# Surveyor's Report

Report Date: 9/21/10 Submittal: Final

Prepared for: SCADA Telemetry Monitoring

# South Florida Water Management District



South Florida Water Management District SURVEY SECTION 3301 Gun Club Road West Palm Beach, Florida 33406 Phone; 561.686.8800 Fax: 561.682.0066

# TABLE OF CONTENTS

Introduction	2
Purpose	3
Project Location	3
Datum	3
Leveling Methods	4
Horizontal Locations	4 - 5
Vertical Control	5 - 10
Project Results	10 - 16
Surveyor's Certificate	17

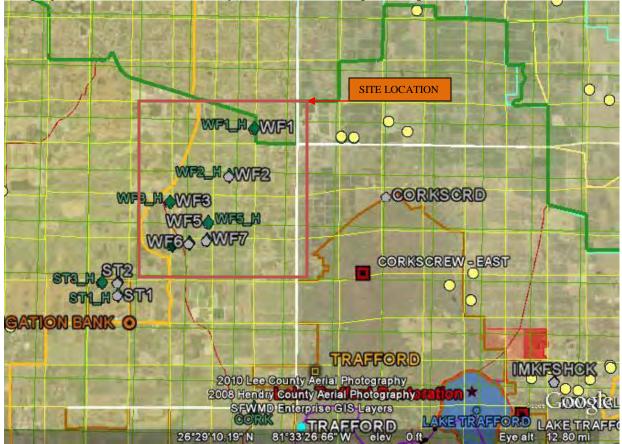
# **OVERVIEW OF THE PROJECT**

#### PURPOSE

The purpose of this Survey is to establish Reference Elevations for monitoring wells by establishing NGS Third order elevations referring to both the North American Vertical Datum of 1988 (NAVD-88) and the National Geodetic Vertical Datum of 1929 (NGVD-29) at the site.

#### **Location of Project**

The project is located in Lee County, Florida. Following is a map of Location.



General Location (Not to Scale)

#### VERTICAL DATUM FOR THE PROJECT

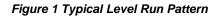
The vertical datum for the project is the North American Vertical Datum of 1988. For correlation with older data sets, the elevations of the benchmarks are also shown in the National Geodetic Vertical Datum (NGVD) of 1929. The NGVD 29 elevations were derived using data from published NGS superseded values when applicable, otherwise values provided by the South Florida Water Management District in a file named "NGVD29.txt" were used. The linear unit for all elevations is the U.S. survey feet unless otherwise stated.

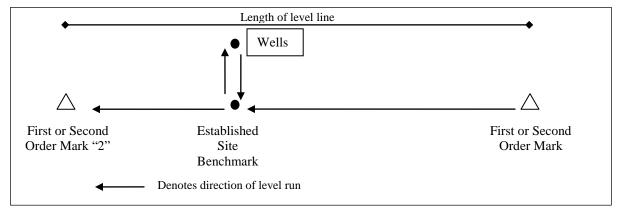
# LEVELING METHODS

#### **CONFIGURATION OF LEVEL RUNS**

The leveling for the project was performed in accordance with the Federal Geodetic Control Subcommittee standard for Second-Order, Class II geodetic leveling. A brief description of the procedures used is as follows. The run was started at one of the First or Second Order marks and continued through the existing reference point established at the well and closed on the original First or Second Order vertical mark. (see Figure 1. below).

For each well site, a closed loop was run from an established Third Order vertical mark (Site Benchmark).





The FGCS maximum allowable misclosure for this type of run is 0.03' multiplied by the square root of the length of the line in miles.

#### EQUIPMENT USED

All leveling was performed with a Zeiss NI2 Level; Serial # 159720 and Philadelphia rod.

# HORIZONTAL LOCATIONS

#### INTRODUCTION

The following instrument was used for the GPS observations: (1) Trimble GeoXT hand held unit

Description	X, (Easting) 83/99	Y, (Northing) 83/99	Latitude	Longitude
	Coordinates	Coordinates		
BM W244	390938.820	767259.044	26 26 32	81 48 32
BM P533	466722.955	796031.467	26 31 21	81 34 45.7
LC-4	455507.41	785414.08	26 29 32.7	81 36 46.2
LC-6	456007.12	779750.23	26 28 39.3	81 36 42.8
LC-7	458290.583	779934.191	26 28 41.2	81 36 17.7
LC-10	463230.55	788644.30	26 30 07.7	81 35 23.8
LEE-18	460637.74	782573.90	26 29 07.5	81 35 52.0

Description	ion X, (Easting) 83/99 Y, (Northing) 83/99		Latitude	Longitude
	Coordinates	Coordinates		
LEE-19	460636.64	780557.36	26 28 46.6	81 35 53.6
WF 2	463195.288	788554.604	26 30 06.8	81 35 24.16
WF 3	455730.227	785146.406	26 29 32.7	81 36 46.15
WF 4	456109.126	779807.195	26 28 39.84	81 36 41.7
WF 5	460633.160	782664.623	26 29 08.35	81 35 52.06
WF 6	458253.027	780063.613	26 28 42.48	81 36 18.12
WF 7	460480.264	780465.151	26 28 46.56	81 35 53.63

# PROJECT RESULTS

The following tables list the elevations established for each existing or new mark, the level run misclosure, "to-reach" description for each mark and a photo of the mark. All elevations and coordinates are in US Survey Feet.

# SURVEYOR'S REPORT VERTICAL CONTROL

BM W 244 (AD1343)	ation:	12.34 ft	(NAVD 88)	13.54 ft	(NGVD 29)		
BM P 533 (AJ 7541)	Elevation:		29.86 ft	(NAVD 88)	31.074 ft	(NGVD 29)	
Site BM	LC-10		<b>30.686</b> ft	(NAVD 88)	31.90 ft	(NGVD 29)	
Monitoring Well	WF 2 (STG)		34.48ft	(NAVD 88)	35.69ft	(NGVD 29)	
Ground Water Well	WF 2 (GW)		31.93ft	(NAVD 88)	33.14ft	(NGVD 29)	
Length of Run:		01 mi	To Reach LC-10:				
Max Allowable Misclosure:							
Actual Misclosure:		0 00 ft	<b>TO REACH</b> the Mark from SR29 and SR82 (south of				

**IO REACH** the Mark from SR29 and SR82 (south of Labelle)...go west on SR82 for 8.6mls to Farm gate entrance on south side of Rd. Continue thru gate easterly along a dirt Rd for 0.9ml to 90deg. Bend, continue south for 1.5ml to another bend, go west 0.5ml to another bend to the south....go west NW along dirt trail and ditch on west side 550ft to concrete pump pad and Mark...



Mark recovered as described in SFWMD database in good condition.



BM W 244 (AD 1343)	Elevation:	12.34ft	(NAVD 88)	13.54ft	(NGVD 29)
BM P 533 (AJ 7541)	Elevation:	29.86ft	(NAVD 88)	31.074ft	(NGVD 29)
Site BM	LC-4	31.64ft	(NAVD 88)	32.85ft	(NGVD 29)
Monitoring Well	WF 3 (STG)	33.08ft	(NAVD 88)	34.29ft	(NGVD 29)
Ground Water Well	WF 3 (GW)	31.46ft	(NAVD 88)	32.67ft	(NGVD 29)
		To Reach LC-4:			
		1			

**TO REACH** the Mark from SR29 and SR82 (south of Labelle)...go west on SR82 for 8.6mls to Farm gate entrance on south side of Rd. Continue thru gate for 1.0ml to a "T" intersection. ...go right and meander for 1.7ml to office on left...continue 0.2ml to another "T" intersection ...go right for 0.4ml to Mark.



Mark recovered as described in SFWMD database in good condition.



BM W 244 (AD 1343)	Elevation:	12.34 ft	(NAVD 88)	13.54 ft	(NGVD 29)
BM P 533 (AJ 7541)	Elevation:	29.86ft	(NAVD 88)	31.074ft	(NGVD 29)
Site BM	LC-6	32.01ft	(NAVD 88)	33.22ft	(NGVD 29)
Monitoring Well	WF 4 (STG)	32.67ft	(NAVD 88)	33.88ft	(NGVD 29)
Ground Water Well	WF 4 (GW)	31.13ft	(NAVD 88)	32.34ft	(NGVD 29)
		To Reach LC-6:			

**TO REACH** the Mark from SR29 and SR82 (south of Labelle)...go west on SR82 for 8.6mls to Farm gate entrance on south side of Rd. Continue thru gate for 1.0ml to a "T" intersection. ...go right and meander for 1.7ml to office on left...continue 0.2ml to another "T" intersection ...go right for 1.6ml to Mark.



Mark recovered as described in SFWMD database in good condition.



BM W 244 (AD 1343)	Elevation:	12.34 ft	(NAVD 88)	13.54 ft	(NGVD 29)
BM P 533 (AJ 7541)	Elevation:	29.86ft	(NAVD 88)	31.074ft	(NGVD 29)
Site BM	LEE- 18	28.58ft	(NAVD 88)	29.79ft	(NGVD 29)
Monitoring Well	WF 5 (STG)	33.71ft	(NAVD 88)	34.92ft	(NGVD 29)
Ground Water Well	WF 5 (GW)	32.44ft	(NAVD 88)	33.65ft	(NGVD 29)
		To Reach LEE-	18:		

**TO REACH** the Mark from SR29 and SR82 (south of Labelle)...go west on SR82 for 8.6mls to Farm gate entrance on south side of Rd. Continue thru gate easterly along a dirt Rd for 0.9ml to a 90deg. Bend...go south 1.5ml to another 90deg. Bend..continue 0.2ml to another 90deg. Bend...go west 0.6ml to a "T" intersection ...go south meandering 1.0ml to a double ditch with a berm in the middle running east/west ... go to the south side of the south ditch... go east along the south side of the ditch for 0.25ml and Mark.



Mark recovered as described in SFWMD database in good condition.



BM W 244 (AD 1343)	Elevation:	12.34ft	(NAVD 88)	13.54 ft	(NGVD 29)
BM P 533 (AJ 7541)	Elevation:	29.86ft	(NAVD 88)	31.074ft	(NGVD 29)
Site BM	LC- 7	28.81ft	(NAVD 88)	30.02ft	(NGVD 29)
Monitoring Well	WF 6 (STG)	31.985ft	(NAVD 88)	33.195ft	(NGVD 29)
Ground Water Well	WF 6 (GW)	30.205ft	(NAVD 88)	31.415ft	(NGVD 29)
	I	To Reach LC-7:			
	d in SFWMD database in good dition.	TO REACH th Labelle)go wes entrance on sout to a "T" intersect office on leftco go right and m culvert and mear main Rd left is gr	st on SR82 for 8 h side of Rd. Co iongo right a ntinue 0.2ml to eander 1.7ml nder 0.8ml to a "	3.6mls to Fam ontinue thru g ind meander f another "T" in .go left at a di 'T" intersectio	n gate ate for 1.0ml for 1.7ml to tersection rt Rd with n Right is

BM W 244 (AD 1343)	Elevation:	12.54 ft	(NAVD 88)	13.54 ft	(NGVD 29)
BM P 533 (AJ 7541)	Elevation:	29.86ft	(NAVD 88)	31.074ft	(NGVD 29)
Site BM	LEE- 19	28.23ft	(NAVD 88)	29.44ft	(NGVD 29)
Monitoring Well	WF 7 (STG)	33.22ft	(NAVD 88)	34.43ft	(NGVD 29)
Ground Water Well	WF 7 (GW 1)	30.55ft	(NAVD 88)	31.76ft	(NGVD 29)
Ground Water Well	WF 10 (GW 2)	30.89ft	(NAVD 88)	32.10ft	(NGVD 29)
		To Reach LEE -	19:		
		1			



Mark recovered as described in SFWMD database in good condition.

**TO REACH** the Mark from SR29 and SR82 (south of Labelle)...go west on SR82 for 8.6mls to Farm gate entrance on south side of Rd. Continue thru gate easterly along a dirt Rd for 0.9ml to a 90deg. Bend...go south 1.5ml to another 90deg. Bend...ontinue 0.2ml to another 90deg. Bend...go west 0.6ml to a "T" intersection ...go south meandering 1.2ml to a "T"...go west 0.1ml to a 90deg bend....go south 0.2ml to a double ditch with a berm in the middle...go east 0.45ml along the north side of the north ditch to the earthen bridge going southerly and the Mark.



# WF 2 (STG) and (GW) Wells

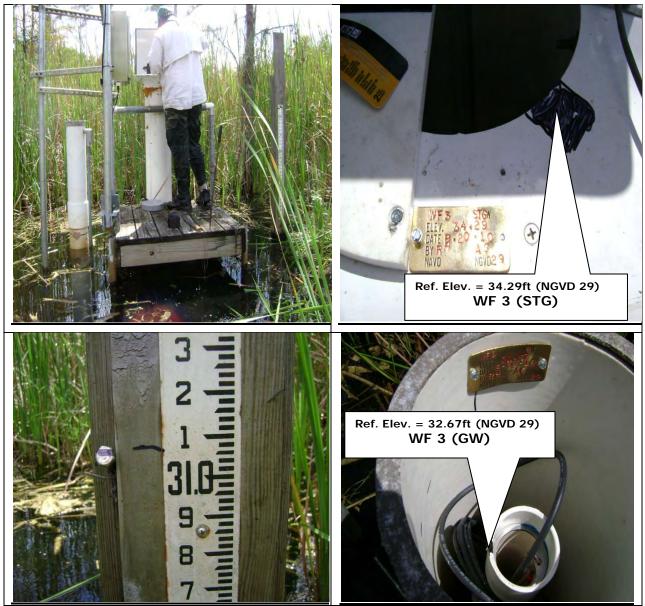


Elevation are shown in NGVD 29 datum unless noted otherwise

Party Chief. Hudson Field Book: Misc. FB# 007 Pg# 56 Bench Mark: "LC-10" Elev. = 30.686 ft (NAVD 88) Elev. = 31.90 ft (NGVD 29) Date of Survey: September 14, 2010.

**Offset:** = 1.213ft add this value to NAVD 88 to obtain NGVD 29 values

# WF 3 (STG) and (GW) Wells



Elevation are shown in NGVD 29 datum unless noted otherwise

Party Chief. Hudson Field Book: Misc. FB# 007 Pg# 57 Bench Mark: "LC-4" Elev. = 31.64 ft (NAVD 88) Elev. = 32.85 ft (NGVD 29) Date of Survey: September 20, 2010.

**Offset:** = 1.21ft add this value to NAVD 88 to obtain NGVD 29 value

# WF 4 (STG) and (GW) Wells



Elevation are shown in NGVD 29 datum unless noted otherwise

Party Chief. Hudson Field Book: Misc. FB# 007 Pg# 57 Bench Mark: "LC-6" Elev. = 32.01 ft (NAVD 88) Elev. = 33.22 ft (NGVD 29) Date of Survey: July 20, 2010. Offset: = 1.21ft add this value to NAVD 88 to obtain NGVD 29 value

# WF 5 (STG) and (GW) Wells



Elevation are shown in NGVD 29 datum unless noted otherwise

Party Chief R. Hudson, Field Book: Misc. FB# 007 Pg#49 Bench Mark: "LEE-18" Elev. = 28.58 ft (NAVD 88) Elev. = 29.79ft (NGVD 29) Date of Survey: July 15, 2010.

**Offset:** = 1.21ft add this value to NAVD 88 to obtain NGVD 29 value

# WF 6 (STG) and (GW) Wells



Elevation are shown in NGVD 29 datum unless noted otherwise

Party Chief R. Hudson, Field Book: Misc. FB# 007 Pg# 56 Bench Mark: "LC-7" Elev. = 28.81 ft (NAVD 88) Elev. = 30.02ft (NGVD 29) Date of Survey: September 15, 2010.

**Offset:** = 1.21ft add this value to NAVD 88 to obtain NGVD 29 value

# WF 7 (STG) and (GW) Wells



Elevation are shown in NGVD 29 datum unless noted otherwise

Party Chief R. Hudson, Field Book: Misc. FB# 007 Pg# 55 Bench Mark: "LEE-19" Elev. = 28.23 ft (NAVD 88) Elev. = 29.44ft (NGVD 29) Date of Survey: September 8, 2010.

**Offset:** = 1.21ft add this value to NAVD 88 to obtain NGVD 29 value.

# Abbreviation:

NAVD 88 -	North American Vertical Datum of 1988
NGVD 29 –	National Geodetic Vertical Datum of 1929
NAD 83/99-	(Horizontal Datum) North American Datum
NGS –	National Geodetic Survey.
SFWMD –	South Florida Water Management District
PSM –	Professional Surveyor & Mapper

# SURVEYOR'S CERTIFICATION

I hereby certify that this Specific Purpose Survey was made under my responsible charge and meets applicable portions of the Minimum Technical Standards set forth by the Florida Board of Professional Surveyors and Mappers in Chapter 5J-17.050 thru 5J-17.052, Florida Administrative Code, pursuant to Section 472.027, Florida State Statutes. This report is prepared for the sole and specific use of the South Florida Water Management District and is not assignable.

\_\_\_\_\_

Date of Survey 7/15 - 9/15, 2010

Elvie D. Ebanks PSM Professional Surveyor and Mapper State of Florida Certificate No. 5765

\_\_\_\_\_

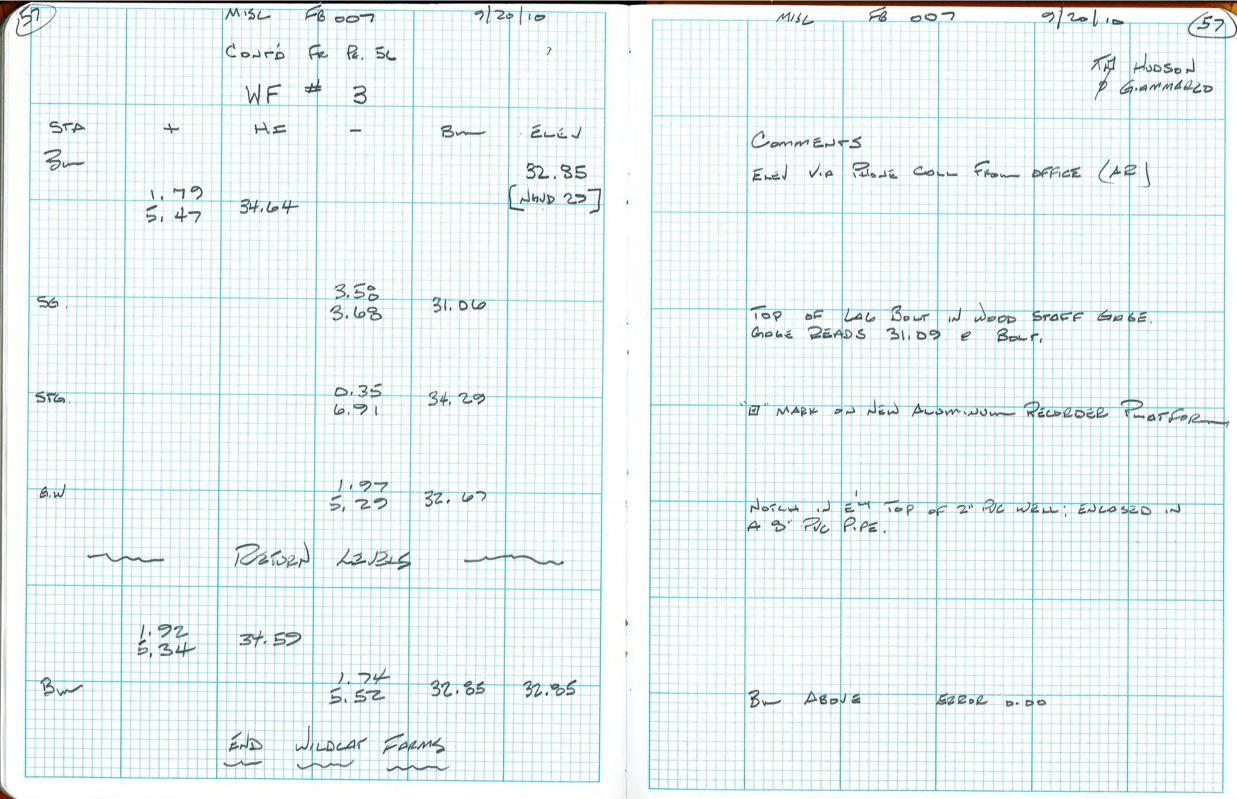
9)	MISO	FB	607	7/15	110	MISC F3 007 7/15(10 (
SEC	10	TWP	465	RAE	276	
	ESTABLISH	REFRENCE	ELEVATION	NS FOR		W Hooson
	WF5	WELL IN LE	E COUNTY			& GIAMMAR
REF.	BM DESC.	SHEET				
		WF #	: 5]			
STA	+	HT		ELEJ	Bm	COMMENTS
					29,79 (HOVE 29)	Bu LEE 18" AS Rie DESC.
	6,98	34.77			(	
STG. NELL			1,85 5,41	34,92		"B" MARK ON NEW ALUMINUM RECORDERI REARCORN ON SOUTH TEP DE 12" POL WELL.
GRND WELL			3.1Z 4.14	33.65		NOTAH CUT IN NORTH JOP OF A 2" PUE LOUGL FIXED TO A 2" PUE WELL, ENCASED IN A B" PUE PIPE.
BOLT			4.61	32,14		TOP OF LAG BELT IN WOOD STATE GAGE
						646E REDDS 32.16 @ TOP 06 BOLT HEAD
		RETURN	LEVEL	<u>ج</u>	~~~	
	4,52	36.68				
Bu			6.39	29,79	29.79	Bu ABOVE EROR D.00'
		END UF	# 5			
		CONTO RE.	. 50			

	MISC	FB 00	7	7/20/1	0	hha.	54 FB 007	(
		Cours &	E R. 49	9				
		WF #	4					HI HUDSED
STA	4	HE	-	(خ)	3		Comments	& GIAMMAR
					33.22		Bru "LC10" as Par DESC.	4 RIJUEL
	4.93 2.33	38.15					See 15 Twp 44 Rate 27	
nQ			5.92 1.44	32 33	32. 335 (ADS)		NOTLH LUT IN N'LY TOP OF A 2" FIC COUNTS A 2" FIC WELL, ENCASED IN A 8" PI	
:761.			4.27 2,99	33.33	33.835 (4951		"M "MARK ON NEW ANUM PERTE FIXED BL. STAGING WELL.	To A 12"
2LT			8,00 5,26	30.15	30.155 (ADS)		Top of BOLT 12 DOOD STREE GAGE	F
		RETURN	LEJELS					
	10 15 10	38.30						
3~			5.09 2.17	33,21	33.22		B- ABOJE ERER 5.5."	
		END	NF 4-					

		MISC S	8 8 8 7	91	8/10	M154 FB 007	9/0/10
		WF	# 7				
u) in	DCOT	Farms	Conto Fe	Rg 50			TH HUDSON
STA	+	HE		ELEJ	Bin	COMMENTS	& GIAMMARCO
Bin					29,44	Bun LEE , 9" PER DESC.	
4	79 47	36.23			(ilus)		
2F7			4.47 2.79	31.76		WET" Not CH CUP IN NOT TOP OF 2 IN B" PUE WELL.	PUL PIPE ENCASED
e loe de l			1.00	34.43		W MARE ON NEW ALUMINUM	RELORDER THEFORM
15 10			4.13 3.13	32.10		"WE ID" NOTCH CUT IN N'M TOP DE 2" P IN 8" FUC WELL	VC PRE ENCOSED
w.5.			6.55	29.68		WARER SURFACE ELED. STAFF GAGE = 29.66	
	_	RETURN	Liduces				
F 7	4.56 2.70	36.32		31.76		WET ABOJE	
Bu			6.33	23.44	29.44	Bu- Leiz 13	
		END	WE 7		,		

0		MIGG FB	007	9/14	/10	MISL	FB 007 0	116/10
		Conro Fr	B. 55					Fill Hoos
		WF	# 2					& Gripma
STA	4	HI	-	ELZJ	Bu		Comerces	
Bu					31.90		BAN LC. 15" ha PHONE FEOR	- E. EBANKS
	6.79	38.69						
<u> </u>			4.61	34.03			LAO BOLT IN STOFIC GOGE R.	.eps 34.24 '
STL			3.00	35.69			"E" MARK ON NEW ALON. FLORA	color-
			4.20					
(Shu)			5.55	33. )4			North LUT IN EW TOP 2" PSL	
							Cost, NG	WELL IN DIVE
		RETURN	LEVELS					
	5.48	38,62						
	1,73	23,00						
0			6.72	0				
Br			6.72	31.90	31.90		Br ABODE.	

de		MISL FE		9/15	110	NYSC FB 007 9/15/10 (56
			z. P6, 55			
		WF #	f 6			LIT HUDSON
STA	+-	HI		ELEJ	Bn	COMMENTS & GIAMMARLI
8-	له، له کې کې ج کې	36,70			30.02 . [NGJD Z9]	Br LE. 7" PER DESC.
<del>ا</del> تحالی ا			6.58 0,68	30.12	30.125 (MPJ)	TOP OF LAG BONF IN DOODEN SPACE GAGE, GAGE READS - 30, 14 & TOP OF BOLF,
Srg.			3,51 3,75	33.19	33.195 ( <sup>AO</sup> J)	I MARIL ON NEW ALUM, RECORDER PLOTRORY
6. N.			5.29	31,41	31.415 (40)1	NOTCH IN NEW TOP OF 2" PIC WELL INSIDE A g" PUL COSTINKS
<u> </u>		Rerven	LEJEL	)		
	5.14	36.55				
Bm		EHD	9.54 9.72 2F 9	30.01	30,02	Bu DBOJE (ERPOR-0.01')













































































## SOUTH FLORIDA, WATER MANAGEMENT

DISTRICT

FOR INFO GIVE NUMBER AND HRITE P.O.BOX 24680 WPB FL 33416-4680













