000
	Non-construction capital cost (45%)	$28,960,000
	Total:	**$93,316,000**

4.3.2 Water Supply Project Operation and Maintenance (O&M) Cost Estimates

O&M include labor, power, and chemical costs necessary for operation; and R&R for equipment maintenance and membrane replacement. Labor costs were based on an estimated workforce needed to operate the facility. Chemical costs were based on estimated usage and vendor quotes. Power costs were estimated based on current rates and equipment operation needs. R&R were based on a combination of annual needs and project lifecycle of 30 years. For purposes of this report this is estimated to be 1% of the construction cost for the water treatment and storage facilities, and 0.5% of the construction cost for the transmission system. 0.5% is used for the reservoir facilities. The operating costs for this desalination process are considerable due to high power consumption and periodic membrane replacements. Tables 4-19 through 4-26 provide a summary of the O&M costs for the water supply project options.

Table 4-19. Lake Rousseau Surface Water: 25 mgd Operation and Maintenance Estimate.

Item No.	Description	Estimated Annual Costs
1	Labor	$1,250,000
2	Chemicals	$2,400,000
3	Power	$1,110,000
4	Equipment Renewal & Replacement	$781,000
5	Transmission Renewal & Replacement	$324,000
	Total:	**$5,865,000**

Table 4-20. Holder Surface Water: 25 mgd Operation and Maintenance Estimate.

Item No.	Description	Estimated Annual Costs
1	Labor	$1,250,000
2	Chemicals	$2,400,000
3	Power	$1,110,000
4	Equipment Renewal & Replacement	$1,261,000
5	Transmission Renewal & Replacement	$449,000
	Total:	**$6,470,000**

Notes:
1) O&M costs include %0.5 renewal and replacement for the raw water storage reservoir.

Table 4-21. Seawater Desalination: 15 mgd Operation and Maintenance Estimate.

Item No.	Description	Estimated Annual Costs
1	Labor	$750,000
2	Chemicals	$2,150,000
3	Power	$8,500,000
4	Equipment Renewal & Replacement	$1,115,000
5	Transmission Renewal & Replacement	$281,000
	Total:	**$12,796,000**

Table 4-22. Sumter UFA Wellfield: Operation and Maintenance Cost Estimate.

Item No.	Description	Estimated Annual Costs
1	Labor	$200,000
2	Chemicals	$50,000
3	Power	$130,000
4	Equipment Renewal & Replacement	$80,000
5	Transmission Renewal & Replacement	$70,000
	Total:	**$530,000**

Table 4-23. Citrus Wellfield: Operation and Maintenance Cost Estimate.

Item No.	Description	Estimated Annual Costs
1	Labor	$100,000
2	Chemicals	$25,000
3	Power	$100,000
4	Equipment Renewal & Replacement	$60,000
5	Transmission Renewal & Replacement [(1)]	$13,000
	Total:	**$298,000**

(1) The transmission system included in the cost estimate is not sufficient to convey the full design capacity of the project.

Table 4-24. Northwestern Marion Wellfield: Operation and Maintenance Cost Estimate.

Item No.	Description	Estimated Annual Costs
1	Labor	$300,000
2	Chemicals	$75,000
3	Power	$200,000
4	Equipment Renewal & Replacement	$105,000
5	Transmission Renewal & Replacement	$78,000
	Total:	**$758,000**

Table 4-25. Northeastern Marion Wellfield: Operation and Maintenance Cost Estimate.

Item No.	Description	Estimated Annual Costs
1	Labor	$300,000
2	Chemicals	$75,000
3	Power	$200,000
4	Equipment Renewal & Replacement	$105,000
5	Transmission Renewal & Replacement	$123,000
	Total:	**$803,000**

Table 4-26. North Sumter Surface Water: 10 mgd Operation and Maintenance Estimate.

Item No.	Description	Estimated Annual Costs
1	Labor	$850,000
2	Chemicals	$1,000,000
3	Power	$750,000
4	Equipment Renewal & Replacement	$337,000
5	Transmission Renewal & Replacement	$115,000
	Total:	**$3,052,000**

Notes:
1) O&M costs assume continuous operation; however, the facility is expected to provide conjunctive supply. Actual MFL adoption will determine whether this facility can be a year-round or conjunctive supply.

4.3.3 Water Supply Projects Unit Production Cost Estimates

Unit production cost is a function of the capital costs, debt service, annual O&M costs and the amount of water produced. For this analysis, the debt service is estimated based on a 30-year project lifecycle at 4.625% interest (2009 federal discount rate for water resource projects). Tables 4-27 through 4-34 provide a summary of these costs for each water supply project option.

Table 4-27. Lake Rousseau: 25 mgd Unit Production Cost Estimate.

Item No.	Description	Total Cost
1	Total Capital Cost	$254,982,000
2	Annual O&M Cost	$5,865,000
	Equivalent Annual Cost:	**$21,746,386**
	Unit Production Cost ($/kgal)	**$2.38**

Notes:
1) The construction cost within the total capital cost includes a 20% contingency.
2) 30-year amortization at 4.625%.

Table 4-28. Holder: 25 mgd Unit Production Cost Estimate.

Item No.	Description	Total Cost
1	Total Capital Cost	$357,302,000
2	Annual O&M Cost	$6,470,000
	Equivalent Annual Cost:	**$28,724,319**
	Unit Production Cost ($/kgal)	**$3.15**

Notes:
1) The construction cost within the total capital cost includes a 20% contingency.
2) 30-year amortization at 4.625%.

Table 4-29. Seawater Desalination: 15 mgd Unit Production Cost Estimate.

Item No.	Description	Total Cost
1	Total Capital Cost	$170,321,000
2	Annual O&M Cost	$12,796,000
	Equivalent Annual Cost:	**$23,404,331**
	Unit Production Cost ($/kgal)	**$4.27**

Notes:
1) The construction cost within the total capital cost includes a 20% contingency.
2) 30-year amortization at 4.625%.

Table 4-30. Sumter Wellfield: 10 mgd Unit Production Cost Estimate.

Item No.	Description	Total Cost
1	Total Capital Cost	$36,501,000
2	Annual O&M Cost	$530,000
	Equivalent Annual Cost:	**$2,803,441**
	Unit Production Cost ($/kgal)	**$0.77**

Notes:
1) The construction cost within the total capital cost includes a 20% contingency.
2) 30-year amortization at 4.625%.

Table 4-31. Citrus Wellfield: 7.5 mgd Unit Production Cost Estimate.

Item No.	Description	Total Cost
1	Total Capital Cost	$13,312,000
2	Annual O&M Cost	$298,000
	Equivalent Annual Cost:	**$1,127,129**
	Unit Production Cost ($/kgal)	**$0.42**

Notes:
1) The construction capital cost within the total capital cost includes a 20% contingency.
2) 30-year amortization at 4.625%.
3) The transmission system cost included in the construction cost is not sufficient to convey the design capacity of the project.

Table 4-32. Northwestern Marion Wellfield: 15 mgd Unit Production Cost Estimate.

Item No.	Description	Total Cost
1	Total Capital Cost	$42,884,000
2	Annual O&M Cost	$758,000
	Equivalent Annual Cost:	**$3,429,002**
	Unit Production Cost ($/kgal)	**$0.63**

Notes:
1) The construction cost within the total capital cost includes a 20% contingency.
2) 30-year amortization at 4.625%.

Table 4-33. Northeastern Marion Wellfield: 15 mgd Unit Production Cost Estimate.

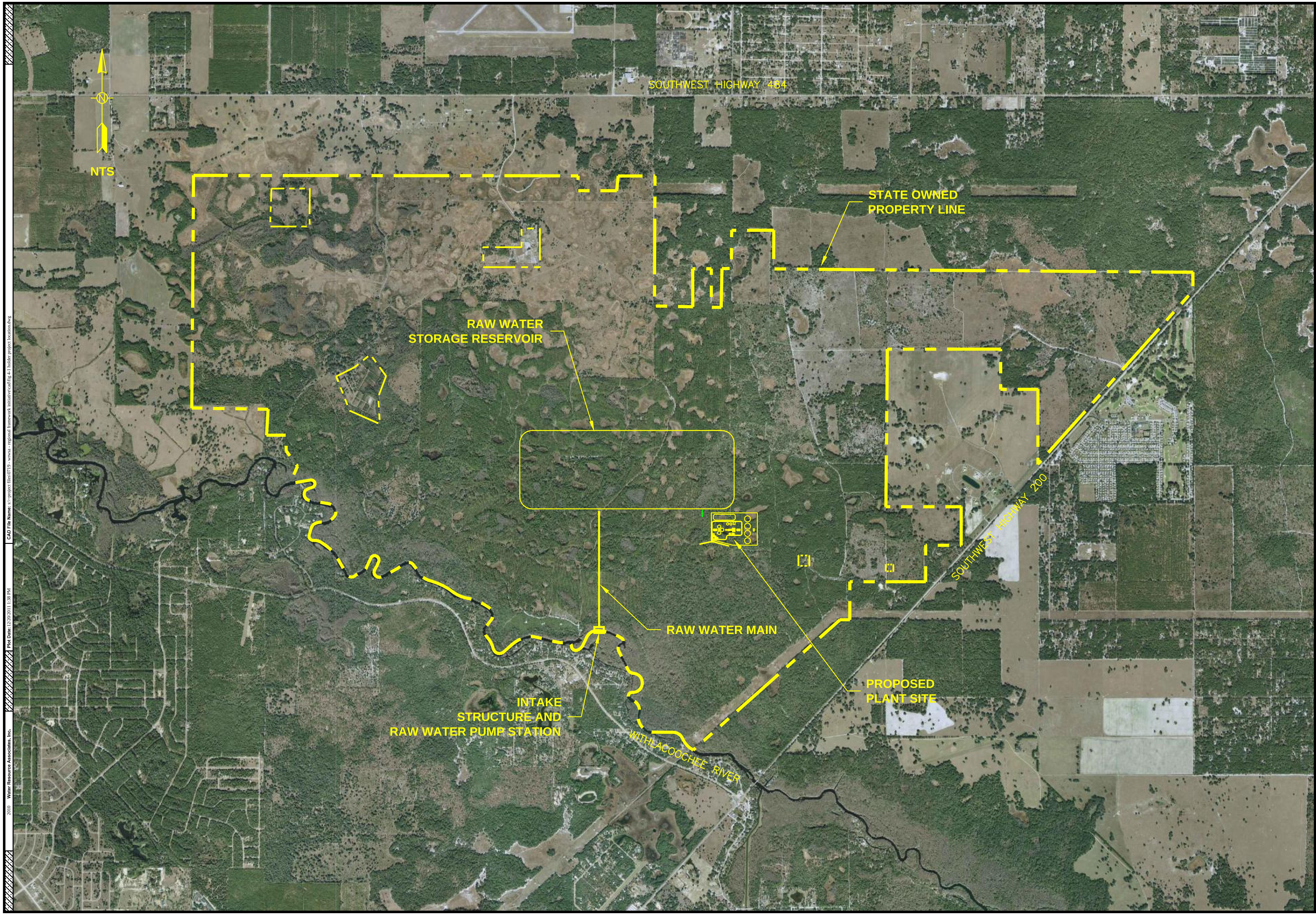
Item No.	Description	Total Cost
1	Total Capital Cost	$58,048,000
2	Annual O&M Cost	$803,000
	Equivalent Annual Cost:	**$4,418,481**
	Unit Production Cost ($/kgal)	**$0.81**

Notes:
1) *The construction cost within the total capital cost includes a 20% contingency.*
2) *30-year amortization at 4.625%.*
3) *The transmission system cost included in the construction cost is unlikely to be sufficient to convey the design capacity of the project.*

Table 4-34. North Sumter: 10 mgd Unit Production Cost Estimate.

Item No.	Description	Total Cost
1	Total Capital Cost	$93,316,000
2	Annual O&M Cost	$3,052,000
	Equivalent Annual Cost:	**$8,864,126**
	Unit Production Cost ($/kgal)	**$2.43**

Notes:
1) *Unit production costs assume continuous operation; however, the facility is expected to provide conjunctive supply. Actual MFL adoption will determine whether this facility can be a year-round or conjunctive supply.*
2) *The construction cost within the total capital cost includes a 20% contingency.*
3) *30-year amortization at 4.625%.*



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PROJECT: WRWSA Regional Framework Initiative
JOB #: 0468/12007377

DRAWING: HOLDER PROJECT LOCATION
DESIGNED: JRS DRAWN: TS APPROVED: DW

REVISIONS
1.
2.
3.
4.
5.
6.
7.

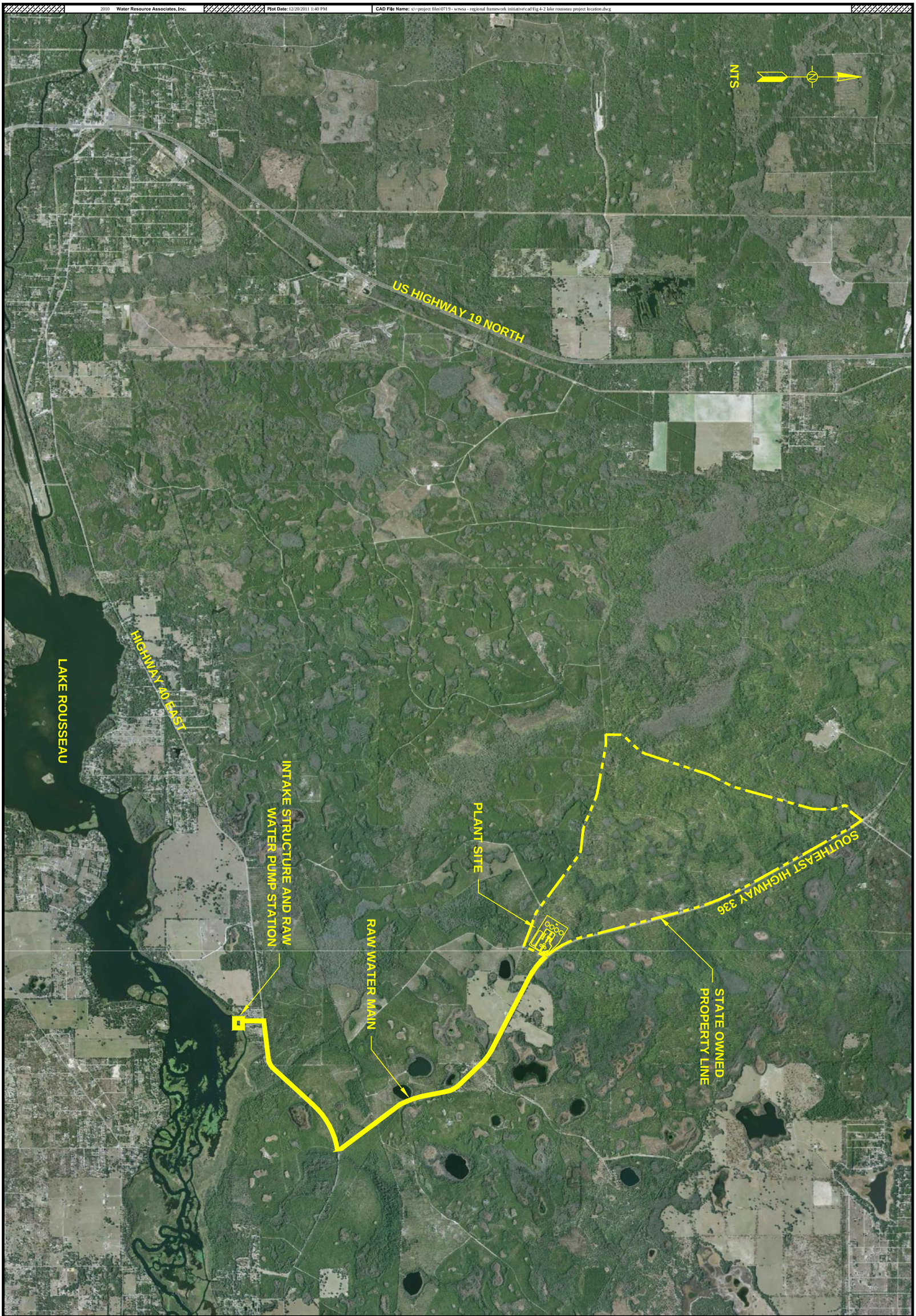
GENERAL
Original Date: 7/16/07
Last Modified: 12/01/11
Scale: NTS

FIGURE
4-1

FL P.E. #

Plot Date: 12/20/2011 1:40 PM

CAD File Name: s:\~project files\0719 - wrwsa - regional framework initiative\cad\fig 4-2 lake rousseau project location.dwg



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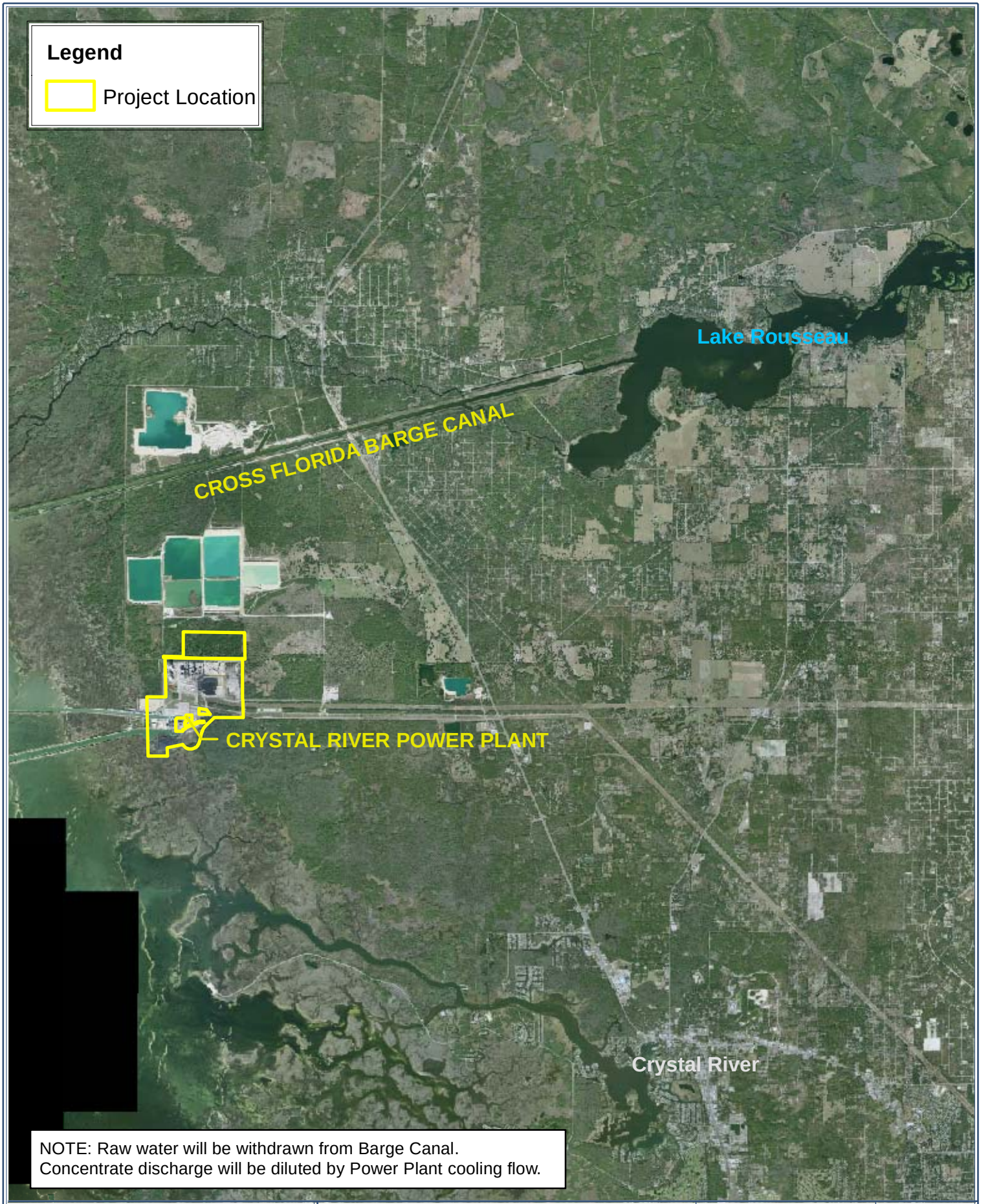
PROJECT	DRAWING	REVISIONS	GENERAL
WRWSA Regional Framework Initiative	LAKE ROUSSEAU PROJECT LOCATION	1. 2. 3. 4. 5. 6. 7.	Original Date: 7/16/07 Last Modified: 12/01/11 Scale: NTS FIGURE 4-2
JOB #: 0468/12007377	DESIGNED: JRS DRAWN: TS APPROVED: DW		FL P.E. #:



NOTE: Raw water will be withdrawn from Barge Canal.
Concentrate discharge will be diluted by Power Plant cooling flow.

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PROJECT: 0719 - Regional Framework Initiative

FIGURE 4-3
GENERAL LOCATION OF
SEAWATER DESALINATION FACILITY

ORIGINAL DATE: 10-28-09
REVISION DATE: 01-11-10
JOB NUMBER: 0468
FILE NAME: Desal location.mxd
GIS OPERATOR: DR

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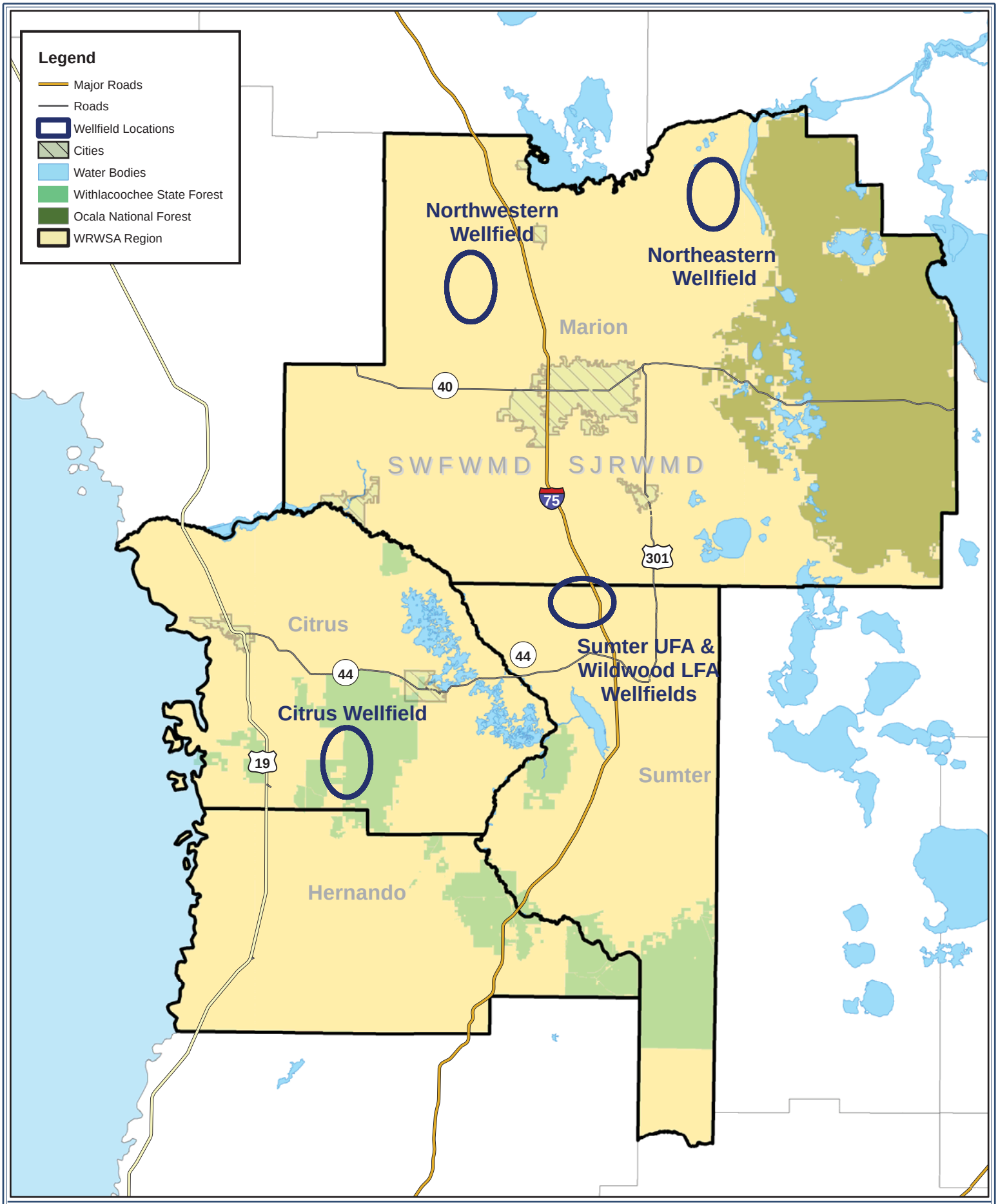
1 inch = 2 miles



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PROJECT: 0719 - Regional Framework Initiative

Figure 4-4
Fresh Groundwater Project Options

ORIGINAL DATE: 01-06-10
REVISION DATE: 12-12-2011
JOB NUMBER: 0719
FILE NAME: Figure 4-4...mxd
GIS OPERATOR: DR

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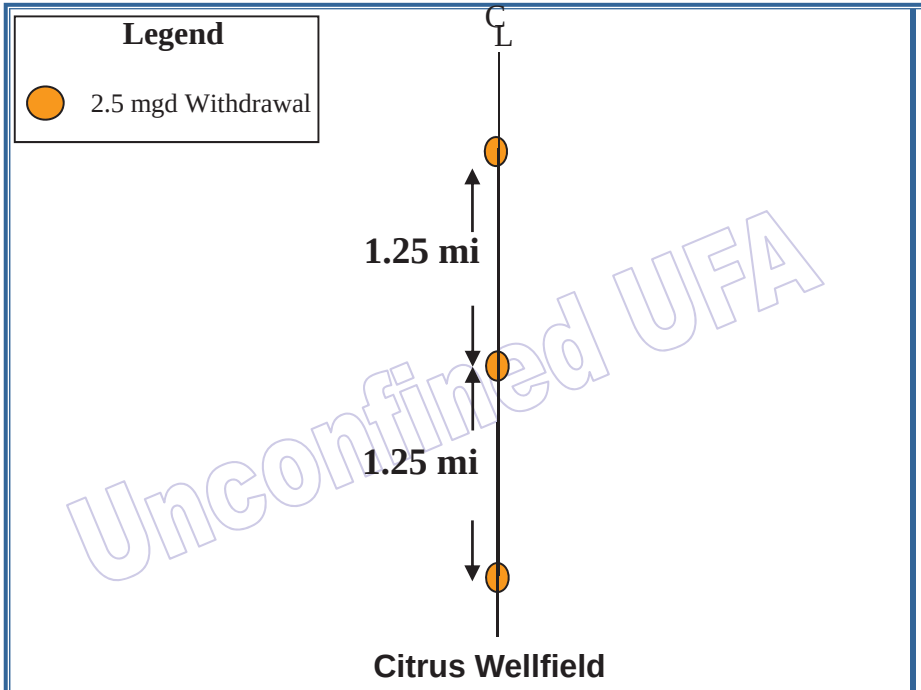
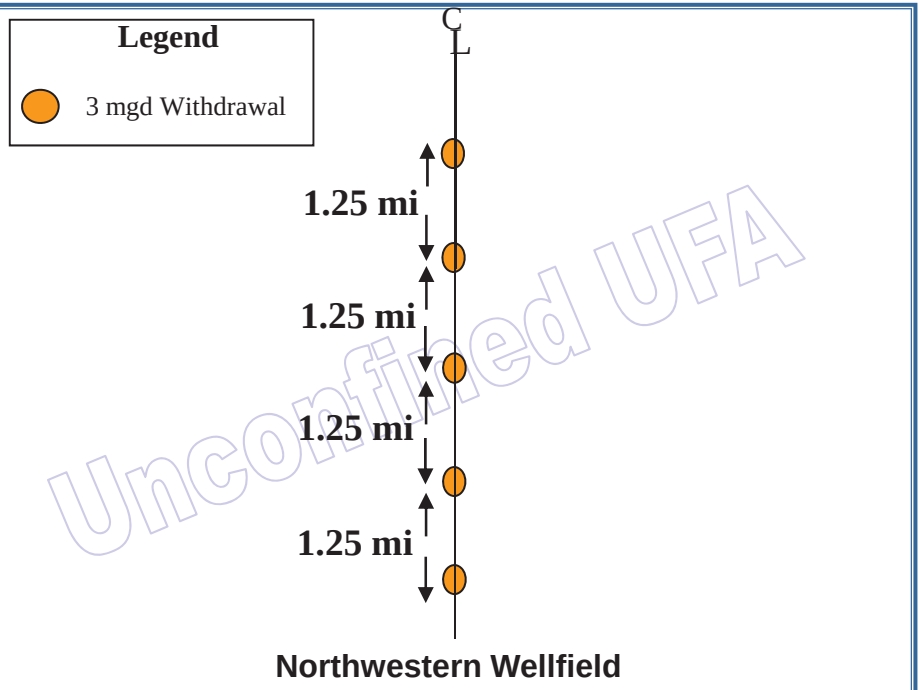
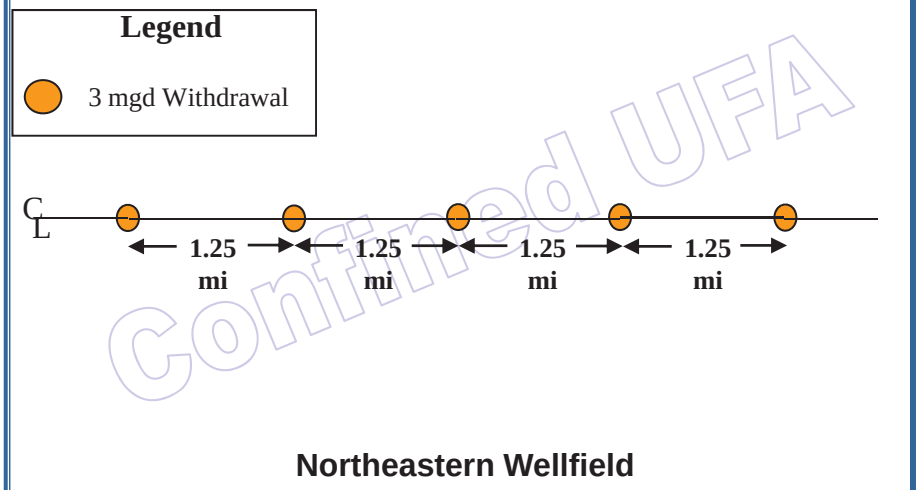
1 inch = 10 miles



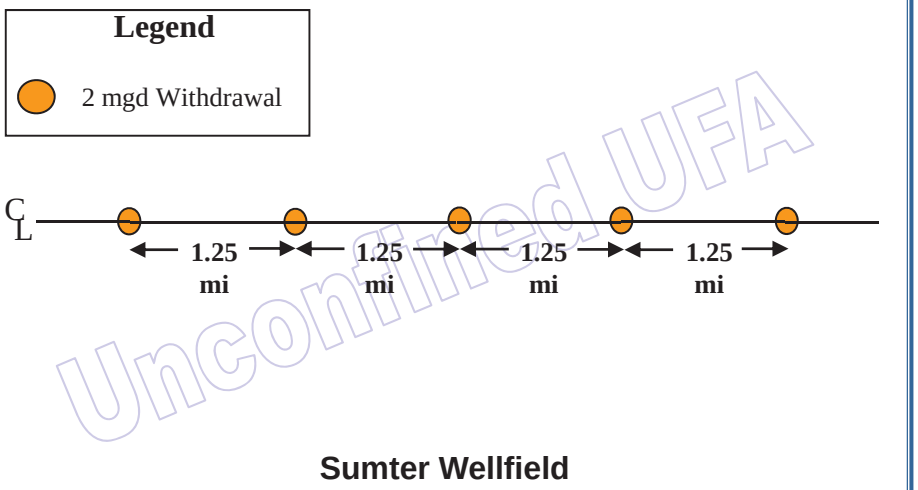
Citrus Wellfield



Northwestern Wellfield



Northeastern Wellfield



Sumter Wellfield

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PROJECT: 0719 Regional Framework Initiative

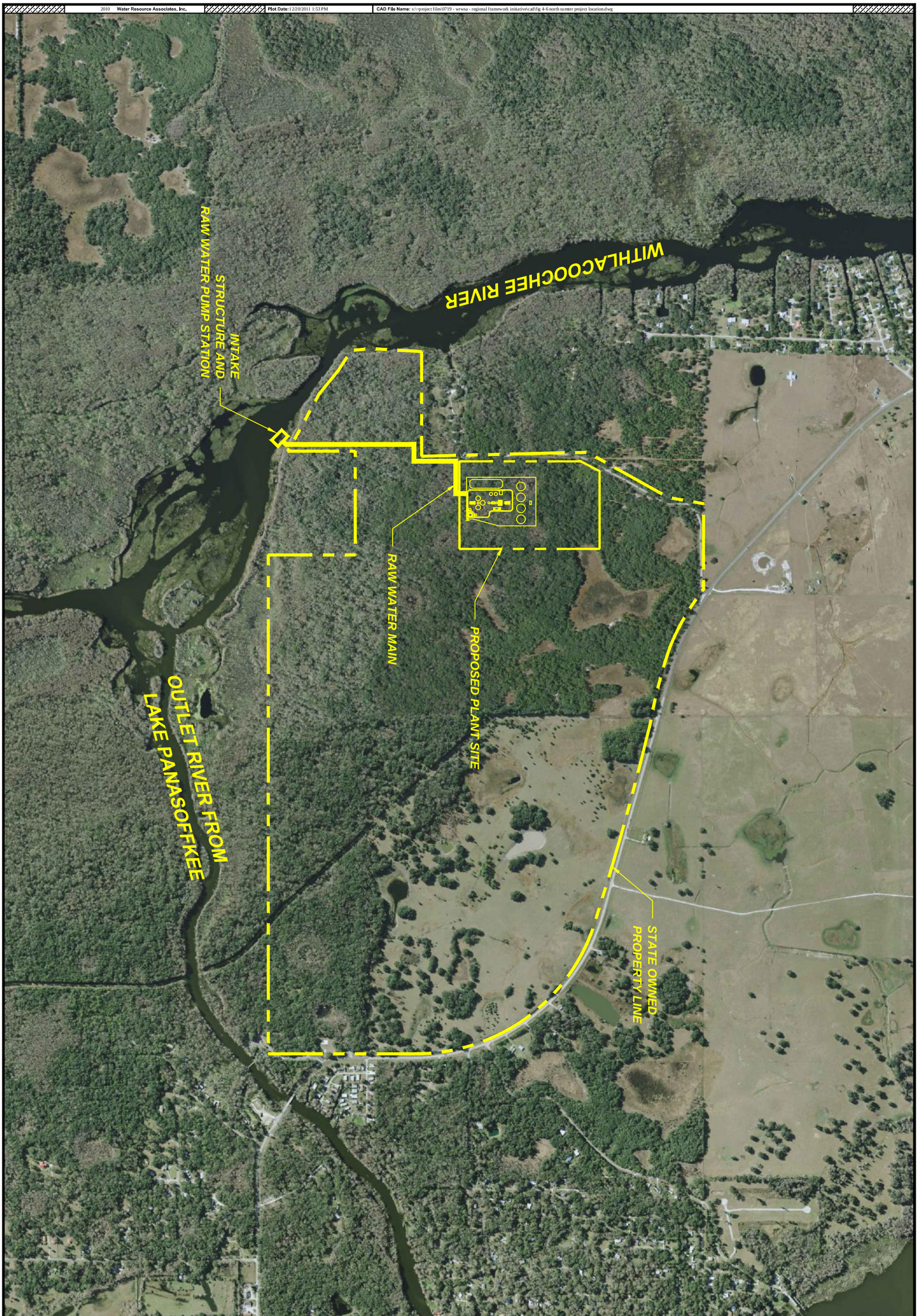
Figure 4-5
Withdrawal Modeling Configurations

ORIGINAL DATE: 01-06-10
REVISION DATE: 12-12-2011
JOB NUMBER: 0719
GIS OPERATOR: DR

N W E S

Plot Date: 12/20/2011 1:53 PM

CAD File Name: s:\~project files\0719 - wrwsa - regional framework initiative\cad\fig 4-6 north sumter project location.dwg



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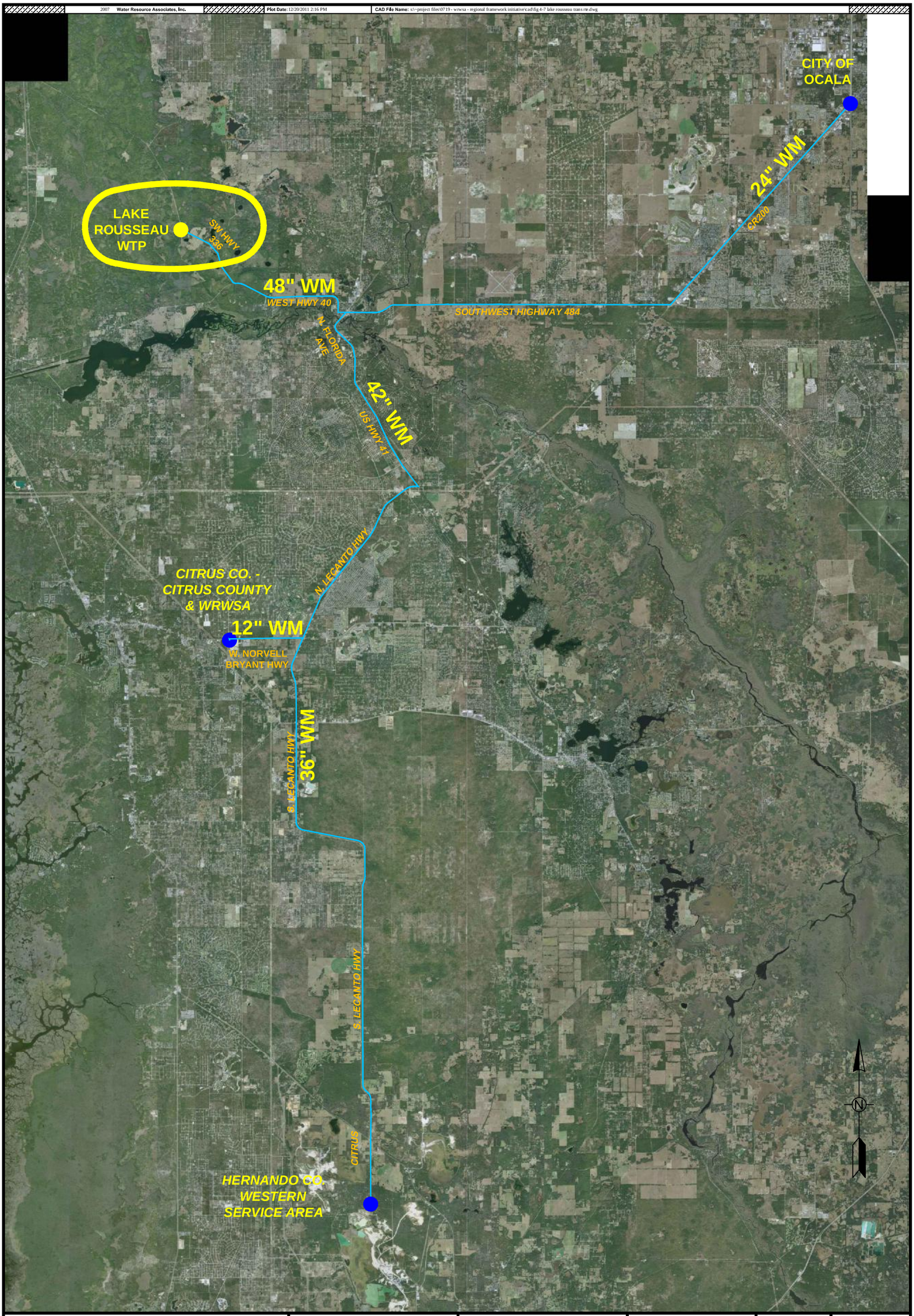
PROJECT	DRAWING	REVISIONS	GENERAL
WRWSA Regional Framework Initiative	NORTH SUMTER PROJECT LOCATION	1. 2. 3. 4. 5. 6. 7.	Original Date: 7/16/07 Last Modified: 12/01/11 Scale: NTS FIGURE 4-6
JOB #: 0468/12007377	DESIGNED: JRS DRAWN: TS APPROVED: DW		FL P.E. #

Plot Date: 12/20/2011 2:16 PM

CAD File Name: s:\~project files\0719 - wrwsa - regional framework initiative\cad\fig 4-7 lake rousseau trans rte.dwg



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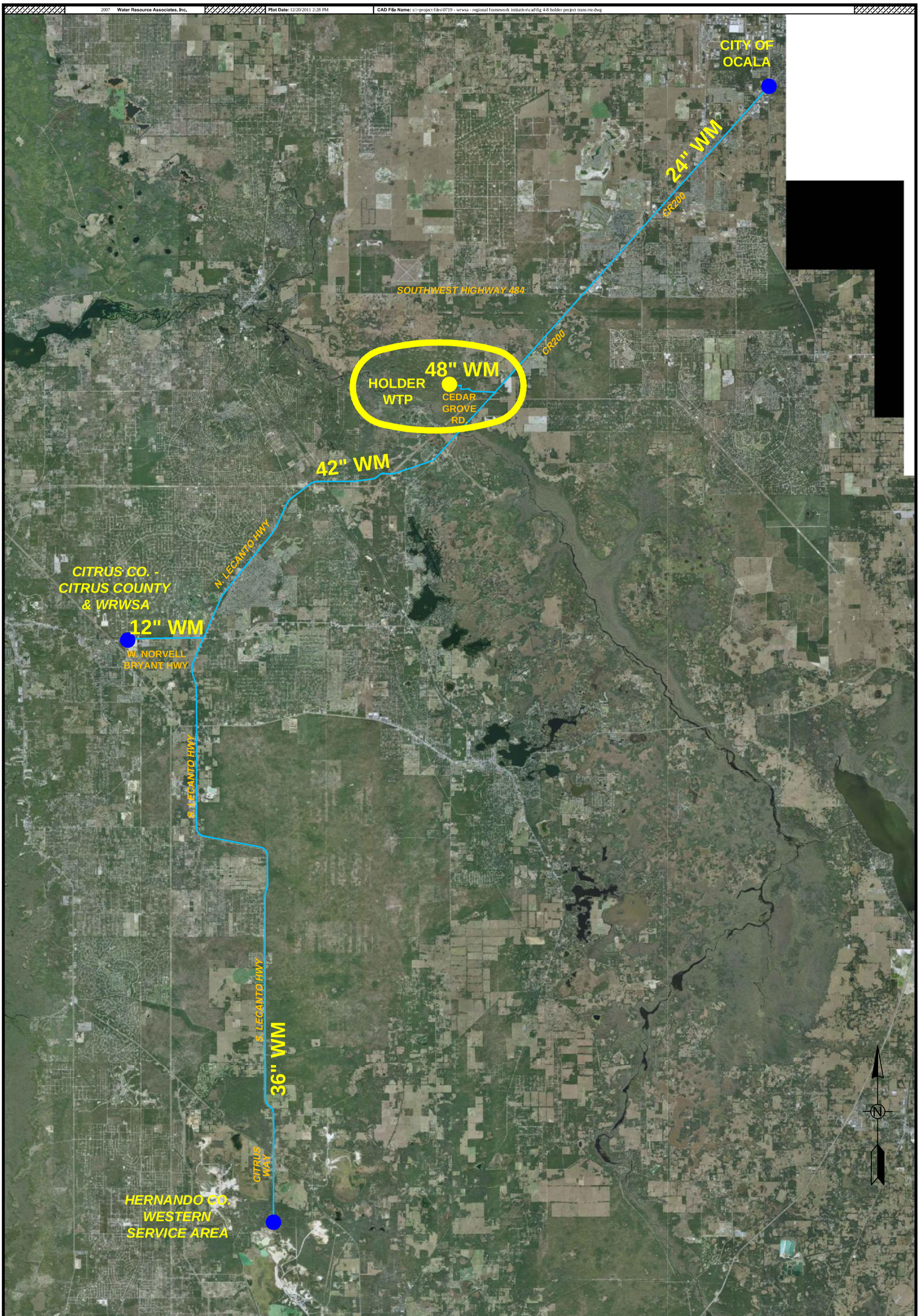
PROJECT	DRAWING	REVISIONS	GENERAL
WRWSA PHASE II WATER SUPPLY PLAN	CONCEPTUAL LAKE ROUSSEAU TRANSMISSION ROUTE	1. 2. 3. 4. 5. 6. 7.	Original Date: 07/16/07 Last Modified: 12/01/11 Scale: NTS FIGURE 4-7
JOB #: 0468	DESIGNED: JRS DRAWN: BH APPROVED: DAW		FL P.E. #

Plot Date: 12/20/2011 2:28 PM
CAD File Name: s:\~project files\0719 - wrwsa - regional framework initiative\cad\fig 4-8 holder project trans rte.dwg



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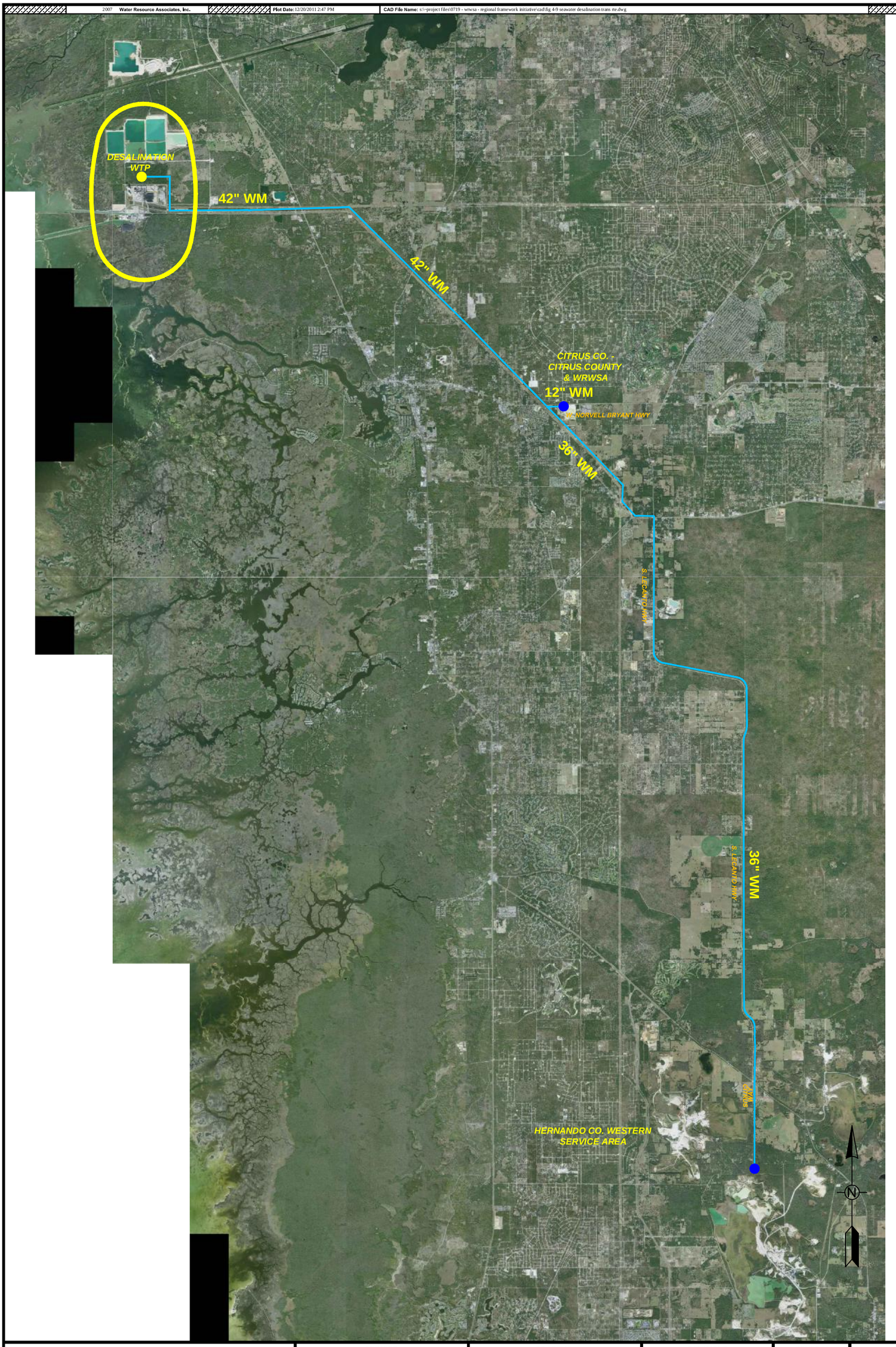
PROJECT	DRAWING	REVISIONS	GENERAL
WRWSA Regional Framework Initiative	CONCEPTUAL HOLDER TRANSMISSION ROUTE	1. 2. 3. 4. 5. 6. 7.	Original Date: 07/16/07 Last Modified: 12/01/11 Scale: NTS FIGURE 4-8
JOB #: 0468	DESIGNED: JRS DRAWN: JRS APPROVED: DAW		FL P.E. #

Plot Date: 12/20/2011 2:47 PM

CAD File Name: s:\~project files\0719 - wrwsa - regional framework initiative\cad\fig 4-9 seawater desalination trans rte.dwg



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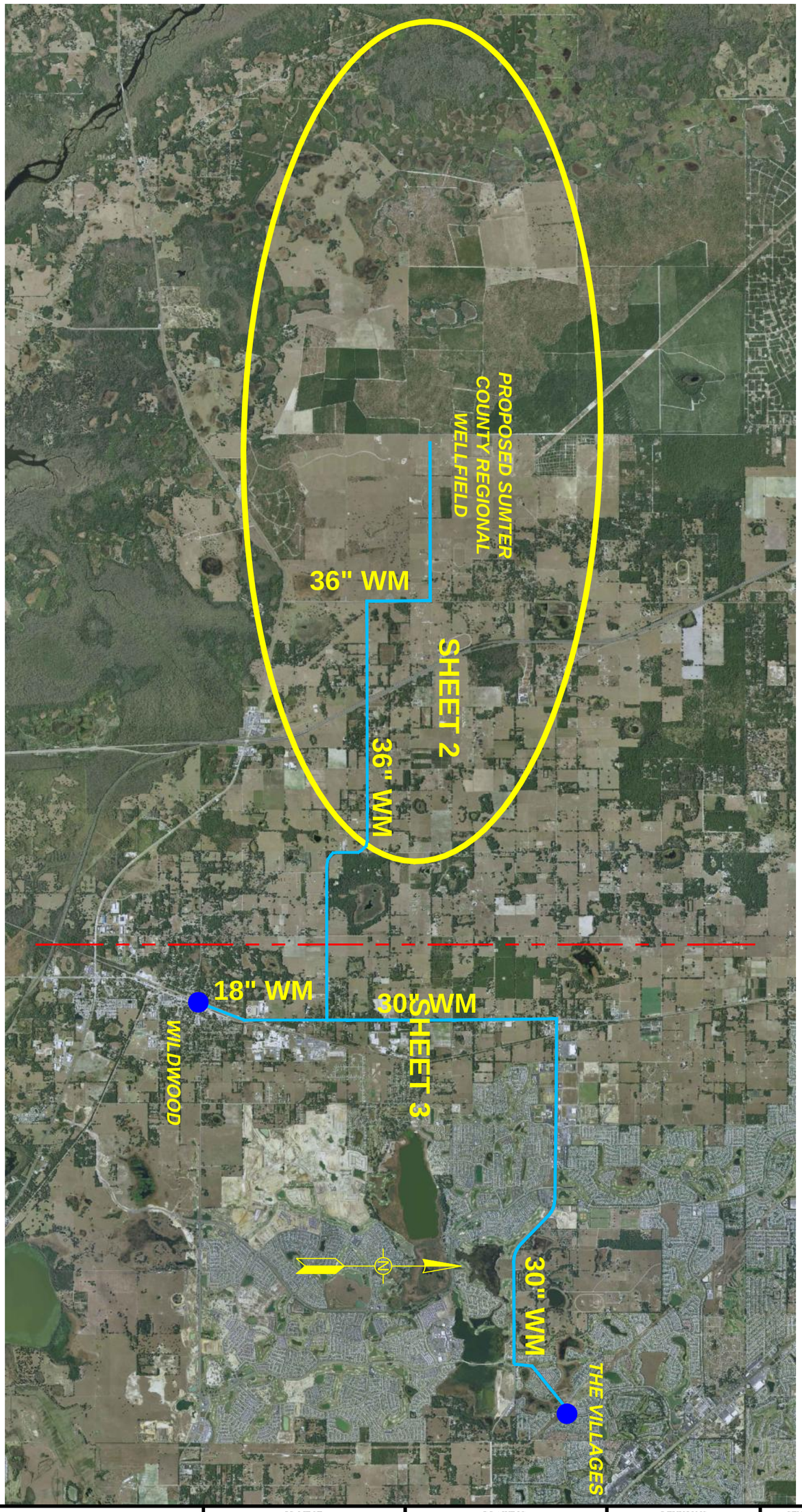
PROJECT	DRAWING	REVISIONS	GENERAL
WRWSA Regional Framework Initiative	CONCEPTUAL SEAWATER DESALINATION TRANSMISSION ROUTE	1. 2. 3. 4. 5. 6. 7.	Original Date: 07/16/07 Last Modified: 01/08/10 Scale: NTS FIGURE 4-9
JOB #: 0468	DESIGNED: JRS DRAWN: JRS APPROVED: DAW		Fl. P.E. #

Plot Date: 12/21/2011 9:52 AM
CAD File Name: s:\~project files\0719 - wrwsa - regional framework initiative\cad\fig 4-10 sumter county wellfield.dwg



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PROJECT	DRAWING	REVISIONS	GENERAL
WRWSA Regional Framework Initiative	CONCEPTUAL TRANSMISSION SYSTEM FOR THE SUMTER COUNTY REGIONAL WELLFIELD	1. 2. 3. 4. 5. 6. 7.	Original Date:03/26/08 Last Modified06/11/08 Scale:NTS
JOB #:0468	DESIGNED:JPS DRAWN:CRC APPROVED:DKW		FIGURE 4-10

FL P.E. #_____

SOUTHERN WOODS AT SUGARMILL WOODS GOLF COURSE

8" WM

PROPOSED CITRUS COUNTY REGIONAL WELLFIELD

42" WM

42" WM

16" WM

HERNANDO CO. - SEVILLE

FLORAL CITY WATER ASSOC.

6" WM

SHEET 2

SHEET 3

36" WM

SHEET 4

CITY OF BROOKSVILLE

8" WM

16" WM

12" WM

36" WM

HERNANDO CO. - WEST HERNANDO

12" WM

HERNANDO CO. - EAST HERNANDO

GENERAL
Original Date: 12/01/11
Last Modified: 06/11/08
Scale: NTS

FIGURE 4-11

P. E. #

REVISIONS
1.
2.
3.
4.
5.
6.
7.

DRAWING

CONCEPTUAL TRANSMISSION SYSTEM FOR THE CITRUS COUNTY WELLFIELD

DESIGNED: JRS DRAWN: JRS APPROVED: DAW

PROJECT

WRWSA Regional Framework Initiative

JOB #: 0468

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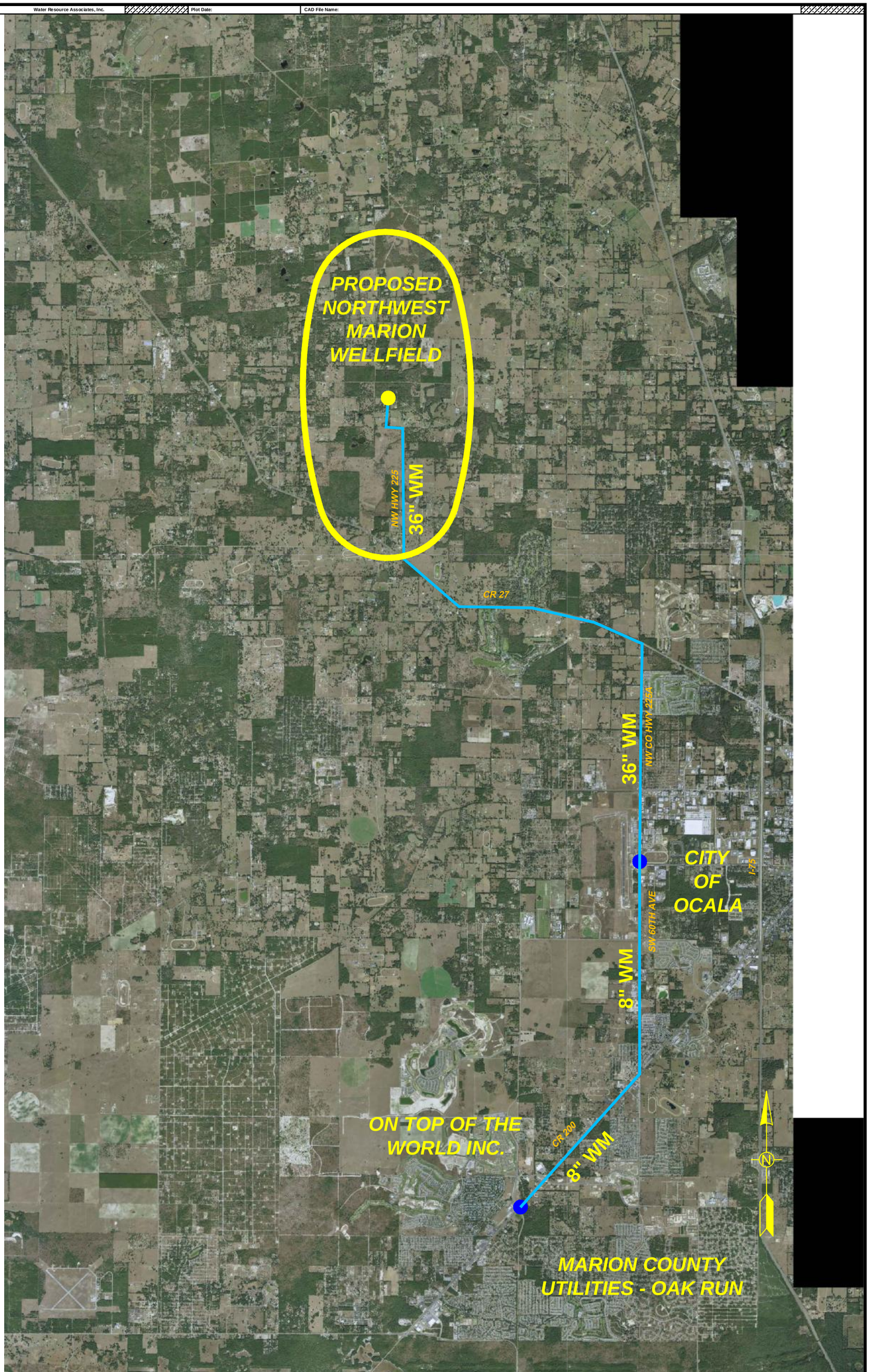
WRA

2008 Water Resource Associates, Inc. | Plot Date: 12/20/2011 3:46 PM | CAD File Name: x:\projects\0468\739 - wrwsa - regional framework initiative\conf\fig 4-11 citrus county trans rte.dwg



Water Resource Associates, Inc.

Plot Date:

CAD File Name:

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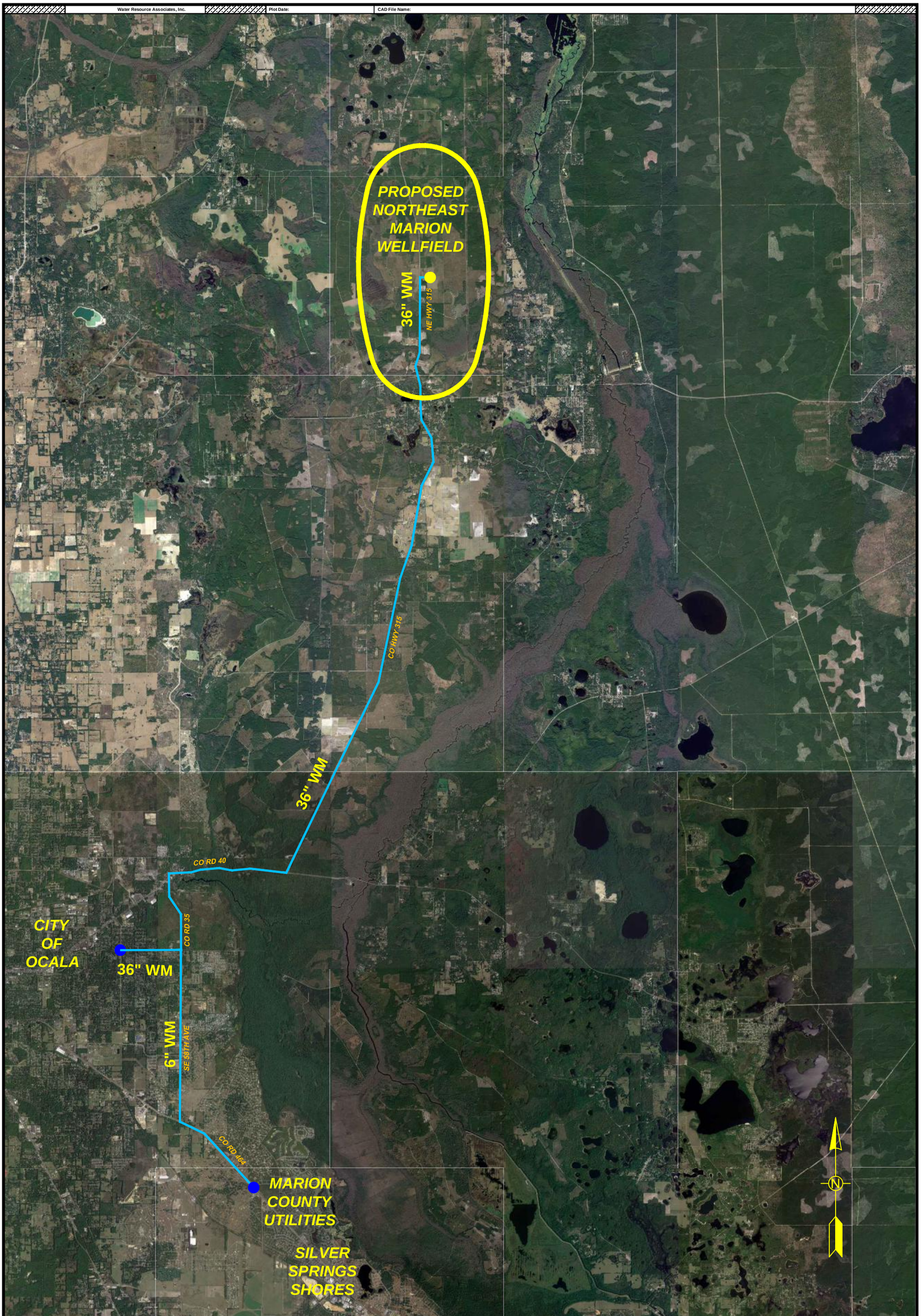
PROJECT	DRAWING	REVISIONS	GENERAL
WRWSA Regional Framework Initiative	CONCEPTUAL NORTHWESTERN MARION WELLFIELD TRANSMISSION ROUTE	1. 2. 3. 4. 5. 6. 7.	Original Date: 01/08/10 Last Modified: 12/01/11 Scale:NTS FIGURE 4-12
JOB #: 0576	DESIGNED: JS DRAWN: BS APPROVED: JS		FL P.E. #



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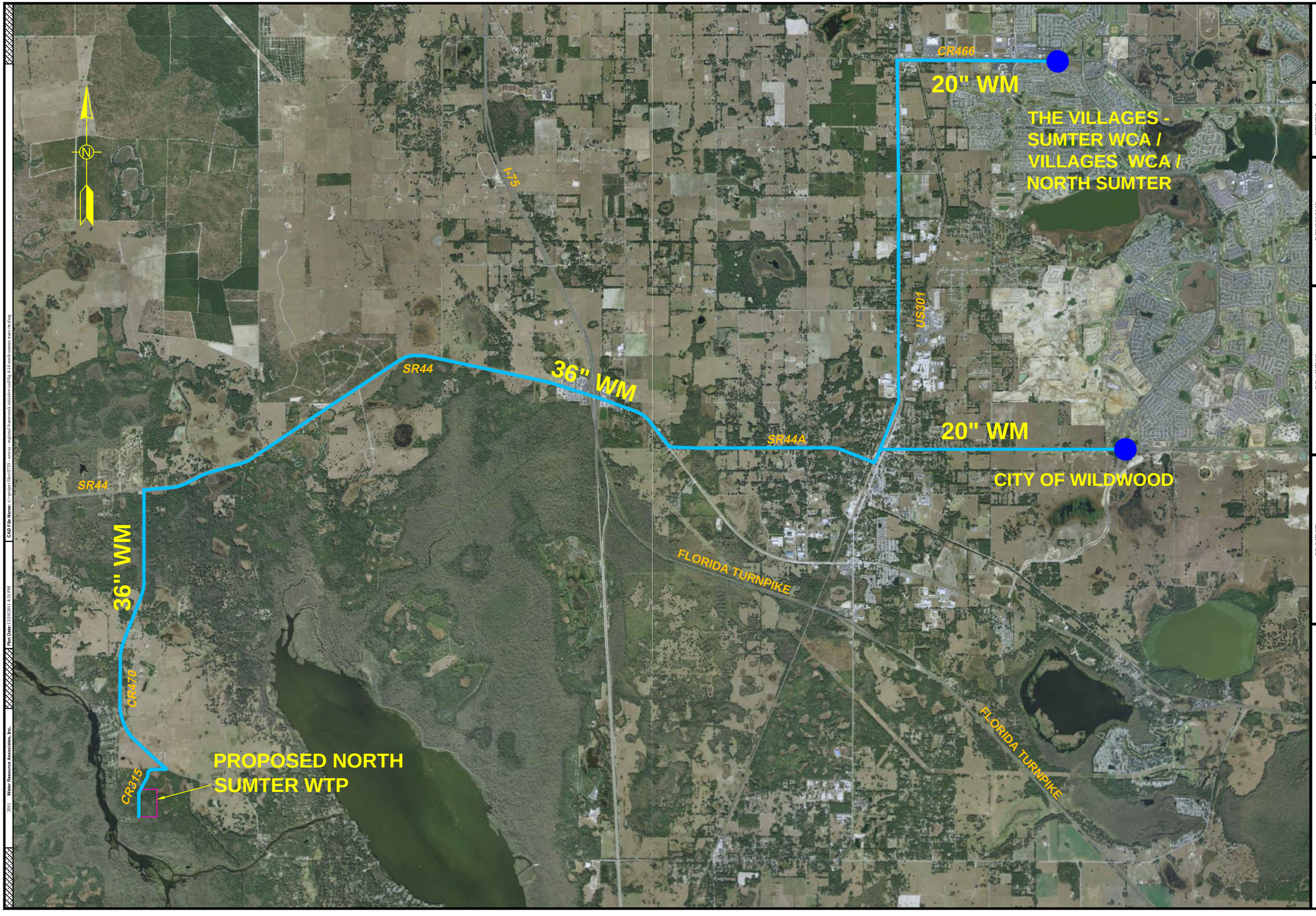
PROJECT	DRAWING	REVISIONS	GENERAL
WRWSA Regional Framework Initiative	CONCEPTUAL NORTHEASTERN MARION WELLFIELD TRANSMISSION ROUTE	1. 2. 3. 4. 5. 6. 7.	Original Date: 01/08/10 Last Modified: 12/01/11 Scale:NTS FIGURE 4-13
JOB #: 0576	DESIGNED: JS DRAWN: BS APPROVED: JS		FL P.E. #



GENERAL
Original Date: 7/16/07
Last Modified: 12/01/11
Scale:NTS
FIGURE 4-14

REVISIONS
1. 2. 3. 4. 5. 6. 7.

DRAWING
CONCEPTUAL NORTH SUMTER TRANSMISSION ROUTE
DESIGNED: ___ DRAWN: ___ APPROVED: ___

PROJECT
WRWSA PHASE II
WATER SUPPLY PLAN
JOB # 0486

H.P.E. #

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Chapter 5 – Regional Framework Partnerships

5.0 Key Points

Key Points

- Partnerships between utilities were identified in the Phase II report as an integral part of the Regional Framework concept.
- Driving these collaborative projects are constraints on traditional water supply development such as the establishment of MFLs and AWS conditions that have been mandated through the permitting process.
- Partnerships are also being pursued by local government utilities to maximize limited, cheaper groundwater sources.
- Currently several examples of sub-regional partnerships are in the planning stages. These include:
    - City of Wildwood and The Villages – both are considering development of the LFA system to satisfy AWS condition of their WUPs to meet future demands.
    - City of Ocala – analyzing development of AWS projects such as the LFA system and the Ocklawaha River to satisfy CUP condition and meet future water demands. Also planning collaboratively with On Top of the World to exchange reclaimed water for potable drinking water.
    - Marion County and Ocala – discussing opportunities for water service agreements; utilizing/sharing excess WWTF capacity; and other opportunities for efficiency in delivery of services.
    - Marion County and the City of Belleview – the County and Belleview are planning an interconnection of water services to act as an emergency backup and possibly provide future water service.
    - Marion County and the City of Dunnellon – the County and Dunnellon are planning an interconnection of water services to act as an emergency backup and possibly provide future water service.
    - Citrus County and the WRWSA – the County and the WRWSA are currently in discussions on the possible expansion of service to additional areas of northwest Citrus County.

The Phase II report identified both traditional and AWS water supply projects that were viable considering existing constraints such as MFLs, permitting, environmental issues and availability of the resource. Projects ranged from traditional supplies such as groundwater to more non-traditional and costlier projects such as surface water and desalination. These projects were conceptualized by determining preliminary designs; quantity; potential customers; transmissions routes; and unit cost to produce the water.

The projects were then categorized by potential implementation horizons, generally characterized by short, mid and long-term periods. Short term implementation included the next

15 to 20-years; mid-term 15 to 30-years; and long-term 25 to 50-years. These horizons were general in nature and purposely overlap time periods.

Traditional and alternative water supply project implementation horizons varied widely through the development of the Phase II study. Initially it was thought that traditional groundwater supplies were severely limited and that the AWS projects would be pursued in the short and mid-term planning horizons. This was also during a period of time where population projections and the resulting water demands were pressing for larger projects that could service large regional demands.

As the study and time progressed the demand for the immediate influx of large quantities of water to service this new population diminished. The population boom and resulting need for additional water supplies faded quickly as the economy faltered. Many projected Developments of Regional Impact (DRI) and projects smaller in nature failed to materialize. An overabundance of housing was built with projected occupancy rates that never materialized.

Another major impact to large projected water demands was the positive direction that water conservation was having on historical water per capita rates. Voluntary water conservation was being instituted throughout the WRWSA four county region and slowly water use was declining. In 2008 mandatory water conservation was required by utilities throughout the SWFWMD when Compliance per Capita Rates were instituted. This rule mandated that per capita rates District-wide must be at 150-gallons per capita per day (gpcpd), by December 31, 2019. It also required those utilities that were above the 150-gpcpd to reduce the overage by 50% by December 31, 2014. Upon renewal, Water Use Permits for utilities will be lowered by these new per capita rates dramatically flattening the water demand curves. When compliance per capita rates are applied to the water demand projections determined in the Phase II report, a WRWSA-wide savings of approximately 21 mgd is realized.

When this diminished demand and groundwater modeling revealed some additional groundwater that could be developed in the region, the planning horizons were reevaluated and the ranking of projects within them changed dramatically. Ultimately, groundwater was identified as a short-term project, developed sub-regionally where appropriate. Mid-term projects consisted of additional development of groundwater, the start of AWS projects and it was speculated that utilities would begin to realize that collaborative approaches (sub-regional partnerships) would maximize and extend the life of cheaper traditional water supplies. Long-term projects were the integration of AWS water supply into a more extensive regionally connected water supply system as part of the Regional Framework Initiative.

The Phase II study emphasized the concept of regionalization throughout the WRWSA. This was encouraged both on a regional and sub-regional basis. Within SWFWMD it has been demonstrated that collaborative approaches to water supply development and distribution have been beneficial in a number of ways. This has occurred through Tampa Bay Water (TBW) and the Peace River/Manasota Water Supply Authority (PR/MRWSA). TBW and the PR/MRWSA are both located within Water Use Caution Areas, Northern Tampa Bay and the Southern Water Use Caution Area, respectively. As discussed, Water Use Caution Areas are generally identified as areas where the water supply has been overdeveloped causing resource and /or environmental issues. This has resulted in an approach among utilities within these water supply authorities to develop water supplies in a collaborative approach. Both regional water supply authorities have overseen projects for their members that provide water sources regionally and transmission facilities that maximize the flexibility of their system operation

Maximizing available water supplies in a regional or sub-regional manner can be beneficial as scarce groundwater or surface water is developed by multiple utilities rather than independently. Limiting this competition can take full advantage of economies of scale as joint projects are designed, permitted, developed and operated/maintained. Environmental and resource benefits can also accrue as possible less impacting, more expensive alternatives are available to governments. Pooling resources and sharing in the capital cost of potentially larger, less impacting water supply projects can provide opportunities to local governments and the WRWSA alike.

Once a rural, dissimilar region from a water supply perspective, the WRWSA is becoming more homogeneous as the four county area grows. Rural areas are developing and utility service areas expanding to meet this growth. The establishment of MFLs has limited the supply of both groundwater and surface water. AWS conditions are generally standard on WUPs and CUPs requiring permittees to offset groundwater withdrawals with more expensive water supply alternatives. Local government budgets are also shrinking due to the economic turndown and access to capital for project development is diminished. As all of this occurs, prospects for sharing resources and sub-regional interconnections present unique opportunities.

Sub-regional opportunities are already being pursued within the WRWSA. The following are examples of WRWSA members that are discussing and in some instances implementing collaborative approaches to water supply development in the region. The intent of this section is to report on these efforts with respect to the Regional Framework and provide examples for other WRWSA members to consider as they look at their own water supply expansion.

The Villages and the City of Wildwood

The northeast corner of Sumter County is one of the fastest growing areas within the WRWSA. Population projections and water supply demand for this area have grown rapidly and are projected to grow by 87% over the planning horizon to 2030. The majority of this growth has and is projected to occur within The Villages and the City of Wildwood.

When WUPs were issued to The Villages and Wildwood, SWFWMD was concerned about the additional groundwater quantities allocated to both and their potential impact to MFLs on lakes established in and around these communities. AWS conditions were added to the WUPs which in general required the Permittees to investigate the feasibility of developing alternative sources to offset groundwater withdrawals that had the potential of impacting these established MFLs.

The following are the original AWS conditions from the two WUPs. Both conditions require the utilities to investigate the feasibility of developing one or more AWS projects to offset groundwater withdrawals. The conditions go on to require timelines that lay out the schedules to develop AWS plans; submittals of preliminary designs; financial plans; and AWS implementation schedules.

The Villages AWS condition requires an impact analysis, “demonstrating to the satisfaction of the District that unacceptable adverse impacts are neither observed nor predicted. In that case, the Permittee may seek a waiver or an extension of time for implementing the alternative water supply project(s).” The condition goes on to say if it can be demonstrated that impacts are not occurring then the permittee can request a waiver or extension of time in the implementation of the AWS project. It should be noted that the timeline on this condition has been extended by two years.

Wildwood

The Permittee shall investigate, singly or jointly with others, one or more alternative, water supply projects that are economically and technically feasible, in accordance with the Basis of Review for Water Use Permit Applications, Section 4.11, to potentially supply quantities to meet public water demands beyond 2013. The Permittee shall, after consultation with the Southwest Florida Water Management District, St. John's River Water Management District or appropriate local authorities and utilities, participate in an alternative water supply project including but not limited to: a) Withlacoochee River System; b) Lower Ocklawaha River, c) St. Johns River near Deland; d) St. Johns River at Yankee Lake; or e) another similar AWS project. The schedule to investigate the potential AWS shall be as follows:

A. By February 28, 2008, the Permittee shall submit, singly or jointly with others, for District approval, an Alternative Water Supply Plan. The Alternative Water Supply Plan shall evaluate, identify alternative water supply projects.

B. By February 28, 2010, submit, singly or jointly with others, a preliminary design of the Alternative Water Supply project(s) that the Permittee will implement to the District.

C. By February 28, 2010, submit, singly or jointly with others, a financial plan to the District describing how the Permittee will fund the construction and operation of the alternative water supply project(s).

D. By February 28, 2010, submit singly or jointly with others, an alternative water supply implementation schedule to the District for approval, detailing the dates when construction will begin and end, and the date when water will be delivered from the project(s) for use by the Permittee (991)

(Southwest Florida WUP # 8135.008)

The Villages

The Permittee shall develop, singly or jointly with others, one or more alternative, water supply projects that are economically and technically feasible, in accordance with the Basis of Review for Water Use Permit Applications, Section 4.11, to supply at least seven million gallons per day (mgd) to meet public water demands to offset groundwater allocated by this permit. Permittees shall, after consultation with the Southwest Florida Water Management District, St. John's River Water Management District and the appropriate local governments, select one or more of the following alternative water supply projects: a) Withlacoochee River System in Sumter County; b) Lower Ocklawaha River, c) St. Johns River near Deland; d) St. Johns River at Yankee Lake; or e) another similar AWS project; and implement the selected according to the following schedule:

A. By July 1, 2007, the Permittee shall submit, singly or jointly with others, for District approval, an Alternative Water Supply Plan. The Alternative Water Supply Plan shall evaluate, identify, and propose alternative water supply development of at least seven mgd.

B. By February 28, 2008, submit, singly or jointly with others, a final description of the alternative water supply project(s) that the permittee plans to implement to the

District.

C. By February 28, 2010, submit, singly or jointly with others, a preliminary design of the Alternative Water Supply project(s) that the Permittee will implement to the District.

D. By February 28, 2010, submit singly or jointly with others, a financial plan to the District describing how the Permittee will fund the construction and operation of the alternative water supply project(s).

E. By February 28, 2010 Permittees may submit data and analysis demonstrating to the satisfaction of the District that unacceptable adverse impacts are neither observed nor predicted. In that case, the Permittee may seek a waiver or an extension of time for implementing the alternative water supply project(s). If the District does not approve the extension of time, the alternative water supply project(s) schedule must be maintained

F. By February 28, 2011, submit, singly or jointly with others, a water use permit application for authorization to use at least seven mgd of water from the project(s), unless an extension of time has been granted by the District

G. By February 28, 2011, submit, singly or jointly with others, an alternative water supply implementation schedule to the District for approval detailing the dates when construction will begin and end and the date when water will be delivered from the project(s) for use by the Permittees. In no event shall the date when water is supplied by the project(s) be after February 28, 2013, unless an extension of time has been granted by the District.

H. Compliance with the Alternative Water Supply Implementation Schedule is required by Permittees, unless extended or otherwise modified in writing by the District. Each year, by March 1, Permittees shall submit, singly or jointly with others, to the District a status report describing the progress made on the Alternative Water Supply Implementation Schedule. If any project has fallen behind schedule, Permittees shall explain how Permittees will comply with the schedule.

(Southwest Florida WUP # 13005)

As mentioned in Chapter 4, the City of Wildwood has investigated the development of the LFA for future water supplies. SWFWMD recognizes this aquifer as a potential AWS project from a regulatory perspective due to the confinement that separates it from surface features such as wetlands, lakes and rivers. The successful development of the Champagne Farms Water Supply Facility provides the Wildwood an apparent long range groundwater supply for their future growth.

Originally the Phase II report recommended the Sumter Wellfield as a potential source to satisfy the AWS conditions for The Villages and Wildwood. The Sumter Wellfield was proposed to develop the UFA, and was located strategically to avoid impacts to MFLs. The project concept was to develop the wellfield and transport the water through a common transmission system to The Villages and Wildwood.

Since the completion of the Phase II report and the successful testing of the Champagne Farms Water Supply Facility discussions have been held between Wildwood, The Villages and the

WRWSA on the possibility of collaboratively developing the LFA in this area. The potential options include:

1. The Villages plan to develop a wellfield utilizing property they own near the intersection of I-75 and CR 475 several miles to the north of the Champagne Farms Water Supply Facility. It is thought because of the proximity of these two parcels that the LFA may be as productive and also produce good water quality;

2. The Villages partner with Wildwood and develop the Champagne Farms system jointly, expanding the design to incorporate options to provide the additional 7 mgd required to meet the AWS condition; and

3. Option 2 with a collaboration between The Villages, Wildwood and the WRWSA.

Currently The Villages contend that the resource monitoring is not showing any impacts from current withdrawals so a request for a waiver or an extension of time from the implementation schedule may be warranted. The date for implementation is not known at this time but will be better understood spring 2012 when the preliminary design and the resource data is submitted to the District.

City of Ocala

As part of the City of Ocala's Consumptive Use Permit renewal from SJRWMD l a number of AWS conditions were included in the permit. They required the City to identify potential AWS sources and to investigate whether partnerships were necessary to implement the project; evaluate the AWS projects from a technical, environmental and economic perspective; identify the projects and partnerships that appear to be the most viable; and design permit and construct based on a SJRWMD approved schedule. The specific AWS condition from the CUP is as follows:

> *City of Ocala*
>
> *The permittee must implement the following actions to plan for and develop one or more alternative water supply projects to meet future water supply needs, in accordance with the schedule set herein:*
>
> *A. No later than February 28, 2011, permittee shall identify potential alternative water supply projects that could be implemented, with or without partners, to secure the quantities of water necessary to meet permittee's projected demands after 2027 without unacceptable impacts to water resources and related natural systems. Potential water supply partners include those that could provide alternative water supplies or partner with the permittee in the development of alternative water supplies. If partners are identified, the permittee shall contact these potential partners to determine the viability of developing partnership agreements with them for the identified potential water supply projects. A written description of the potential projects, and partners, if identified, along with a description of the contacts between permittee and the potential partners and the viability of the development of partnership agreements shall be submitted to the District no later than February 28, 2011.*
>
> *B. No later than February 28, 2012, permittee shall prepare and submit to the District for review, a comprehensive written report of an evaluation of the technologic,*

economic, and environmental feasibility of implementing the identified viable and partnerships, if identified. The evaluations reported shall be performed to acceptable professional standards.

C. No later than February 28, 2014, permittee shall identify the project(s) and partnership(s), if identified; that it proposes to implement to secure the quantities of water necessary to meet permittee's projected demands after 2027 without unacceptable impacts to water resources and related natural systems. The permittee shall submit the following to the District for review and approval: preliminary design of the alternative water source project(s); a proposed timeline for final design, permitting and construction of the project(s); and a financial plan, describing how the permittee plans to fund construction and a financial plan, describing how the permittee plans to fund construction and operation of the project(s). It also shall include firm evidence that the permittee has developed the necessary partnership agreement(s) for implementation of the project(s) of choice, if partners have been identified.

D. The permittee shall proceed to complete final design, permitting, and construction of the project(s) in accordance with the timetable as approved by the District.

(SJRWMD CUP No. 50324)

The City is investigated different sources and potential partnership as outlined below.

Lower Floridan Aquifer System

In order to meet the AWS condition from the SJRWMD Ocala, similar to the City of Wildwood, has been investigating the use of the LFA. The intent of investigating the LFA is to potentially find confinement between that level of the aquifer and the UFA. This confinement would help mitigate potential environmental impacts caused by UFA groundwater withdrawal drawdown.

A well was drilled approximately 1,250 feet into the LFA. Once confinement is confirmed, Ocala in cooperation with the SJRWMD will complete performance testing for potential impacts to the Upper Floridan aquifer. Also testing for quantity and quality (treatment requirements) as a potable source will occur. Initially the SJRWMD did not recognize the LFA as an AWS. But preliminary indication from SJRWMD is that the LFA now appears to be an eligible AWS to meet the City's permit condition.

On Top of the World

Currently the City of Ocala and On Top of the World (OTOW) are collaborating on an exchange water and wastewater between their communities. The concept is in its early stages, but it is a proposal that will provide excess reclaimed water from the City and provide it to the Top of the World for irrigation purposes. The OTOW currently irrigates golf and recreational areas with potable water. This agreement would provide for potable water, currently used for irrigation, and excess available capacity to be reallocated for higher use with the City of Ocala's distribution system. Reclaimed water within OTOW would be provided by Ocala's reclaimed water network. Current estimates are that the City will provide approximately 0.5 mgd of reclaimed water. OTOW can provide up to 5.0 mgd of potable water to the City.

OTOW is located within the SWFWMD and the transfer of water may require a transfer agreement from the water management districts.

Lower Ocklawaha River
The City of Ocala is continuing to monitor the sustainability work that is being completed on the Lower Ocklawaha River as a possible regional AWS project. This includes the MFL work that is being completed and all requisite environmental assessments by the SJRWMD.

Marion County and the City of Ocala
Regional collaboration between Marion County and the City of Ocala is being discussed for water, reclaimed water and wastewater treatment. The proximity of the City boundaries to County services allows for opportunities to share infrastructure. The WRWSA has participated in several meetings with the City and County discussing opportunities. The goal of these partnerships is to more efficiently and economically provide services and potentially reduce the redundancy and duplication provided by the utilities. This is even more critical with shrinking local government budgets.

Marion County and the City of Belleview
A major interconnection between Marion County and the City of Belleview is planned for the coming years. The interconnection is designed to act as an emergency backup to both communities and gives the ability to supply additional quantities of water at a point in the future when this demand may be required.

The interconnection is planned to occur at the City-County boundary and the cities are in active negotiations to accomplish this interconnection.

Marion County and the City of Dunnellon
Marion County and the City of Dunnellon are planning a connection of their water supply at the Dunnellon Airport in western Marion County. The interconnection is planned to occur at the City-County boundary and the cities are in active negotiations to accomplish this interconnection.

Citrus County and the WRWSA
The Charles A. Black Water Supply Facility (CABWSF) completed in four phases in 1992, is the first wellfield and water supply facility developed by the WRWSA in central Citrus County. It was constructed with financial assistance from SWFWMD's Withlacoochee and Coastal Rivers Basin Boards. Total pumping capacity from the combined CABWSF is 19.2 mgd from 7 wells.

SWFWMD had supported the regional concept of water supply development. Financial support of the CABWSF was another example of their desire to strengthen the development of regional water supply authorities within the SWFWMD jurisdiction. With this project SWFWMD became the only water management district in the state that worked to help create and foster regional water supply authorities (RWSA) over its entire service area. SWFWMD through its Basin Boards provided approximately $5 million in funding for the engineering, design and construction of the water supply facility. The development of this facility was the first step toward implementation of the Authority's Regional Water Supply Plan and a key ingredient in making the Authority self-sufficient. (Cite: WRWSA website).

The WRWSA has retained ownership of the facility and Citrus County has operated and maintained the CABWSF since it became operational. The WRWSA and Citrus County are a co-permittee on the WUP for the facility which is currently permitted for 5.971 mgd annual average and 8.538 mgd peak month. The costs of the facility are being paid back to the WRWSA through a Project Facility Charge that consists of a 30-year, 0% interest loan which

was negotiated to allow the County to build its customer base in the beginning years of the wellfield operation.

Citrus County has contracted with other governmental entities to provide service or standby capacity to their utilities. This includes the Ozello Water association and the City of Crystal River. It is anticipated that as development increases and the County considers the potential of the CABWSF becoming a potential regional source that additional capacity from CAB may be required.

Citrus County and the WRWSA are currently in discussions regarding the current method of payment for the facility. The current payback schedule is completed in 2021 when it if is reduced substantially and ends in 2026. Renegotiation of the Project Facility Charge is being discussed and an outside accounting firm has been retained to develop payments based on consumption from the CABWSF rather than a fixed rate.

Citrus County and the WRWSA are also discussing the potential expansion of the CABWSF. Citrus County Utilities has included funding in the next two years to extend water and wastewater service to potential customers in the northwest sector of the County. These extensions could be served by water sources from the CABWSF, the Citrus Springs/Pine Ridge System or both. The potential customers include:

1. Commercial development;
2. A 500-unit RV park with a golf course;
3. Approximately 400 homes that are on domestic supply that have arsenic levels that exceed drinking water standards;
4. A new port, Port Citrus on the Cross Florida Barge Canal;
5. A industrial gypsum board manufacturer;
6. New demands from Progress Energy Florida in Citrus and Levy County; and
7. Potentially the Cities of Inglis and Yankeetown.

Chapter 6 – Regional Framework Transmission Routes

6.0 Key Points

Key Points

- The Regional Framework Initiative provides the network that will guide future water development within the WRWSA.
- Sub-regional and regional collaboration is the recommended approach to water supply development as traditional water supplies become scarcer and more difficult to develop.
- The WRWSA Board has adopted the Regional Framework Initiative as a goal in guiding the development of traditional and AWS projects in the future.
- The Regional Framework concept revolves around the ability to transmit water within the WRWSA efficiently and economically to support future AWS projects.
- The grid or pattern of these transmission systems should be used to guide development of water supply projects in the short and mid-term planning horizons.
- As transmission systems for both traditional and ASW water supply projects are delineated, a pattern begins to develop on how water can be shared throughout a regional system.
- Chapter 6 details how traditional and AWS projects could be planned, located and developed in a manner that will eventually provide the network for a regional water supply system.

Transmission systems are the backbone to the Regional Framework concept. The potential network of pipelines provides the opportunities for regional and sub-regional collaboration for water supply development. As water sources become scarcer due to quantity, quality and environmental limitations, regional solutions to water supply development projects will become more the norm in the WRWSA four county region. As stated, regional water supply authorities to the south within SWFWMD, have found that regional solutions have meant more reliable, economical and environmentally sensitive solutions to sustainable water supply development.

The Regional Framework also provides for a much more cost effective way to bring expensive AWS projects online within the region. As is evident in Chapter 4 – Regional Framework Water Supply Options, water supply projects, especially AWS, are costly and require a significant quantity of water to be developed in order to make projects cost effective. This will necessitate collaboration between multiple local government utilities to utilize the quantities of water that are anticipated from the conceptual plans developed for these projects.

The network or grid that is developed in this chapter begins to lay out the potential structure of such a system. It is not anticipated that all the projects that were identified in the Phase II report will be developed. However, the Regional Framework grid ties projects together with demand areas. The network or backbone of the Regional Framework begins to develop as individual project corridors are combined with others. When they are superimposed upon one another the

pattern begins to develop of an interconnected system that potentially may take shape over time.

The Regional Framework should be used as a screening mechanism as water supply projects are developed in the region. It is another tool to determine the potential long range viability of water supply projects that are planned on a single utility, sub-regional or regional basis. The WRWSA should play a proactive role in coordinating with local utilities in the planning process for water supply development to determine if they can fully integrate themselves into the long range Regional Framework concept.

Transmission systems for projects were evaluated in the Phase II report. A transmission route typically assumed that water would be provided to utilities at an approximate location within their service area, via easements acquired along public rights-of-way. The conceptual routes for the proposed pipe routes ran along county or state roads. For this report, a two-mile buffer of the Phase II transmission lines was created to demonstrate the potential transmission corridors for each of the projects.

Since a proposed facility would be a major water supply facility for the area, careful planning and consideration should be given to the location where the finished water supply should be routed and connected into the existing water distribution systems that are currently present in the local area. Actual pipeline routes and points of connection will be identified during design and permitting through coordination with the participating utility.

6.1 Holder Gage Surface Water Project Transmission Corridor

The Holder Gage Surface Water Project conceptual transmission corridor is depicted on Figure 6-1. As mentioned in Chapter 4, the Holder project would provide a total 25 mgd of water for end users. End users of the project have been identified as the City of Ocala located to the north of the project; Citrus County who would receive the water at the CABWSF located southwest of the project; and the western service area of Hernando County located south of the surface water project. These end users would be responsible for interconnection and distribution of combined water to their respective users. The locations of the connection points to their distribution systems are approximate. The actual alignment will be determined during design and permitting.

The Holder project has other possible interconnections with other water supply projects in the WRWSA. One potential interconnection identified is with the Sumter County LFA and UFA wellfield projects located northeast of the Holder gage. This project could connect through an existing power line easement running northwest to southeast, and could tie into the potential transmission corridor outlined in Figure 6-2.

6.2 Lake Rousseau Surface Water Project Transmission Corridor

The conceptual transmission route for the Lake Rousseau Surface Water Project is illustrated in Figure 6-3. As mentioned in Chapter 4, the Lake Rousseau surface water project would provide 25 mgd of water to end users. The end users identified for the Lake Rousseau project have been identified as the City of Ocala located to the east; Citrus County who would receive the water at the CABWTF located south of the surface water project; and the western service area of Hernando County located south of the project. The locations of the connection points to the distribution systems of the different municipalities are approximate. The actual alignment will be determined during design and permitting.

Another possible water supply interconnection with the Lake Rousseau project is the Holder project. Figure 6-4 depicts the location of the Lake Rousseau project located west of the Holder project, as well as the two (2) possible interconnections located north and south of the Holder surface water project.

6.3 Crystal River Desalination Water Project Transmission Corridor

Figure 6-5 depicts the conceptual transmission route for the Crystal River Desalination Project. The locations of the connection points to the distribution systems of the different municipalities are approximate. As mentioned in Chapter 4, the Crystal River project is designed for 25 mgd of water. End users of Crystal River Desal water project have been identified as Citrus County located southeast which will receive the water at the CABWTF. The Western Service Area of Hernando County is another potential user, located southeast of the Desalination project.

The Crystal River desalination water project has a possible interconnection with the Holder gage project. As shown in Figure 6-6, this project is located east of the desalination water project, and has two (2) possible connection points. The Holder project can connect with the desal project through an existing easement coming from the Crystal River power plant, and can be interconnected through the end user in Citrus County connecting at the CABWTF.

6.4 North Sumter Groundwater (UFA and LFA) Wellfield Transmission Corridors

The conceptual transmission route for the Sumter County UFA wellfield project is shown in Figure 6-7. The actual alignment will be determined during design and permitting. As mentioned in Chapter 4, the Sumter County UFA wellfield project would provide a total of 10 mgd of water. End users of the North Sumter UFA wellfield project have been identified as the City of Wildwood and the Villages in North Sumter both located east of the surface water project. These end users would be responsible for interconnection and distribution of combined water to their respective users.

Figure 6-7 also shows the location of the proposed Champagne Farms LFA wellfield project. The LFA water supply project is located approximately 3 miles east of the UFA water supply project, and is located within the 2 mile transmission corridor that was shown in Figures 6-7.

Potential interconnections of water supply projects to the UFA and LFA projects in Sumter County is the Holder project located to the northwest. Figure 6-8 depicts the transmission corridor for this interconnection, and other possible interconnections for this route. Figure 6-8 also shows the possible interconnection of the North Sumter Surface Water Project that is referenced later on in the chapter.

6.5 Northwestern Marion County Wellfield Transmission Corridor

Figure 6-9 illustrates the conceptual transmission route for the Northwestern water supply wellfield project in Marion County. As mentioned in Chapter 4, the Northwestern Wellfield water project would provide 15 mgd of water. End users of the Northwestern Wellfield have been identified as the City of Ocala located to the southeast; Marion County who would connect at the Oak Run service area; and On Top of the World Inc. Utilities. The locations of the connection points to the distribution systems of the different municipalities are approximate.
A possible water supply interconnection with the Northwestern Wellfield water project is the Holder Gage Surface Water Project.

Figure 6-10 depicts the location of the Northwestern Wellfield located north of the Holder project, as well as the possible interconnections located in the City of Ocala.

6.6 Northeastern Marion County Wellfield Transmission Corridor

The conceptual transmission route for the Northeastern Marion County Wellfield project in is shown in Figure 6-11. As mentioned in Chapter 4, the Northeastern Wellfield would provide 15 mgd of water. End users of the Northwestern Wellfield have been identified as the City of Ocala located to the south and Marion County who would use the water for their Silver Spring Shores service area.

A possible water supply interconnection with the Northeastern Wellfield is the Ocklawaha River Surface Water project, which is being analyzed by the SJRWMD. Figure 6-12 depicts the location of the Northeastern Wellfield water project located north of the Ocklawaha River Surface Water project, as well as the possible interconnections located within the Marion County Utilities.

6.7 North Sumter Surface Water Project Transmission Corridor

The North Sumter County Surface Water Project conceptual transmission route is depicted in Figure 6-13. As mentioned in Chapter 4, the Sumter County surface water supply project would provide a total of 10 mgd of water for end users. End users of the North Sumter project have been identified as the City of Wildwood and the Villages in North Sumter both located east of the surface water project. These end users would be responsible for interconnection and distribution of combined water to their respective users.

Potential interconnections of water supply projects to the Sumter County surface water project are the Sumter County UFA and LFA Wellfield projects located north of the surface water project area. Figure 6-14 illustrates the transmission corridor for this interconnection and location of possible interconnections for this route. The locations of the connection points to the distribution systems of the different municipalities are approximate.

Another potential interconnection of water supply projects to the Sumter County surface water project is the Holder project located northwest. Figures 6-8 and 6-14 depict the transmission corridor for this interconnection, and location of possible interconnections for this route.

6.8 Composite Water Supply Transmission Corridors

One of the goals of the Regional Framework Initiative is to identify key projects and potential partners for the water supply projects that have been identified in Chapter 4. The overall potential for the Regional Framework is identified in Figure 6-15. This figure depicts all of the water supply projects that were identified in Chapter 4, as well as their transmission corridors to provide an overview of all of the possible interconnections between projects.

This figure is not intended to depict the ultimate build-out of the Regional Framework. As mentioned, it is not anticipated that all the water supply projects identified will be built. Cost considerations and water demand will ultimately dictate project selection. This composite and the individual transmission corridors should be used as water supply projects are reviewed at a local, sub-regional or regional basis. Recommendation 7.1 of Chapter 7 contemplates the implementation of the Regional Framework and the proposed role of the WRWSA with its members. This composite figure of the Regional Framework should be used with and by

members as new water supply projects are contemplated or planned. The WRWSA role should be to determine how these proposed projects fit into the Regional Framework concept and where they don't what changes could be made to make it consistent.

CITY OF OCALA

HOLDER
WTP

CITRUS CO
CITRUS COUNTY
& WRWSA

HERNANDO CO
WESTERN
SERVICE AREA

Legend

- Phase II Pipeline Alignment
- Holder Pipeline Corridor
- Water Bodies
- County Boundaries

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FIGURE 6-1
CONCEPTUAL HOLDER
TRANSMISSION ROUTE

ORIGINAL DATE: 08-24-2011
REVISION DATE: 12-1-2011
JOB NUMBER: 0719
FILE NAME: Holder Pipeline...mxd
GIS OPERATOR: DR

N
W E
S

1 Inch = 2.55 Miles

CITY OF OCALA

LAKE ROUSSEAU WTP

HOLDER WTP

CHAMPAGNE FARMS

CITRUS CO CITRUS COUNTY & WRWSA

SUMTER WELLFIELDS

HERNANDO CO WESTERN SERVICE AREA

Legend

type

- Pipeline Alignment
- Phase II Pipeline Alignment
- Pipeline Corridors
- Holder Pipeline Corridor
- Water Bodies
- County Boundaries

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FIGURE 6-2
CONCEPTUAL HOLDER
TRANSMISSION ROUTE WITH POSSIBLE
WATER SUPPLY PROJECT INTERCONNECTIONS

ORIGINAL DATE: 08-24-2011
REVISION DATE: 12-1-2011
JOB NUMBER: 0719
FILE NAME: Holder Pipeline...mxd
GIS OPERATOR: DR

N W E S

1 Inch = 2.55 Miles

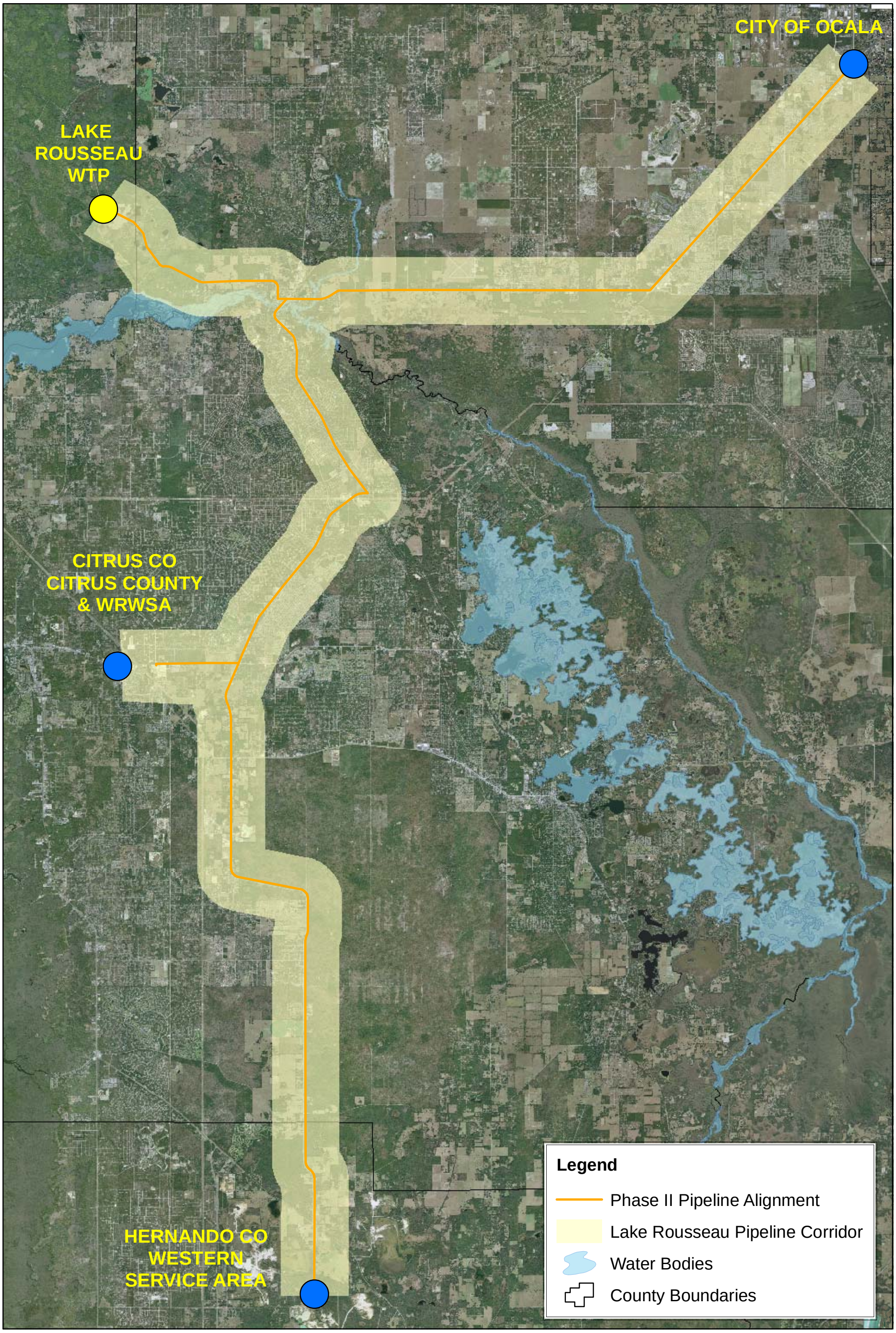

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FIGURE 6-3
CONCEPTUAL LAKE ROUSSEAU TRANSMISSION ROUTE

ORIGINAL DATE: 08-24-2011
REVISION DATE: NA
JOB NUMBER: 0719
FILE NAME: Lake Rousseau...mxd
GIS OPERATOR: DR

N W E S

1 Inch = 300 Feet

CITY OF OCALA

LAKE ROUSSEAU WTP

HOLDER WTP

CITRUS CO CITRUS COUNTY & WRWSA

HERNANDO CO WESTERN SERVICE AREA

Legend

- Phase II Pipeline Alignment
- Lake Rousseau Pipeline Corridor
- Pipeline Corridor
- Water Bodies
- County Boundaries

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FIGURE 6-4
CONCEPTUAL LAKE ROUSSEAU TRANSMISSION ROUTE WITH POSSIBLE WATER SUPPLY PROJEC INTERCONNECTIONS

ORIGINAL DATE: 08-24-2011
REVISION DATE: 12-1-2011
JOB NUMBER: 0719
FILE NAME: Lake Rousseau...mxd
GIS OPERATOR: DR

N W E S

1 Inch = 300 Feet

DESALINATION
WTP

CITRUS CO
CITRUS COUNTY
& WRWSA

HERNANDO CO
WESTERN
SERVICE AREA

Legend

- Phase II Pipeline Alignment
- Crystal River Desal Pipeline Corridor
- Water Bodies
- County Boundaries

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FIGURE 6-5
CONCEPTUAL SEAWATER
DESALINATION TRANSMISSION ROUTE

ORIGINAL DATE: 08-24-2011
REVISION DATE: NA
JOB NUMBER: 0719
FILE NAME: Crystal River Pipe...mxd
GIS OPERATOR: DR

N
W E
S

1 Inch = 2.55 Miles

LAKE ROUSSEAU
WTP

HOLDER
WTP

DESALINATION
WTP

CITRUS CO
CITRUS COUNTY
& WRWSA

HERNANDO CO
WESTERN
SERVICE AREA

Legend

- Phase II Pipeline Alignment
- Desalination Transmission Corridor
- Alternate Pipeline Alignments
- Water Supply Project Pipeline Corridors
- Water Bodies
- County Boundaries

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FIGURE 6-6
CONCEPTUAL DESALINATION TRANSMISSION ROUTE WITH POSSIBLE WATER SUPPLY PROJECT INTERCONNECTIONS

ORIGINAL DATE: 08-24-2011
REVISION DATE: 12-1-2011
JOB NUMBER: 0719
FILE NAME: Desal Pipeline...mxd
GIS OPERATOR: DR

N W E S

1 Inch = 2.55 Miles

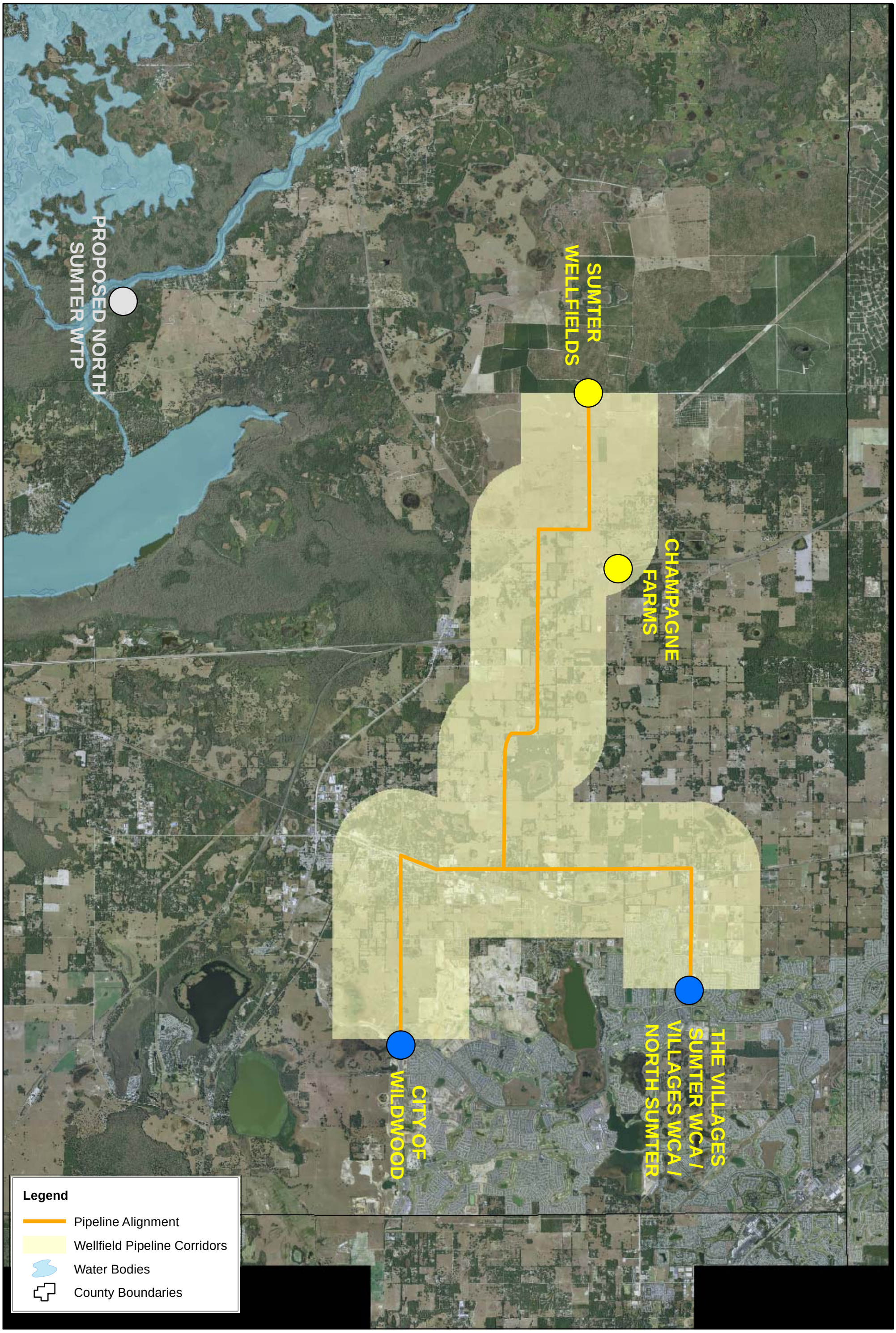

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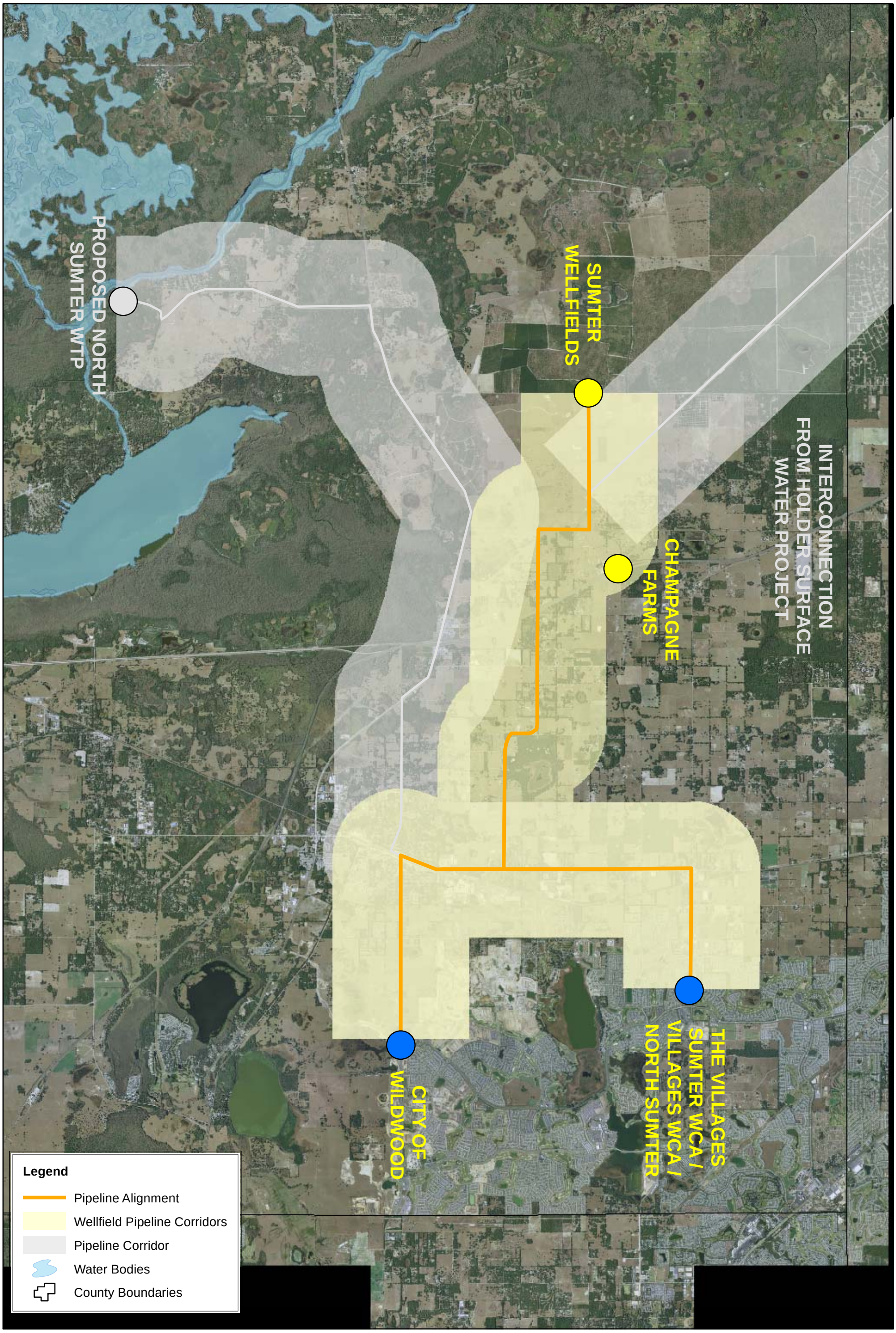
FIGURE 6-7
CONCEPTUAL SUMTER WELLFIELDS TRANSMISSION ROUTES

ORIGINAL DATE: 08-24-2011
REVISION DATE: 12-1-2011
JOB NUMBER: 0719
FILE NAME: North Sumter Pipe...mxd
GIS OPERATOR: DR

W S N E

1 Inch = 1.11 Miles



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PROJECT: WRWSA - Regional Framework Initiative

FIGURE 6-8
CONCEPTUAL SUMTER WELLFIELDS TRANSMISSION ROUTES WITH POSSIBLE WATER SUPPLY PROJECT INTERCONNECTIONS

ORIGINAL DATE: 08-24-2011
REVISION DATE: 12-1-2011
JOB NUMBER: 0719
FILE NAME: North Sumter Pipe...mxd
GIS OPERATOR: DR

1 Inch = 1.11 Miles

NORTHWESTERN MARION WELLFIELD

CITY OF OCALA

LAKE ROUSSEAU WTP

ON TOP OF THE WORLD UTILITIES INC

MARION COUNTY UTILITIES OAK RUN

HOLDER WTP

Legend

- NW Wellfield Pipeline Alignment
- NW Pipeline Corridor
- Water Bodies
- County Boundaries

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FIGURE 6-9
CONCEPTUAL NORTHWESTERN WELLFIELD TRANSMISSION ROUTE

ORIGINAL DATE: 08-24-2011
REVISION DATE: 12-1-2011
JOB NUMBER: 0719
FILE NAME: Northwestern...mxd
GIS OPERATOR: DR

N W E S

1 Inch = 300 Feet

NORTHWESTERN
MARION
WELLFIELD

CITY OF
OCALA

LAKE
ROUSSEAU
WTP

ON TOP OF THE
WORLD UTILITIES INC

MARION COUNTY
UTILITIES
OAK RUN

HOLDER
WTP

CITRUS CO
CITRUS COUNTY
& WRWSA

Legend

- NW Wellfield Pipeline Alignment
- NW Pipeline Corridor
- Pipeline Corridor
- Water Bodies
- County Boundaries

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FIGURE 6-10
CONCEPTUAL NORTHWESTERN WELLFIELD TRANSMISSION ROUTE WITH POSSIBLE WATER SUPPLY PROJECT INTERCONNECTIONS

ORIGINAL DATE: 08-24-2011
REVISION DATE: 12-1-2011
JOB NUMBER: 0719
FILE NAME: Northwestern...mxd
GIS OPERATOR: DR

N W E S

1 Inch = 300 Feet

NORTHEASTERN
MARION WELLFIELD

CITY OF
OCALA

MARION COUNTY
UTILITIES
SILVER SPRING SHORES

Legend

- NE Pipeline Alignment
- NE Pipeline Corridor
- Pipeline Corridor
- Water Bodies
- County Boundaries

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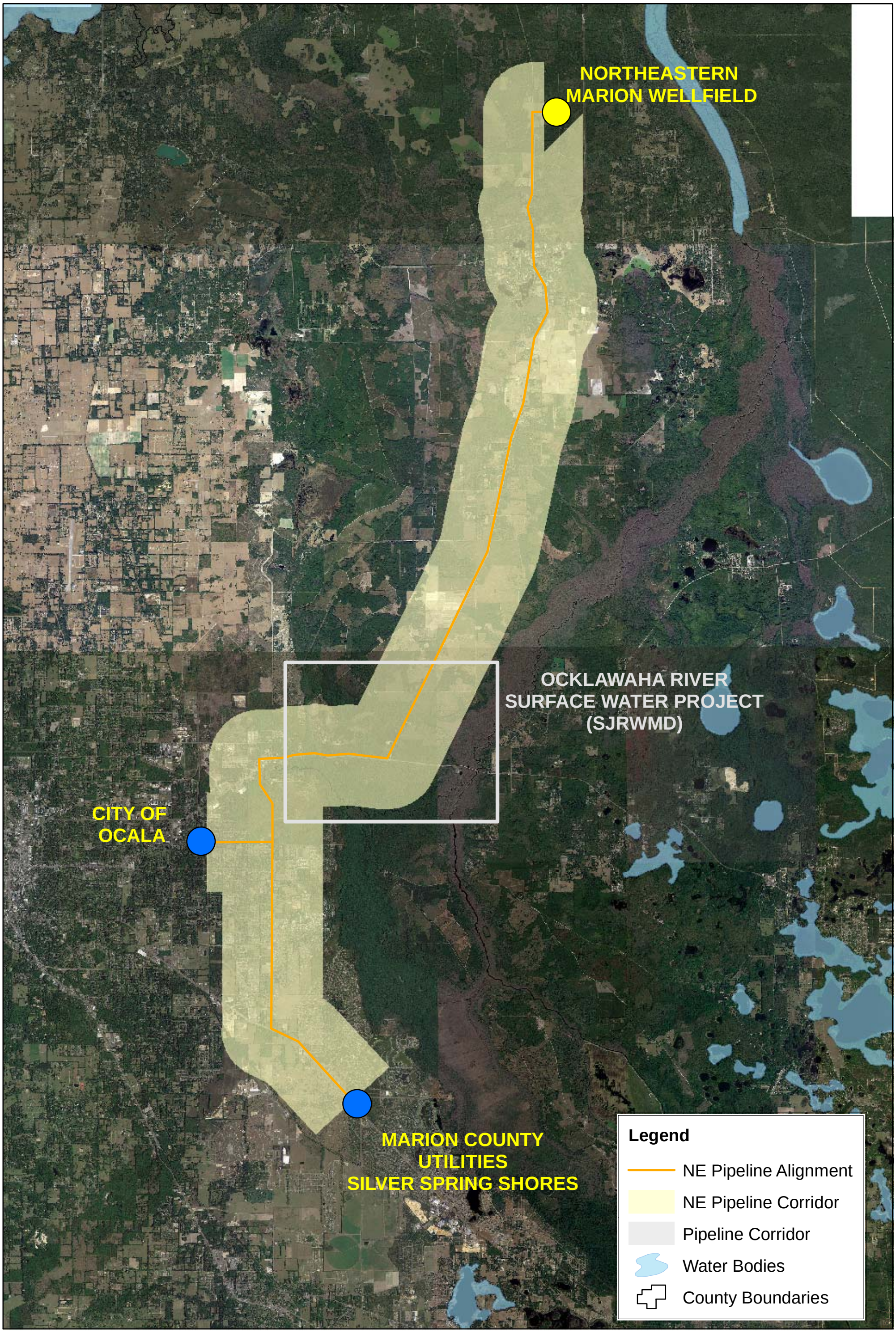
FIGURE 6-11
CONCEPTUAL NORTHEASTERN WELLFIELD
TRANSMISSION ROUTE

ORIGINAL DATE: 08-24-2011
REVISION DATE: 12-1-2011
JOB NUMBER: 0719
FILE NAME: Northwestern...mxd
GIS OPERATOR: DR

N
W E
S

1 Inch = 300 Feet



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PROJECT: WRWSA - Regional Framework Initiative

FIGURE 6-12
CONCEPTUAL NORTHEASTERN WELLFIELD TRANSMISSION ROUTE WITH POSSIBLE WATER SUPPLY PROJECT INTERCONNECTIONS

ORIGINAL DATE: 08-24-2011
REVISION DATE: 12-1-2011
JOB NUMBER: 0719
FILE NAME: Northwestern...mxd
GIS OPERATOR: DR

N W E S

1 Inch = 300 Feet

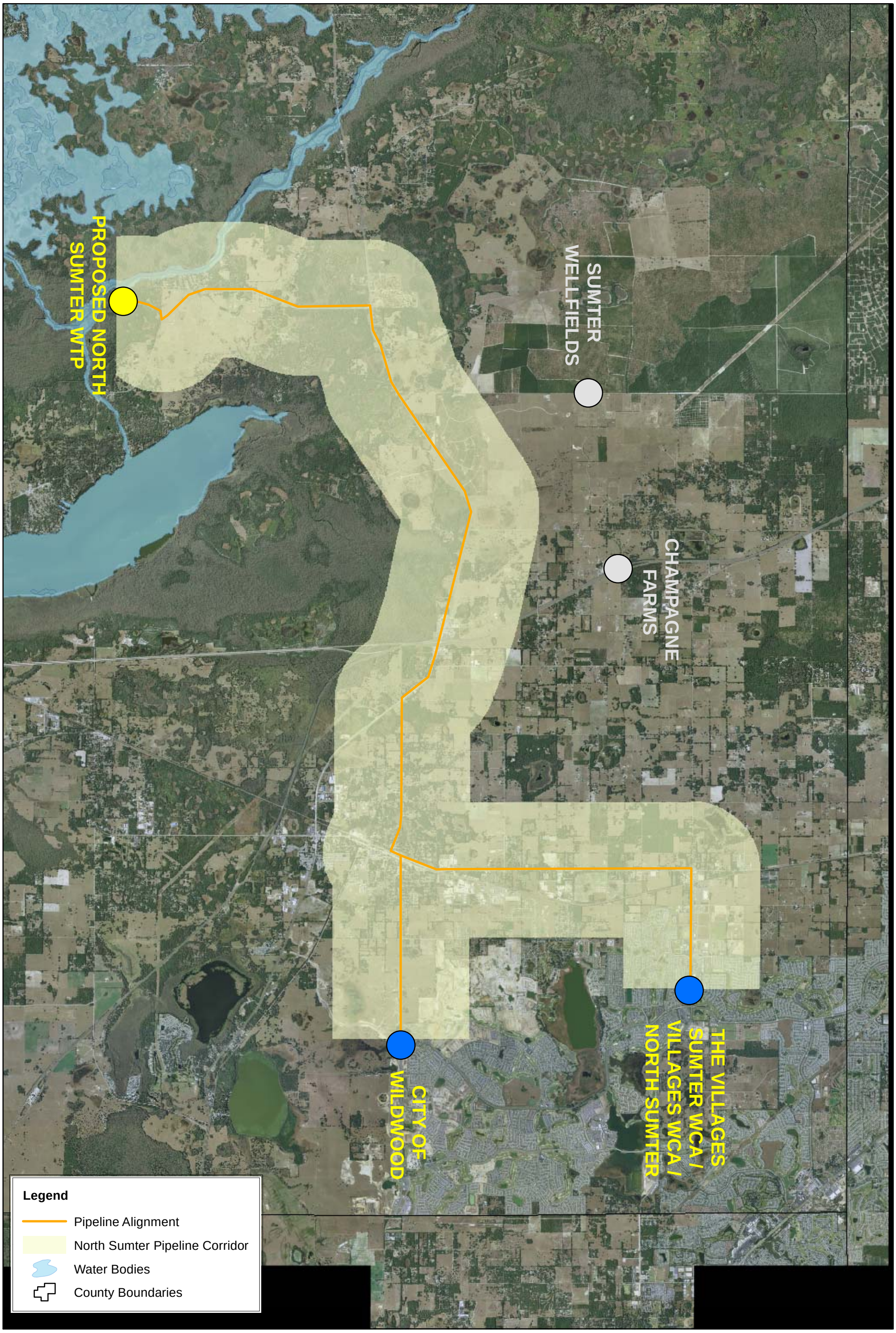

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FIGURE 6-13
CONCEPTUAL NORTH SUMTER TRANSMISSION ROUTE

ORIGINAL DATE: 08-24-2011
REVISION DATE: 12-1-2011
JOB NUMBER: 0719
FILE NAME: North Sumter Pipe...mxd
GIS OPERATOR: DR

1 Inch = 1.11 Miles

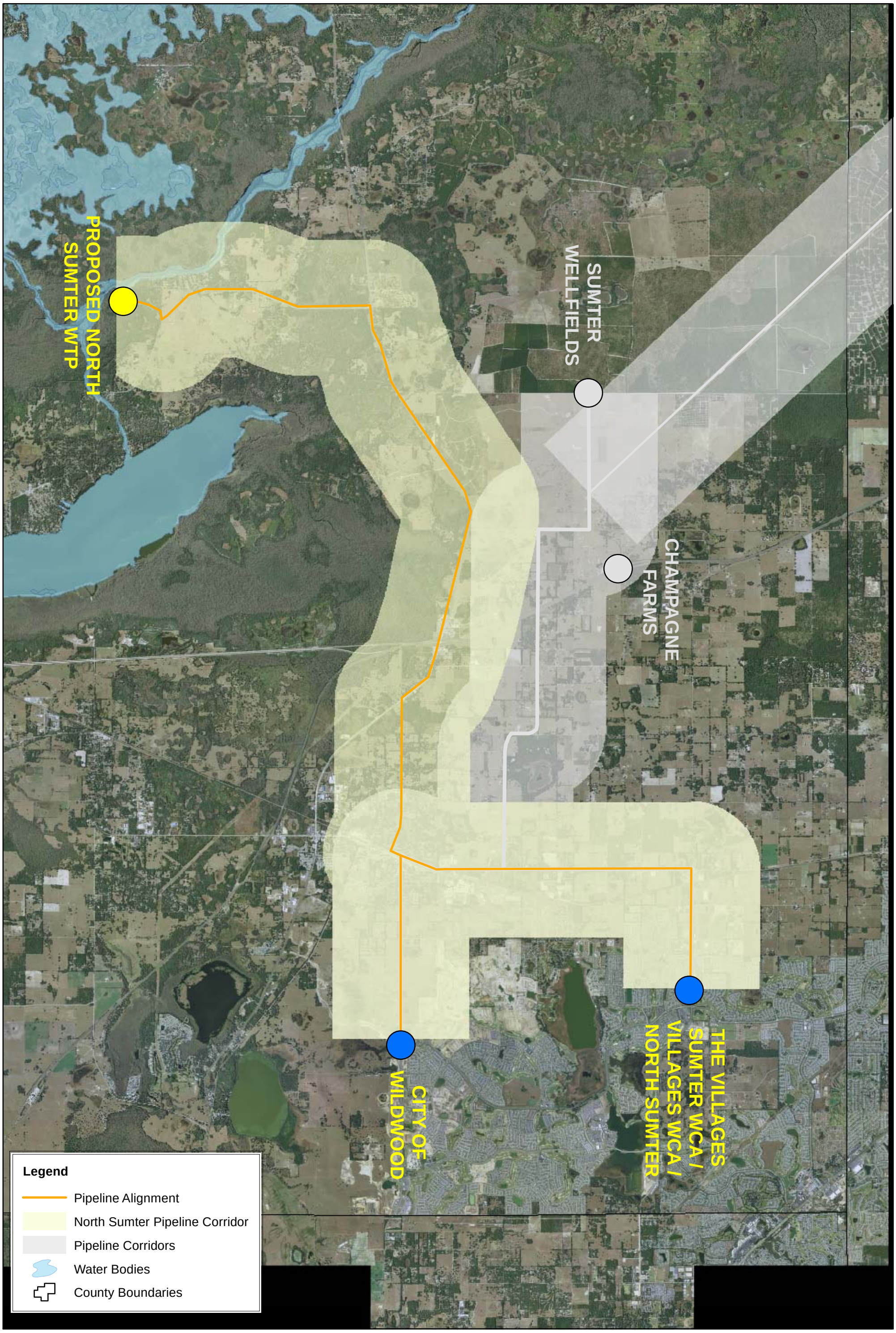

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FIGURE 6-14
CONCEPTUAL NORTH SUMTER TRANSMISSION ROUTE WITH POSSIBLE WATER SUPPLY PROJECT INTERCONNECTIONS

ORIGINAL DATE: 08-24-2011
REVISION DATE: 12-1-2011
JOB NUMBER: 0719
FILE NAME: North Sumter Pipe...mxd
GIS OPERATOR: DR

1 Inch = 1.11 Miles

NORTHEASTERN MARION WELLFIELD

NORTHWESTERN MARION WELLFIELD

OCKLAWAHA RIVER SURFACE WATER

CITY OF OCALA

LAKE ROUSSEAU WTP

MARION COUNTY UTILITIES

MARION COUNTY UTILITIES

HOLDER WTP

DESALINATION WTP

THE VILLAGES SUMTER WOA / VILLAGES WCA / NORTH SUMTER

CHAMPAGNE FARMS

SUMTER WELLFIELD

CITRUS CO CITRUS COUNTY & WRWSA

CITY OF WILDWOOD

SUMTER SURFACE WATER

CITRUS COUNTY WELLFIELD

HERNANDO CO WESTERN SERVICE AREA

Legend

- End Users
- Suppliers
- County Boundaries
- Desal to Holder Pipeline Alignment
- Holder to Sumter Wellfield Pipeline Alignment
- Sumter Wellfield Pipeline Alignment
- Crystal River Phase II Pipeline Alignment
- Holder Phase II Pipeline Alignment
- Lake Rousseau Phase II Pipeline Alignment
- NE Pipeline Alignment
- NW Wellfield Pipeline Alignment
- Pipeline Corridor
- Desal To Holder Corridor
- Sumter Pipeline Corridor
- NE Pipeline Corridor
- Crystal River Desal Pipeline Corridor
- Holder Pipeline Corridor
- Lake Rousseau Pipeline Corridor
- Holder to Sumter Corridor
- NW Pipeline Corridor
- Water Bodies

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PROJECT: WRWSA - Regional Framework Initiative

FIGURE 6-15
WRWSA CONCEPTUAL
PIPELINE CORRIDORS AND PROJECT OPTIONS

ORIGINAL DATE: 08-25-2011
REVISION DATE: 12-2-2011
JOB NUMBER: 0719
FILE NAME: WRWSA Pipeline.mxd
GIS OPERATOR: DR

N W E S

1 Inch = 4.34 Miles

Chapter 7 – Regional Framework Recommendations

7.0 Introduction

The WRWSA Regional Framework has become the key initiative for water supply planning and development within the four-county area. It is the basis and the underpinning of efforts within the region upon which plans to meet future water supply demands should rely. The Regional Framework is the roadmap for members of the Authority as they contemplate water supply development opportunities on an individual, sub-regional or regional perspective. The Regional Framework is not a static document but one that must be revisited on a regular basis as changes in water demands or access to the water resource occurs.

The recommendations presented in this chapter have been developed as part of the Regional Framework Initiative and from input by the WRWSA Technical Review Committee (TRC) and Board. These recommendations are generated as possible "next steps" for the WRWSA as the landscape for water supply planning and development continue to evolve. As evidenced by the changes that have occurred from the start of the MWSP&IP process to this Regional Framework Initiative, change in the variables surrounding water will be constantly evolving.

7.1 Implementation of the Regional Framework

The WRWSA should continue to maintain the role of administering the Regional Framework for the region and members of the authority. The dynamic factors that drive water supply planning and development require periodic updates of the Regional Framework to review the previous assumptions and results that it was based on. This Regional Framework update should occur every two to three-years, midway between the five-year update of the RWSP.

On an annual basis the WRWSA should facilitate a meeting of the TRC to discuss the water supply planning and development activities of member governments. This meeting is an opportunity to compare member plans for consistency with the Regional Framework. It also gives members of the TRC a forum to discuss opportunities for regional or sub-regional approaches to water supply development for both traditional and alternative water supplies.

Continued coordination with member governments regarding water supply development and the Regional Framework should be an initiative that the WRWSA continues. The assistance from the WRWSA to bridge the technical, economic and political issues regarding water supply development can be an important role for the WRWSA in the future.

The technical basis and assumptions that are contained in the current Regional Framework Initiative report should be reviewed at these annual TRC meetings to ensure that they are consistent with current conditions. Adjustments to these assumptions should be cataloged and included in the Regional Framework updates.

7.2 Update of the Master Regional Water Supply Planning & Implementation Program (MRWSP&IP)

The original MRWSP&IP was developed and adopted by the WRWSA Board in 2005. As mentioned in this report, the water supply demands that were anticipated at that time where in response to significant anticipated growth that never materialized due to the economic

turndown. As a result, the rush for traditional and AWS water supply development to meet these water demands has not been needed.

Based on these changes parts of the MRWSP&IP are in need of updating based on the new assumptions of water demands, water supply implementation schedules, impacts of water conservation, MFLs and the availability of remaining groundwater. Recognition of and consistency with the Regional Framework is also an important consideration when the MRWSP&IP is reviewed and revised.

7.3 WRWSA Regional Water Supply Plan Update

The WRWSA Regional Water Supply Plan (RWSP) was last updated in 2007 as Phase I of the MWSP&IP. Phase II – Detailed Water Supply Feasibility Analyses was completed in 2010. Both Phases I and II reports were used by SWFWMD in the development of the SWFWMD Regional Water Supply Plan. Recommendations from the Phase II report from the MWSP&IP included a continued role for the WRWSA in water supply planning for the region. As part of those recommendations was the continual update of the population and water demands. The recommendation goes on to say, “These updates should take place on a regular basis, every five-years, concurrently with the SWFWMD update of their RWSP.”

The update of the SWFWMD RWSP is due in 2015 and the need for consistency between the two agencies reports is important. SWFWMD has approached the WRWSA to again develop their RWSP update on a schedule that will allow them to use information generated for their RWSP update. WRWSA has submitted a Cooperative Funding Initiative (CFI) request to SWFWMD for a 50% financial match for FY 2013 budget cycle for this work.

Information generated in the WRWSA RWSP update for the eastern portion of Marion County within the SJRWMD should be provided to that district for consideration in the update of their RWSP.

7.4 Impacts to the Regional Framework from MFL Development

Proxy MFLs were utilized during the development of water supply projects in the Phase II report. These were used on waterbodies, water courses and springs that were scheduled for MFLs but were not developed at the time of the analyses for Phase II. Proxy MFLs were developed in conjunction with SWFWMD staff to be used as a constraint for overdevelopment of the resource.

Since Phase II was completed, MFLs have been adopted and are being proposed by the water management districts. As discussed in Chapter 3, most of the proxy MFLs based on a percentage basis close to what has been adopted or proposed by the districts. Two water supply projects were singled out where SWFWMD was more restrictive than the proxy MFLs used in the Phase II report. It is recommended that during the update of the RWSP these projects in conjunction with the MFLs are readdressed to determine the potential impact to water supply yields. Also, that the WRWSA tracks closely the MFL process for both the SWFWMD and SJRWMD to determine if proposed MFLs will impact water supply projects that will potentially supply Authority members in the future.

7.5 Member Advocate to Legislative Bodies & Federal, State and Regional Agencies

The WRWSA must continue to play a role in advocating on behalf of its members relating to water supply in the legislative process and with regulatory agencies. Issues arise that are common to members and can be more effectively addressed collectively through the WRWSA rather than individual governments. The Regional Framework must be continually monitored as legislative recommendations or potential agency rule changes adversely impact its structure or the WRWSA ability to implement this plan within the region. Enhancements to laws or agency rules could be beneficial to the program is where WRWSA can also play an important role.

Current examples could include legislative changes to the definition of alternative water sources that could impact the ability to utilize state and regional funding for AWS projects. Rules governing the establishment of MFLs can have an impact on the ability to develop both traditional and ASW projects. Changes to the "Local Sources First" policies could have a devastating impact to the Regional Framework concept. The WRWSA continued presence in the legislative process with the current Legislative Liaison position is critical.

7.6 Incentivizing Water Project Partnerships for the Regional Framework

The WRWSA should work with the SWFWMD and the SJRWMD to assist in incentivizing water resource development projects that are regional or sub-regional in configuration and that support the Regional Framework concept. Currently, the water management district's priorities regarding either financial or regulatory incentives are targeted at AWS development. This is appropriate in areas where traditional groundwater sources are limited and AWS sources are the next logical water supply project(s) to meet demand. However, in areas like the four-county region of the WRWSA, supporting water supply projects that are either collaborative in nature between utilities or directly support the Regional Framework should be encouraged. This should be supported whether the water source is AWS or traditional groundwater sources. As discussed in the Phase II report, short-term water supplies within the WRWSA are more likely going to come from groundwater sources. The development of these sources either regionally or sub-regionally in concert with the Regional Framework should be encouraged.

Incentives could be in the form of financial support; technical assistance; land acquisition; and regulatory considerations. These incentives could be offered by the water management districts in collaboration with the WRWSA.

7.6.1 Financial Support

Encourage the water management districts to expand their funding policies to consider the development of groundwater in a manner that supports the Regional Framework concept as eligible for financial support. This would include monetary support for the design and construction of water supply facilities and transmission mains that interconnect systems.

7.6.2 Land Acquisition

Existing District and future acquisition lands should be prioritized based on sites for Regional Framework water supply development potential. Regional and sub-regional sites for water supply development, off-stream water storage or transmission lines could be accommodated within the water management districts land acquisition and management policies.

7.6.3 Technical Assistance

The water management districts vast technical resources could be focused on assistance to local governments and WRWSA on projects supporting the Regional Framework concept. Regional and site specific groundwater modeling and environmental technical assistance would provide a positive collaborative approach to the development of water supply in a regional or sub-regional manner.

7.6.4 Regulatory Considerations

Longer duration water use or consumptive use permits that require collaborative approaches to water supply development should be considered by the water management districts. Longer duration permits are currently available to applicants based generally on an AWS water source or a low per capita usage amount. This recommendation would expand this access to longer duration permits to projects that are consistent the Regional Framework concept.

7.7 Water Conservation

Although the Regional Framework is focused on the eventual interconnection between traditional and AWS projects, water conservation plays an important role. The rate or schedule at which sources need to be developed is a direct function of potential water savings through water conservation. The WRWSA has an important existing and future role regarding water conservation programs throughout its four-county region. Water conservation has been an ongoing program with the WRWSA Local Government Water Supply Assistance Funding Program since 1999. Water conservation has been the emphasis of the program including educational projects; the funding of Water Conservation Coordinators in each of the four counties; irrigation audit programs; and a grants program that has funded numerous water conservation projects for its members.

Water conservation is even more important to its members since the compliance water per capita rates were extended to include the SWFWMD Northern Planning Region. These compliance per capita rates require utilities with high per capita rates to lower them within a prescribed period. Per capita rates need to reach 150 gallons per capita per day by December 31, 2019. The estimated difference in water demand projections as outlined in Chapter 2 is approximately 21 mgd reduction or 15% in 2030 based on revised per capita rates and on the compliance per capita rates compared to the Phase II projections.

Promoting, funding and implementing water conservation initiatives within the region should continue to be a priority function of the WRWSA. It directly complements the Regional Framework.

7.8 Northern Planning Region Liaison to SWFWMD in Support of the Regional Framework

SWFWMD Basin Boards have historically had an important role in the SWFWMD organizational structure. The Basin Boards provided the local and institutional knowledge with respect to the water resource, water supply development and the need for water conservation within SWFWMDs 16-county area. These boards were also responsible for half of the SWFWMD millage rate capacity for water management projects and research. In 2011, SWFWMD eliminated the Basin Boards in a cost cutting move that took away the local input to the District with respect to these water management functions.

The WRWSA should consider filling this void and becoming the Northern Planning Region Liaison to SWFWMD assuming some of the functions of the basin boards. The Northern Planning Region was primarily overseen by the Coastal Rivers and the Withlacoochee River Basin Boards. This liaison role for the Authority would cover issues within the WRWSA mandate such as water supply planning; water supply development; water conservation and education.

An example of the Northern Planning Region Liaison role would be a greater involvement in the SWFWMD Cooperative Funding Initiative (CFI). As part of the CFI program, the eight local SWFWMD Basin Boards played a significant role in the funding program. This included the prioritization, selection and funding of eligible project applications from local governments. Since the Basin Boards are no longer involved in the "screening" process for the CFI program, the WRWSA could fill that role for the District. The WRWSA is in a unique position of understanding local needs since the water supply planning process for the SWFWMD Northern Planning Region has been essentially driven through the Authority's MRWSP&IP process.

The WRWSA could work with its members on the CFI process and assist in the development of applications to SWFWMD. When the applications are completed the WRWSA can be the initial "screen" in their prioritization in relation to the most recent Authority RWSP and the Regional Framework concept. Criteria for ranking and ultimate selection by SWFWMD within the Northern Planning Region could include WRWSA member water demands; current per capita rates and need for water conservation initiatives; regional and sub-regional water supply opportunities; or alternative water supply development requirements.

As the CFI dollars become more and more competitive, the WRWSA can also develop a longer range look at CFI funding within the Northern Planning Region. Rather than an ad hoc process that considers requests on a year-to-year basis it is recommended that a process similar to a 3 to 5-year Capital Improvement Program (CIP) process that lays out a comprehensive and coherent plan to maximize SWFWMD and local matching dollars be implemented. The CIP process would track recommendations from the WRWSA RWSP and the SWFWMD Northern Planning Region RWSP. The goal is to identify, recommend and fund programs that will achieve the most cost-effective results on a schedule that matches the WRWSA and SWFWMD priorities.

7.9 Preliminary Analyses of Potential Regional Framework Projects

Several water supply projects previously identified in the Phase II report and now the Regional Framework Initiative analysis have the potential for both short and mid-range viability to meet local and regional water demands. As the MWSP&IP is reevaluated and revised, several projects may merit the next level of detailed evaluation to determine their technical, environmental and economic feasibility. The timeline for evaluating, designing, permitting and implementation of a new water supply project can be lengthy, so an upfront identification and feasibility analysis of potential sources to add and keep the potential list of options is important.

The level of detailed analysis recommended would mirror the Phase II report. This would entail the development of a conceptual design for the project; determination of the potential yield of the water source; analysis of environmental issues related to the water source development; identification of potential customers for the water; and the estimated cost of developing the project.
Regional Framework projects that merit consideration include:

7.9.1 Expansion of the WRWSA Charles A. Black Water Treatment Facility (CABWTF)

As discussed in Chapter 4, the CABWTF is currently permitted at quantities that are potentially less than can be withdrawn from a physical and permitting criteria perspective. The wells that currently serve CABWTF can physically withdraw up to 19.2 mgd versus the permitted annual average quantity of 6.3 mgd. The location of CAB may also be conducive for expansion from a water resource and environmental perspective due to its location with respect to established or proposed MFLs and other environmental features.

This expansion could serve the current and projected growth from within Citrus County as detailed in Chapter 4. However, an expansion of CABWTF could potentially play a regional or sub-regional role when water supply demands start to once again increase. The Phase II report had analyzed the potential of a groundwater source in south-central Citrus County. This analysis should compare the expansion of CABWTF to this source. This analysis would determine if the Citrus Wellfield could be eliminated or potentially scaled back as a source if the CABWTF expansion had merit.

7.9.2 Avatar/Ocala Springs LFA Well

A series of wells were permitted in northeastern Marion County associated with a development known as Ocala Springs owned by Avatar Properties, Inc. The projects water supply was proposed from one 6-inch, two 8-inch, one 16-inch and three 2-inch diameter wells. Discussions regarding these wells revolve around their construction and the belief that the largest is drilled to the LFA. Anecdotally, it is believed that water quantity and quality from this well is good and very acceptable for potable demands and these wells are now capped. The Florida Greenways and Trails, a division of the Florida Department of Environmental Protection (FDEP), now owns the property that the wells are located.

If water quality and quantity from this system is indeed adequate for potable purposes the potential is for a water supply project for existing or future water demands. The technical, regulatory and ownership issues surrounding this source should be investigated by the WRWSA.

7.9.3 Further Investigation of the LFA

A greater emphasis on investigation of the extent and viability of the LFA should be pursued by the WRWSA. As MFLs continue to be adopted in the Northern Planning Region groundwater sources from the upper Floridan aquifer are becoming more difficult to develop due to the interrelationship between pumpage and environmental impacts. The LFA, where it occurs, generally has a thick confining layer that separates the upper from the LFA. This confinement minimizes impacts to wetlands, lakes and rivers when pumpage comes from the LFA. However, water quality from the LFA can be poor leading to advanced treatment which can be costly.

The geographic extent of the LFA is not well documented. However, the ability to locally develop an AWS project like the LFA and minimize transmission costs is a benefit to utilities. Transmission costs from the projects identified in the Phase II reports were a large percentage of their capital costs. The WRWSA should consider an initiative to better define the LFA in cooperation with the water management districts.

7.10 Accelerated Data Acquisition for the Northern Planning Region to Support the Regional Framework

The WRWSA, SWFWMD and The Villages cofounded an accelerated groundwater data collection program for northern Sumter and southern Marion Counties. During the development of the SWFWMD Northern District Regional Model, it was determined that there was a lack of aquifer characteristic information in that area. In order to improve the model characterization and the ability to utilize it for predictive analysis, additional hydrogeologic testing was required.

In order to continue to enhance the Regional Framework the WRWSA should continue supporting accelerated data acquisition both technically and monetarily. This will ensure that water supply projects are prioritized and pursued on the basis of the best available information with regard to potential water resource and environmental impacts from water withdrawals.