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Surveyor's Project Report

South Florida Water Management District  
**C-111 Spreader Canal Western Project**  
**Frog Pond**  
**Vertical Control Survey**

District Work Order Number: 4600000943-WO 16

Prepared For:



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## APPENDICES

### APPENDIX A

Survey Data for each Well Site including:

- Benchmark Description Sheet
- Site Photographs
- Field Notes

### APPENDIX B

- GPS Network Adjust Report
- NGS Control Datasheets

## **OVERVIEW OF THE PROJECT**

### **PURPOSE**

The C-111 Spreader Canal Western project is one element of the Comprehensive Everglades Restoration Plan (CERP) authorized by the United States Congress as part of the 2000 Water Resources Development Act. This project is designed to restore the quantity, timing, and distribution of water delivered to Florida Bay via Taylor Slough and the area south of the C-111 canal known as the Southern Glades and Model Lands. This involves the use of structures (detention areas, canals, canal plugs, levees, gates and pump stations) and operational procedures to reduce seepage losses from Taylor Slough, the Southern Glades, and Model Lands.

A key component of the project is to ensure that impacts to Cape Sable Seaside Sparrow (CSSS) Designated Critical Habitat Units 2 and 3 (also referred to as subpopulations C and D, respectively) do not exceed that recognized in the United States Fish and Wildlife Service (USFWS's) Incidental Take Statement. That need was documented in the USFWS's Biological Opinion and Incidental Take Statement (ITS), both of which were issued on August 25, 2009, and required the SFWMD to conduct additional monitoring and reporting to meet the requirements of the Endangered Species Act. One of the Term and Conditions (#3) of the ITS requires that SFWMD conduct additional surveys to more accurately document existing topography in subpopulations C & D, and that the SFWMD provide a methodology to accomplish the foregoing within 6 month of issuance of the Incidental Take Statement. "The methodology was submitted to the USFWS on February 25, 2010. This scope of work defines the work outlined in the methodology."

The South Florida Water Management is requesting a Vertical Control Survey to set 1 benchmark at 4 monitoring sites and obtain the well reference marks set by SFWMD.

The project is located in the Frog Pond Area and in the C-111 Spreader Canal Western project, Miami- Dade County Florida.

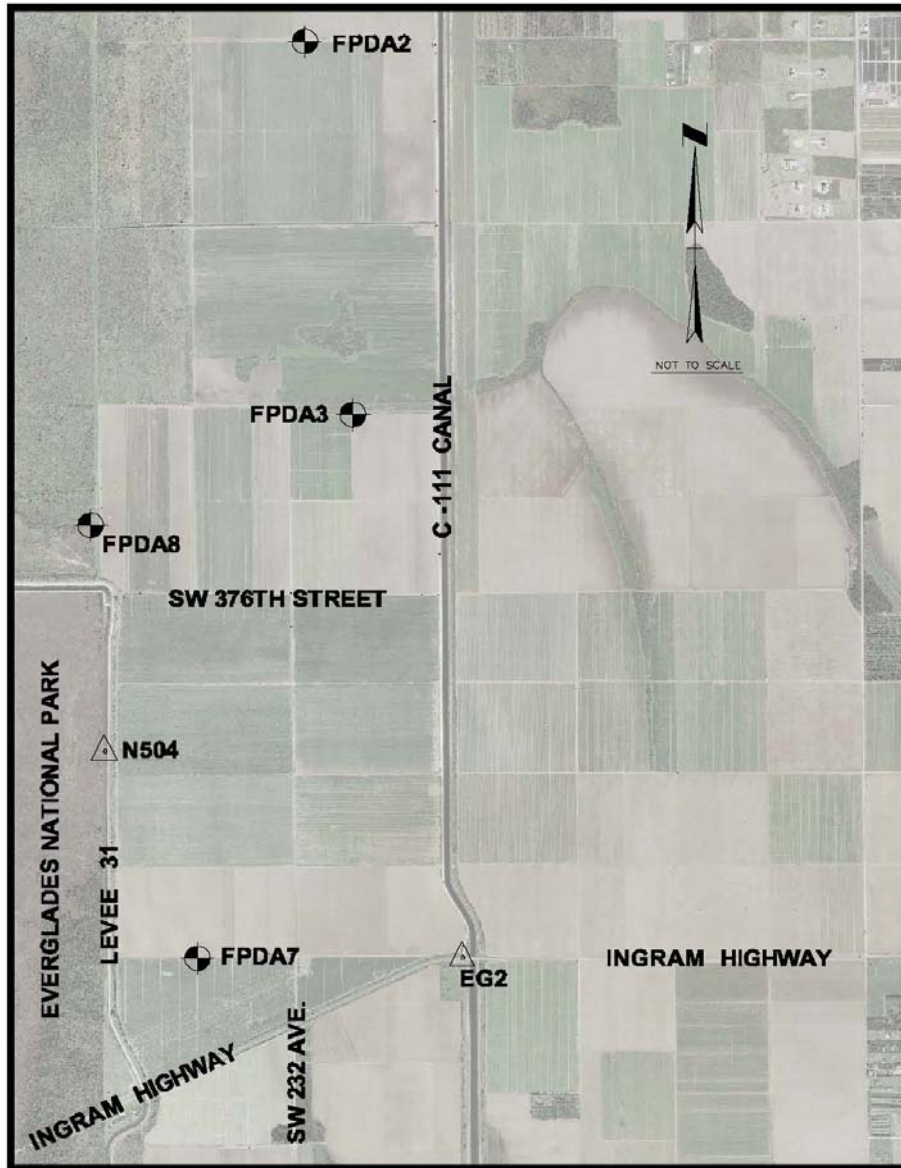
The Vertical Control Survey shall be in strict accordance with the Minimum Technical Standards (MTS) set forth in Chapter 5J of the Florida Administrative Code (FAC) and with the specifications outlined in Work Order. WSM shall set one bench mark at 4 monitoring sites.

All services were performed under the direction of a Professional Surveyor and Mapper (PSM) registered in the State of Florida in accordance with Chapter 472 of the Florida Statutes and 5J FAC.

### **LOCATION OF PROJECT**

The project is located in Miami-Dade County. Below is a map depicting the location of the project well sites Located within the Frog Pond just East of the Eastern Boundary of

Everglades National Park.



**ITEMS DELIVERED TO THE DISTRICT**

The following items are delivered to the District with this report. Neither the report nor the items listed below are complete without the other.

1. Paper and electronic copy of field notes
2. Paper and electronic copy of computation sheets
3. Paper and electronic copy of site photographs
4. Paper and electronic copy of District Benchmark Description Sheets

**VERTICAL DATUM FOR THE PROJECT**

The vertical datum for the project is the North American Vertical Datum of 1988, and is based upon measurements to vertical control marks published by the NGS.

For correlation with older data sets, the elevations of the benchmarks derived for this project are also shown in the National Geodetic Vertical Datum (NGVD) of 1929. The file named “NGVD29.txt” provided by the SFWMD containing NGVD29 elevations for National Geodetic Survey (NGS) marks did not contain any benchmarks within the project area. Therefore the NGVD 1929 orthometric heights (elevations) established for this survey are based upon a calculated difference or shift between NAVD 1988 and NGVD 1929 that was derived by Corpscon version 6.0.1 and verified relying on published values on various benchmarks surrounding this project. An average differential of 1.52 was used to establish the NGVD 29 elevations.

**EQUIPMENT USED**

Trimble DiNi 22 Digital Level  
Star\*Lev, version 1.30

**LEVELING METHODS**

**INTRODUCTION**

The benchmarks listed below are located on roads and levees surrounding this project. The “two peg” method was utilized to check the level’s accuracy prior to commencement of the level run on each day.

**BENCHMARKS**

N504	PID No. AJ8401	Elevation: 6.89 NAVD88
EG2	PID No. AB2362	Elevation: 9.11 NAVD88

Back shots and Fore shots were limited to 250 feet and a 15 pound steel turning point (Turtle) was used when permanent marks were not set.

## **DATA PROCESSING**

### Data Acquisition

Data was downloaded from digital level using Trimble Geomatics Office software, version 1.60 (TGO), and transferred to our server through a Virtual Private Network.

### Data Quality

Data was checked for sight imbalances and sights across areas with intense solar radiation. Collimation checks prior to commencement of work on each day ensured accurate raw data.

### Adjustment

The adjustment software Star\*Lev, version 1.30 was used for the level network adjustment. NGS control stations N504 and EG2 were used to constrain the adjustment. These two stations have published values that are relative to the North American Vertical Datum of 1988 (NAVD88). No apparent blunders were present in the adjustment, and all statistics were found to be acceptable.

A copy of the final adjustment can be found in Appendix B of this report.

## **PROJECT RESULTS**

Once benchmarks were established at each well site, differential level observations were made to determine the elevation of the well reference mark (set by SFWMD) and the top of the bolt set in the concrete slab (set by others). Appendix A contains a section for each well site. Within each of these sections there is 1) a benchmark description sheet, 2) well site photographs, 3) level run adjustment computations, and 4) field notes.

The benchmark description sheet describes the well site benchmark that was found or set, lists the newly established coordinates and elevations of the benchmark, and how to reach the benchmark. The field notes contain the elevations of the well reference marks. The chart below also shows the elevations required to calibrate the recorders.

<b>FPDA2</b>	BENCHMARK ELEVATION	WELL REF. MARK ELEVATION	TOP OF BOLT IN CONCRETE
NAVD88	4.61	7.82	4.65
NGVD29	6.13	9.34	6.17

<b>FPDA3</b>	BENCHMARK ELEVATION	WELL REF. MARK ELEVATION	TOP OF BOLT IN CONCRETE
NAVD88	3.49	6.73	3.48
NGVD29	5.01	8.25	5.00

<b>FDPA7</b>	BENCHMARK ELEVATION	WELL REF. MARK ELEVATION	TOP OF BOLT IN CONCRETE
NAVD88	3.09	6.42	3.19
NGVD29	4.61	7.94	4.71

<b>FDPA8</b>	BENCHMARK ELEVATION	WELL REF. MARK ELEVATION	TOP OF BOLT ON GAUGE BOARD
NAVD88	4.77	8.20	4.89
NGVD29	6.29	9.72	6.41

**SURVEYOR'S CERTIFICATION**

In my professional opinion, this report of survey meets applicable portions of the Minimum Technical Standards set forth by the Florida Board of Professional Surveyors and Mappers in Chapter 5J-17, Florida Administrative Code. This report is prepared for the sole and specific use of the South Florida Water Management District and is not assignable. This report is not valid without the signature and the original raised seal of a Florida licensed surveyor and mapper.

Whidden Surveying & Mapping, Inc.  
Authorization Number LB-7232

02/22/2011  
Date of Survey

By: \_\_\_\_\_  
Thomas E. Whidden  
Professional Surveyor and Mapper  
State of Florida  
License Number LS-6225

# **APPENDIX    A**

- Benchmark Description Sheets
- Site Photographs
- Field Notes



## **APPENDIX    B**

- GPS Network Adjustment Report
- NGS Data Sheets