Surveyor's Report

Specific Purpose Survey
Well Site ACME WWTP

SFWMD Work Order Number: 4500016343

Contractors Project No. 07050.07

Report Date: 7/08/08

Submittal: Final

Prepared for:

South Florida Water Management District

KEITH & ASSOCIATES, INC.
consulting engineers

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OVERVIEW OF THE PROJECT

PURPOSE

This survey request consists of the establishment of elevations via GPS to third order National Geodetic Survey (NGS) Standards at the existing well site in Section 23, Township 44 South, Range 41 East, Palm Beach County, Florida:

The objective of this Work Order is to:

1. Establish elevations on the wells.
2. Establish a third-order benchmark at the well site.

The services listed in this report 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.

LOCATION OF PROJECT

The project is located in Palm Beach County, Florida.

ITEMS DELIVERED TO THE DISTRICT

The following items were delivered to the District with this report.

Two signed and sealed paper copies of the surveyor's report.

A CD containing the following:

- The survey report in Microsoft Word format.
- Digital photos.
- Scanned copies of field notes.
- Any other digital files associated with the survey.
- Completed District benchmark description sheet for all set marks.
- Completed Excel benchmark spread sheet
- Completed Excel well activation sheet
- CorpsMet 95 Meta Data files

DATUM FOR THE PROJECT

The vertical datum for the project is National Geodetic Vertical Datum of 1929 (NGVD 29) and North American Vertical Datum of 1988 (NAVD 88). NGVD 1929 elevations and offset were derived using Vertcon version 6.0.1. Horizontal datum shown hereon is North American Datum of 1983 with the 1990 adjustment applied (NAD 83/90).

GPS PROCEDURES AND EQUIPMENT

Horizontal and Vertical data on the site benchmark was established using the following methods.
A 3/1/2" SFWMD brass disk was set on the concrete slab and stamped ACME WWTP 2007. Site benchmark ACME WWTP 2007 was occupied a total of three times consisting of four-hour GPS static sessions each time. The observed GPS baselines were from benchmark ACME WWTP 2007 to The National Geodetic Survey monuments G-413, N-233 and Z-537. Those National Geodetic Survey monuments were also connected to each other by four-hour static sessions. Trimble 5700 receivers and Zephyr model number 39105.00 antennas (without ground plane) were used for all static sessions.

DATA PROCESSING

The baseline files were processed and adjusted using Trimble Geomatics Office version 1.62 holding the published elevations of NGS monuments G-413, N-233 and Z-537. Two of the three observed adjusted values were averaged to obtain the final elevation of benchmark ACME WWTP 2007. The third one had a value difference of -0.3' from the other two with the remaining two being within 0.068' of each other. All the baselines passed the Chi Square Test at 95% confidence level. The expected accuracy for the final elevation of site benchmark "ACME WWTP 2007" is ± 0.10'. In addition the three GPS observations of site benchmark ACME WWTP 2007 were processed through the National Geodetic Survey's OPUS program. The difference between the highest and lowest processed orthometric heights was 0.076'.

VERTICAL CONTROL

G-413	Elevation:	**NAVD 1988**	**18.064'**	**NGVD 1929**	**19.554'**
PID AD8195	Latitude	26° 40' 56" (Scaled)	From NGS Data Sheet		Superseded Value from NGS Data Sheet
State/County FL/Palm Beach	Longitude	-80° 15' 52" (Scaled)			
USGS QUAD Loxahatchee (1984)					
Vertical Order First Class II		The orthometric height was determined by differential leveling and adjusted by the NATIONAL GEODETIC SURVEY in September 1992. 19.4 km (12.05 mi) westerly along U.S. Highway 98 from the junction of Interstate Highway 95 in West Palm Beach, 231.0 m (757.9 ft) east center of the road, 12.1 m (39.7 ft) south of the centerline of the westbound lanes of the highway, 2.0 m (6.6 ft) southeast of the center of a storm drain, 1.3 m (4.3 ft) south-southwest of a witness post, and 0.5 m (1.6 ft) below the level of the highway. Note--access to the datum point is through a 5-inch logo cap.			

VERTICAL CONTROL

N-233	Elevation:	**NAVD 1988**	**15.020'**	**NGVD 1929**	**16.535'**
PID AD2794	Latitude	26° 37' 52" (Scaled)	From NGS Data Sheet		Superseded Value from NGS Data Sheet
State/County FL/Palm Beach	Longitude	-80° 03' 33" (Scaled)			
USGS QUAD Palm Beach (1983)					
Vertical Order First Class II		The orthometric height was determined by differential leveling and adjusted in June 1991. In Lake Worth, at the intersection of 13th Avenue North and the Florida East Coast Railroad, 14.4 m (47.2 ft) west of the near rail, 10.0 m (32.8 ft) north of the avenue center, 1.4 m (4.6 ft) north of a sidewalk, 1.3 m (4.3 ft) southeast of a fence corner, 0.4 m (1.3 ft) east of a witness post, 0.3 m (1.0 ft) west of a witness post, 0.3 m (1.0 ft) northeast of utility pole number 1-1016 with a guy wire, 0.3 m (1.0 ft) below the level of the avenue, and the monument is recessed 0.1 m (0.3 ft) below the ground surface.			

VERTICAL CONTROL

Z-536	Elevation:	**NAVD 1988**	**24.252'**	**NGVD 1929**	**None**
PID AJ8761	Latitude	26° 35' 26.17839"	From NGS Data Sheet		
State/County FL/Palm Beach	Longitude	-80° 16' 12.12537"			
USGS QUAD Loxahatchee SE (1984)					
Vertical Order First Class II Horizontal Order First		The orthometric height was determined by differential leveling and adjusted by the NATIONAL GEODETIC SURVEY in May 2002. About 21.4 km (13.3 miles) west northwest of Boynton Beach, about 10.4 km (6.4 miles) south southeast of Loxahatchee in section 40, township 44.S, range 41 E. To reach the station from the intersection of State Road 804 (Boynton Beach Blvd.) and State Road 7 / U.S. 441, go south on State Road 7 / U.S. 441 for 3.2 km (2.0 miles) to the intersection of Lee Road and State Road 7 / U.S. 441, turn right and go west on Lee Road for 1.6 km (1.0 miles) to the end at the Arthur R. Marshall Loxahatchee Wildlife Refuge, turn right and go north on L-40 levee, passing through access gate, for 11.7 km (7.25 miles) to the mark on the right in a turn around area. The mark is 17.4 meters (57.0 feet) north of the south end of the turn around area, 11.6 meters (38.0 feet) south of the north end of the turnaround area, 4.7 meters (15.5 feet) east of a carsonite witness post and 3.4 meters (11.0 feet) northwest of a metal witness post. Access to the datum point (top of a stainless steel rod) is had through a 5 inch logo cap. note a magnet was placed inside the pvc encasement.			

VERTICAL CONTROL

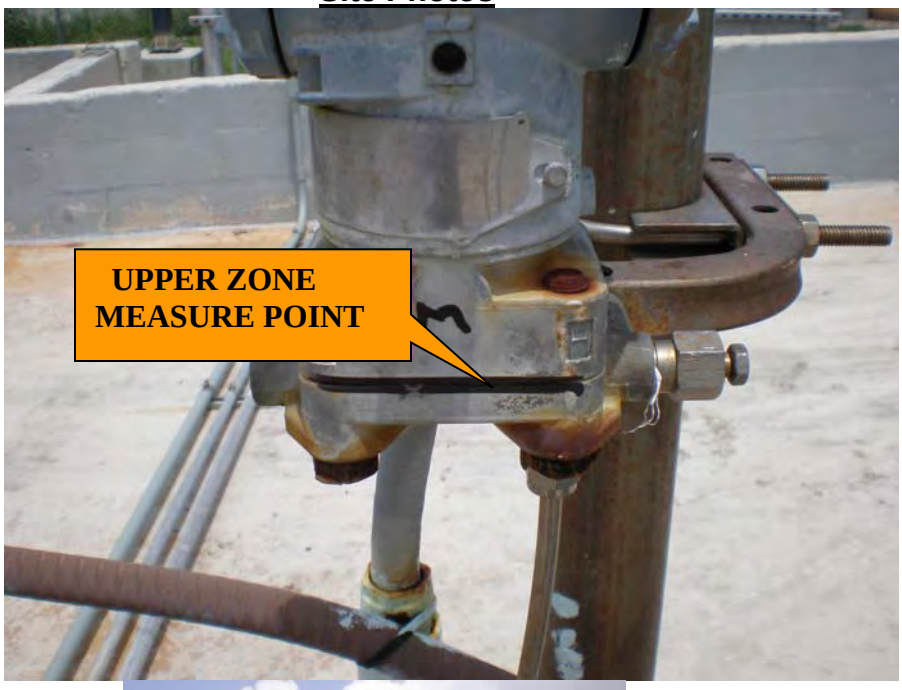
SITE BENCHMARK "ACME WWTP 2007"	Elevation:	**NAVD 1988**	**17.7'**	**NGVD 1929**	**19.1'**
	Latitude	26° 38' 05.2"	Derived from the GPS observations described above		Derived from the GPS observations described above
State/County FL/Palm Beach	Longitude	-80° 13' 57.3"			
USGS QUAD Palm Beach Farms					
Vertical Order Third Horizontal Order Third					

From the junction of Stae Road 7 (U.S. Highway 441) and Lake Worth Road (State Road 802) proceed west on Lake Worth Road (State Road 802) approx. 2.0 miles to the junction of 120 Avenue South on the right, turn right onto 120 Avenue South and proceed north approx. 1.0 mile to the junction of Pierson Road, turn right onto Pierson Road and proceed east approx. 800' to the entrance of a waste water treatment plant on the right, turn right into the plant and proceed to the southeast corner of the plant and the well site, the mark is a 3-1/2" SFWMD brass disk stamped ACME WWTP 2007 at the N.E. corner of the concrete pad, 2.5' S.W. of the N.E. corner of the pad and 2' S.W. of the N.E. corner of a 2' concrete block wall.

PROJECT RESULTS

Upper Zone	Lower Zone
Reference mark: Set mark on brass fitting New Information at the site: Mark El. 22.1' NGVD 29 Mark El. 20.7' NAVD 88 Initials: K&A Date: 7/07/08 Offset: -1.4 Previous Information at the site: Reference Mark Elevation(s) El. None Date: None Initials: None Reference Mark location: Same as noted above.	Reference mark: Set mark on brass fitting New Information at the site: Mark El. 22.2' NGVD 29 Mark El. 20.8' NAVD 88 Initials: K&A Date: 7/07/08 Offset: -1.4 Previous Information at the site: Reference Mark Elevation(s) El. None Date: None Initials: None Reference Mark location: Same as noted above
DTW (Distance to water inside well) Unable to obtain, well sealed. Reference mark: N/A El. N/A (NGVD 29) Measurement to water: N/A Date: N/A Time: N/A Ground Elevation next to Well: 18.7' (NGVD 1929) (on concrete pad). NAD 1983/90 Florida East Zone Latitude: 26° 38' 05.2" Longitude: - 80° 13' 57.3" Northing:(Y) 837164 Easting:(X) 906864	DTW (Distance to water inside well) Unable to obtain, well sealed. Reference mark: N/A El. N/A (NGVD 29) Measurement to water: N/A Date: N/A Time: N/A Ground Elevation next to Well: 18.7' (NGVD 1929) (on concrete pad). NAD 1983/90 Florida East Zone Latitude: 26° 38' 05.2" Longitude: - 80° 13' 57.3" Northing:(Y) 837164 Easting:(X) 906864

Site Photos


UPPER ZONE
MEASURE POINT


7-7-08 K&A
(-)1.4 TO NAVD 1988
NGVD 1929 EL=22.1

Site Photos

Lower Zone Well Measure Point and Information
7/07/08
Keith and Associates

Comments

Elevations shown hereon are NGVD 1929 datum unless noted otherwise.
Party Chief: D. Ferels, A. McKinney Field Book: 278 Page Pages 70-72, 74, 76-77
Bench Mark: "ACME WWTP 2007" El. 17.7', Vertical Datum: NAVD1988
El. 19.1', Vertical Datum: NGVD1929
SFWMD Offset: 1.4' SFWMD VALUE (subtract this value from NGVD 1929 to convert to NAVD 1988)
NGS Offset: 1.4' NGS VALUE (subtract this value from NGVD 1929 to convert to NAVD 1988)
The offset values referred to as "SFWMD VALUE" and "NGS VALUE" were derived by subtracting the NAVD 1988 value from the NGVD 1929 value at SFWMD benchmark ACME WWTP 2007. The NGVD 1929 value for benchmark was established using Vertcon version 6.0.1. the NAVD 1988 value was established using GPS methods as described above. Horizontal datum shown hereon is North American Datum of 1983 with the 1990 adjustment applied (NAD 83/90).

NAVD 88 - North American Vertical Datum of 1988
NGVD29 -National Geodetic Vertical Datum of 1929
NAD 83 -99 (Horizontal Datum) North American Datum
NGS - National Geodetic Survey
SFWMD - South Florida Water Management District
PVC - Polyvinyl Chloride
L.B. - Licensed Business
RTK – Real Time Kinematic
K&A – Keith and Associates
PSM – Professional Surveyor & Mapper
USGS – United States Geological Survey
QUAD – Quadrangle Map
PID - Permanent Identifier
OPUS- Online Positioning User Service

SURVEYOR'S CERTIFICATION

I hereby certify that this Specific Purpose Survey meets applicable portions of the Minimum Technical Standards set forth by the Florida Board of Professional Surveyors and Mappers in Chapter 61-G17, Florida Administrative Code. This report is prepared for the sole and specific use of the South Florida Water Management District and is not assignable.

Keith and Associates, Inc.
L.B. number 6860

By:

Date of Survey
July 7, 2008

Michael M. Mossey, PSM
Professional Surveyor and Mapper
State of Florida
Certificate No. 5660

REGISTRATION WORKSHEET - ACME WWTP LOWER ZONE

Site Name:		ACME WWTP LOW			Today's Date:									Type Recorder:					
Activity:					Effective Date:									Start Date of Data :					
Customer:						Division:				Agency:				Proj Activity Code:					
Project Manager:						Division:				Agency:			Contract #:						
Project name:										Legal Mandate:									
Short Common Name / Description:	ACME IMPROVEMENT DISTRICT WELL SITE																		
Proj. Mgr. Notes:	Survey information update.																		
Site Directions:																			
Site Address (if any):																			
Transportation:							Lock type or combination:							#					
Recorder Location/Purpose:										Structure Type:									
Array ID Configuration table attached																			

SURVEY INFORMATION

B.M. Elevation:	19.1' (NGVD 1929) E					Date:	7/8/2008					Stamp:	ACME WWTP 2007						
Agency:	ORG					Type:	BRASS					Datum:	NGVD29						

Benchmark Location/ Description: From the junction of Stae Road 7 (U.S. Highway 441) and Lake Worth Road (State Road 802) proceed west on Lake Worth Road (State Road 802) approx. 2.0 miles to the junction of 120 Avenue South on the right, turn right onto 120 Avenue South and proceed north approx. 1.0 mile to the junction of Pierson Road, turn right onto Pierson Road and proceed east approx. 800' to the entrance of a waste water treatment plant on the right, turn right into the plant and proceed to the southeast corner of the plant and the well site, the mark is a 3-1/2" SFWMD brass disk stamped ACME WWTP 2007 at the N.E. corner of the

COMMUNICATIONS INFORMATION

Communications System:					Loggernet Server:						Loggernet IP Address:								
Tower:		Communication Type:						R.F. Code/Modem Address:						R.F. Access Point:					
Phone Number:																			
RTU Address:		Gateways:																	

WELL INFORMATION

Sensor	Customer Ref	Ref Elev	Elev Date	Top of Well	Bottom of Well	Ground/ Land Elev	Depth of Well	Sensor Location	Ground Water Sensor Location

ADDITIONAL GIS INFORMATION

Item/Parm	Lat	Long	X-Coord	Y-Coord	Sec	Township	Range	Quad	Basin		County	Description

REGISTRATION WORKSHEET - ACME WWTP UPPER ZONE

2	Site Name:		ACME WWTP UPP			Today's Date:								Type Recorder:					
4	Activity:					Effective Date:								Start Date of Data :					
6	Customer:						Division:			Agency:				Proj Activity Code:					
8	Project Manager:						Division:			Agency:			Contract #:						
10	Project name:									Legal Mandate:									
12	Short Common Name / Description:		ACME IMPROVEMENT DISTRICT WELL SITE																
14	Proj. Mgr. Notes:		Survey information update.																
16	Site Directions:																		
18	Site Address (if any):																		
20	Transportation:							Lock type or combination:						#					
22	Recorder Location/Purpose:									Structure Type:									
24	Array ID Configuration table attached																		
26	**SURVEY INFORMATION**																		
28	B.M. Elevation:		**19.1' (NGVD 1929) E**					Date:	**7/8/2008**					Stamp:	**ACME WWTP 2007**				
30		Agency:	**ORG**					Type:	**BRASS**					Datum:	NGVD29				
32	Benchmark Location/ Description		From the junction of Stae Road 7 (U.S. Highway 441) and Lake Worth Road (State Road 802) proceed west on Lake Worth Road (State Road 802) approx. 2.0 miles to the junction of 120 Avenue South on the right, turn right onto 120 Avenue South and proceed north approx. 1.0 mile to the junction of Pierson Road, turn right onto Pierson Road and proceed east approx. 800' to the entrance of a waste water treatment plant on the right, turn right into the plant and proceed to the southeast corner of the plant and the well site, the mark is a 3 1/2" SFWMD brass disk stamped ACME WWTP 2007 at the N.E. corner of the																
34	**COMMUNICATIONS INFORMATION**																		
36		Communications System:					Loggernet Server:					Loggernet IP Address:							
38	Tower:			Communication Type:						R.F. Code/Modem Address:				R.F. Access Point:					
40		Phone Number:																	
42		RTU Address:			Gateways:														
44	**WELL INFORMATION**																		

46	Sensor	Customer Ref	Ref Elev	Elev Date	Top of Well	Bottom of Well	Ground/ Land Elev	Depth of Well	Sensor Location	Ground Water Sensor Location
47										
48										
49										
50										
51										

52	**ADDITIONAL GIS INFORMATION**											
54	**Item/Parm**	**Lat**	**Long**	**X-Coord**	**Y-Coord**	**Sec**	**Township**	**Range**	**Quad**	**Basin**	**County**	**Description**
55												
56												

The NGS Data Sheet

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DATABASE = Sybase ,PROGRAM = datasheet, VERSION = 7.48
1        National Geodetic Survey,   Retrieval Date = JULY  3, 2007
 AD8195 ***********************************************************************
 AD8195  DESIGNATION -  G 413
 AD8195  PID         -  AD8195
 AD8195  STATE/COUNTY-  FL/PALM BEACH
 AD8195  USGS QUAD   -  LOXAHATCHEE (1984)
 AD8195
 AD8195                        *CURRENT SURVEY CONTROL
 AD8195  ______________________________________________________________________
 AD8195* NAD 83(1986)-  26 40 56.     (N)    080 15 52.     (W)     SCALED
 AD8195* NAVD 88     -         5.506  (meters)      18.06   (feet)  ADJUSTED
 AD8195  ______________________________________________________________________
 AD8195  GEOID HEIGHT-         -25.78  (meters)                      GEOID03
 AD8195  DYNAMIC HT  -           5.497 (meters)      18.03  (feet)  COMP
 AD8195  MODELED GRAV-     979,113.6   (mgal)                        NAVD 88
 AD8195
 AD8195  VERT ORDER  -  FIRST     CLASS II
 AD8195
 AD8195.The horizontal coordinates were scaled from a topographic map and have
 AD8195.an estimated accuracy of +/- 6 seconds.
 AD8195
 AD8195.The orthometric height was determined by differential leveling
 AD8195.and adjusted by the NATIONAL GEODETIC SURVEY in September 1992.
 AD8195
 AD8195.The geoid height was determined by GEOID03.
 AD8195
 AD8195.The dynamic height is computed by dividing the NAVD 88
 AD8195.geopotential number by the normal gravity value computed on the
 AD8195.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 AD8195.degrees latitude (g = 980.6199 gals.).
 AD8195
 AD8195.The modeled gravity was interpolated from observed gravity values.
 AD8195
 AD8195;                    North         East     Units  Estimated Accuracy
 AD8195;SPC FL E     -   260,410.      273,210.      MT  (+/- 180 meters Scaled)
 AD8195
 AD8195                          SUPERSEDED SURVEY CONTROL
 AD8195
 AD8195  NGVD 29 (09/01/92)    5.960  (m)           19.55   (f) ADJUSTED    1 2
 AD8195
 AD8195.Superseded values are not recommended for survey control.
 AD8195.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 AD8195.See file dsdata.txt to determine how the superseded data were derived.
 AD8195
 AD8195_U.S. NATIONAL GRID SPATIAL ADDRESS: 17RNK731514(NAD 83)
 AD8195_MARKER: I = METAL ROD
 AD8195_SETTING: 59 = STAINLESS STEEL ROD IN SLEEVE (10 FT.+)
 AD8195_SP_SET: STAINLESS STEEL ROD IN SLEEVE
 AD8195_STAMPING: G 413 1992
 AD8195_MARK LOGO: NGS
 AD8195_PROJECTION: FLUSH
 AD8195_MAGNETIC: I = MARKER IS A STEEL ROD
 AD8195_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
 AD8195_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
 AD8195+SATELLITE: SATELLITE OBSERVATIONS - February 04, 2005
 AD8195_ROD/PIPE-DEPTH: 48.4 meters
```

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AD8195_SLEEVE-DEPTH  : 0.9 meters
AD8195
AD8195  HISTORY     - Date     Condition        Report By
AD8195  HISTORY     - 1992     MONUMENTED       NGS
AD8195  HISTORY     - 20021111 GOOD             USPSQD
AD8195  HISTORY     - 20040115 GOOD             USPSQD
AD8195  HISTORY     - 20050204 GOOD             USPSQD
AD8195
AD8195                          STATION DESCRIPTION
AD8195
AD8195'DESCRIBED BY NATIONAL GEODETIC SURVEY 1992
AD8195'19.4 KM (12.05 MI) WESTERLY ALONG U.S. HIGHWAY 98 FROM THE JUNCTION
AD8195'OF INTERSTATE HIGHWAY 95 IN WEST PALM BEACH, 231.0 M (757.9 FT) EAST
AD8195'CENTER OF E ROAD, 12.1 M (39.7 FT) SOUTH OF THE CENTERLINE OF THE
AD8195'WESTBOUND LANES OF THE HIGHWAY, 2.0 M (6.6 FT) SOUTHEAST OF THE
AD8195'CENTER OF A STORM DRAIN, 1.3 M (4.3 FT) SOUTH-SOUTHWEST OF A WITNESS
AD8195'POST, AND 0.5 M (1.6 FT) BELOW THE LEVEL OF THE HIGHWAY.
AD8195'NOTE--ACCESS TO THE DATUM POINT IS THROUGH A 5-INCH LOGO CAP.
AD8195
AD8195                          STATION RECOVERY (2002)
AD8195
AD8195'RECOVERY NOTE BY US POWER SQUADRON 2002 (AAS)
AD8195'CAP BROKEN OFF.
AD8195
AD8195                          STATION RECOVERY (2004)
AD8195
AD8195'RECOVERY NOTE BY US POWER SQUADRON 2004 (AAS)
AD8195'RECOVERED IN GOOD CONDITION.
AD8195
AD8195                          STATION RECOVERY (2005)
AD8195
AD8195'RECOVERY NOTE BY US POWER SQUADRON 2005 (AAS)
AD8195'RECOVERED IN GOOD CONDITION.

*** retrieval complete.
Elapsed Time = 00:00:00
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The NGS Data Sheet

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DATABASE = Sybase ,PROGRAM = datasheet, VERSION = 7.57
1        National Geodetic Survey,   Retrieval Date = DECEMBER 26, 2007
 AD2794 ***********************************************************************
 AD2794  DESIGNATION -  N 233
 AD2794  PID         -  AD2794
 AD2794  STATE/COUNTY-  FL/PALM BEACH
 AD2794  USGS QUAD   -  PALM BEACH (1983)
 AD2794
 AD2794                         *CURRENT SURVEY CONTROL
 AD2794  ______________________________________________________________________
 AD2794* NAD 83(1986)-  26 37 52.      (N)    080 03 33.      (W)      SCALED
 AD2794* NAVD 88     -         4.578   (meters)      15.02    (feet)   ADJUSTED
 AD2794  ______________________________________________________________________
 AD2794  GEOID HEIGHT-         -26.29  (meters)                        GEOID03
 AD2794  DYNAMIC HT  -           4.571 (meters)       15.00   (feet)   COMP
 AD2794  MODELED GRAV-     979,113.6   (mgal)                          NAVD 88
 AD2794
 AD2794  VERT ORDER  -  FIRST     CLASS I
 AD2794
 AD2794.The horizontal coordinates were scaled from a topographic map and have
 AD2794.an estimated accuracy of +/- 6 seconds.
 AD2794
 AD2794.The orthometric height was determined by differential leveling
 AD2794.and adjusted in June 1991.
 AD2794
 AD2794.The geoid height was determined by GEOID03.
 AD2794
 AD2794.The dynamic height is computed by dividing the NAVD 88
 AD2794.geopotential number by the normal gravity value computed on the
 AD2794.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 AD2794.degrees latitude (g = 980.6199 gals.).
 AD2794
 AD2794.The modeled gravity was interpolated from observed gravity values.
 AD2794
 AD2794;                    North         East     Units  Estimated Accuracy
 AD2794;SPC FL E     -   254,880.      293,680.      MT  (+/- 180 meters Scaled)
 AD2794
 AD2794                           SUPERSEDED SURVEY CONTROL
 AD2794
 AD2794  NGVD 29 (09/01/92)    5.040  (m)           16.54   (f) ADJUSTED    1 1
 AD2794
 AD2794.Superseded values are not recommended for survey control.
 AD2794.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 AD2794.See file dsdata.txt to determine how the superseded data were derived.
 AD2794
 AD2794_U.S. NATIONAL GRID SPATIAL ADDRESS: 17RNK936459(NAD 83)
 AD2794_MARKER: DB = BENCH MARK DISK
 AD2794_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
 AD2794_SP_SET: CONCRETE POST
 AD2794_STAMPING: N 233 1965
 AD2794_MARK LOGO: CGS
 AD2794_MAGNETIC: N = NO MAGNETIC MATERIAL
 AD2794_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
 AD2794+STABILITY: SURFACE MOTION
 AD2794_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
 AD2794+SATELLITE: SATELLITE OBSERVATIONS - April 21, 2006
 AD2794
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AD2794  HISTORY     - Date     Condition        Report By
AD2794  HISTORY     - 1965     MONUMENTED       CGS
AD2794  HISTORY     - 1973     GOOD             NGS
AD2794  HISTORY     - 1987     POOR             USPSQD
AD2794  HISTORY     - 1987     GOOD             USPSQD
AD2794  HISTORY     - 1988     GOOD             USPSQD
AD2794  HISTORY     - 19910114 GOOD             NGS
AD2794  HISTORY     - 20011222 GOOD             USPSQD
AD2794  HISTORY     - 20020221 GOOD             FLDEP
AD2794  HISTORY     - 20040126 GOOD             USPSQD
AD2794  HISTORY     - 20050126 GOOD             USPSQD
AD2794  HISTORY     - 20060421 GOOD             USPSQD
AD2794
AD2794                          STATION DESCRIPTION
AD2794
AD2794'DESCRIBED BY COAST AND GEODETIC SURVEY 1965
AD2794'AT LAKE WORTH.
AD2794'AT LAKE WORTH, ABOUT 1.2 MILES NORTH ALONG FLORIDA EAST COAST
AD2794'RAILWAY FROM THE STATION, AT THE CROSSING OF 13TH AVENUE NORTH,
AD2794'NEAR MILEPOST 305, 31.0 FEET NORTH OF THE CENTER LINE OF THE
AD2794'AVENUE, 34.0 FEET WEST OF THE WEST RAIL OF THE SOUTHBOUND MAIN
AD2794'TRACK, 55.0 FEET NORTHWEST OF THE CENTER OF THE CROSSING, 21
AD2794'FEET SOUTHWEST OF THE FIRST TELEPHONE POLE NORTH OF THE CROSSING,
AD2794'95.5 FEET NORTH-NORTHWEST OF AND ACROSS TRACK FROM THE MILEPOST,
AD2794'1.5 FEET EAST OF A METAL WITNESS POST, ABOUT 2 FEET BELOW THE
AD2794'LEVEL OF THE TRACK AND SET IN THE TOP OF A CONCRETE POST
AD2794'PROJECTING 0.3 FOOT.  NOTE-- THE RAILWAY STATION HAS BEEN
AD2794'REMOVED.
AD2794
AD2794                          STATION RECOVERY (1973)
AD2794
AD2794'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1973
AD2794'RECOVERED IN GOOD CONDITION.
AD2794
AD2794                          STATION RECOVERY (1987)
AD2794
AD2794'RECOVERY NOTE BY US POWER SQUADRON 1987 (RG)
AD2794'MARK RECOVERED IN POOR CONDITION.
AD2794
AD2794                          STATION RECOVERY (1987)
AD2794
AD2794'RECOVERY NOTE BY US POWER SQUADRON 1987 (JRM)
AD2794'RECOVERED IN GOOD CONDITION.
AD2794
AD2794                          STATION RECOVERY (1988)
AD2794
AD2794'RECOVERY NOTE BY US POWER SQUADRON 1988 (BJS)
AD2794'RECOVERED IN GOOD CONDITION.
AD2794
AD2794                          STATION RECOVERY (1991)
AD2794
AD2794'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1991
AD2794'IN LAKE WORTH, AT THE INTERSECTION OF 13TH AVENUE NORTH AND THE
AD2794'FLORIDA EAST COAST RAILROAD, 14.4 M (47.2 FT) WEST OF THE NEAR RAIL,
AD2794'10.0 M (32.8 FT) NORTH OF THE AVENUE CENTER, 1.4 M (4.6 FT) NORTH OF
AD2794'A SIDEWALK, 1.3 M (4.3 FT) SOUTHEAST OF A FENCE CORNER, 0.4 M (1.3
AD2794'FT) EAST OF A WITNESS POST, 0.3 M (1.0 FT) WEST OF A WITNESS POST,
AD2794'0.3 M (1.0 FT) NORTHEAST OF UTILITY POLE NUMBER 1-1016 WITH A GUY
AD2794'WIRE, 0.3 M (1.0 FT) BELOW THE LEVEL OF THE AVENUE, AND THE MONUMENT
AD2794'IS RECESSED 0.1 M (0.3 FT) BELOW THE GROUND SURFACE.
```

```
AD2794
AD2794                          STATION RECOVERY (2001)
AD2794
AD2794'RECOVERY NOTE BY US POWER SQUADRON 2001 (AAS)
AD2794'RECOVERED IN GOOD CONDITION.
AD2794
AD2794                          STATION RECOVERY (2002)
AD2794
AD2794'RECOVERY NOTE BY FL DEPT OF ENV PRO 2002 (JLM)
AD2794'RECOVERED IN GOOD CONDITION.
AD2794'
AD2794'
AD2794'
AD2794
AD2794                          STATION RECOVERY (2004)
AD2794
AD2794'RECOVERY NOTE BY US POWER SQUADRON 2004 (AAS)
AD2794'RECOVERED IN GOOD CONDITION.
AD2794
AD2794                          STATION RECOVERY (2005)
AD2794
AD2794'RECOVERY NOTE BY US POWER SQUADRON 2005 (AAS)
AD2794'RECOVERED IN GOOD CONDITION.
AD2794
AD2794                          STATION RECOVERY (2006)
AD2794
AD2794'RECOVERY NOTE BY US POWER SQUADRON 2006 (AAS)
AD2794'RECOVERED IN GOOD CONDITION.

*** retrieval complete.
Elapsed Time = 00:00:00
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The NGS Data Sheet

```
DATABASE = Sybase ,PROGRAM = datasheet, VERSION = 7.48
1        National Geodetic Survey,   Retrieval Date = JULY  3, 2007
 AJ8761 ***********************************************************************
 AJ8761  DESIGNATION -  Z 536
 AJ8761  PID         -  AJ8761
 AJ8761  STATE/COUNTY-  FL/PALM BEACH
 AJ8761  USGS QUAD   -  LOXAHATCHEE SE (1984)
 AJ8761
 AJ8761                        *CURRENT SURVEY CONTROL
 AJ8761  ______________________________________________________________________
 AJ8761* NAD 83(1999)-  26 35 26.17839(N)    080 16 12.12537(W)     ADJUSTED
 AJ8761* NAVD 88     -         7.392  (meters)      24.25   (feet)  ADJUSTED
 AJ8761  ______________________________________________________________________
 AJ8761  X           -     964,564.698 (meters)                      COMP
 AJ8761  Y           -  -5,625,220.387 (meters)                      COMP
 AJ8761  Z           -   2,837,717.170 (meters)                      COMP
 AJ8761  LAPLACE CORR-          -2.30  (seconds)                     DEFLEC99
 AJ8761  ELLIP HEIGHT-         -18.227 (meters)          (12/12/02) GPS OBS
 AJ8761  GEOID HEIGHT-         -25.59  (meters)                     GEOID03
 AJ8761  DYNAMIC HT  -           7.381 (meters)      24.22  (feet)  COMP
 AJ8761  MODELED GRAV-     979,106.6   (mgal)                       NAVD 88
 AJ8761
 AJ8761  HORZ ORDER  -  FIRST
 AJ8761  VERT ORDER  -  FIRST     CLASS II
 AJ8761  ELLP ORDER  -  THIRD     CLASS I
 AJ8761
 AJ8761.The horizontal coordinates were established by GPS observations
 AJ8761.and adjusted by the National Geodetic Survey in December 2002.
 AJ8761
 AJ8761.The orthometric height was determined by differential leveling
 AJ8761.and adjusted by the NATIONAL GEODETIC SURVEY in May 2002.
 AJ8761
 AJ8761.The X, Y, and Z were computed from the position and the ellipsoidal ht.
 AJ8761
 AJ8761.The Laplace correction was computed from DEFLEC99 derived deflections.
 AJ8761
 AJ8761.The ellipsoidal height was determined by GPS observations
 AJ8761.and is referenced to NAD 83.
 AJ8761
 AJ8761.The geoid height was determined by GEOID03.
 AJ8761
 AJ8761.The dynamic height is computed by dividing the NAVD 88
 AJ8761.geopotential number by the normal gravity value computed on the
 AJ8761.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 AJ8761.degrees latitude (g = 980.6199 gals.).
 AJ8761
 AJ8761.The modeled gravity was interpolated from observed gravity values.
 AJ8761
 AJ8761;                    North         East     Units Scale Factor Converg.
 AJ8761;SPC FL E     -   250,252.968   272,710.049   MT  1.00000642   +0 19 36.3
 AJ8761;SPC FL E     -   821,038.28    894,716.22   sFT  1.00000642   +0 19 36.3
 AJ8761;UTM  17      - 2,941,299.564   572,685.240   MT  0.99966522   +0 19 36.3
 AJ8761
 AJ8761!             -  Elev Factor  x  Scale Factor =   Combined Factor
 AJ8761!SPC FL E     -   1.00000286  x   1.00000642  =   1.00000928
 AJ8761!UTM  17      -   1.00000286  x   0.99966522  =   0.99966808
 AJ8761
```

```
AJ8761|----------------------------------------------------------------------|
AJ8761| PID    Reference Object                    Distance      Geod. Az  |
AJ8761|                                                          dddmmss.s |
AJ8761| AJ8799 PB 37                           289.008 METERS 32056     |
AJ8761|----------------------------------------------------------------------|
AJ8761
AJ8761                          SUPERSEDED SURVEY CONTROL
AJ8761
AJ8761  NAVD 88 (12/12/02)    7.39   (m)           24.2    (f) LEVELING    3
AJ8761
AJ8761.Superseded values are not recommended for survey control.
AJ8761.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
AJ8761.See file dsdata.txt to determine how the superseded data were derived.
AJ8761
AJ8761_U.S. NATIONAL GRID SPATIAL ADDRESS: 17RNK7268541300(NAD 83)
AJ8761_MARKER: F = FLANGE-ENCASED ROD
AJ8761_SETTING: 49 = STAINLESS STEEL ROD W/O SLEEVE (10 FT.+)
AJ8761_STAMPING: Z 536 2001 CERP
AJ8761_MARK LOGO: NONE
AJ8761_PROJECTION: RECESSED 8 CENTIMETERS
AJ8761_MAGNETIC: M = MARKER EQUIPPED WITH BAR MAGNET
AJ8761_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
AJ8761_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
AJ8761+SATELLITE: SATELLITE OBSERVATIONS - February 05, 2004
AJ8761_ROD/PIPE-DEPTH:  6.5 meters
AJ8761
AJ8761  HISTORY     - Date     Condition        Report By
AJ8761  HISTORY     - 20010919 MONUMENTED       SFLWMD
AJ8761  HISTORY     - 20020423 GOOD             MAPTEC
AJ8761  HISTORY     - 20021207 GOOD             FLDEP
AJ8761  HISTORY     - 20040205 GOOD             FLDEP
AJ8761
AJ8761                          STATION DESCRIPTION
AJ8761
AJ8761'DESCRIBED BY S FL WATER MGMT DIST 2001 (MAB)
AJ8761'THE STATION IS LOCATED ABOUT 34.9 KM (21.7 MILES) NORTH NORTHWEST OF
AJ8761'DEERFIELD BEACH,
AJ8761'ABOUT 21.4 KM (13.3 MILES) WEST NORTHWEST OF BOYNTON BEACH, ABOUT 10.4
AJ8761'KM (6.4 MILES)
AJ8761'SOUTH SOUTHEAST OF LOXAHATCHEE IN SECTION 40, TOWNSHIP 44.5, RANGE 41
AJ8761'EAST.
AJ8761'
AJ8761'OWNERSHIP  SOUTH FLORIDA WATER MANAGEMENT DISTRICT.
AJ8761'
AJ8761'TO REACH THE STATION FROM THE INTERSECTION OF STATE ROAD 804 (BOYNTON
AJ8761'BEACH BLVD.) AND
AJ8761'STATE ROAD 7 / U.S. 441, GO SOUTH ON STATE ROAD 7 / U.S. 441 FOR 3.2
AJ8761'KM (2.0 MILES) TO THE
AJ8761'INTERSECTION OF LEE ROAD AND STATE ROAD 7 / U.S. 441, TURN RIGHT AND
AJ8761'GO WEST ON LEE ROAD
AJ8761'FOR 1.6 KM (1.0 MILES) TO THE END AT THE ARTHUR R. MARSHALL
AJ8761'LOXAHATCHEE WILDLIFE REFUGE,
AJ8761'TURN RIGHT AND GO NORTH ON L-40 LEVEE, PASSING THROUGH ACCESS GATE,
AJ8761'FOR 11.7 KM (7.25
AJ8761'MILES) TO THE MARK ON THE RIGHT IN A TURN AROUND AREA.
AJ8761'
AJ8761'THE MARK IS 17.4 METERS (57.0 FEET) NORTH OF THE SOUTH END OF THE TURN
AJ8761'AROUND AREA, 11.6
AJ8761'METERS (38.0 FEET) SOUTH OF THE NORTH END OF THE TURNAROUND AREA, 4.7
AJ8761'METERS (15.5 FEET)
```

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AJ8761'EAST OF A CARSONITE WITNESS POST AND 3.4 METERS (11.0 FEET) NORTHWEST
AJ8761'OF A METAL
AJ8761'WITNESS POST. ACCESS TO THE DATUM POINT (TOP OF A STAINLESS STEEL ROD)
AJ8761'IS HAD THROUGH A
AJ8761'5 INCH LOGO CAP.
AJ8761'
AJ8761'NOTE  A MAGNET WAS PLACED INSIDE THE PVC ENCASEMENT.
AJ8761'
AJ8761'
AJ8761'
AJ8761'
AJ8761
AJ8761                          STATION RECOVERY (2002)
AJ8761
AJ8761'RECOVERY NOTE BY MAPTECH INCORPORATED 2002 (CDP)
AJ8761'THE STATION IS LOCATED ABOUT 34.9 KM (21.7 MILES) NORTH NORTHWEST OF
AJ8761'DEERFIELD BEACH,
AJ8761'ABOUT 21.4 KM (13.3 MILES) WEST NORTHWEST OF BOYNTON BEACH, ABOUT 10.4
AJ8761'KM (6.4 MILES)
AJ8761'SOUTH SOUTHEAST OF LOXAHATCHEE IN SECTION 40, TOWNSHIP 44.5, RANGE 41
AJ8761'EAST.
AJ8761'
AJ8761'OWNERSHIP  SOUTH FLORIDA WATER MANAGEMENT DISTRICT.
AJ8761'
AJ8761'TO REACH THE STATION FROM THE INTERSECTION OF STATE ROAD 804 (BOYNTON
AJ8761'BEACH BLVD.) AND
AJ8761'STATE ROAD 7 / U.S. 441, GO SOUTH ON STATE ROAD 7 / U.S. 441 FOR 3.2
AJ8761'KM (2.0 MILES) TO THE
AJ8761'INTERSECTION OF LEE ROAD AND STATE ROAD 7 / U.S. 441, TURN RIGHT AND
AJ8761'GO WEST ON LEE ROAD
AJ8761'FOR 1.6 KM (1.0 MILES) TO THE END AT THE ARTHUR R. MARSHALL
AJ8761'LOXAHATCHEE WILDLIFE REFUGE,
AJ8761'TURN RIGHT AND GO NORTH ON L-40 LEVEE, PASSING THROUGH ACCESS GATE,
AJ8761'FOR 11.7 KM (7.25
AJ8761'MILES) TO THE MARK ON THE RIGHT IN A TURN AROUND AREA.
AJ8761'
AJ8761'THE MARK IS 17.4 METERS (57.0 FEET) NORTH OF THE SOUTH END OF THE TURN
AJ8761'AROUND AREA, 11.6
AJ8761'METERS (38.0 FEET) SOUTH OF THE NORTH END OF THE TURNAROUND AREA, 4.7
AJ8761'METERS (15.5 FEET)
AJ8761'EAST OF A CARSONITE WITNESS POST AND 3.4 METERS (11.0 FEET) NORTHWEST
AJ8761'OF A METAL
AJ8761'WITNESS POST. ACCESS TO THE DATUM POINT (TOP OF A STAINLESS STEEL ROD)
AJ8761'IS HAD THROUGH A
AJ8761'5 INCH LOGO CAP.
AJ8761'
AJ8761'NOTE  A MAGNET WAS PLACED INSIDE THE PVC ENCASEMENT.
AJ8761'
AJ8761'
AJ8761'STATION RECOVERY (2002)
AJ8761'RECOVERY NOTE BY MAPTECH, INCORPORATED 2002 (CDP).
AJ8761'RECOVERED AS DESCRIBED.
AJ8761'
AJ8761'
AJ8761'
AJ8761
AJ8761                          STATION RECOVERY (2002)
AJ8761
AJ8761'RECOVERY NOTE BY FL DEPT OF ENV PRO 2002 (BPJ)
AJ8761'RECOVERED AS DESCRIBED.
```

```
AJ8761'
AJ8761
AJ8761                          STATION RECOVERY (2004)
AJ8761
AJ8761'RECOVERY NOTE BY FL DEPT OF ENV PRO 2004 (JLM)
AJ8761'RECOVERED AS DESCRIBED.

*** retrieval complete.
Elapsed Time = 00:00:01
```

```
Identification_Information:
        Citation:
                Citation_Information:
                        Originator: Michael M. Mossey, P.S.M.(ed.)
                        Publication_Date: 20080713
                        Publication_Time: Unknown
                        Title: ACME WWTP
                        Edition: 1
                        Publication_Information:
                                Publication_Place: Not Published
                                Publisher: None
                        Online_Linkage: mmossey@keith-associates.com
        Description:
                Abstract: Well site ACME WWTP  Upper and Lower Zones.
                Purpose:
                        To establish reference elevations in NAVD 1988 and
                        NGVD 1929 datum at the site on the existing
                        wells and set a site benchmark. The benchmark and well
                        elevations were derived using GPS and are shown to the
                        nearest tenth.
        Time_Period_of_Content:
                Time_Period_Information:
                        Range_of_Dates/Times:
                                Beginning_Date: 20071226
                                Ending_Date: 20080708
                Currentness_Reference: Publication Date
        Status:
                Progress: Complete
                Maintenance_and_Update_Frequency: Unknown
        Spatial_Domain:
                Bounding_Coordinates:
                        West_Bounding_Coordinate: 80°13'57.3"
                        East_Bounding_Coordinate: 80°13'57.3"
                        North_Bounding_Coordinate: 26°38'05.2"
                        South_Bounding_Coordinate: 26°38'05.2"
        Keywords:
                Theme:
                        Theme_Keyword_Thesaurus: Specific Purpose Survey
                        Theme_Keyword: Well Site
                Place:
                        Place_Keyword_Thesaurus: Palm Beach County, Florida
                        Place_Keyword: Well Site ACME WWTP
                        Place_Keyword: Sections 23 Township 44 S - Range 41 E
        Access_Constraints: None
        Use_Constraints: None
        Point_of_Contact:
                Contact_Information:
                        Contact_Person_Primary:
                                Contact_Person: Steve Krupa
                                Contact_Organization: South Florida Water Management District
                        Contact_Position: Senior Supervisor
                        Contact_Address:
                                Address_Type: mailing and physical address
                                Address:
                                        3301 Gun Club Road
                                        MS 4330
                                City: West Palm Beach
                                State_or_Province: Florida
                                Postal_Code: 33406
                                Country: USA
                        Contact_Voice_Telephone: Office (561) 682-6923
                        Contact_Electronic_Mail_Address: skrupa@sfwmd.gov
                        Hours_of_Service: 8:00 am to 5:00 pm EST
Data_Quality_Information:
        Attribute_Accuracy:
                Attribute_Accuracy_Report:
                        Horizontal locations were obtained using a Trimble 5700
                        receiver. Coordinates are based on the
                        Florida State Plane Coordinate System, East Zone, NAD
                        1983/90. Elevations are based on NGVD 1929 with an
                        offset supplied to convert to NAVD 1988.
        Logical_Consistency_Report:
```

The vertical datum for the project is National Geodetic Vertical Datum of 1929 (NGVD 29) and North American Vertical Datum of 1988 (NAVD 88). NGVD 1929 elevations and offset were derived using Vertcon version 6.0.1. Horizontal datum shown hereon is North American Datum of 1983 with the 1990 adjustment applied (NAD 83/90).

Completeness_Report:

Upper Zone Well (NGVD1929) Elev. 22.1'
Upper Zone Well (NAVD1988) Elev. 20.7'
Lower Zone Well (NGVD1929) Elev. 22.2'
Lower Zone Well (NAVD1988) Elev. 20.8'
Site Benchmark ACME WWTP 2007, From the junction of Stae Road 7 (U.S. Highway 441) and Lake Worth Road (State Road 802) proceed west on Lake Worth Road (State Road 802) approx. 2.0 miles to the junction of 120 Avenue South on the right, turn right onto 120 Avenue South and proceed north approx. 1.0 mile to the junction of Pierson Road, turn right onto Pierson Road and proceed east approx. 800' to the entrance of a waste water treatment plant on the right, turn right into the plant and proceed to the southeast corner of the plant and the well site, the mark is a 3-1/2" SFWMD brass disk stamped ACME WWTP 2007 at the N.E. corner of the concrete pad, 2.5' S.W. of the N.E. corner of the pad and 2' S.W. of the N.E. corner of a 2' concrete block wall.
NAVD 1988 elevation 17.7' (field derived)
NGVD 1929 elevation 19.1' (field derived)
Benchmark Z-536, The orthometric height was determined by differential leveling and adjusted by the NATIONAL GEODETIC SURVEY in May 2002. About 21.4 km (13.3 miles) west northwest of Boynton Beach, about 10.4 km (6.4 miles) south southeast of Loxahatchee in section 40, township 44.S, range 41 E. To reach the station from the intersection of State Road 804 (Boynton Beach Blvd.) and State Road 7 / U.S. 441, go south on State Road 7 / U.S. 441 for 3.2 km (2.0 miles) to the intersection of Lee Road and State Road 7 / U.S. 441, turn right and go west on Lee Road for 1.6 km (1.0 miles) to the end at the Arthur R. Marshall Loxahatchee Wildlife Refuge, turn right and go north on L-40 levee, passing through access gate, for 11.7 km (7.25 miles) to the mark on the right in a turn around area. The mark is 17.4 meters (57.0 feet) north of the south end of the turn around area, 11.6 meters (38.0 feet) south of the north end of the turnaround area, 4.7 meters (15.5 feet) east of a carsonite witness post and 3.4 meters (11.0 feet) northwest of a metal witness post. Access to the datum point (top of a stainless steel rod) is had through a 5 inch logo cap. Note a magnet was placed inside the pvc encasement.
NAVD 1988 elevation 24.252' (NGS Data sheet)
NGVD 1929 elevation (None)
Benchmark G-413, The orthometric height was determined by differential leveling and adjusted by the NATIONAL GEODETIC SURVEY in September 1992. 19.4 km (12.05 mi) westerly along U.S. Highway 98 from the junction of Interstate Highway 95 in West Palm Beach, 231.0 m (757.9 ft) east center of the road, 12.1 m (39.7 ft) south of the centerline of the westbound lanes of the highway, 2.0 m (6.6 ft) southeast of the center of a storm drain, 1.3 m (4.3 ft) south-southwest of a witness post, and 0.5 m (1.6 ft) below the level of the highway. Note--access to the datum point is through a 5-inch logo cap.
NAVD 1988 elevation 18.064' (NGS Data sheet)
NGVD 1929 elevation None
Benchmark N-233, The orthometric height was determined by differential leveling and adjusted in June 1991. In Lake Worth, at the intersection of 13th Avenue North

and the Florida East Coast Railroad, 14.4 m (47.2 ft) west of the near rail, 10.0 m (32.8 ft) north of the avenue center, 1.4 m (4.6 ft) north of a sidewalk, 1.3 m (4.3 ft) southeast of a fence corner, 0.4 m (1.3 ft) east of a witness post, 0.3 m (1.0 ft) west of a witness post, 0.3 m (1.0 ft) northeast of utility pole number 1-1016 with a guy wire, 0.3 m (1.0 ft) below the level of the avenue, and the monument is recessed 0.1 m (0.3 ft) below the ground surface.
NAVD 1988 elevation 15.020' (NGS Data sheet)
NGVD 1929 elevation 16.535' Superseded Value from NGS Data Sheet

Positional_Accuracy:
Horizontal_Positional_Accuracy:
Horizontal_Positional_Accuracy_Report:
The horizontal location of the benchmark was obtained using Trimble 5700 receiver and four-hour static sessions. The results of the static sessions were processed through the NGS wesite OPUS program .
Quantitative_Horizontal_Positional_Accuracy_Assessment:
Horizontal_Positional_Accuracy_Value: +/- 0.1'
Horizontal_Positional_Accuracy_Explanation: Value derived using Trimble 5700 receiver/celluar RTK link.
Vertical_Positional_Accuracy:
Vertical_Positional_Accuracy_Report:
NGS benchmarks Z-536, G-413 and N-233 were used to establish the elevations on site benchmark ACME WWTP.Site benchmark ACME WWTP 2007 was used to establish the elevations at the site.
Quantitative_Vertical_Positional_Accuracy_Assessment:
Vertical_Positional_Accuracy_Value: 0.10'
Vertical_Positional_Accuracy_Explanation: Elevations were determined usin GPS
Quantitative_Vertical_Positional_Accuracy_Assessment:
Vertical_Positional_Accuracy_Value: 0.10'
Vertical_Positional_Accuracy_Explanation: Elevations were determined usin GPS
Lineage:
Process_Step:
Process_Description:
Horizontal and Vertical data on the site benchmark was established using the following methods.
A 3/1/2" SFWMD brass disk was set on the concrete slab and stamped ACME WWTP 2007. Site benchmark ACME WWTP 2007 was occupied a total of three times consisting of four-hour GPS static sessions each time. The observed GPS baselines were from benchmark ACME WWTP 2007 to The National Geodetic Survey monuments G-413, N-233 and Z-537. Those National Geodetic Survey monuments were also connected to each other by four-hour static sessions. Trimble 5700 receivers and Zephyr model number 39105.00 antennas (without ground plane) were used for all static sessions.
The baseline files were processed and adjusted using Trimble Geomatics Office version 1.62 holding the published elevations of NGS monuments G-413, N-233 and Z-537. Two of the three observed adjusted values were averaged to obtain the final elevation of benchmark ACME WWTP 2007. The third one had a value difference of -0.3' from the other two with the remaining two being within 0.068' of each other. All the baselines passed the Chi Square Test at 95% confidence level. The expected accuracy for the final elevation of site benchmark "ACME WWTP 2007" is ± 0.10'. In addition the three GPS observations of site benchmark ACME WWTP 2007 were processed through the National Geodetic Survey's OPUS program. The difference between the highest and lowest processed orthometric heights was 0.076'.
Process_Date: 20071226
Spatial_Reference_Information:
Horizontal_Coordinate_System_Definition:

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                Geographic:
                        Latitude_Resolution: 26°38'05.2"
                        Longitude_Resolution: -80°13'57.3"
                        Geographic_Coordinate_Units: Degrees, minutes, and decimal seconds
Distribution_Information:
        Distributor:
                Contact_Information:
                        Contact_Organization_Primary:
                                Contact_Organization: Keith and Associates
                                Contact_Person: Michael Mossey
                        Contact_Position: Project Surveyor
                        Contact_Address:
                                Address_Type: mailing and physical address
                                Address: 301 East Atlantic Boulevard
                                City: Pompano Beach
                                State_or_Province: Florida
                                Postal_Code: 33060-6643
                                Country: Broward
                        Contact_Voice_Telephone: 954 788-3400
                        Contact_Facsimile_Telephone: 954 788-3500
                        Contact_Electronic_Mail_Address: mmossey@keith-associates.com
                        Hours_of_Service: 8:00-5:00 est.
        Distribution_Liability: None
Metadata_Reference_Information:
        Metadata_Date: 20080713
        Metadata_Review_Date: 20050721
        Metadata_Contact:
                Contact_Information:
                        Contact_Person_Primary:
                                Contact_Person: Michael M.Mossey, P.S.M.
                                Contact_Organization: Keith and Associates
                        Contact_Position: Project Surveyor
                        Contact_Address:
                                Address_Type: mailing and physical address
                                Address: 301 East Atlantic Boulevard
                                City: Pompano Beach
                                State_or_Province: FL
                                Postal_Code: 33060-6643
                                Country: USA
                        Contact_Voice_Telephone: 954 788-3400
                        Contact_Facsimile_Telephone: 954 788-3500
                        Contact_Electronic_Mail_Address: mmossey@keith-associates.com
                        Hours_of_Service: 8:00 am to 5:00 pm EST
        Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata
        Metadata_Standard_Version: 19940608
```

12-26-07
A.McKinney
A.P.nock

S.F.W.M.D.
"ACME IMP DIST WWTP"
SET & OBS DISC

SET 3 1/2" DISC. S.F.W.M.D. STAMPED ACME WWTP @ N.E. COR. OF WELL PAD COR +/- (INSIDE WELL AREA), 2.50'+/- S.W. OF THE N.E. COR. OF CONC. PAD., & 2.00'+/- S.W. OF N.E. COR OF 2' CONC. WALL..
VILLAGE OF WELLINGTON
WASTEWATER TREATMENT & RECLAMATION FACILITY
#11860 PIERSON RD... (GAURD GATE)

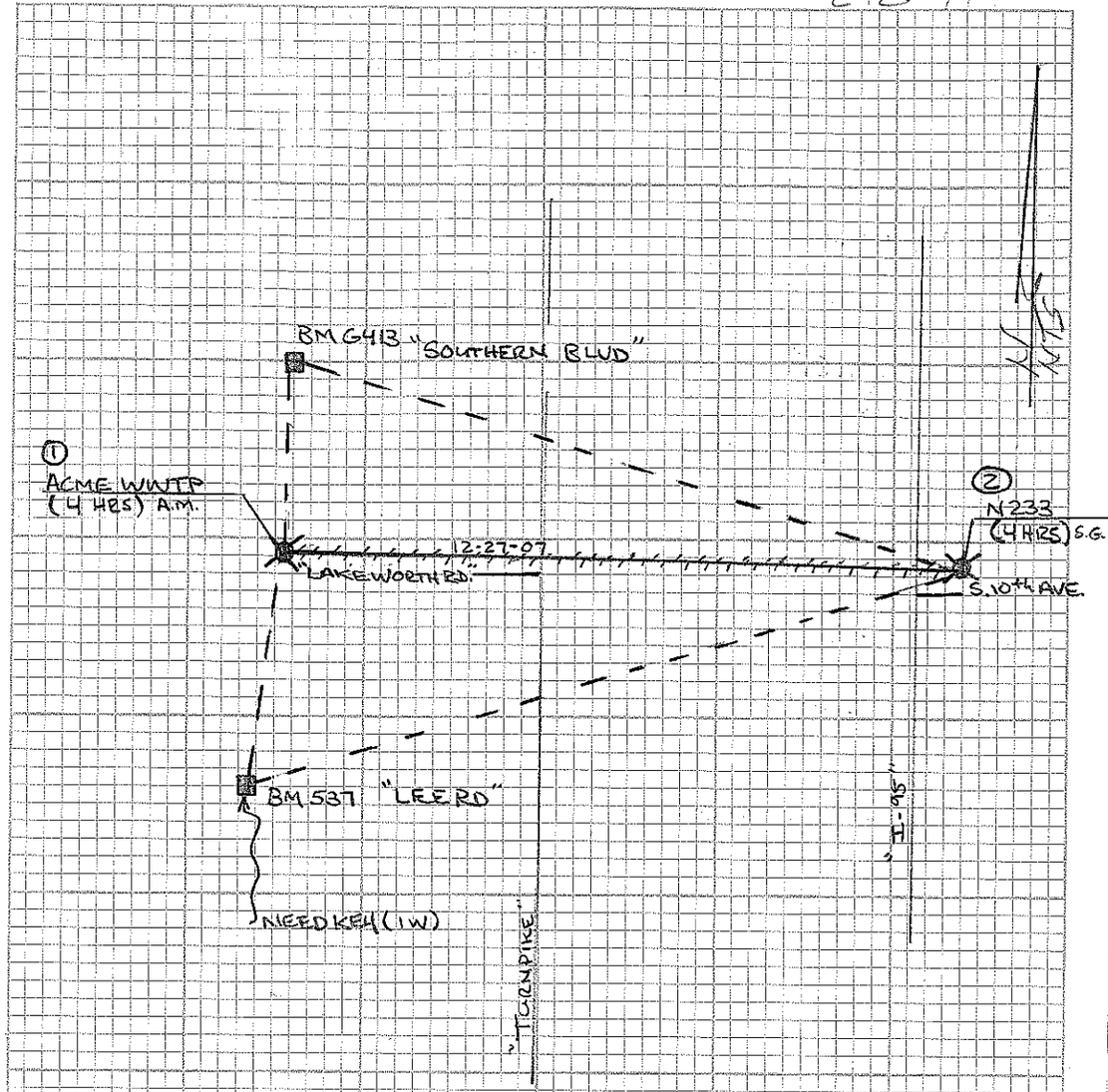
GPS @ ACME WWTP
START TIME: 11:21 AM
END TIME: 11:44 AM > 1460 (M)
HI: 4.790
S/N 60109000 (INT)
S/N 0220280228 (RCV)

12-27-07
A. McKinney
S. Grees

S.F.W.M.D.
ACME IMP DIST WWTP
TO N233... (4 HRS.)

①
GPS@ ACME WWTP
HI: 5.022
START TIME: 10:45 Am (CALLED @ 10:44 Am)
END TIME: 3:00 PM
S/N INT: 60109000
S/N RCV: 0220280228
OPERATOR: Anthony McKinney

②
GPS@ N233
HI: 5.253
START TIME: 10:37 Am
END TIME: 3:00 PM
S/N INT: 12299654
S/N RCV: 0220279869
OPERATOR: Shaun Grees



01-02-08
A.McKinney
S.Grees

S.F.W.M.D.
ACME IMP DIST WWTP
TO BM G413

~~① VOID~~
GPS @ BM G413
HI: 4.994
START TIME: 8:27 AM
END TIME: 5:39 PM
S/N INT: 60109000
S/N RCV: 0220280228
OPERATOR: Shawn Grees

~~② VOID~~
GPS @ ACME WWTP
HI: 4.935
START TIME: 8:36 AM
END TIME: 12:44 PM
S/N INT: 12299654
S/N RCV: 0220279869
OPERATOR: Anthony McKinney

~~② VOID~~
GPS @ N233
HI: 5.450
START TIME: 1:29 PM
END TIME: 5:39 PM
S/N INT: 12299654
S/N RCV: 0220279869
OPERATOR: Anthony McKinney

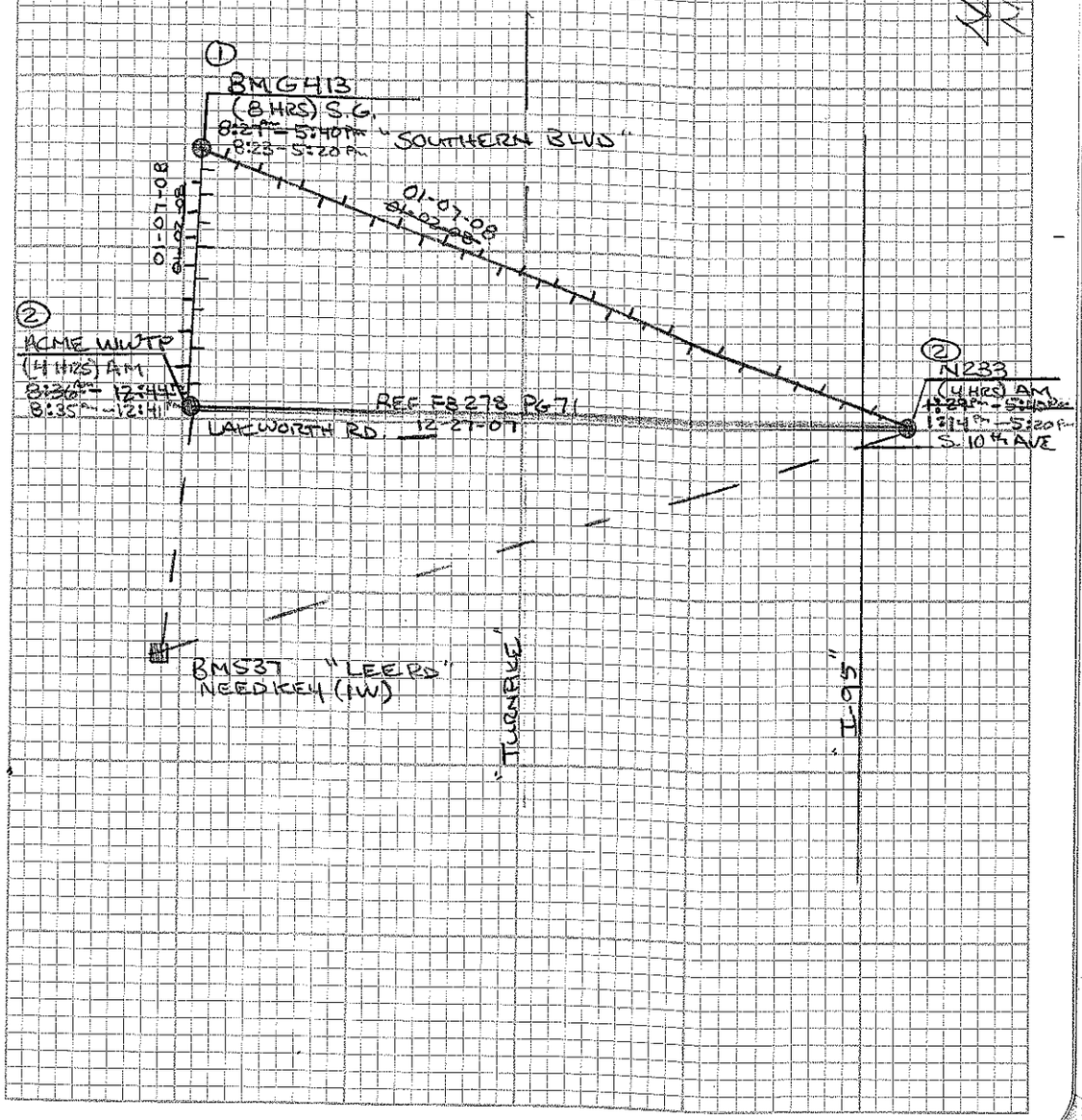
01-07-08
A.McKinney
S.Grees

① GPS @ BM G413
HI: 4.910 / 1.497 (m)
START TIME: 8:23 AM
END TIME: 5:20 PM
S/N INT: 60109000
S/N RCV: 0220279869
OPERATOR: Shawn Grees

② GPS @ ACME WWTP
HI: 4.764 / 1.452 (m)
START TIME: 8:35 AM
END TIME: 12:41 PM
S/N INT: 12299654
S/N RCV: 0220280228
OPERATOR: Anthony McKinney

② GPS @ N233
HI: 5.455 / 1.663 (m)
START TIME: 1:14 PM
END TIME: 5:20 PM
S/N INT: 12299654
S/N RCV: 0220280228
OPERATOR: Anthony McKinney

2-78-72



4.8.08

FERELS

HAIS

LAZOWICK

S.F.W.M.D.

ACME JMP DIST. WWTP

GPS @ Z-536 (END S.S. ROD IN PVC BOX W/ LID)

START TIME 8:51 AM

END TIME 1:00 PM

H.I. 5.461 / 1.664 (m)

S.N. 022082798669

GPS @ ACME WWTP (BRASS DISC IN CONC. S.F.W.M.D.)

START TIME 8:32 AM

END TIME 1:00 PM

H.I. 4.482 / 1.366 (m)

S.N. 022082802288

4.9.08 S.F.W.M.D.
FERRIS ACME IMP DIST W/WTP
MAIS

GPS @ Z 536

START TIME 8:15 AM
END TIME 5:15 PM
HI 5.381' / 1.640(m)
S/N 02202 79864

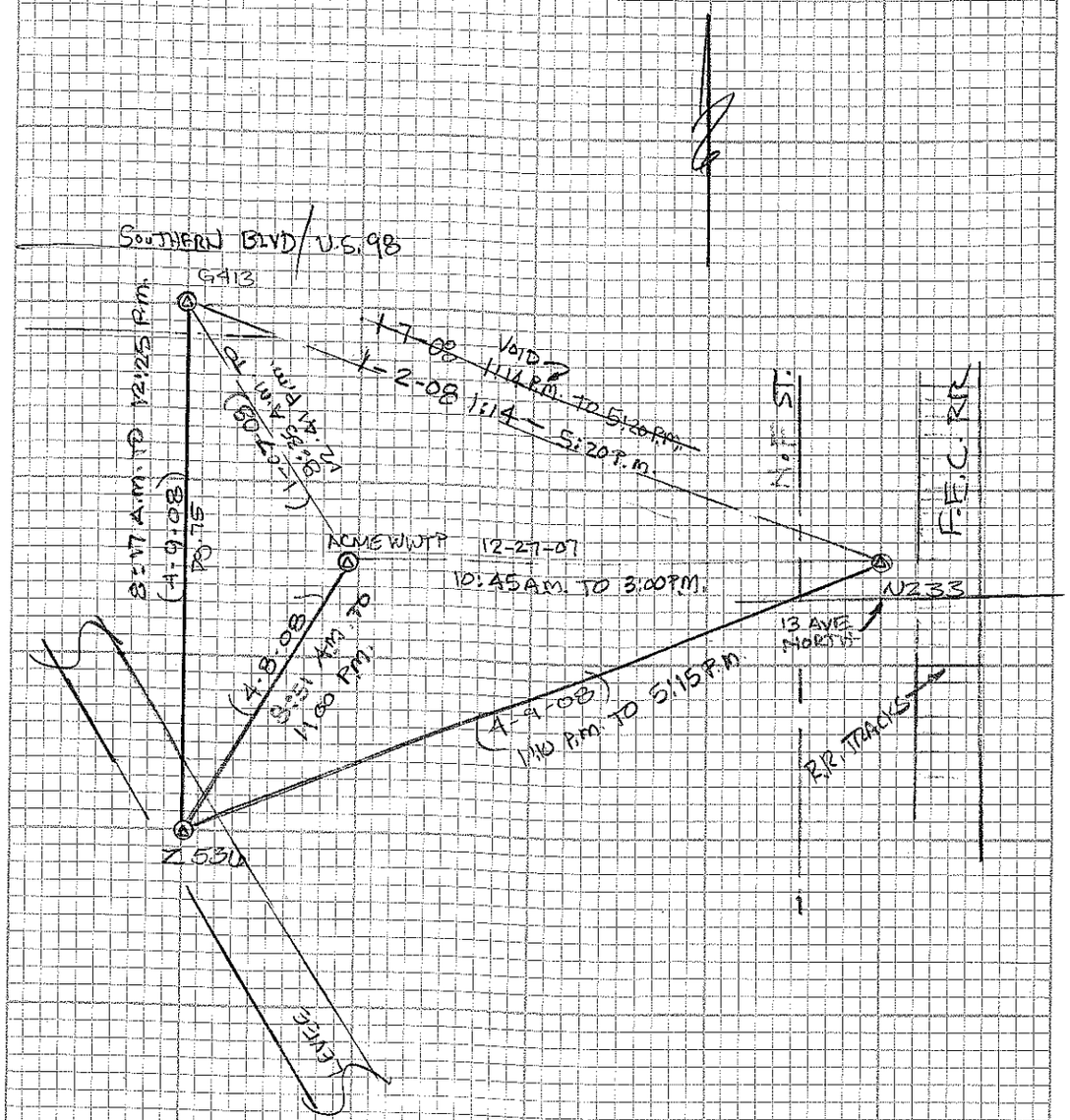
GPS @ G913

START TIME 8:17 AM
END TIME 12:25 PM
HI 4.815' / 1.469(m)
S/N 02202 80228

GPS @ N233

START TIME 1:10
END TIME 5:15 PM
HI 9.18 / 2.798(m)
S/N 02202-80228

278-776



07-07-08

A. McKinney
M. Mias

S.F.W.M.D.
ACME IMP DIST. WWTP
UPPER ZONE EL = 22.137 (22.10)
LOWER ZONE EL = 22.199 (22.20)
STATIC GPS 20 MINS..
BATTERIES DIED!!!

START TIME: ~~1:26~~ PM 2:00 PM
END TIME: 2:22 P.M.
INT. HT: 5.725
INT. SN# 12299654
REC. SN# 02202280228

STA	+	HI	-	EL	NGVD 1929 BM EL
	4765				19.08 ✓
BM 19.08	4.590 = 4592 ✓	23.672 ✓			
	4420				
	1.790		1.54 ✓		
LOWER ZONE	1.680 = 1.681 ✓	23.880 ✓	1.470 = 1.473 ✓	22.199 ✓	
	1.622		1.410	(22.20)	
	1.772		1.810 ✓		
UPPER ZONE	1.710 = 1.711 ✓	23.848 ✓	1.740 = 1.743	22.137 ✓	
	1.650		1.680	(22.10)	
			4.950		
BM 19.08			4.770 = 4.770	19.078 ✓	19.08
			4.590		0.002

278/77

NOTE: MORE PICTURE INFO FB 278 PG 78

DESCRIPTIONS

BM 19.08 = FND 3½" BRASS DISC S.F.W.M.D. "STAMPED ACME WWTP 2007" IN N.E. COR. OF WELL STATION...

LOWER ZONE = SET ELV. ON TOP OF FLOW NUT ON THE SOUTHSIDE OF 4" METAL WELL PIPE (LOWER ZONE)
(22.20) PIC: 0260, 0261, 0262, 0263, 0267

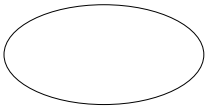
UPPER ZONE = SET ELV. ON THE WESTSIDE OF UPPER ZONE VALVE.. (GASKET CRESS LINE).
(22.10) PIC: 0260, 0264, 0265, 0266, 0268

BM 19.08 = SAME AS ABOVE!!!

Network Adjustment Report

Project : ACME FINAL

User name	mmossey	**Date & Time**	4:51:21 PM 6/20/2008
Coordinate System	US State Plane 1983	**Zone**	Florida East 0901
Project Datum	NAD 1983 (Conus)		
Vertical Datum		**Geoid Model**	sub0307(2)
Coordinate Units	US survey feet		
Distance Units	US survey feet		
Height Units	US survey feet		



Adjustment Style Settings - 99% Confidence Limits

Residual Tolerances

To End Iterations : 0.000033sft
Final Convergence Cutoff : 0.016404sft

Covariance Display

Horizontal
Propagated Linear Error [E] : U.S.
Constant Term [C] : 0.00000000sft
Scale on Linear Error [S] : 2.58

Three-Dimensional
Propagated Linear Error [E] : U.S.
Constant Term [C] : 0.00000000sft
Scale on Linear Error [S] : 2.58

Elevation Errors were used in the calculations.

Adjustment Controls

Compute Correlations for Geoid : False

Horizontal and Vertical adjustment performed

Set-up Errors

GPS
Error in Height of Antenna : 0.000sft
Centering Error : 0.000sft

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Statistical Summary

Successful Adjustment in 1 iteration(s)

Network Reference Factor : 1.00
Chi Square Test (α=95%) : PASS
Degrees of Freedom : 0.00

Sub-Network 1 Statistics

Reference Factor : 1.00
Chi Square Test (α=95%) : PASS
Degrees of Freedom : 0.00

Sub-Network 2 Statistics

Reference Factor : 1.00
Chi Square Test (α=95%) : PASS
Degrees of Freedom : 0.00

Sub-Network 3 Statistics

Reference Factor : 1.00
Chi Square Test (α=95%) : PASS
Degrees of Freedom : 0.00

Sub-Network 4 Statistics

Reference Factor : 1.00
Chi Square Test (α=95%) : PASS
Degrees of Freedom : 0.00

GPS Observation Statistics

Reference Factor : 1.00
Redundancy Number (r) : 0.00

Individual GPS Observation Statistics

Observation ID	Reference Factor	Redundancy Number
B1	1.00	0.00
B2	1.00	0.00
B3	1.00	0.00
B4	1.00	0.00
B5	1.00	0.00
B6	1.00	0.00

Weighting Strategies

GPS Observations
Default Scalar Applied to All Observations

Scalar : 1.00

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Sub-Network 1 Adjusted Coordinates

Adjustment performed in WGS-84

Number of Points : 2
Number of Constrained Points : 0

Adjusted Grid Coordinates

Errors are reported using 2.58σ.

Point Name	Northing	N error	Easting	E error	Elevation	e error	Fix
98693610	836300.607sft	0.010sft	963490.754sft	0.020sft	N/A	N/A	
02283610	837191.233sft	0.010sft	906878.001sft	0.020sft	N/A	N/A	

Adjusted Geodetic Coordinates

Errors are reported using 2.58σ.

Point Name	Latitude	N error	Longitude	E error	Height	h error	Fix
98693610	26°37'52.87322" N	0.010sft	80°03'33.33773" W	0.020sft	-71.410sft	0.061sft	
02283610	26°38'05.43971" N	0.010sft	80°13'57.09223" W	0.020sft	-66.794sft	0.061sft	

Coordinate Deltas

Point Name	ΔNorthing	ΔEasting	ΔElevation	ΔHeight	ΔGeoid Separation
98693610	0.000sft	0.000sft	N/A	0.000sft	N/A
02283610	0.000sft	0.000sft	N/A	0.000sft	N/A

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Sub-Network 2 Adjusted Coordinates

Adjustment performed in WGS-84

Number of Points : 3
Number of Constrained Points : 0

Adjusted Grid Coordinates

Errors are reported using 2.58σ.

Point Name	Northing	N error	Easting	E error	Elevation	e error	Fix
98690070	854350.678sft	0.006sft	896315.681sft	0.017sft	N/A	N/A	

02280070	837191.243sft	0.007sft	906877.927sft	0.019sft	N/A	N/A	
02280071	836300.616sft	0.012sft	963490.759sft	0.032sft	N/A	N/A	

Adjusted Geodetic Coordinates

Errors are reported using 2.58σ.

Point Name	Latitude	N error	Longitude	E error	Height	h error	Fix
98690070	26°40'55.98799" N	0.006sft	80°15'52.39497" W	0.017sft	-66.952sft	0.035sft	
02280070	26°38'05.43982" N	0.007sft	80°13'57.09305" W	0.019sft	-67.146sft	0.041sft	
02280071	26°37'52.87332" N	0.012sft	80°03'33.33768" W	0.032sft	-71.595sft	0.066sft	

Coordinate Deltas

Point Name	ΔNorthing	ΔEasting	ΔElevation	ΔHeight	ΔGeoid Separation
98690070	0.000sft	0.000sft	N/A	0.000sft	N/A
02280070	0.000sft	0.000sft	N/A	0.000sft	N/A
02280071	0.000sft	0.000sft	N/A	0.000sft	N/A

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Sub-Network 3 Adjusted Coordinates

Adjustment performed in WGS-84

Number of Points : 2
Number of Constrained Points : 0

Adjusted Grid Coordinates

Errors are reported using 2.58σ.

Point Name	Northing	N error	Easting	E error	Elevation	e error	Fix
98690990	821038.280sft	0.003sft	894716.218sft	0.008sft	N/A	N/A	
02280990	837191.256sft	0.003sft	906877.950sft	0.008sft	N/A	N/A	

Adjusted Geodetic Coordinates

Errors are reported using 2.58σ.

Point Name	Latitude	N error	Longitude	E error	Height	h error	Fix
98690990	26°35'26.17839" N	0.003sft	80°16'12.12537" W	0.008sft	-59.780sft	0.017sft	
02280990	26°38'05.43995" N	0.003sft	80°13'57.09280" W	0.008sft	-66.861sft	0.017sft	

Coordinate Deltas

Point Name	ΔNorthing	ΔEasting	ΔElevation	ΔHeight	ΔGeoid Separation
98690990	0.000sft	0.000sft	N/A	0.000sft	N/A
02280990	0.000sft	0.000sft	N/A	0.000sft	N/A

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Sub-Network 4 Adjusted Coordinates

Adjustment performed in WGS-84

Number of Points : 3
Number of Constrained Points : 0

Adjusted Grid Coordinates

Errors are reported using 2.58σ.

Point Name	Northing	N error	Easting	E error	Elevation	e error	Fix
98691000	821038.278sft	0.004sft	894716.235sft	0.013sft	N/A	N/A	

02281000	854350.698sft	0.006sft	896315.718sft	0.017sft	N/A	N/A	
02281001	836300.603sft	0.008sft	963490.694sft	0.023sft	N/A	N/A	

Adjusted Geodetic Coordinates

Errors are reported using 2.58σ.

Point Name	Latitude	N error	Longitude	E error	Height	h error	Fix
98691000	26°35'26.17836" N	0.004sft	80°16'12.12518" W	0.013sft	-59.869sft	0.027sft	
02281000	26°40'55.98819" N	0.006sft	80°15'52.39457" W	0.017sft	-66.803sft	0.036sft	
02281001	26°37'52.87319" N	0.008sft	80°03'33.33840" W	0.023sft	-71.428sft	0.048sft	

Coordinate Deltas

Point Name	ΔNorthing	ΔEasting	ΔElevation	ΔHeight	ΔGeoid Separation
98691000	0.000sft	0.000sft	N/A	0.000sft	N/A
02281000	0.000sft	0.000sft	N/A	0.000sft	N/A
02281001	0.000sft	0.000sft	N/A	0.000sft	N/A

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Control Coordinate Comparisons

Values shown are control coord minus adjusted coord.

Point Name	ΔNorthing	ΔEasting	ΔElevation	ΔHeight
98693610	N/A	N/A	N/A	N/A
98690070	N/A	N/A	N/A	N/A
02280071	N/A	N/A	N/A	N/A
98690990	0.000sft	0.000sft	N/A	0.000sft

98691000	0.003sft	-0.017sft	N/A	0.089sft
02281000	N/A	N/A	N/A	N/A
02281001	N/A	N/A	N/A	N/A

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Adjusted Observations

Adjustment performed in WGS-84

GPS Observations

Number of Observations : 6
Number of Outliers : 4

Sub-Network 1

Observation Adjustment (Critical Tau = 0.00). Any outliers are in red.

Obs. ID	From Pt.	To Pt.		Observation	A-posteriori Error (2.58σ)	Residual	Stand. Residual
B1	98693610	02283610	**Az.**	271°19'22.9057"	0°00'00.0766"	0°00'00.0000"	0.00
			ΔHt.	4.616sft	0.122sft	0.000sft	0.00
			Dist.	56618.018sft	0.040sft	0.000sft	0.00

Sub-Network 2

Observation Adjustment (Critical Tau = 0.00). Any outliers are in red.

Obs. ID	From Pt.	To Pt.		Observation	A-posteriori Error (2.58σ)	Residual	Stand. Residual
B2	98690070	02280070	**Az.**	148°42'58.3334"	0°00'00.1477"	0°00'00.0000"	0.00
			ΔHt	-0.194sft	0.039sft	0.000sft	0.00

			.				
			Dist.	20149.415sft	0.010sft	0.000sft	0.00
B3	98690070	02280071	Az.	105°22'12.6207"	0°00'00.0583"	0°00'00.0000"	0.00
			ΔHt.	-4.643sft	0.097sft	0.000sft	0.00
			Dist.	69555.945sft	0.046sft	0.000sft	0.00

Sub-Network 3

Observation Adjustment (Critical Tau = 0.00). Any outliers are in red.

Obs. ID	From Pt.	To Pt.		Observation	A-posteriori Error (2.58σ)	Residual	Stand. Residual
B4	98690990	02280990	Az.	37°18'12.4413"	0°00'00.1337"	0°00'00.0000"	0.00
			ΔHt.	-7.081sft	0.034sft	0.000sft	0.00
			Dist.	20219.257sft	0.011sft	0.000sft	0.00

Sub-Network 4

Observation Adjustment (Critical Tau = 0.00). Any outliers are in red.

Obs. ID	From Pt.	To Pt.		Observation	A-posteriori Error (2.58σ)	Residual	Stand. Residual
B6	98691000	02281001	Az.	77°48'53.2591"	0°00'00.0320"	0°00'00.0000"	0.00
			ΔHt.	-11.559sft	0.069sft	0.000sft	0.00
			Dist.	70445.698sft	0.034sft	0.000sft	0.00
B5	98691000	02281000	Az.	3°04'34.3242"	0°00'00.1164"	0°00'00.0000"	0.00

			ΔHt.	-6.934sft	0.041sft	0.000sft	0.00
			Dist.	33350.569sft	0.007sft	0.000sft	0.00

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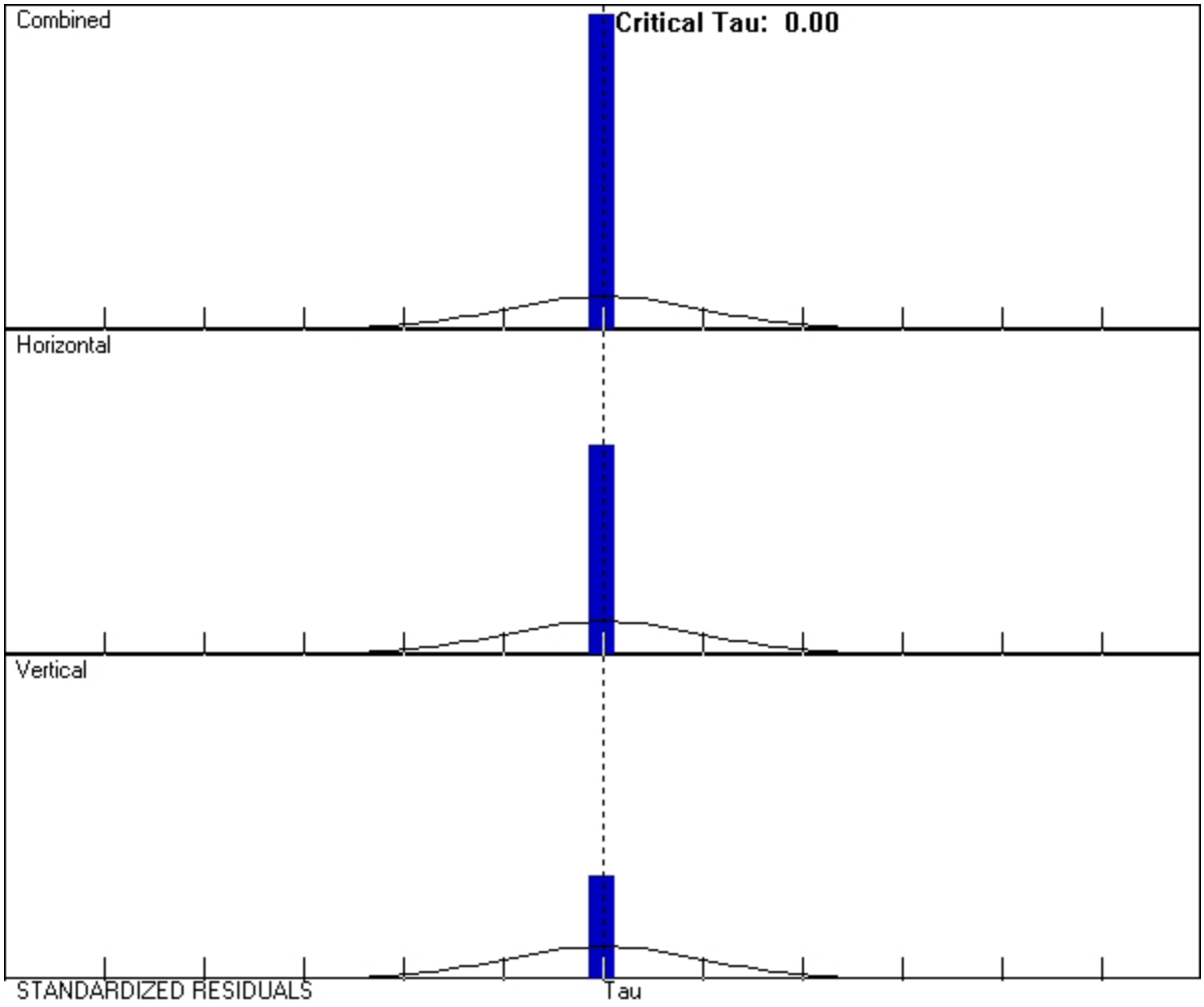
Histograms of Standardized Residuals



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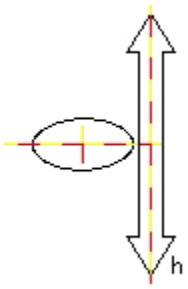
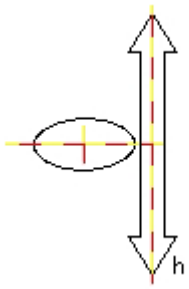
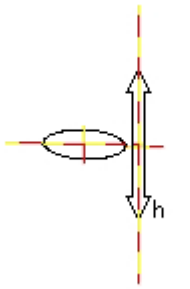
Point Error Ellipses

98693610	02283610	98690070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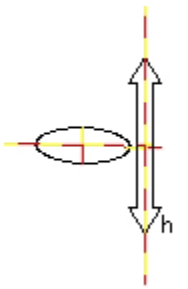
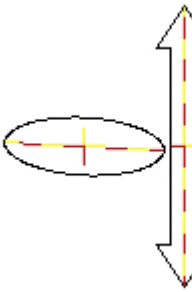
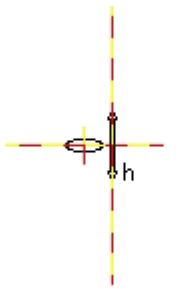
02280070	**02280071**	**98690990**
		
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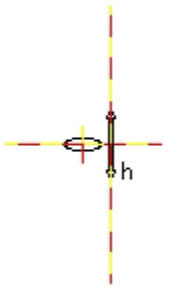
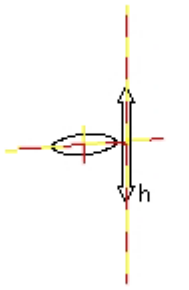
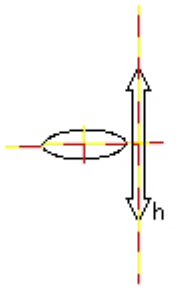
02280990	**98691000**	**02281000**
		
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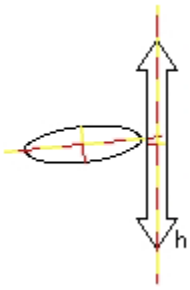
02281001		
		
Tick Size: 0.0100sft Horizontal Bivariate Scalar: 3.04σ Vertical Univariate Scalar: 2.58σ		

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Covariant Terms

Adjustment performed in WGS-84

From Point	To Point		Components	A-posteriori Error (2.58σ)	Horiz. Precision (Ratio)	3D Precision (Ratio)
98693610	02283610	**Az.**	271°19'22.9057"	0°00'00.0766"	1:1398238	1:1398238
		ΔHt.	4.616sft	0.122sft		
		ΔElev.	?	?		
		Dist.	56618.018sft	0.040sft		
98690070	02280070	**Az.**	148°42'58.3334"	0°00'00.1477"	1:2025576	1:2025576
		ΔHt.	-0.194sft	0.039sft		
		ΔElev.	?	?		
		Dist.	20149.415sft	0.010sft		
98690070	02280071	**Az.**	105°22'12.6207"	0°00'00.0583"	1:1504407	1:1504407
		ΔHt.	-4.643sft	0.097sft		
		ΔElev.	?	?		
		Dist.	69555.945sft	0.046sft		
98690990	02280990	**Az.**	37°18'12.4413"	0°00'00.1337"	1:1897820	1:1897820
		ΔHt.	-7.081sft	0.034sft		
		ΔElev.	?	?		
		Dist.	20219.257sft	0.011sft		
98691000	02281000	**Az.**	3°04'34.3242"	0°00'00.1164"	1:4547785	1:4547785
		ΔHt.	-6.934sft	0.041sft		
		ΔElev.	?	?		
		Dist.	33350.569sft	0.007sft		
98691000	02281001	**Az.**	77°48'53.2591"	0°00'00.0320"	1:2086709	1:2086709
		ΔHt.	-11.559sft	0.069sft		
		ΔElev.	?	?		
		Dist.	70445.698sft	0.034sft		

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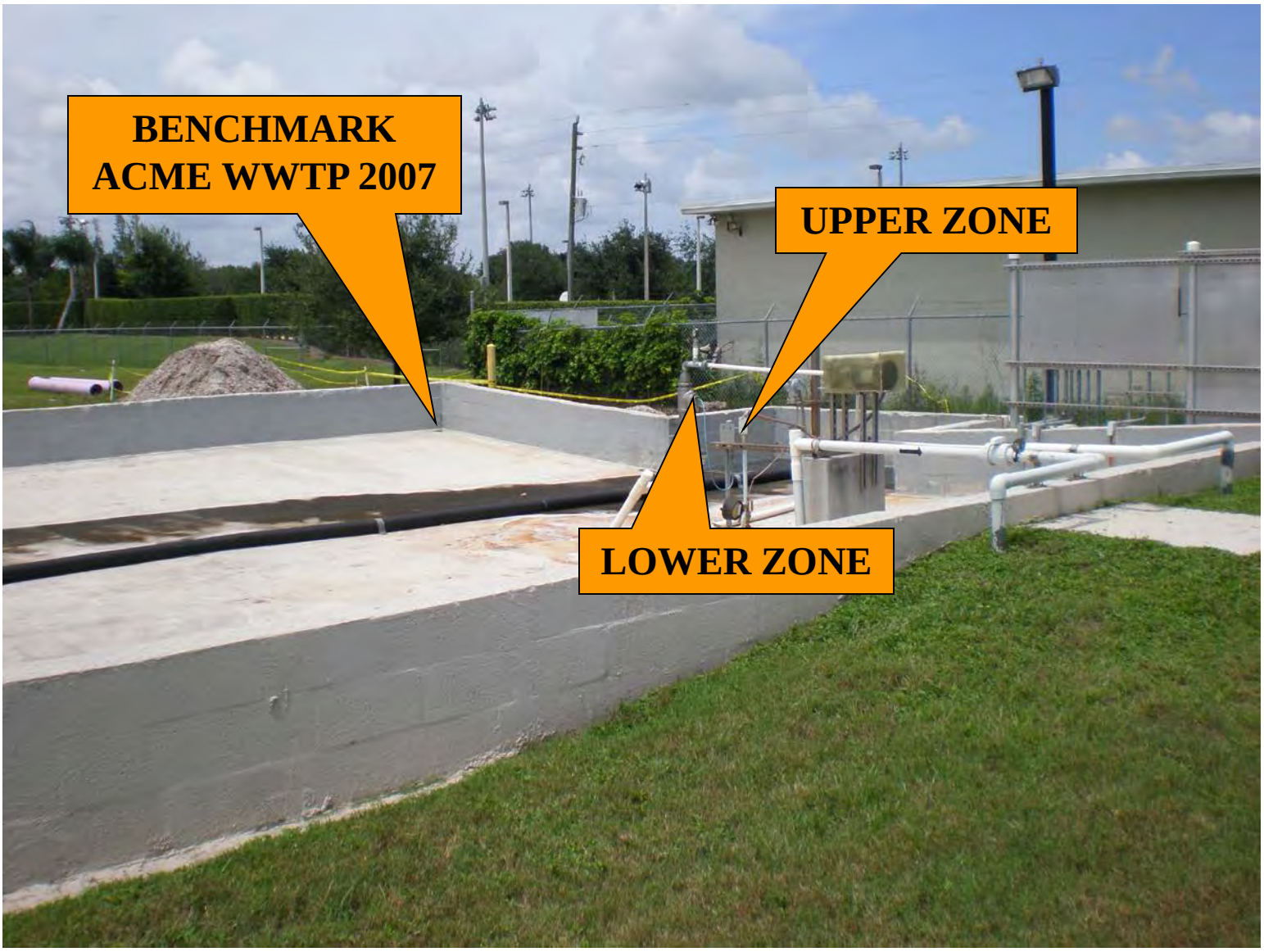
ACME IMPROVEMENT

DISTRICT WELL SITE



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ACME IMPROVEMENT

DISTRICT WELL SITE

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Benchmark ACME WWTP 2007

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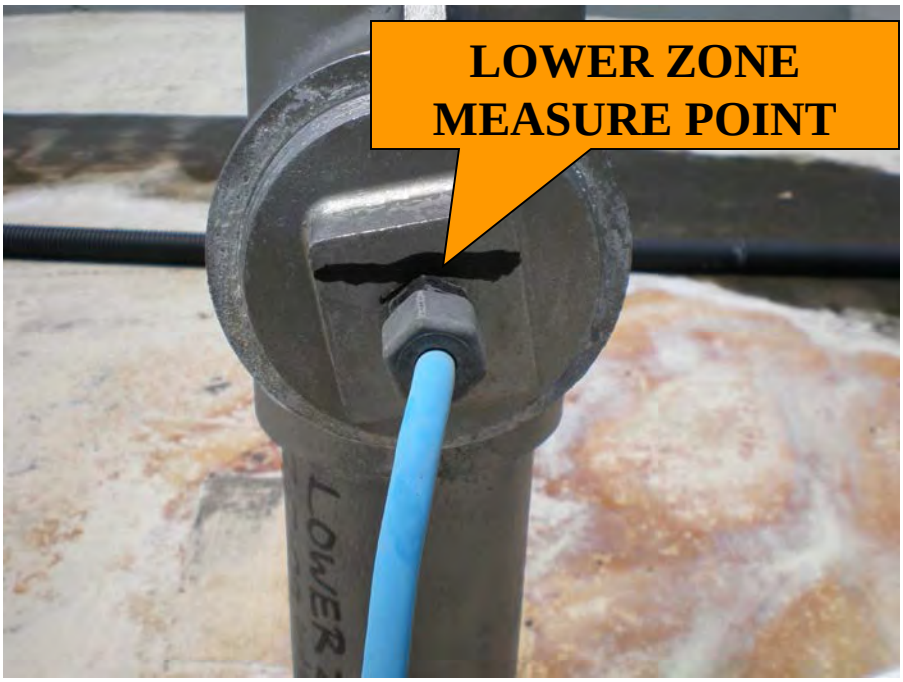
DISTRICT WELL SITE



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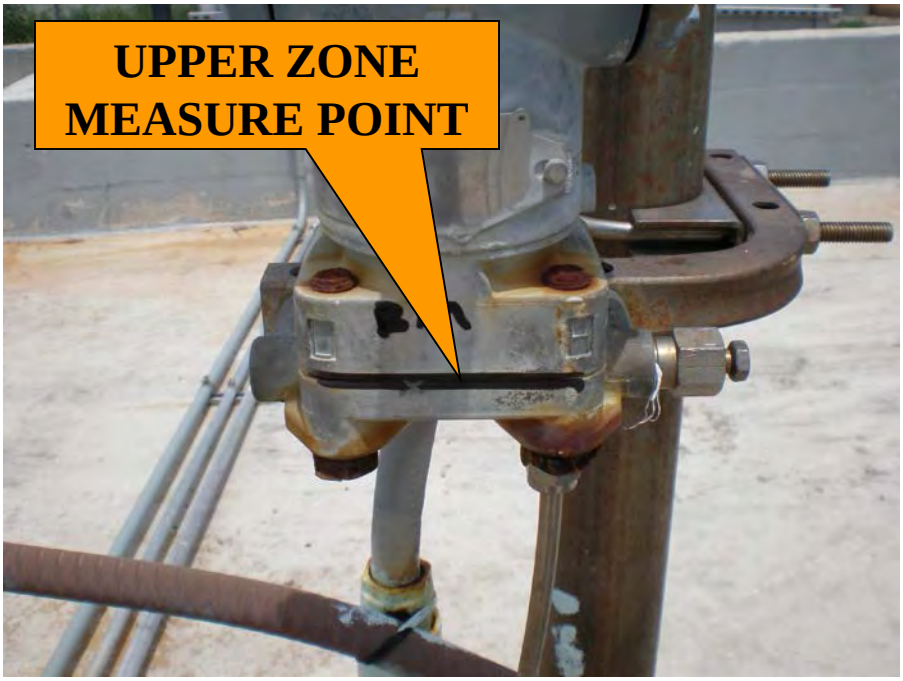
Keith and Associates, Inc.

Lower Zone Measure Point

ACME IMPROVEMENT

DISTRICT WELL SITE



07/07/08

Keith and Associates, Inc.

Upper Zone Measure Point