



Contract # CN60744/3600000504
Work Order #5



VERTICAL CONTROL SURVEY REPORT

**SOUTH FLORIDA WATER
MANAGEMENT DISTRICT**

FINAL

February, 2008

VERTICAL CONTROL SURVEY REPORT

Monitoring Well Reference Elevations

for:

South Florida Water Management District
3301 Gun Club Road
West Palm Beach, FL 33406

by:

WOOLPERT, INC.
Florida Certificate of Authorization # 6777
2121 Ponce de León Blvd., Suite 200
Coral Gables, Florida 33134
(305) 567-9900/fax: (305) 567-9009

Prepared by:

John A. Cestnick, PSM
Florida Professional Surveyor and Mapper # 5994

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Overview of the Project

This survey consisted of establishing or verifying elevations to third-order National Geodetic Survey (NGS) Standards at District Recorder Well Sites. This survey request is associated with the District's Vertical Datum Upgrade Project (VDUP).

There were two main tasks to this survey.

1. Set reference elevations and tags at each well using a local site benchmark (BM) referenced to the National Geodetic Vertical Datum of 1929 (NGVD29).
2. For those sites that did not have a local benchmark, set a concrete monument and establish elevations referencing the North American Vertical Datum of 1988 (NAVD88), and then compute a conversion NGVD29 elevation.

The following list of 25 well sites were included within this Work-Order #5.

BOGAFB	LCYP19	LKISSP	S65A-SCA	TIGER
KENAN	LHAT11	MARIC	S-65GW	TURLAK
KUB009	LHATCH3	ORF61	SEBRING	WR11
KUB012	LJACK	RATHAM	SKYLAK	WR15
LAKWEO	LKIS5B	S63A-SCA	SNIVLY	WR16

Also a part of this report, and the delivery of Work-Order #5 are the following sites: BFARM, KISSFS, WRLGTE. These sites could not be completed during Work-Order #4 for various reasons, so their information is being delivered along with Work-Order #5.

List of Project Deliverables

In addition to four signed and sealed hard copies of this survey report, the following deliverables were also a part of this project.

1. The survey report in Adobe Acrobat format.
2. Digital photos named by sites.
3. Scanned copies of field notes.
4. Any other digital files associated with the survey.
5. Completed District benchmark description sheet for all set marks.

These digital deliverables will be delivered on CD along with the final signed and sealed copy of this report.

Date of Survey

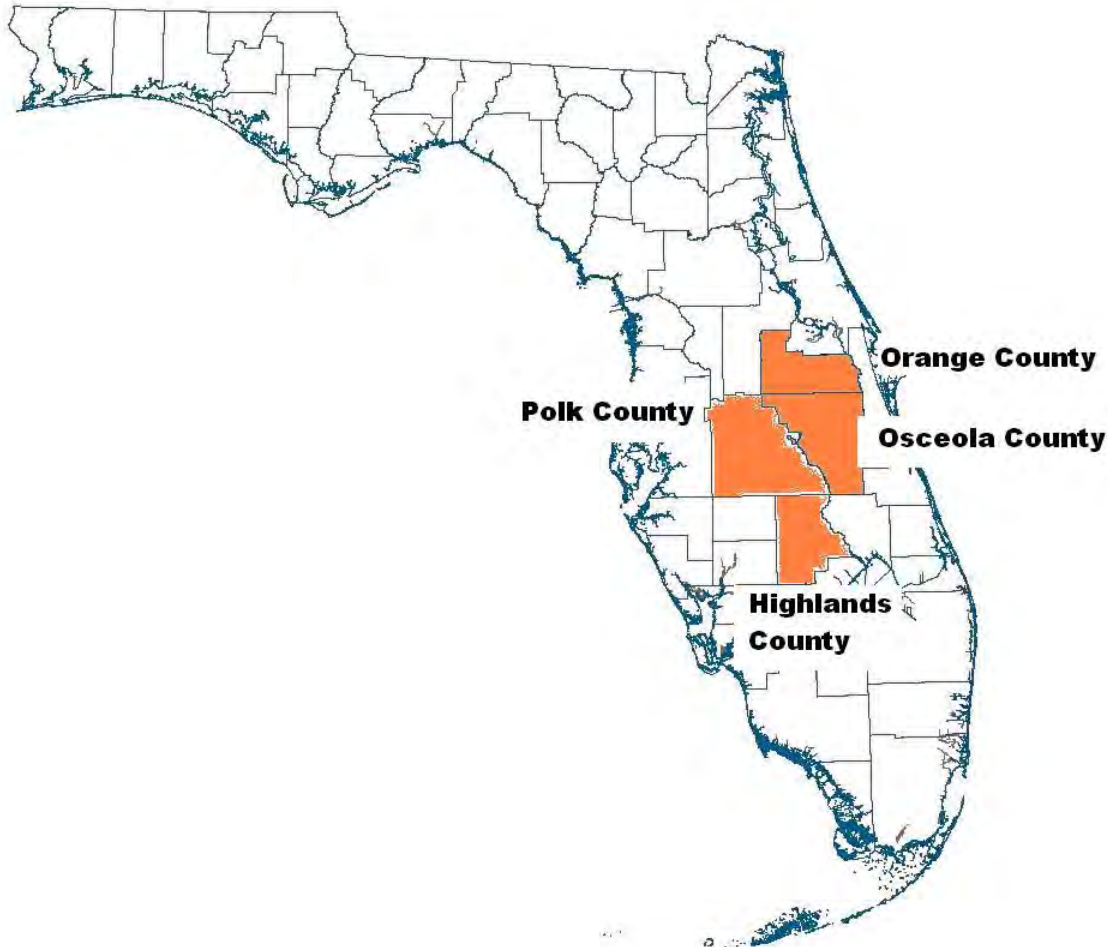
All site field operations took place between December 3, 2007 and January 22, 2008.

Equipment Used

Wild NA2002 digital levels were used for all leveling. Latitude and Longitudes were determined for each site using Trimble Pro-XR sub-meter GPS equipment. These Latitudes and Longitudes were then converted to Florida State Plane Coordinates, East Zone, using the United States Army Corps of Engineers software CORPSCON version 6.0.1.

Project Location

All well site locations were in Orange, Osceola, Highlands and Polk Counties, Florida.



Survey Methodology

Woolpert began by setting concrete monuments at each of the locations that did not have a benchmark on site. Monuments consisted of an 8 inch PVC pipe, 40 inches long, filled with poured concrete with an aluminum South Florida Water Management District survey cap.

Following building the concrete monuments, reconnaissance was done to find existing NGS control stations. Once found, elevation were established by using two NGS stations, performing closed level loops ensuring that NGS monument published elevations matched.

At each site, Woolpert used the local site benchmark to set reference elevations for each found well. Woolpert used the local benchmark to perform a closed loop level run from the benchmark to the reference mark to establish a NGVD29 elevation on the well reference point. If the local benchmark did not have a published NGVD29 elevation, Woolpert used the latitude, longitude, and NAVD88 elevation to find a NGVD29 elevation using the United States Army Corps of

Engineers software CORPSCON version 6.0.1. To determine the sites benchmark latitude and longitude, Woolpert used a Trimble Pro-XR GPS receiver. This GPS receiver obtains differential GPS corrections from Coast Guard stations, resulting in horizontal accuracies of approximately 1 meter, at one sigma.

If a staff gauge existed at the site, Woolpert obtained the water level, the staff gauge reading, and recorded the time and date of those measurements.

Following all leveling and positioning, Woolpert then attached metal tags to each found well. Each tag was stamped with: Site name, well designation, elevation, date, firm name, and reference datum (NGVD29 in all cases).

Summary of Leveling Results

BFARM was set using NGS station G354, a First-Order Class II benchmark with published elevation of 66.85 feet (NAVD88), and NGS station OSF WELLS BM1, a South Florida Water Management District benchmark with published elevation of 67.514 feet (NAVD88). Leveling began at station G354, passed through BFARM, and ended on OSF WELLS BM1 with a leveled elevation of 67.472. Total leveling distance was 6.63 miles resulting in a closure of 0.042 (0.077 allowable). Resulting elevation for BFARM was 64.09 feet NAVD88. This was converted using the United States Army Corps of Engineers software CORPSCON version 6.0.1 to derive a NGVD29 elevation of 65.02 feet.

WR11 was set using NGS station OS134, a Second-Order Class I benchmark with published elevation of 70.65 feet (NAVD88), and NGS station OS135, a Second-Order Class I benchmark with published elevation of 64.75 feet (NAVD88). Leveling began at station OS134, passed through WR11, and ended on OS135 with a leveled elevation of 64.65. Total leveling distance was 18.99 miles resulting in a closure of 0.10 (0.13 allowable). Resulting elevation for WR11 was 67.59 feet NAVD88. This was converted using the United States Army Corps of Engineers software CORPSCON version 6.0.1 to derive a NGVD29 elevation of 68.66 feet.

WR15 was set using NGS station OS134, a Second-Order Class I benchmark with published elevation of 70.65 feet (NAVD88), and NGS station OS135, a Second-Order Class I benchmark with published elevation of 64.75 feet (NAVD88). Leveling began at station OS134, passed through WR15, and ended on OS135 with a leveled elevation of 64.65. Total leveling distance was 18.99 miles resulting in a closure of 0.10 (0.13 allowable). Resulting elevation for WR15 was 62.01 feet NAVD88. This was converted using the United States Army Corps of Engineers software CORPSCON version 6.0.1 to derive a NGVD29 elevation of 63.09 feet.

For Well Site WR16, there existed a BM “WR11 1996” but it only had a published NGVD29 elevation of 66.19 feet. It did not have a published NAVD88 elevation. To establish an NAVD88 elevation, Woolpert used NGS station OS134, a Second-Order Class I benchmark with published elevation of 70.65 feet (NAVD88), and NGS station OS135, a Second-Order Class I benchmark with published elevation of 64.75 feet (NAVD88). Leveling began at station OS134, passed through “WR11 1996”, and ended on OS135 with a leveled elevation of 64.65. Total leveling distance was 18.99 miles resulting in a closure of 0.10 (0.13 allowable). Resulting elevation for “WR11 1996” was 65.14 feet NAVD88. As a check, the NAVD88 elevation was converted to NGVD29 using CORPSCON which yielded a value of 66.23 feet.

WRLGTE was set using NGS station L-715-003, a Second-Order Class I benchmark with published elevation of 91.44 feet (NAVD88), and NGS station L-659-024, a Second-Order Class I benchmark with published elevation of 102.44 feet (NAVD88). Leveling began at station L-715-003, passed through WRLGTE, and ended on L-659-024 with a leveled elevation of 102.43. Total leveling distance was 3.91 miles resulting in a closure of 0.01 (0.06 allowable). Resulting elevation for WRLGTE was 93.14 feet NAVD88. This was converted using the United States Army Corps of Engineers software CORPSCON version 6.0.1 to derive a NGVD29 elevation of 94.03 feet.

TURLAK was set using NGS station GOTHA RESET, a Second-Order Class I benchmark with published elevation of 136.56 feet (NAVD88), and NGS station ORA30, a Second-Order Class I benchmark with published elevation of 110.95 feet (NAVD88). Leveling began at station GOTHA RESET, passed through TURLAK, and ended on ORA30 with a leveled elevation of 111.030. Total leveling distance was 10.0 miles resulting in a closure of 0.08 (0.09 allowable). Resulting elevation for TURLAK was 123.39 feet NAVD88. This was converted using the United States Army Corps of Engineers software CORPSCON version 6.0.1 to derive a NGVD29 elevation of 124.28 feet.

Well Site Notes and Changes

On January 9th, 2008 the District removed the following sites from the project. However, since four of the sites were already completed, Woolpert has included them within this report.

Well Designation	Notes
SKYLAK	
MARIC	~ had already been completed.
LHATCH3	~ had already been completed.
LHAT11	~ decommissioned.
SNIVLY	~ visited but not complete due to BM.
KUB009	~ visited but not complete. Tag existed, and BM was not at site.
KUB012	
LKISSP	~ visited to find BM, but not completed.
TIGER	~ had already been completed.
LKIS5B	
KENAN	~ had already been completed.

The following are project notes pertaining to specific well sites:

BOGAFB:

This site was completed however the well box was empty at the time of measurements.

LAKWEO:

The supplied BM from the District (P-13) did not have a published NAVD88 elevation, and could not be found in the field. According to a NGS BM search, the two nearest BM's with NAVD88 elevations would require approximately 20 miles of levels if they were found (BM's L64 and KR122 RESET). It would also require the construction of another concrete monument close to the LAKWEO site. These services could not be performed under this work-order since it would exceed the maximum fee allowed.

ORF61:

The BM provided by the District for this site was R627, and was not on-site. It required approximately 1.2 miles of leveling.

SEBRING:

Two NGS BM's with NAVD88 elevations could not be found within 5 miles of the SEBRING well site. Woolpert used the on-site BM (SEBRING MW2004) to verify the existing tag in NGVD29.

KISSFS:

Woolpert used the on-site BM (KISSFS 1983) supplied by the District to set a reference tag in NGVD29. Using the two nearest NGS BM's with NAVD88, if found (Q512 and P512), would require approximately six miles of levels and could not be completed under this work-order since it would exceed the maximum fee allowed.

WR11:

Only GW1 was measured at this site, not GW2. GW2 was missed because both wells share the same box and the field crews did not notice the second well.

WR15:

Only GW1 was measured at this site, not GW2. GW2 was missed because both wells share the same box and the field crews did not notice the second well.

WR16:

Only GW1 was measured at this site, not GW2. GW2 was missed because both wells share the same box and the field crews did not notice the second well.

Therefore, a final list of the Well Sites included within this report are:

BOGAFB	MARIC	S-65GW	WR15
KENAN1	ORF61	SEBRING (no NAVD88)	WR16
LCYP19	RATHAM	TIGER	BFARM
LHATCH3	S63A-SCA	TURLAK	KISSFS (no NAVD88)
LJACK	S65A-SCA	WR11	WRLGTE

Monitoring Well Site Information Summary

In Section 2, all well site information is presented in the same format.

EXAMPLE:

Site Name		Sensor		
Example		GW1		
Latitude	Longitude	Northing	Easting	
28° 23' 31.937"	81° 22' 31.937"	1472251	538267	
Section	Township	Range	County	Quad
13	24	29	Orange	Lake Jessamine
Benchmark Information:				
Name	Existing / Set	NAVD88	NGVD29	
BOG527	Set	80.851	81.876	
Reference Point Information:				
Stamped Elevation (NGVD29)	Stamped Date	By Firm		
87.50	9-21-07	Woolpert, Inc.		
Note: Reference mark at edge of wood as marked.				
Staff Gauge Information:				
Water Elevation (NGVD29)	Gauge Reading	Time of Reading	Date of Reading	
79.928	80.05	09:25	9-21-07	

NOTES:

1. Latitude and longitude were derived at the benchmark location, and is given to assist in locating the site. It is not meant to accurately locate each well.
2. The Northing and Easting were obtained by using CORPSCON to convert the latitude and longitude to Florida State Plane Coordinates, East Zone, Adjustment of 1990 (NAD83/90) HARN.
3. All measurements and elevations are in feet unless otherwise noted.
4. Reference point elevations were determined by using the stated NGVD29 elevation.
5. The site bench mark NGVD29 elevations were calculated using CORPSCON to convert the published NAVD88 elevation if a published NGVD29 elevation was not available.
6. In some cases the local benchmark only had a NGVD29 elevation, so it was used and no NAVD88 elevation is stated.
7. For some well sites an existing tag was found with a stamped elevation from another source. For these sites, Woolpert verified the tag elevation by leveling from the local site bench mark to the reference point. If the stamped tag elevation was accurate based on the leveling, the tag was left alone.

Surveyor's Notes:

THIS SURVEY IS NOT VALID WITHOUT THE SIGNATURE AND ORIGINAL RAISED SEAL OF A FLORIDA LICENSED SURVEYOR AND MAPPER.

THIS REPORT OF SURVEY CONSISTS OF FOUR SECTIONS AS OUTLINED WITHIN THE SUMMARY OF CONTENTS AND IS NOT VALID UNLESS ATTACHED TO THE OTHERS IN THEIR ENTIRETY.

ADDITIONS OR DELETIONS TO SURVEY MAPS AND REPORTS BY OTHER THAN THE SIGNING PARTY OR PARTIES IS PROHIBITED WITHOUT THE WRITTEN CONSENT OF THE SIGNING PARTY OR PARTIES.

Surveyor and Mapper in Responsible Charge:

John A. Cestnick

Professional Surveyor and Mapper,

License Number: 5994

Signed: _____
(For, and on behalf of the firm Woolpert, Inc.)

Seal:

Section 2: Monitoring Well Site Information

Site Name		Sensor		
WR11		GW1		

Latitude 28° 05' 03.64"	Longitude 81° 24' 23.95"	Northing 1363587	Easting 525045	
Section 3	Township 28	Range 29	County Osceola	Quad Lake Hatchineha

Benchmark Information:

Name WR11 2007	Existing / Set Set	NAVD88 67.59	NGVD29 68.66
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Reference Point Information:

Stamped Elevation (NGVD29) 71.97	Stamped Date 12-19-07	By Firm Woolpert, Inc.
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Note: Reference point at edge of the box as marked.

Staff Gauge Information:

Water Elevation (NGVD29) 65.82	Gauge Reading 65.83	Time of Reading 09:48	Date of Reading 12-19-07
--	-------------------------------	---------------------------------	------------------------------------

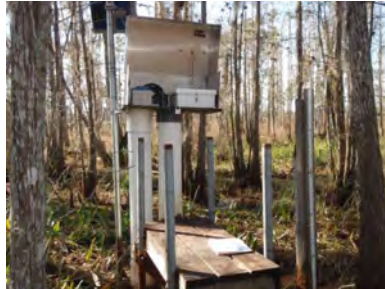
To Reach Description:

From the intersection of US423 and US192 in Kissimmee Fl. travel south on N John Young Pkwy for 3.51 miles to Pleasant Hill Road. Turn left (south) on Pleasant Hill Road and travel 8.6 miles to Scrub Jay Trail. Turn left (east) onto Scrub Jay Trail (entrance to Disney Wilderness preserve, gate access required) travel along Scrub Jay trail 1.4 miles to unnamed dirt road on right. Turn onto dirt road (west) and travel dirt road 0.70 miles to another unnamed dirt road and turn left (south). Travel dirt road for 3.1 miles to off road trail on left (east). Turn left on trail and follow trail for 0.40 miles. Bench mark for well is on right side (south) of trail 10+/- . Well WR11 is 350Ft from bench mark at a 75degree compass bearing.

Sensor Well Area:



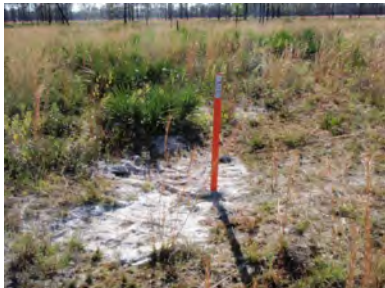
Sensor Well:



Tag Close Up:



Bench Mark:



Bench Mark:



Staff Gauge:



Monitoring Well Field Data Sheet

SFWMD #067411

Site/Station Designation: WR11

Date: Dec 19, 07

Crew: W. MILLER, A. ANTONO

Bench Mark Used: WR11 (2007)

Name stamp	Date stamp	Published NAVD 88 Elev.	Published NGVD 29 Elev.	Sign Present (Y/N)
WR11	2007	67.59		Y

(if needed) Conversion factor = $\frac{1.04}{1.07}$ Converted NGVD29 = $\frac{68.63}{68.66}$

Level Setup:

STA	BS	HI	FS	NGVD29 EL	DIST & REM
BM WR11	5.129	73.059			245.23
Ground			7.899	65.8 8 89	163.53
Water			7.766	65.29 823	164.80
MARK			1.832	71.937	166.57
	1.763	73.700		.967	166.96
✓ BM			5.082	68.618	244.51

NGVD 29 Ground Elev. @ Well Site: 65.8~~8~~89

Tag Check List:

Photo Check List:

- | | | | |
|----------------------------------|-----------------|----------------------|--------------------|
| • Stamp Site/Station Designation | <u>WR11</u> | Bench Mark close Up | Picture # <u>5</u> |
| • Stamp Elevation in NGVD 29 | <u>✓ 71.97</u> | Bench Mark standing | Picture # <u>6</u> |
| • Stamp Date | <u>12-19-07</u> | M. Well tag close Up | Picture # <u>1</u> |
| • Stamp By Woolpert | <u>✓</u> | M. Well standing | Picture # <u>2</u> |
| • Stamp Datum (NGVD 29) | <u>✓</u> | M. Well Area | Picture # <u>3</u> |
| • Scratch Elev / Remove Tag | <u>✓</u> | Staff Gauge | Picture # <u>4</u> |

Staff Gauge:

Site Name	Water Elev.	Gauge Reading	Time Meas.	Date Meas.
WR11	65.2982	65.83	9:43 AM	12-19-07

Latitude and Longitude Of Local Bench Mark:

<u>28 05 03.64</u>	<u>81 24 23.90</u>
--------------------	--------------------

Site Description, Comments, or Remarks:

Site Name				Sensor
WR15				GW1

Latitude 28° 05' 02.38"	Longitude 81° 23' 24.51"	Northing 1363442	Easting 530369
Section 2	Township 28	Range 29	County Osceola
			Quad Lake Hatchineha

Benchmark Information:

Name WR15 2007	Existing / Set Set	NAVD88 62.01	NGVD29 63.09
--------------------------	------------------------------	------------------------	------------------------

Reference Point Information:

Stamped Elevation (NGVD29) 67.86	Stamped Date 12-19-07	By Firm Woolpert, Inc.
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Note: Reference point at edge of the box as marked.

Staff Gauge Information: Water level was below staff gauge so reading was not available (NA).

Water Elevation (NGVD29) NA	Gauge Reading NA	Time of Reading NA	Date of Reading NA
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To Reach Description:

From the intersection of US423 and US192 in Kissimmee, FL. travel south on N John Young Pkwy for 3.51 miles to Pleasant Hill Road. Turn left (south) on Pleasant Hill Road and travel 8.6 miles to Scrub Jay Trail, Turn left (east) onto Scrub Jay Trail (entrance to Disney Wilderness preserve, gate access required) travel along Scrub Jay trail 1.4 miles to unnamed dirt road on right. Turn onto dirt road (west) and travel dirt road 0.70miles to another dirt road and turn left (south) on dirt road and travel 2.4miles to another unnamed off road trail on left and turn (east). Travel 1.7 miles along trail to bench mark on north side of trail 10Ft +/- . Well WR15 is 500Ft+/- from bench mark at a 195 degree compass bearing.

Sensor Well Area:



Sensor Well:



Tag Close-up:



Bench Mark:



Bench Mark:



Staff Gauge:



Monitoring Well Field Data Sheet

SFWMD #067411

Site/Station Designation: WR 15

Date: DEC 19, 07

Crew: W. MILLER / A. ANTONIO

Bench Mark Used: WR 15

Name stamp	Date stamp	Published NAVD 88 Elev.	Published NGVD 29 Elev.	Sign Present (Y/N)
<u>WR15</u>	<u>2007</u>	<u>62.01</u>		<u>Y</u>

(if needed) Conversion factor = $\frac{1.04}{1.079}$ Converted NGVD29 = $\frac{62.01}{1.079} = 63.089$

Level Setup:

STA	BS	HI	FS	NGVD29 EL	DIST & REM
				<u>.470</u>	
				<u>61.431</u>	<u>GROUND</u>
<u>SEE</u>	<u>BOOK 021</u>	<u>PG 51</u>			
<u>FOR</u>	<u>BENCH RUN</u>			<u>67.823</u>	<u>MARK</u>
				<u>.862</u>	

NGVD 29 Ground Elev. @ Well Site: 61.431 470

Tag Check List:

Photo Check List:

- | | | | |
|--|----------|----------------------------------|---------------------|
| <input checked="" type="checkbox"/> Stamp Site/Station Designation | <u>✓</u> | Bench Mark close Up | Picture # <u>12</u> |
| <input checked="" type="checkbox"/> Stamp Elevation in NGVD 29 | <u>✓</u> | <u>67.86</u> Bench Mark standing | Picture # <u>11</u> |
| <input checked="" type="checkbox"/> Stamp Date | <u>✓</u> | M. Well tag close Up | Picture # <u>10</u> |
| <input checked="" type="checkbox"/> Stamp By Woolpert | <u>✓</u> | M. Well standing | Picture # <u>9</u> |
| <input checked="" type="checkbox"/> Stamp Datum (NGVD 29) | <u>✓</u> | M. Well Area | Picture # <u>8</u> |
| <input checked="" type="checkbox"/> Scratch Elev / Remove Tag | <u>✓</u> | Staff Gauge | Picture # <u>7</u> |

Staff Gauge:

Site Name	Water Elev.	Gauge Reading	Time Meas.	Date Meas.
<u>WR 15</u>	<u>NONE</u>	<u>N/A</u>	<u>12:15 PM</u>	<u>12-19-07</u>

Latitude and Longitude Of Local Bench Mark:

<u>28.05 04.33</u>	<u>31.23 74.51</u>
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Site Description, Comments, or Remarks:

Site Name		Sensor	
WR16		GW1	

Latitude 28° 04' 41.79"	Longitude 81° 23' 31.30"	Northing 1361365	Easting 529754
Section 2	Township 28	Range 29	County Osceola
			Quad Lake Hatchineha

Benchmark Information:

Name WR-11 1996	Existing / Set Existing	NAVD88 65.14	NGVD29 66.19
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Reference Point Information:

Stamped Elevation (NGVD29) 70.68	Stamped Date 12-19-07	By Firm Woolpert, Inc.
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Note: Reference point at top of PVC pipe as marked.

Staff Gauge Information: Water level was below staff gauge so reading was not available (NA).

Water Elevation (NGVD29) NA	Gauge Reading NA	Time of Reading NA	Date of Reading NA
---------------------------------------	----------------------------	------------------------------	------------------------------

To Reach Description:

From the intersection of US423 and US192 in Kissimmee, FL. travel south on N John Young Pkwy for 3.51 miles to Pleasant Hill road. Turn left (south) on Pleasant Hill Road and travel 8.6 miles to Scrub Jay Trail, Turn left (east) onto Scrub Jay Trail (entrance to Disney Wilderness preserve, gate access required) travel along Scrub Jay trail 1.4 miles to unnamed dirt road on right. Turn onto dirt road (west) and travel dirt road 0.70miles to another dirt road and turn left (south) on dirt road and travel 2.4 miles to another unnamed off road trail on left and turn (east). Travel 1.4 miles to unnamed trail on right and turn (south) and follow trail for 300+/- to another trail on left and turn on trail (southeast) and follow trail for 0.40 miles. Bench mark for WR16 (stamped WR11) is 30Ft+/- on west side of trail and WR16 is 300Ft+/- at a 260 degree compass bearing from benchmark.

Sensor Well Area:



Sensor Well:



Tag Close-up:



Bench Mark:



Bench Mark:



Staff Gauge:



Monitoring Well Field Data Sheet

SFWMD #067411

Site/Station Designation: WR 16

Date: Dec 19, 07

Crew: W. MILLER, A. ANTONIO

Bench Mark Used: WR 11 1996

Name stamp	Date stamp	Published NAVD 88 Elev.	Published NGVD 29 Elev.	Sign Present (Y/N)
WR 11	1996	65.14		Y

(if needed) Conversion factor = 1.04 Converted NGVD29 = 66.18

Level Setup:

STA	BS	HI	FS	NGVD29 EL	DIST & REM
BM WR 11	5.173	71.353			187.20
GROUND			6.887	64.466	153.54
MARK			.0672	70.681	157.15
	0.646	71.326			156.60
			5.143	66.183	186.66

NGVD 29 Ground Elev. @ Well Site: 64.466

Tag Check List:

- Stamp Site/Station Designation
- Stamp Elevation in NGVD 29
- Stamp Date
- Stamp By Woolpert
- Stamp Datum (NGVD 29)
- Scratch Elev / Remove Tag

Photo Check List:

- | | |
|--|---------------------|
| <input checked="" type="checkbox"/> Bench Mark close Up | Picture # <u>18</u> |
| <input checked="" type="checkbox"/> Bench Mark standing | Picture # <u>17</u> |
| <input checked="" type="checkbox"/> M. Well tag close Up | Picture # <u>16</u> |
| <input checked="" type="checkbox"/> M. Well standing | Picture # <u>15</u> |
| <input checked="" type="checkbox"/> M. Well Area | Picture # <u>14</u> |
| <input checked="" type="checkbox"/> Staff Gauge | Picture # <u>13</u> |

Staff Gauge:

Site Name	Water Elev.	Gauge Reading	Time Meas.	Date Meas.
WR 16	NONE	N/A	1:58 PM	12-19-07

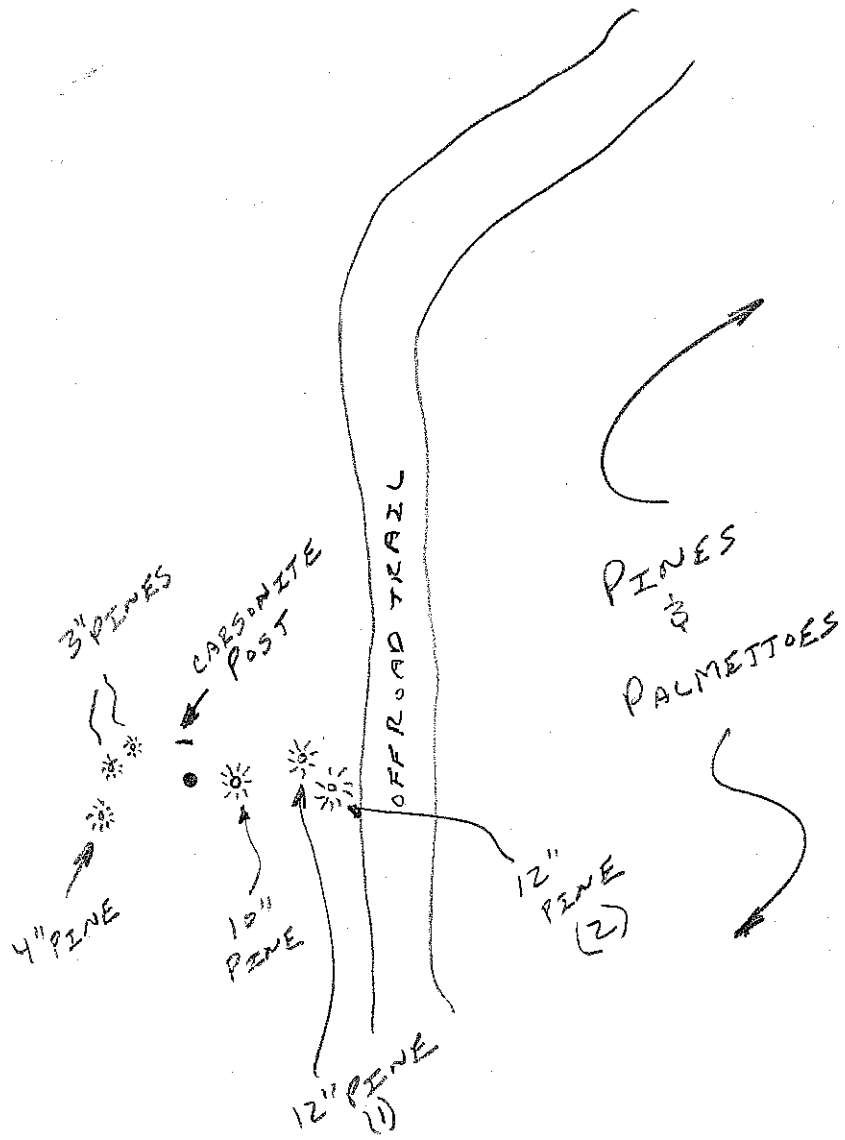
Latitude and Longitude Of Local Bench Mark:

28 04 41.79	81 23 31.30
-------------	-------------

Site Description, Comments, or Remarks:

WR 16

LAT 28 04 41.79
LONG 81 23 31.30



TO
BM

AZ DIST

10" PINE 270° 4 FT

12" PINE (1) 255° 23'

12" PINE (2) 270° 29'

3" PINES 120° 11 FT

4" PINE 80° 13 FT

E TRAIL 270° 44'

CARSONITE POST 0° 0.50 FT



South Florida Water Management District Benchmark Database

Report run on: May 21, 2008 6:32 AM

Designation: WR11
County: POLK
USGS Quad: LAKE HATCHINEHA
Project: WR16 WELL SITE
Sec: 2 Twp: 28 Rge: 29
Status: GOOD

Latitude: 280441.800 Scaled values only
Longitude: 812331.300
Monument By: SFWMD
Year: 1996
Type: V
Stamping: SITE 6 1996 WR-11
Party Chief: ART HOLLIN
Field Book KISS LAKES 57
Page: 6 & 7

NAD 1927 Coordinates:

N =
E =

Adjustment:

NAD 1983 Coordinates:

X =
Y =

Adjustment:

Order:
Class:

NGVD 1929
Elevation: 66.180
Order: 3
Class:

NAVD 1988
Elevation: 65.140
Order: 3
Class:

Description:

SFWMD EL. 66.19 NGVD 1929

***** RECOVERY NOTE *****
12/19/07 MILLER WOOLPERT NO FIELD BOOK WR 11 1996 EL. 65.14 NAVD 1988
VERTCON CONVERSION EL. 66.22 NGVD 1929 LATITUDE: 28^04'41.79"
LONGITUDE 81^23'31.30" (21-MAY-08 HJE)

TO REACH: FROM THE INTERSECTION OF PLEASANT HILLS (STATE ROAD 531) AND CYPRESS PARKWAY, GO WEST ON PLEASANT HILLS 0.6 OF A MILE TO THE INTERSECTION OF A DIRT ROAD (SCRUB JAY LANE) ON SOUTH SIDE OF THE ROAD; THEN GO SOUTH ON ROAD 1.8 MILES TO THE MAIN GATE TO THE DISNEY WILDERNESS PRESERVE (WALKER RANCH); THEN GO THRU GATE & CONTINUE ON ROAD 2.8 MILES TO A ROAD (TRAIL) ON THE EAST SIDE OF THE ROAD; THEN GO EAST ON ROAD 1.05 MILES TO WHERE TWO ROADS INTERSECT; CONTINUE EASTERLY ON ROAD. 0.3 OF A MILE (AND THE ROAD IS HEADING SOUTH AND AT THE INTERSECTION OF AN EAST/WEST FENCE LINE (COUNTY LINE , TOWNSHIP LINE AND OSCEOLA, POLK COUNTY LINES); CONTINUE THROUGH THE GATE AND THE ROAD SPLITS; THEN GO ON ROAD TO SOUTH SOUTHWEST, 0.45 OF A MILE TO STATION.
STATION IS 48.4 FEET WEST OF THE CENTERLINE OF THE ROAD, 102.4 FEET S47 DEGREES W. OF A 25-INCH OAK, 3.4 FEET WEST OF AN 8-INCH PINE TREE W/WITNESS SIGN, 71 FEET EAST OF THE EAST EDGE OF A CYPRESS POND AND 250 FEET MORE OR LESS WEST OF A LARGER CYPRESS POND.

STATION W.R-11 SITE 6 IS A 1-1/4" X 3' GALVANIZED IRON PIPE WITH A SFWMD ALUMINUM DISK STAMPED "SITE 6 1996 BM WR-11".





SM
URPK

WATER MANAGEMENT DISTRICT
SURVEY
SITE 6
1996 BM
WR - 11
MARKER. 1510
FLA.

Section 3: Monitoring Well Site Information in Table Format

Monitoring Well Site Information in Table Format

Well Designation	Well Type	County	Quadrangle	Section	Township	Range	Northing	Easting	Latitude of BM	Longitude of BM	Ref. Point Elev. (NGVD29)	Ref. Point Elev. (NAVD88)	Benchmark Name Used to Set Ref. Elev.	Benchmark Elev. (NGVD29)	Benchmark Elev. (NAVD88)
BOGAFB	NONE	ORANGE	PINE CASTLE	33	23	30	1497078	556344	28 27 05.30	81 18 36.09	92.14	91.17	GODWIN1	89.45	88.48
KENAN1	GW1	OSCEOLA	LAKE MARIN NE	10	30	33	1292324	650320	27 53 19.06	81 01 05.93	79.32	78.09	KEEN5	75.83	74.61
LCYPR19	GW1	OSCEOLA	CYPRESS LAKE	4	28	30	1360051	549721	28 04 28.30	81 19 49.10	57.51	56.39	LCYP19	54.53	53.41
LHATCH3	STG1	POLK	HESPERIDES	1	29	29	1327143	534579	27 59 02	81 22 37	59.27	58.06	LHATCH3	54.50	53.29
LJACK	STG1	OSCEOLA	LAKE MARIAN NW	31	29	32	1326984	607824	27 54 36	81 09 00	58.88	57.68	TLWMA3	60.80	59.60
MARIC	STG1	POLK	LAKE HATCHINEHA	18	28	29	1352657	507088	28 03 07.77	81 27 44.68	57.85	56.84	POT 28518	54.34	53.33
ORF 61	GW1	ORANGE	WINDERMERE	10	23	28	1503773	482382	28 28 09	81 32 28	108.40	107.45	R 627	108.71	107.77
ORF 61	GW2	ORANGE	WINDERMERE	10	23	28	1503773	482382	28 28 09	81 32 28	108.49	107.55	R 627	108.71	107.77
ORF 61	GW3	ORANGE	WINDERMERE	10	23	28	1503773	482382	28 28 09	81 32 28	108.49	107.55	R 627	108.71	107.77
RATHAM	GW1	POLK	FORT KISSIMMEE NW	6	32	32	1231938	602118	27 43 20.72	81 10 02.20	53.17	51.94	F 461	53.68	52.45
S63A-SCA	HW	OSCEOLA	CYPRESS LAKE	6	28	31	1361858	572373	28 04 47.8	81 15 35.5	67.95	67.05	KR 1068	63.86	62.96
S63A-SCA	TW	OSCEOLA	CYPRESS LAKE	6	28	31	1361858	572373	28 04 47.8	81 15 35.5	67.96	67.06	KR 1068	63.86	62.96
S-65GW	GW1	OSCEOLA	LAKE MARIAN SW	11	31	31	1261327	592302	27 48 12.7	81 11 51.2	57.88	56.69	KR 1013	63.00	61.81
S-65GW	GW2	OSCEOLA	LAKE MARIAN SW	11	31	31	1261327	592302	27 48 12.7	81 11 51.2	57.98	56.79	KR 1013	63.00	61.81
S-65GW	GW3	OSCEOLA	LAKE MARIAN SW	11	31	31	1261327	592302	27 48 12.7	81 11 51.2	57.87	56.68	KR 1013	63.00	61.81
S 65A SCA	STG1	OSCEOLA	FORT KISSIMMEE NW	28	32	32	1363587	525045	27 39 33.2	81 08 07.2	57.57	56.38	MACK 5-23-84	53.95	52.76
SEBRING	GW1	HIGHLANDS	LORIDA	5	35	30	1136116	541350	27 27 30.54	81 21 15.34	66.35	NA	SEBRING MW2004	63.04	NA
TIGER	STG1	POLK	LAKE WEOHYAKAPKA	17	30	30	1286486	545269	27 52 19.72	81 20 36.48	58.12	56.92	Z 504	56.24	55.04
TURLAK	GW1	ORANGE	LANDO WEST	11	23	28	1515086	503067	28 30 02.9	81 28 36.00	127.13	126.24	TURLAK 2008	124.28	123.39
WR 11	GW1	OSCEOLA	LAKE HATCHINEHA	3	28	29	1363587	525045	28 05 03.64	81 24 23.95	71.97	70.93	WR11 2007	68.66	67.59
WR 15	GW1	OSCEOLA	LAKE HATCHINEHA	2	28	29	1363442	530369	28 05 02.38	81 23 24.51	67.86	66.82	WR15 2007	63.09	62.01
WR 16	GW1	OSCEOLA	LAKE HATCHINEHA	2	28	29	1361365	529754	28 04 41.79	81 23 31.30	70.68	69.64	WR11 1996	66.19	65.14
BFARM	STG1	OSCEOLA	KISSIMMEE	35	25	28	1432592	503001	28 16 26.10	81 28 33.08	64.13	63.17	BFARM 2007	65.02	64.09
KISSFS	GW1	OSCEOLA	KISSIMMEE	19	25	29	1438580	511848	28 17 25.73	81 26 54.39	74.95	NA	KISSFS 1983	75.84	NA
KISSFS	GW2	OSCEOLA	KISSIMMEE	19	25	29	1438580	511848	28 17 25.73	81 26 54.39	74.36	NA	KISSFS 1983	75.84	NA
KISSFS	GW3	OSCEOLA	KISSIMMEE	19	25	29	1438580	511848	28 17 25.73	81 26 54.39	74.46	NA	KISSFS 1983	75.84	NA
WRLGTE	GW1	ORANGE	INTERCESSION CITY	34	24	28	1461558	494092	28 21 12.55	81 30 14.08	97.20	96.31	WRLGTE 2007	94.03	93.14
WRLGTE	GW2	ORANGE	INTERCESSION CITY	34	24	28	1461558	494092	28 21 12.55	81 30 14.08	97.18	96.29	WRLGTE 2007	94.03	93.14

NOTES:

1. Latitude and longitude were derived at the benchmark location, and is given to assist in locating the site. It is not meant to accurately locate each well.
2. Northing and Eastings were obtained by using CORPSCON to convert the latitude and longitude to Florida State Plane Coordinates, East Zone, Adjustment of 1990 (NAD83/90) HARN.
3. All measurements and elevations are in feet unless otherwise noted.
4. Some Benchmarks used did not have a published NAVD88 elevation, and therefore have been left blank.

Section 4: Benchmark Data Sheets

Section 4: Benchmark Data Sheets



SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Rev. 4/01

COUNTY	OSCEOLA	PROJECT	VDUP- Reference Elevation Audit Project # 1	DESIGNATION	WR11 2007
SECTION	3	TOWNSHIP	28S	RANGE	29E
GEOGRAPHIC INDEX OF QUAD 28081-A4					
Established by WOOLPERT			NAME OF QUADRANGLE LAKE HATCHINEHA		
SURVEYOR JOHN CESTNICK DATE 12 / 19 / 2007			FIELD BOOK W0104 PAGE		
HORIZONTAL DATUM: 1983 ZONE E					
VERTICAL DATUM: NGVD 1929 (CORPSCON) NAVD 1988					
CONTROL ACCURACY: HORIZONTAL GPS RTD			VERTICAL 3		
STATE PLANE COORDINATES	X 525045	Y 1363587	EL. NGVD 29 68.66		
			NAVD 88 67.59		
LATITUDE	28° 05' 03.64"	LONGITUDE	81° 24' 23.95"		
DESCRIPTION					

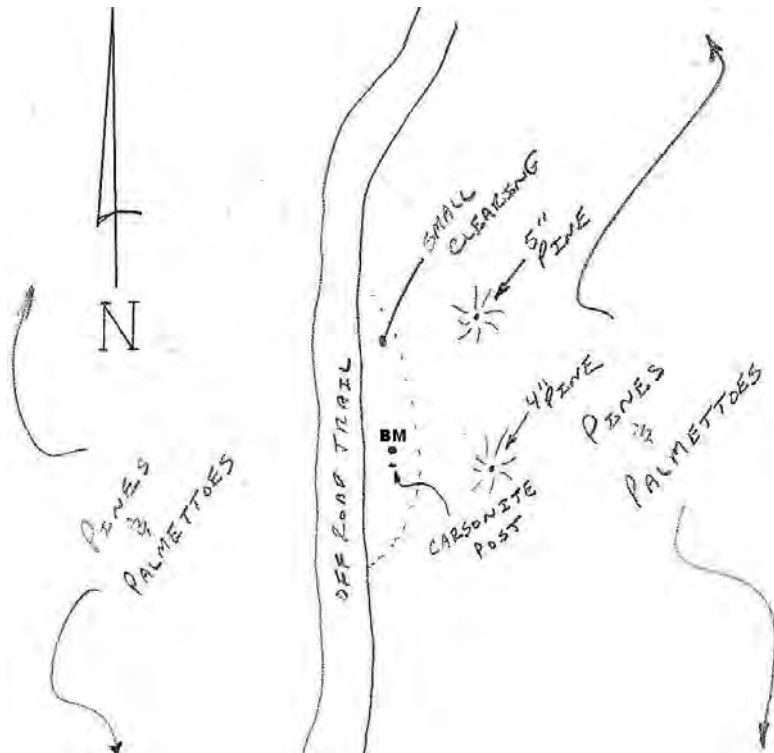
To Reach:

From the intersection of US423 and US192 in Kissimmee FL. travel south on N John Young Pkwy for 3.51 miles to Pleasant Hill Road. Turn left (south) on Pleasant Hill Road and travel 8.6 miles to Scrub Jay Trail. Turn left (east) onto Scrub Jay Trail (entrance to Disney Wilderness preserve, gate access required) travel along Scrub Jay trail 1.4 miles to unnamed dirt road on right. Turn onto dirt road (west) and travel dirt road 0.70 miles to another unnamed dirt road and turn left (south). Travel dirt road for 3.1 miles to off road trail on left (east). Turn left on trail and follow trail for 0.40 miles. Bench mark for well is on right side (south) of trail 10+/-.

SKETCH

References:

- 350° and 1' from carsonite sign
- 295° and 20' from 4" Pine Tree
- 220° and 50' from 5" Pine Tree
- 255° and 350' from Well





SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Rev. 4/01

COUNTY	OSCEOLA	PROJECT	VDUP- Reference Elevation Audit Project # 1	DESIGNATION	WR15 2007
SECTION	2	TOWNSHIP	28S	RANGE	29E
GEOGRAPHIC INDEX OF QUAD 28081-A4					
Established by WOOLPERT			NAME OF QUADRANGLE LAKE HATCHINEHA		
SURVEYOR JOHN CESTNICK DATE 12 / 19 / 2007			FIELD BOOK W0104 PAGE		
HORIZONTAL DATUM: 1983 ZONE E					
VERTICAL DATUM: NGVD 1929 (CORPSCON) NAVD 1988					
CONTROL ACCURACY: HORIZONTAL GPS RTD			VERTICAL 3		
STATE PLANE COORDINATES	X 530369	Y 1363442	EL. NGVD 29 63.09		
			NAVD 88 62.01		
LATITUDE	28° 05' 02.38"	LONGITUDE	81° 23' 24.51"		
DESCRIPTION					

To Reach:

From the intersection of US423 and US192 in Kissimmee, Fl. travel south on N John Young Pkwy for 3.51 miles to Pleasant Hill Road. Turn left (south) on Pleasant Hill Road and travel 8.6 miles to Scrub Jay Trail, Turn left (east) onto Scrub Jay Trail (entrance to Disney Wilderness preserve, gate access required) travel along Scrub Jay trail 1.4 miles to unnamed dirt road on right. Turn onto dirt road (west) and travel dirt road 0.70miles to another dirt road and turn left (south) on dirt road and travel 2.4miles to another unnamed off road trail on left and turn (east). Travel 1.7 miles along trail to bench mark on north side of trail 10Ft +/-.

SKETCH

References:

- 90 ° and 1' from carsonite sign
- 125° and 15' from 12" Pine Tree
- 110° and 19' from 10" Pine (1) Tree
- 30° and 23' from 10" Pine (2) Tree
- 30° and 8' from trail centerline
- 15° and 500' from Well

