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## **SURVEYOR'S REPORT**

### **USGS Wells Phase 4**

USGS Station No: 281714081093001

Station Name: OSF-22

Prepared For: South Florida Water Management  
District

Work Order No: 4600004161-WO5

Report Date: September 1, 2020

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## SURVEYOR'S REPORT

According to the:  
**STATE OF FLORIDA**  
**Standards of Practice**  
**CHAPTER 472.027 Florida Statutes**  
**Chapter 5J-17.050 through 5J-17.052, Florida Administrative Code**

This report and copies thereof are not valid without the signature and original raised seal of a Florida Licensed Surveyor and Mapper. **This report is not valid without the digital files referenced in this report.**

Additions or deletions to the report by other than the signing party are prohibited without written consent of the signing party.

All fieldwork was performed by:

T2 UES, Inc., LB00008336  
5670 Zip Drive  
Fort Myers, Florida 33905  
Phone: (239) 277-0722 Fax: (239) 277-7179  
Scott Urquhart, PSM 6524 (Surveyor and Mapper in Responsible Charge)

I hereby certify that as a duly registered Florida Professional Surveyor and Mapper, I have prepared this Report for the specific purpose of providing the **South Florida Water Management District** with the information as outlined. This report is not complete without the referenced information being available during an examination of said Report. I further certify that the precision achieved and the care taken in collecting the data to formulate this Report are adequate for the purpose of the assignment and that the standards set forth in Chapter 5J-17.050 through 5J-17.052 of the Florida Administrative Code have been met.

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Scott Urquhart  
Professional Surveyor & Mapper  
Florida Certificate No. 6524  
(For the firm – LB 8336)

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Date Signed



## PURPOSE OF SURVEY AND PROJECT OVERVIEW

The specific purpose of this survey is establish North American Vertical Datum of 1988 (NAVD88) elevations for United States Geological Survey (USGS) well site **OSF-22**, provide a site benchmark and additional well data as follows:

- Establish an elevation on the USGS measuring mark on top of the well(s) at each site.
- Stamp a District provided aluminum tag with the appropriate data in the appropriate spaces on the tag. Including the Corpscon 6.0.1 vertical offset value from NGVD1929 to NAVD1988.
- Establish a North American Datum 83/11 (or higher) State Plane Coordinate on the benchmark and the well head.
- Provide an NAVD88 elevation on each of the USGS benchmarks (in the USGS Reports noted as “Reference Marks” or “RM’s”) recovered at the site.
- Take a typical ground shot near the well.
- Take an elevation shot on all four (4) corners of the concrete well pad.
- Measure the well diameter to determine the casing material (i.e. PVC), include a picture with a ruler on it and state and show in the report.
- Determine distance to the water table inside the well (DTW) (measurement from the well measuring point, along with time and date).
- Measure the well head size whether it is a manhole or surface casing.
- Complete the standard District benchmark form for each control monument set and submit the form as a .pdf and a .xlsx.

## SITE LOCATION

See Page 6 for SFWMD Well Site Form.

## PROJECT DATUM

- Horizontal – The project horizontal data is referenced to the North American Datum of 1983, 2011 adjustment, Florida State Plane Coordinate System, East Zone, U.S. Survey Feet.
- Vertical – The project vertical data is referenced to the North American Vertical Datum of 1988 (NAVD88). All data referenced to National Geodetic Vertical Datum of 1929 (NGVD29) was converted utilizing **Corpscon 6.0.1** - A U.S. Army Corps of Engineers Engineering Research and Development Center Topographic Engineering Center Alexandria, Virginia Windows-based program to convert coordinates and elevations between datum's using vertcon05.txt and vertcon05.05 files supplied by the U.S. Army Corps of Engineers South Atlantic Division, Jacksonville FL.



## **LEVELING PROCEDURES AND METHODOLOGY**

All control leveling for the project was completed utilizing a Leica DNA 03 (serial number 347859) and Leica LS10 digital level (serial number 700874) with barcode level rod. Collimation and adjustment of the instrument was completed prior to leveling. Leveling began on National Geodetic Survey Benchmark OS 99 and closed on National Geodetic Survey Benchmark JOEL1, which was utilized as site benchmark. All leveling was completed in accordance with standard survey practice utilizing conventional third order methods, techniques, and equipment. The overall closure met or exceeded allowable project requirements of  $0.02 \times \text{SQRT}(\text{miles})$ . In attempt to hold National Geodetic Survey benchmarks as primary project control the following NGS benchmarks were searched for but not found or recovered:

- 95 056A (AB5482)

See page 22 for SFWMD Benchmark Datasheet.

## **NATIONAL GEODETIC SURVEY ONLINE POSITIONING USER SERVICE (OPUS)**

The site-established benchmark was also occupied collecting positional GPS data for a duration of 6.5 hours. This information was uploaded to the OPUS site for processing. See pages 23-26 for JOEL 1 OPUS Report.

## **DATES OF FIELD DATA COLLECTION**

Field survey work by T2 was performed between August 5th and 24th, 2020. Field notes are contained in Field Book 555, pages 33-34 and Field Book 537, pages 64-66.



# SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Rev. 1/19

U.S.G.S. Station Name: OSF-22	U.S.G.S. Station Number: 281714081093001	Agency: T2 UES, Inc.	Date of Field Work: 8-26-20
Party Chief: <b>DOULE</b>	Field Book: 555; 537	Page(s): 33-34; 64-66	Report Prepared by: <b>CHAMBLESS</b>

### SITE SPECIFIC DATA

Site Benchmark: JOEL1	Benchmark Elevation(s) (NAVD88): 68.44	Corpscon 6.0.1 Conversion Factor (NAVD88 to NGVD29) +1.05	
Well Reference Elevation (NAVD88): 64.94	DTW: 24.10 (08/24/20 at : 4:50PM)	Ground Elevation (NAVD88): 63.90	Pad Elevation (NAVD88): N/A

### GEOGRAPHIC DATA

Section 30	Township 25S	Range 32E
Well Latitude: 28°17'15.31" N	Well Longitude: 81°09'29.33" W	Location Source: RTK GPS
State Plane Coordinates:	Northing (Y) = 1437294.3540	Easting (X) = 605270.1770

**Notes:** NAVD88 – North American Vertical Datum of 1988; NGVD29- National Geodetic Vertical Datum of 1929; Corpscon 6.0.1 - A U.S. Army Corps of Engineers Engineering Research and Development Center Topographic Engineering Center Alexandria, Virginia Windows-based program to convert coordinates and elevations between datum's using vertcon05.txt and vertcon05.05 files supplied by the U.S. Army Corps of Engineers South Atlantic Division, Jacksonville FL.

### PICTURES

**Aerial of Overall Well Site**



Not to scale (GoogleEarth product)



Well Site and Well Head



Well: "JOEL1"  
Reference Point: "X" CUT ON TOP OF 8" WELL CASING  
Reference Point El. = 64.94 feet NAVD88  
Distance to Water = 24.10 feet from reference point (08/24/20 at : 4:50PM)



# SOUTH FLORIDA WATER MANAGEMENT DISTRICT

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New Aluminum Tag







USGS RMs



RM 1 – LAG BOLT IN PINE TREE



Latitude: 28°17'16.00" N  
Longitude: 81°09'29.12" W  
NAVD88 EL = 64.76



Site Benchmark

Site Benchmark Overall Photo



Site BM:



Latitude: 28°17'12.51" N  
Longitude: 81°09'27.17" W  
NAVD88 EL = 68.44

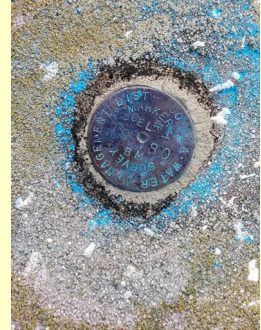




Source Benchmarks



NGS Benchmark "JOEL1" (DG6225)



Latitude: 28°17'13" N SCALED  
Longitude: 81°09'27" W SCALED  
NAVD88 EL = 68.44



NGS Benchmark "OS99" (DG6229)



Latitude: 28°16'33" N SCALED  
Longitude: 81°09'36" W SCALED  
NAVD88 EL = 71.12



DATASHEETS

Page 1 of 2

The NGS Data Sheet

See file [dsdata.pdf](#) for more information about the datasheet.

```

PROGRAM = datasheet95, VERSION = 8.12.5.7
Starting Datasheet Retrieval...
1      National Geodetic Survey,      Retrieval Date = MAY 19, 2020
DG6225 *****
DG6225 DESIGNATION - JOEL 1
DG6225 PID - DG6225
DG6225 STATE/COUNTY- FL/OSCEOLA
DG6225 COUNTRY - US
DG6225 USGS QUAD - NARCOOSSEE (2018)
DG6225
DG6225 *CURRENT SURVEY CONTROL
DG6225
DG6225* NAD 83(1986) POSITION- 28 17 13. (N) 081 09 27. (W) SCALED
DG6225* NAVD 88 ORTHO HEIGHT - 20.860 (meters) 68.44 (feet) ADJUSTED
DG6225
DG6225 GEOID HEIGHT - -28.097 (meters) GEOID18
DG6225 DYNAMIC HEIGHT - 20.829 (meters) 68.34 (feet) COMP
DG6225 MODELED GRAVITY - 979,166.7 (mgal) NAVD 88
DG6225
DG6225 VERT ORDER - SECOND CLASS I
DG6225
DG6225.The horizontal coordinates were scaled from a map and have
DG6225.an estimated accuracy of +/- 6 seconds.
DG6225.
DG6225.The orthometric height was determined by differential leveling and
DG6225.adjusted by the NATIONAL GEODETIC SURVEY
DG6225.in September 2004.
DG6225
DG6225.No vertical observational check was made to the station.
DG6225
DG6225.Significant digits in the geoid height do not necessarily reflect accuracy.
DG6225.GEOID18 height accuracy estimate available here.
DG6225
DG6225.Click photographs - Photos may exist for this station.
DG6225
DG6225.The dynamic height is computed by dividing the NAVD 88
DG6225.geopotential number by the normal gravity value computed on the
DG6225.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
DG6225.degrees latitude (g = 980.6199 gals.).
DG6225
DG6225.The modeled gravity was interpolated from observed gravity values.
DG6225
DG6225; North East Units Estimated Accuracy
DG6225;SPC FL E - 438,020. 184,550. MT (+/- 180 meters Scaled)
DG6225
DG6225_U.S. NATIONAL GRID SPATIAL ADDRESS: 17RMM845289(NAD 83)
DG6225
DG6225 SUPERSEDED SURVEY CONTROL
DG6225
DG6225.No superseded survey control is available for this station.
DG6225

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# SOUTH FLORIDA WATER MANAGEMENT DISTRICT

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## "JOEL1" Benchmark Datasheet (2 of 2)

DATASHEETS

Page 2 of 2

DG6225\_MARKER: DD = SURVEY DISK  
 DG6225\_SETTING: 38 = SET IN THE ABUTMENT OR PIER OF A LARGE BRIDGE  
 DG6225\_SP\_SET: ABUTMENT  
 DG6225\_STAMPING: BM JOEL 1 1980  
 DG6225\_MARK LOGO: FL-097  
 DG6225\_MAGNETIC: N = NO MAGNETIC MATERIAL  
 DG6225\_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL  
 DG6225\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR  
 DG6225+SATELLITE: SATELLITE OBSERVATIONS - December 04, 2002

DG6225	HISTORY	- Date	Condition	Report By
DG6225	HISTORY	- 1980	MONUMENTED	FL-097
DG6225	HISTORY	- 20021204	GOOD	FLDEP

DG6225

### STATION DESCRIPTION

DG6225

DG6225'DESCRIBED BY FL DEPT OF ENV PRO 2002 (JLM)

DG6225'THE MARK IS ABOUT 9.5 MI NORTHWEST OF HOLOPAW, 7.5 MI EAST-NORTHEAST

DG6225'OF ST. CLOUD, 5.5 MI NORTHEAST OF ASHTON, IN SECTION 30, TOWNSHIP 25

DG6225'SOUTH, RANGE 32 EAST.

DG6225'

DG6225'TO REACH THE MARK FROM THE JUNCTION OF U.S. HIGHWAY 192, 441 (13TH

DG6225'STREET) AND COUNTY ROAD 523 (VERMONT AVENUE, CANOE CREEK ROAD) IN ST.

DG6225'CLOUD, GO EAST ON U.S. HIGHWAY 192, 441 (13TH STREET, EAST BRONSON

DG6225'HIGHWAY) FOR 3.0 MI TO THE INTERSECTION OF STATE ROAD 15, CONTINUE

DG6225'EAST ON U.S. HIGHWAY 192, 441 (BRONSON HIGHWAY) FOR 1.25 MI TO THE

DG6225'JUNCTION OF NOVA ROAD (COUNTY ROAD 532) ON THE LEFT, TURN LEFT ON

DG6225'NOVA ROAD (COUNTY ROAD 532) AND GO NORTHEAST FOR 3.65 MI TO THE WEST

DG6225'END OF CANAL C-32C AND THE JUNCTION OF SUNGROVE ROAD, TURN LEFT ON

DG6225'SUNGROVE ROAD AND GO NORTH FOR APPROXIMATELY 100.0 FT TO A LOCKED

DG6225'GATED, CONTINUE NORTH ON SUNGROVE ROAD FOR 0.7 MI TO A 90 DEGREE TURN

DG6225'WEST AND THE MARK ON THE RIGHT, SET FLUSH IN THE TOP OF THE SOUTHWEST

DG6225'BRIDGE ABUTMENT AND ABOUT LEVEL WITH SUNGROVE LANE.

DG6225'

DG6225'LOCATED 85.0 FT NORTHEAST OF THE CENTERLINE OF SUNGROVE LANE, 16.0 FT

DG6225'EAST OF THE APPROXIMATE CENTERLINE OF A DIM TRACK ROAD, 10.2 FT SOUTH

DG6225'OF THE APPROXIMATE CENTERLINE OF THE BRIDGE AND 0.6 FT NORTH OF THE

DG6225'SOUTH END OF THE ABUTMENT.

DG6225'

DG6225'NOTE FOR KEY CONTACT SOUTH FLORIDA WATER MANAGEMENT DISTRICT AT (407)

DG6225'686-8800.

\*\*\* retrieval complete.

Elapsed Time = 00:00:01



The NGS Data Sheet

See file [dsdata.pdf](#) for more information about the datasheet.

PROGRAM = datasheet95, VERSION = 8.12.5.9  
Starting Datasheet Retrieval...  
1 National Geodetic Survey, Retrieval Date = AUGUST 5, 2020  
DG6229 \*\*\*\*\*  
DG6229 DESIGNATION - OS 99  
DG6229 PID - DG6229  
DG6229 STATE/COUNTY- FL/OSCEOLA  
DG6229 COUNTRY - US  
DG6229 USGS QUAD - NARCOOSSEE (2018)  
DG6229  
DG6229 \*CURRENT SURVEY CONTROL  
DG6229  
DG6229\* NAD 83(1986) POSITION- 28 16 33. (N) 081 09 36. (W) SCALED  
DG6229\* [NAVD 88](#) ORTHO HEIGHT - 21.678 (meters) 71.12 (feet) ADJUSTED  
DG6229  
DG6229 GEOID HEIGHT - -28.090 (meters) GEOID18  
DG6229 DYNAMIC HEIGHT - 21.646 (meters) 71.02 (feet) COMP  
DG6229 MODELED GRAVITY - 979,165.3 (mgal) NAVD 88  
DG6229  
DG6229 VERT ORDER - SECOND CLASS I  
DG6229  
DG6229.The horizontal coordinates were scaled from a map and have  
DG6229.an estimated accuracy of +/- 6 seconds.  
DG6229.  
DG6229.The orthometric height was determined by differential leveling and  
DG6229.adjusted by the NATIONAL GEODETIC SURVEY  
DG6229.in September 2004.  
DG6229  
DG6229.Significant digits in the geoid height do not necessarily reflect accuracy.  
DG6229.GEOID18 height accuracy estimate available [here](#).  
DG6229  
DG6229.Click [photographs](#) - Photos may exist for this station.  
DG6229  
DG6229.The dynamic height is computed by dividing the NAVD 88  
DG6229.geopotential number by the normal gravity value computed on the  
DG6229.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45  
DG6229.degrees latitude (g = 980.6199 gals.).  
DG6229  
DG6229.The modeled gravity was interpolated from observed gravity values.  
DG6229  
DG6229;  
DG6229;SPC FL E - North East Units Estimated Accuracy  
DG6229; 436,790. 184,300. MT (+/- 180 meters Scaled)  
DG6229  
DG6229\_U.S. NATIONAL GRID SPATIAL ADDRESS: 17RMM843277(NAD 83)  
DG6229  
DG6229 SUPERSEDED SURVEY CONTROL  
DG6229  
DG6229.No superseded survey control is available for this station.  
DG6229  
DG6229\_MARKER: DD = SURVEY DISK  
DG6229\_SETTING: 31 = SET IN A PAVEMENT SUCH AS STREET, SIDEWALK, CURB, ETC.



# SOUTH FLORIDA WATER MANAGEMENT DISTRICT

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## "OS99" Benchmark Datasheet (2 of 2)

DATASHEETS

Page 2 of 2

DG6229\_SP\_SET: BRIDGE WALKWAY  
 DG6229\_STAMPING: BM OS-99 1980  
 DG6229\_MARK LOGO: SFLWMD  
 DG6229\_MAGNETIC: N = NO MAGNETIC MATERIAL  
 DG6229\_STABILITY: D = MARK OF QUESTIONABLE OR UNKNOWN STABILITY  
 DG6229\_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR  
 DG6229+SATELLITE: SATELLITE OBSERVATIONS - December 04, 2002

DG6229	HISTORY	- Date	Condition	Report By
DG6229	HISTORY	- 1980	MONUMENTED	SFLWMD
DG6229	HISTORY	- 20021204	GOOD	FLDEP

### DG6229 STATION DESCRIPTION

DG6229'DESCRIBED BY FL DEPT OF ENV PRO 2002 (JLM)  
 DG6229'THE MARK IS ABOUT 8.5 MI NORTHWEST OF HOLOPAW, 8.5 MI EAST-NORTHEAST  
 DG6229'OF ST. CLOUD, 4.5 MI NORTHEAST OF ASHTON, IN SECTION 25, TOWNSHIP 25  
 DG6229'SOUTH, RANGE 31 EAST.  
 DG6229'  
 DG6229'TO REACH THE MARK FROM THE JUNCTION OF U.S. HIGHWAY 192, 441 (13TH  
 DG6229'STREET) AND COUNTY ROAD 523 (VERMONT AVENUE, CANOE CREEK ROAD) IN ST.  
 DG6229'CLOUD, GO EAST ON U.S. HIGHWAY 192, 441 (13TH STREET, EAST BRONSON  
 DG6229'HIGHWAY) FOR 3.0 MI TO THE INTERSECTION OF STATE ROAD 15, CONTINUE  
 DG6229'EAST ON U.S. HIGHWAY 192, 441 (BRONSON HIGHWAY) FOR 1.25 MI TO THE  
 DG6229'JUNCTION OF NOVA ROAD (COUNTY ROAD 532) ON THE LEFT, TURN LEFT ON  
 DG6229'NOVA ROAD (COUNTY ROAD 532), GO NORTHEAST FOR 3.65 MI TO CANAL C-32C  
 DG6229'AND THE BRIDGE AND THE MARK ON THE LEFT, SET FLUSH IN THE TOP OF THE  
 DG6229'BRIDGE WALKWAY 0.8 FT ABOVE THE LEVEL OF NOVA ROAD.  
 DG6229'  
 DG6229'LOCATED 16.1 FT NORTH OF THE CENTERLINE OF NOVA ROAD, 3.9 FT EAST OF  
 DG6229'THE NORTHWEST CORNER OF THE BRIDGE WALKWAY AND 1.2 FT SOUTH OF THE  
 DG6229'BRIDGE RAIL.

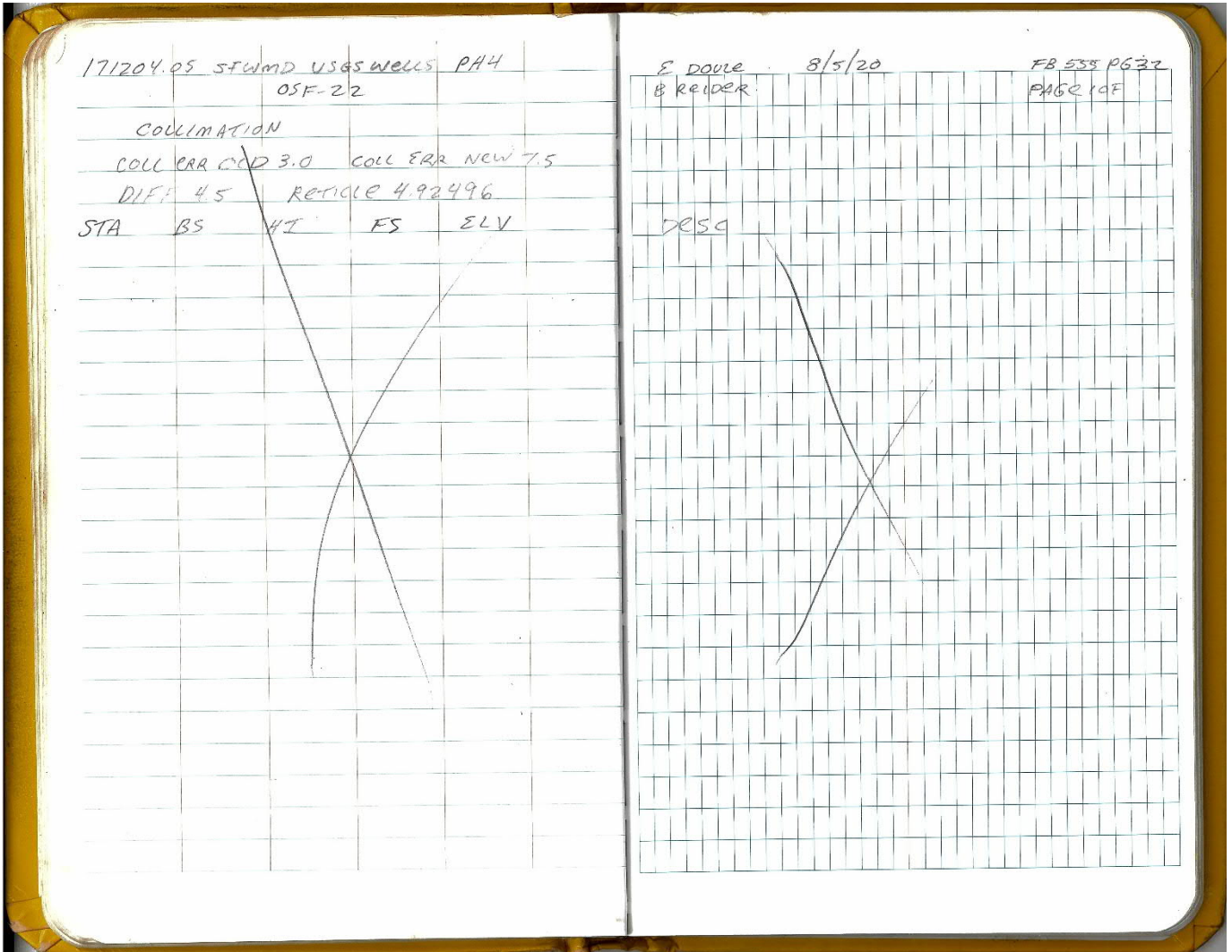
\*\*\* retrieval complete.  
 Elapsed Time = 00:00:01



# SOUTH FLORIDA WATER MANAGEMENT DISTRICT

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## Field Notes (1 of 6)







# SOUTH FLORIDA WATER MANAGEMENT DISTRICT

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## Field Notes (2 of 6)

STA	BS	HI	FS	ELV	
L71204.05 SPWMD USGS WELLS PH4 OSF-22 RUN FROM OS 99 TO JOEL TO WELL CLK IN TO JOEL					E DOYLE 8/5/20 BREIDER FB 555 PG 33 PAGE 1 OF 2
0599	2.242	73.362			NBS PT OS 99 PID 06 6229 EL 71.12
			6.365	66.997	TP1 TEMP TURN
1	4.358	71.355			TP2 TEMP TURN
			5.928	65.425	TP3 TEMP TURN
2	5.263	70.689	5.851	64.837	TP4 TEMP TURN
3	5.802	70.639	5.793	65.346	TP5 TEMP TURN
4	4.722	70.068	6.089	63.929	TP6 TEMP TURN
5	5.985	69.964	4.966	64.998	NGS PT 'JOEL' EL 68.44 PID 06 6225
6	5.712	70.710	2.292	68.417	TP7 TEMP TURN
7	2.055	70.473	5.632	64.840	



# SOUTH FLORIDA WATER MANAGEMENT DISTRICT

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## Field Notes (3 of 6)

171204.05 SFWMD USGS WELLS PH4

STA	BS	HI	FS	ELV
8	4.913	69.754	4.832	64.921

9	4.677	69.599	4.758	64.841
---	-------	--------	-------	--------

10	5.574	70.415	1.996	68.419
----	-------	--------	-------	--------

E DOYLE  
B REIDOR  
DESC

8/5/10

FB 555 P634A  
PAGE 2 OF 2

TOP OF WELL SW COR

TP 7 B (2ND SHOT)

CHECK IN W BM JOEL (NGS PT) (BM JOEL B)  
EL 68.44

COLLIMATION  
COLL ERR OLD 3.0 COLL ERR NEW 7.5  
DIFF 4.5 RETICLE 4.92496

INST & LEICA LS10  
S/N 700874

FILE 171204.05 ED8520

\* NOTE DID COLLIMATION  
BEFORE LEVEL RUN



Field Notes (4 of 6)

17204.05 SFWMD USGS Wells PH4

OSF-22

INST: TRUMBLE R10

FILE: OPUS OSF-228-24-20

START 9:47 10:34

STOP 5:45

\* NOTE LSD REF

PICTURES 'JOEL' IS DESTROYED!

PIC#	DESC
JOEL-1	DISC CLOSE UP
JOEL-2	DISC WAIST HIGH
JOEL-3	LOOKING N
JOEL-4	LOOKING S
JOEL-5	LOOKING E
JOEL-6	LOOKING W

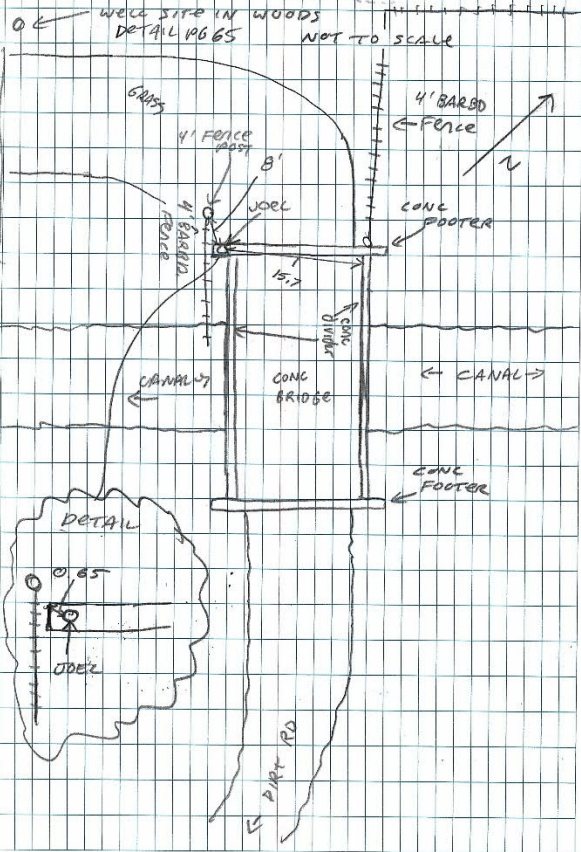
WELL PICTURES

PIC#	DESC
OSF-22 1	WELL CLOSE UP
OSF-22 2	WELL CLOSE UP
OSF-22 3	WELL CLOSE UP OF TAG
OSF-22 4	CLOSE UP OF TAG
OSF-22 5	AREA LOOKING N
OSF-22 6	AREA LOOKING S
OSF-22 7	AREA LOOKING E
OSF-22 8	AREA LOOKING W

E DOULE

8/24/20

FG537 PG 64  
PAGE 1 OF 3





# SOUTH FLORIDA WATER MANAGEMENT DISTRICT

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## Field Notes (5 of 6)

171204.05 SFWMD USGS WELLS PH4  
05F-22

#45004

WELL SITE SKETCH

#45003 WELL

WOODS

REF IN 18" OAK

4' BARBED FENCE

4' BARBED WIRE

METAL GATE

GRASS

CONC BRIDGE

CANAL

SUNGROW LN

PICS OF RM 1

PIC 1 CLOSE UP LAG BOLT

PIC 2 OVERALL LOOKING N

PIC OVERALL LOOKING S

E DOOLE 8/24/20 FB537 PG65  
PAGE 2 OF 3

#45003-45004 JC/TA LOCATED  
FILE: 171204.05 JC 82420

#45003 WELL LOCATION

#45004 LAG BOLT IN TREE

ELEVATED REF LAG BOLT IN TREE

STA	BS	HI	FS	ELV	DESC
WELL	4.140	69.084		64.944	WELL
			64.756		LAG BOLT
1	4.125	68.881	4.328	64.756	LAG BOLT (1)
			3.935	64.946	CHK IN WELL

SET LINKER TO LAG BOLT 64.75

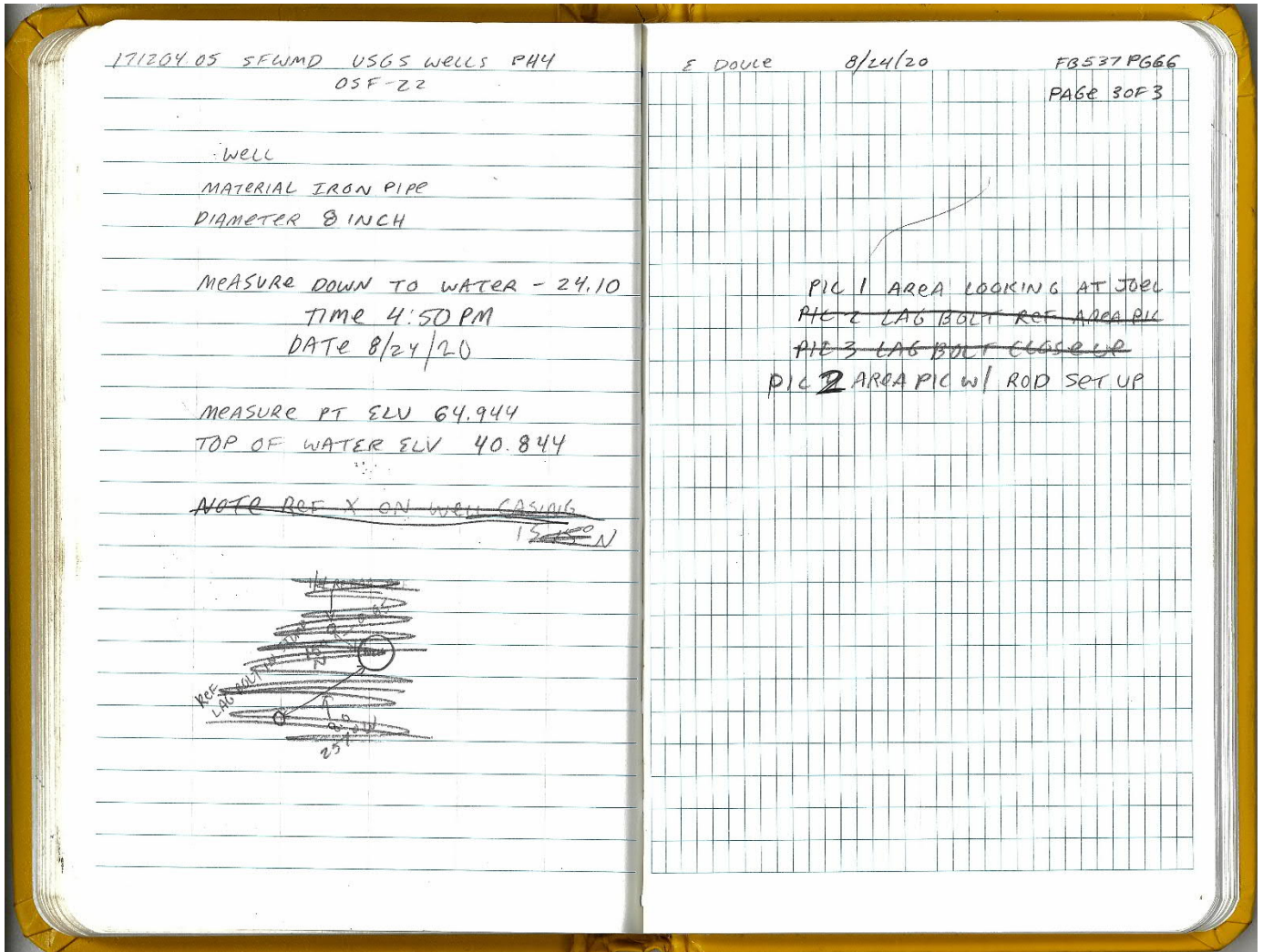
✓ WELL 64.944



# SOUTH FLORIDA WATER MANAGEMENT DISTRICT

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## Field Notes (6 of 6)



171204.05 SFWMD USGS WELLS PH4  
05F-22

E DOUCE 8/24/20

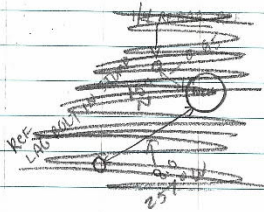
FB537 P666  
PAGE 3 OF 3

WELL  
MATERIAL IRON PIPE  
DIAMETER 8 INCH

MEASURE DOWN TO WATER - 24.10  
TIME 4:50 PM  
DATE 8/24/20

MEASURE PT ELV 64.944  
TOP OF WATER ELV 40.844

~~NOTE REF X ON WELL CASING~~  
~~12650 N~~



PIC 1 AREA LOOKING AT JOEL  
~~PIC 2 LAG BOLT REF AREA PIC~~  
~~PIC 3 LAG BOLT CLOSE UP~~  
PIC 2 AREA PIC W/ ROD SET UP



### South Florida Water Management District Benchmark Datasheet

Designation: <b>JOEL 1</b>	Project Name: <b>USGS PHASE 4 WELLS</b>	Type: <b>V</b>	State Plane Zone: <b>FL East</b>
Stamping: <b>JOEL#1 1980</b>	Field Book Name: <b>555; 537</b>	Field Book Page: <b>33-34; 64-66</b>	
Established By: _____	Recovered By: <b>TZues</b>	Recovery Date: <b>08/05/20</b>	
Surveyor: <b>DOULE</b>	Established Date: _____	Status: <b>New</b>	

#### GEOGRAPHIC POSITION INFORMATION

Section: <b>30</b>	Township: <b>25S</b>	Range: <b>32E</b>
County: <b>OSCEOLA</b>	Quadrangle: <b>NARCOOSSEE</b>	Quad Index: <b>3510</b>
NAD83 Adj. Year: <b>2011</b>	Vertical Datum: <b>NAVD1988</b>	Horizontal Datum: <b>NAD1983</b>
NAVD88 Elevation (feet): <b>68.440</b>	NGVD29 Elevation (feet): <b>69.490</b>	2022 Elevation: _____
NAVD88 Class: _____	NGVD29 Class: _____	Other Elevation: _____
NAVD88 Order: <b>3RD</b>	NGVD29 Order: _____	Other Elevation Type: _____
		NGS Source BM(s): <b>OS 99</b>
		NGS PID(s): <b>DG6229</b>
		NGS NAVD88 Elev (ft): <b>71.12</b>
		NGS NAVD88 Elev (m): <b>21.678</b>
		NGS 2022 Elev (ft): _____

CORPSCON 6.0.1 CONVERSION FACTOR (NAVD88 TO NGVD29): (A U.S. Army Corps of Engineers Engineering Research and Development Center Topographic Engineering Center Alexandria, Virginia Windows-based program to convert coordinates and elevations between datum's using vertcon05.txt and vertcon05.05 files supplied by the U.S. Army Corps of Engineers South Atlantic Division, Jacksonville FL.)

Vertical Datum Offset: + <b>1.05</b>	Actual NGS Elevation or ngvd29.txt file: _____	OPUS Ortho Height: <b>20.892</b>
Northing (Y) (feet): <b>1437011.339</b>	Easting (X) (feet): <b>605463.313</b>	Source of Latitude & Longitude: <b>OPUS SOLUTION</b>
Latitude: <b>28</b>	<b>17</b>	<b>9</b>
DD°	MM'	SS"
Longitude (Decimal Degrees): <b>28.2868096</b>	Longitude (Decimal Degrees): <b>-81.15754617</b>	

#### RECOVERY DATA

How to Reach: **FROM THE PHYSICAL INTERSECTION OF E IRLA BRONSON MEMORIAL HIGHWAY AND NOVA RD, GO NORTH ALONG NOVA RD FOR 4.7 MILES TO A DIRT ROAD RUNNING NORTH ALONG THE WEST SIDE OF A CANAL CONNECTING LAKE JOEL AND TROUT LAKE. GO THROUGH THE GATE AND PROCEED ALONG SAID DIRT ROAD FOR 0.75 OF A MILE TO A BRIDGE, THE MARK IS A BRASS SFWMD DISC SET IN THE SOUTHWEST CORNER OF SAID BRIDGE. JOEL 1 IS 15.7 FEET SOUTHWEST OF THE NORTH BRIDGE WING WALL, 8 FEET WEST OF A BARBED WIRE FENCE POST AND 0.65 OF A FOOT NORTHEAST OF THE SOUTHWEST CORNER OF THE CONCRETE FOOTER IT IS SET IN.**

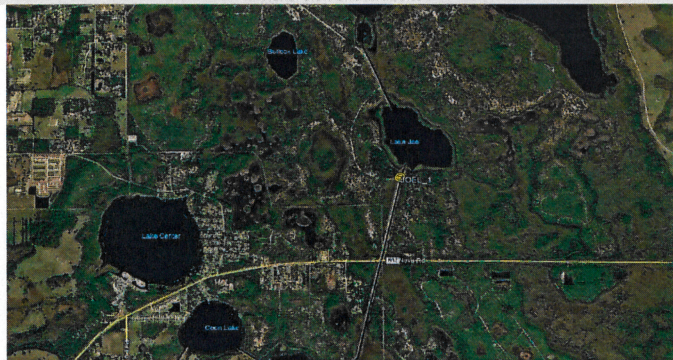
Description/Notes:

Notable Landmarks:

Other Source Benchmarks:

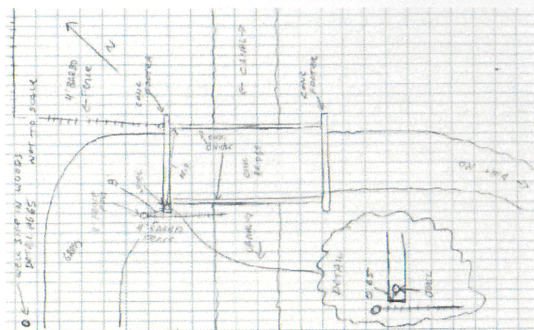
#### PICTURES

Aerial View of Overall Site



#### PICTURES

Site Sketch



Haywood, Joshua

From: opus <opus@ngs.noaa.gov>
Sent: Wednesday, August 26, 2020 9:58 AM
To: Haywood, Joshua
Subject: OPUS solution : 25152372.20o OP1598450171512

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

FILE: 25152372.20o OP1598450171512

NGS OPUS SOLUTION REPORT
=====

All computed coordinate accuracies are listed as peak-to-peak values.

For additional information:

https://can01.safelinks.protection.outlook.com/?url=https%3A%2F%2Fwww.ngs.noaa.gov%2FOPUS%2Fabout.jsp%23accuracy&data=02%7C01%7Cjosh.haywood%40t2ue.com%7Cccf018c937d34177eb8208d849c80c50%7Ce64791d699864645a1a068c1175eda41%7C1%7C0%7C637340470853560050&data=qs m%2FK4ybd6%2FUVfVLAq9Xt%2B8CPOqP8qYB9J9fShGYqI%3D&reserved=0

USER: josh.haywood@t2ue.com DATE: August 26, 2020
RINEX FILE: 2515237o.20o TIME: 13:57:51 UTC

SOFTWARE: page5 1801.18 master70.pl 160321 START: 2020/08/24 14:35:00
EPHEMERIS: igr21201.eph [rapid] STOP: 2020/08/24 21:15:00
NAV FILE: brdc2370.20n OBS USED: 12274 / 15899 : 77%
ANT NAME: TRMR10 NONE # FIXED AMB: 154 / 196 : 79%
ARP HEIGHT: 2.05 OVERALL RMS: 0.025(m)

REF FRAME: NAD\_83(2011)(EPOCH:2010.0000) ITRF2014 (EPOCH:2020.6468)

X: 864006.218(m) 0.015(m) 864005.374(m) 0.015(m)
Y: -5553917.685(m) 0.040(m) -5553916.124(m) 0.040(m)
Z: 3004528.663(m) 0.021(m) 3004528.506(m) 0.021(m)

LAT: 28 17 12.51456 0.026(m) 28 17 12.53580 0.026(m)
E LON: 278 50 32.83379 0.021(m) 278 50 32.81201 0.021(m)
W LON: 81 9 27.16621 0.021(m) 81 9 27.18799 0.021(m)
EL HGT: -7.205(m) 0.036(m) -8.751(m) 0.036(m)
ORTHO HGT: 20.892(m) 0.068(m) [NAVD88 (Computed using GEOID18)]

UTM COORDINATES STATE PLANE COORDINATES
UTM (Zone 17) SPC (0901 FL E)
Northing (Y) [meters] 3128984.469 438001.932
Easting (X) [meters] 484550.860 184545.587
Convergence [degrees] -0.07465833 -0.07465833
Point Scale 0.99960295 0.99994412
Combined Factor 0.99960408 0.99994525

US NATIONAL GRID DESIGNATOR: 17RMM8455028984(NAD 83)

BASE STATIONS USED
PID DESIGNATION LATITUDE LONGITUDE DISTANCE(m)
DH3757 WACH WAUCHULA CORS ARP N273051.042 W0815256.615 111459.3
DE9138 OKCB OKEECHOBEE CORS ARP N271557.715 W0805119.181 116972.6
DR4402 LBL LBL LABELLE CORS ARP N264451.324 W0812712.291 173044.3

NEAREST NGS PUBLISHED CONTROL POINT
DG6225 JOEL 1 N281713.000 W0810927.000 15.6

BASE STATION INFORMATION

STATION NAME: wach a 2 (Wauchula; Wauchula, Florida, U.S.A.)
MONUMENT: NO DOMES NUMBER
XYZ 799335.4500 -5604081.2975 2928868.5949 MON @ 2010.0000 (M)
XYZ -0.0116 0.0017 0.0012 VEL (M/YR)
NEU 0.0000 0.0000 0.0000 MON TO ARP (M)
NEU 0.0001 -0.0008 0.1242 ARP TO L1 PHASE CENTER (M)
NEU -0.0000 -0.0008 0.1337 ARP TO L2 PHASE CENTER (M)
XYZ -0.1238 0.0180 0.0124 VEL TIMES 10.6470 YRS
XYZ 0.0000 0.0000 0.0000 MON TO ARP
XYZ 0.0148 -0.1091 0.0575 ARP TO L1 PHASE CENTER
XYZ 799335.3410 -5604081.3886 2928868.6648 L1 PHS CEN @ 2020.6468
XYZ 0.0000 0.0000 0.0000 + XYZ ADJUSTMENTS

XYZ 799335.3410 -5604081.3886 2928868.6648 NEW L1 PHS CEN @ 2020.6468  
XYZ 799335.3262 -5604081.2795 2928868.6073 NEW ARP @ 2020.6468  
XYZ 799335.3262 -5604081.2795 2928868.6073 NEW MON @ 2020.6468  
LLH 27 30 51.06303 278 7 3.36194 9.2826 NEW L1 PHS CEN @ 2020.6468  
LLH 27 30 51.06302 278 7 3.36197 9.1584 NEW ARP @ 2020.6468  
LLH 27 30 51.06302 278 7 3.36197 9.1584 NEW MON @ 2020.6468

STATION NAME: okcb a 4 (Okeechobee; Okeechobee, Florida, U.S.A.)  
MONUMENT: 49587S001

XYZ 901665.5395 -5601320.7260 2904442.8976 MON @ 2010.0000 (M)  
XYZ -0.0116 0.0012 0.0016 VEL (M/YR)  
NEU 0.0000 0.0000 0.0000 MON TO ARP (M)  
NEU 0.0001 -0.0008 0.1242 ARP TO L1 PHASE CENTER (M)  
NEU -0.0000 -0.0008 0.1337 ARP TO L2 PHASE CENTER (M)  
XYZ -0.1235 0.0124 0.0173 VEL TIMES 10.6470 YRS  
XYZ 0.0000 0.0000 0.0000 MON TO ARP  
XYZ 0.0168 -0.1091 0.0570 ARP TO L1 PHASE CENTER  
XYZ 901665.4328 -5601320.8227 2904442.9719 L1 PHS CEN @ 2020.6468  
XYZ 0.0000 -0.0000 -0.0000 + XYZ ADJUSTMENTS  
XYZ 901665.4328 -5601320.8227 2904442.9719 NEW L1 PHS CEN @ 2020.6468  
XYZ 901665.4160 -5601320.7136 2904442.9149 NEW ARP @ 2020.6468  
XYZ 901665.4160 -5601320.7136 2904442.9149 NEW MON @ 2020.6468  
LLH 27 15 57.73632 279 8 40.79740 -15.2077 NEW L1 PHS CEN @ 2020.6468  
LLH 27 15 57.73631 279 8 40.79743 -15.3319 NEW ARP @ 2020.6468  
LLH 27 15 57.73631 279 8 40.79743 -15.3319 NEW MON @ 2020.6468

STATION NAME: lbll a 1 (LBLL LaBelle; LaBelle, Florida USA)  
MONUMENT: NO DOMES NUMBER

XYZ 847023.9738 -5636220.8238 2853260.8910 MON @ 2010.0000 (M)  
XYZ -0.0111 -0.0005 0.0019 VEL (M/YR)  
NEU 0.0000 0.0000 0.0000 MON TO ARP (M)  
NEU 0.0001 -0.0008 0.1242 ARP TO L1 PHASE CENTER (M)  
NEU -0.0000 -0.0008 0.1337 ARP TO L2 PHASE CENTER (M)  
XYZ -0.1182 -0.0053 0.0202 VEL TIMES 10.6470 YRS  
XYZ 0.0000 0.0000 0.0000 MON TO ARP  
XYZ 0.0157 -0.1098 0.0560 ARP TO L1 PHASE CENTER  
XYZ 847023.8713 -5636220.9389 2853260.9673 L1 PHS CEN @ 2020.6468  
XYZ 0.0001 -0.0000 -0.0001 + XYZ ADJUSTMENTS  
XYZ 847023.8714 -5636220.9389 2853260.9672 NEW L1 PHS CEN @ 2020.6468  
XYZ 847023.8557 -5636220.8292 2853260.9111 NEW ARP @ 2020.6468  
XYZ 847023.8557 -5636220.8292 2853260.9111 NEW MON @ 2020.6468  
LLH 26 44 51.34435 278 32 47.68767 -18.0674 NEW L1 PHS CEN @ 2020.6468  
LLH 26 44 51.34434 278 32 47.68770 -18.1916 NEW ARP @ 2020.6468  
LLH 26 44 51.34434 278 32 47.68770 -18.1916 NEW MON @ 2020.6468

#### REMOTE STATION INFORMATION

STATION NAME: 2515 1

MONUMENT: NO DOMES NUMBER

XYZ 864005.3470 -5553916.1448 3004528.3884 MON @ 2020.6465 (M)  
NEU 0.0009 0.0007 2.0500 MON TO ARP (M)  
NEU -0.0009 -0.0006 0.1284 ARP TO L1 PHASE CENTER (M)  
NEU -0.0027 -0.0064 0.1197 ARP TO L2 PHASE CENTER (M)  
XYZ 0.2781 -1.7833 0.9723 MON TO ARP  
XYZ 0.0168 -0.1122 0.0600 ARP TO L1 PHASE CENTER  
XYZ 864005.6419 -5553918.0403 3004529.4207 L1 PHS CEN @ 2020.6468

BASELINE NAME: wach 2515

XYZ 0.0285 0.0264 0.1292 + XYZ ADJUSTMENTS  
XYZ 864005.6703 -5553918.0138 3004529.5499 NEW L1 PHS CEN @ 2020.6468  
XYZ 864005.6535 -5553917.9016 3004529.4899 NEW ARP @ 2020.6468  
XYZ 864005.3755 -5553916.1184 3004528.5176 NEW MON @ 2020.6468  
LLH 28 17 12.53621 278 50 32.81209 -6.5723 NEW L1 PHS CEN @ 2020.6468  
LLH 28 17 12.53624 278 50 32.81211 -6.7007 NEW ARP @ 2020.6468  
LLH 28 17 12.53621 278 50 32.81209 -8.7507 NEW MON @ 2020.6468

BASELINE NAME: okcb 2515

XYZ 0.0336 0.0387 0.1084 + XYZ ADJUSTMENTS  
XYZ 864005.6755 -5553918.0015 3004529.5292 NEW L1 PHS CEN @ 2020.6468  
XYZ 864005.6587 -5553917.8893 3004529.4691 NEW ARP @ 2020.6468  
XYZ 864005.3806 -5553916.1061 3004528.4968 NEW MON @ 2020.6468  
LLH 28 17 12.53579 278 50 32.81234 -6.5921 NEW L1 PHS CEN @ 2020.6468  
LLH 28 17 12.53582 278 50 32.81237 -6.7205 NEW ARP @ 2020.6468  
LLH 28 17 12.53579 278 50 32.81234 -8.7705 NEW MON @ 2020.6468

BASELINE NAME: lbll 2515

XYZ 0.0183 -0.0016 0.1140 + XYZ ADJUSTMENTS  
XYZ 864005.6601 -5553918.0419 3004529.5347 NEW L1 PHS CEN @ 2020.6468  
XYZ 864005.6433 -5553917.9297 3004529.4747 NEW ARP @ 2020.6468  
XYZ 864005.3653 -5553916.1464 3004528.5024 NEW MON @ 2020.6468  
LLH 28 17 12.53537 278 50 32.81156 -6.5565 NEW L1 PHS CEN @ 2020.6468  
LLH 28 17 12.53540 278 50 32.81158 -6.6848 NEW ARP @ 2020.6468  
LLH 28 17 12.53537 278 50 32.81156 -8.7349 NEW MON @ 2020.6468



G-FILES

Axx2020 824 20 824  
 B2020 8241434 20 8242114 1 page5 v1801.18IGS 132 1 2 27NGS 2020 826IFDDPX  
 ITRF2014\_2114 IGS 20200712  
 C00090001-646700492 11 -501651611 51 -756599103 28 X2370A2515X2370AWACH  
 D 1 2 -5801020 1 3 7516923 2 3 -8937373

Axx2020 824 20 824  
 B2020 8241434 20 8242114 1 page5 v1801.18IGS 132 1 2 27NGS 2020 826IFDDPX  
 ITRF2014\_2114 IGS 20200712  
 C00090004 376600354 9 -474046075 40-1000855820 22 X2370A2515X2370AOKCB  
 D 1 2 -6954995 1 3 4049113 2 3 -8160005

Axx2020 824 20 824  
 B2020 8241434 20 8242114 1 page5 v1801.18IGS 132 1 2 27NGS 2020 826IFDDPX  
 ITRF2014\_2114 IGS 20200712  
 C00090002 -169815096 12 -823046827 55-1512675913 32 X2370A2515X2370ALBL  
 D 1 2 -6485079 1 3 6773814 2 3 -7862843

POST-FIT RMS BY SATELLITE VS. BASELINE

OVERALL 02 05 06 09 10 12 13 15  
 wach-2515| 0.024 0.026 0.020 0.024 0.021 0.031 0.020 0.022 0.028  
 17 18 19 20 24 25 28 29 32  
 wach-2515| 0.023 0.021 0.022 0.034 0.037 0.025 0.033 0.022 ...

OVERALL 02 05 06 09 10 12 13 15  
 okcb-2515| 0.025 0.037 0.020 0.022 0.028 0.013 0.022 0.023 0.023  
 17 18 19 20 24 25 28 29 32  
 okcb-2515| 0.032 0.025 0.021 0.026 0.028 0.036 0.025 0.022 ...

OVERALL 02 05 06 09 10 12 13 15  
 lbl-2515| 0.026 0.028 0.022 0.028 0.032 0.047 0.024 0.025 0.027  
 17 18 19 20 24 25 28 29 32  
 lbl-2515| 0.030 0.021 0.029 0.024 0.022 0.036 ... 0.025 ...

OBS BY SATELLITE VS. BASELINE

OVERALL 02 05 06 09 10 12 13 15  
 wach-2515| 4175 38 590 275 32 64 441 462 252  
 17 18 19 20 24 25 28 29 32  
 wach-2515| 157 284 270 264 154 330 52 510 ...  
 OVERALL 02 05 06 09 10 12 13 15  
 okcb-2515| 4326 63 601 350 199 20 427 488 226  
 17 18 19 20 24 25 28 29 32  
 okcb-2515| 173 244 244 254 171 331 60 475 ...  
 OVERALL 02 05 06 09 10 12 13 15  
 lbl-2515| 3773 15 553 323 173 49 370 370 190  
 17 18 19 20 24 25 28 29 32  
 lbl-2515| 212 202 310 203 144 249 ... 410 ...

ITRF position of 2515 as determined by individual baselines

	X	Y	Z
wach	864005.375	-5553916.118	3004528.518
okcb	864005.381	-5553916.106	3004528.497
lbl	864005.365	-5553916.146	3004528.502

Residuals of position determined by individual baselines from the final position

	X	Y	Z	East	North	Up
wach	0.002	0.005	0.012	0.002	0.013	0.001
okcb	0.007	0.018	-0.009	0.009	-0.000	-0.019
lbl	-0.008	-0.023	-0.003	-0.012	-0.013	0.017

Covariance Matrix for the xyz OPUS Position (meters^2).

0.0000007311	-0.0000002122	0.0000001385
-0.0000002122	0.0000155444	-0.0000007478
0.0000001385	-0.0000007478	0.0000050933

Covariance Matrix for the enu OPUS Position (meters^2).

0.0000010167	0.0000009847	-0.0000017957
0.0000009847	0.0000067204	-0.0000038040
-0.0000017957	-0.0000038040	0.0000136318

Horizontal network accuracy = 0.00523 meters.  
 Vertical network accuracy = 0.00724 meters.

Derivation of NAD 83 vector components

Position of reference station ARP in NAD\_83(2011)(EPOCH:2010.0000).  
 Xa(m) Ya(m) Za(m)

WACH 799336.16445 -5604082.87126 2928868.78053 2010.00  
 OKCB 901666.25422 -5601322.30851 2904443.08260 2010.00  
 LBL 847024.68649 -5636222.40999 2853261.08073 2010.00

Position of reference station monument in NAD\_83(2011)(EPOCH:2010.0000).

	Xr(m)	Yr(m)	Zr(m)	
WACH	799336.16445	-5604082.87126	2928868.78053	2010.00
OKCB	901666.25422	-5601322.30851	2904443.08260	2010.00
LBL	847024.68649	-5636222.40999	2853261.08073	2010.00

Velocity of reference station monument in NAD\_83(2011)(EPOCH:2010.0000).

	Vx (m/yr)	Vy (m/yr)	Vz (m/yr)
WACH	0.00128	0.00265	-0.00157
OKCB	0.00118	0.00217	-0.00155
LBL	0.00151	0.00044	-0.00103

Vectors from unknown station monument to reference station monument in NAD\_83(2011)(EPOCH:2010.0000).

	Xr-X= DX(m)	Yr-Y= DY(m)	Zr-Z= DZ(m)	
WACH	-64670.05355	-50165.18626	-75659.88247	2010.00
OKCB	37660.03622	-47404.62351	-100085.58040	2010.00
LBL	-16981.53151	-82304.72499	-151267.58227	2010.00

STATE PLANE COORDINATES - U.S. Survey Foot

SPC (0901 FL E)  
 Northing (Y) [feet] 1437011.339  
 Easting (X) [feet] 605463.313  
 Convergence [degrees] -0.07465833  
 Point Scale 0.99994412  
 Combined Factor 0.99994525

\*\*\*\*\* New Reference Frame Preview \*\*\*\*\*

We are replacing the nation's NAD 83 and NAVD 88 datums, to improve access and accuracy of the National Spatial Reference System. More at <https://can01.safelinks.protection.outlook.com/?url=https%3A%2F%2Fgeodesy.noaa.gov%2Fdatums%2Fnewdatums%2F&data=02%7C01%7Cjosh.haywood%40t2ue.com%7Cccf018c937d34177eb8208d849c80c50%7Ce64791d699864645a1a068c1175eda41%7C1%7C0%7C637340470853560050&reserved=0>

Below are approximate coordinates for this solution in the new frames:

APPROX ORTHO HGT: 20.896 (m) [PROTOTYPE (Computed using xGeoid19B,GRS80,ITRF2014)]

This position and the above vector components were computed without any knowledge by the National Geodetic Survey regarding the equipment or field operating procedures used.

OSF-22 Raw Level Data.GSI

\*110001+00000000000000000001 32...7+0000000000325515 331.27+0000000000043845  
390...+00000000000000000003 391.27+0000000000000000  
\*110002+00000000000000000002 32...7+0000000000319736 332.27+0000000000047283  
390...+00000000000000000003 391.27+0000000000000000  
\*110003+00000000000000000003 32...7+0000000000649896 332.27+0000000000052702  
390...+00000000000000000004 391.27+0000000000000001  
\*110004+00000000000000000004 32...7+0000000001295039 331.27+0000000000049278  
390...+00000000000000000003 391.27+0000000000000002  
\*410005+00000000?. . . . . 1  
\*110006+0000000000000000S99 83..17+0000000000711200  
\*110007+0000000000000000S99 32...7+0000000000372039 331.07+0000000000022425  
390...+00000000000000000003 391.07+0000000000000000  
\*110008+0000000000000000TP1 32...7+0000000000381869 332.07+0000000000063652  
390...+00000000000000000003 391.07+0000000000000000  
\*110009+0000000000000000TP1 573.07-0000000000009830 574.07+0000000000753909  
83..07+00000000000669973  
\*110010+0000000000000000TP1 32...7+0000000003536180 331.07+0000000000043584  
390...+00000000000000000003 391.07+0000000000000001  
\*110011+0000000000000000TP2 32...7+0000000003577779 332.07+0000000000059299  
390...+00000000000000000003 391.07+0000000000000002  
\*110012+0000000000000000TP2 573.07-0000000000051429 574.07+0000000007867867  
83..07+00000000000654258  
\*110013+0000000000000000TP2 32...7+0000000003524150 331.07+0000000000052633  
390...+00000000000000000003 391.07+0000000000000003  
\*110014+0000000000000000TP3 32...7+0000000003525244 332.07+0000000000058513  
390...+00000000000000000003 391.07+0000000000000006  
\*110015+0000000000000000TP3 573.07-0000000000052523 574.07+0000000014917262  
83..07+00000000000648379  
\*110016+0000000000000000TP3 32...7+0000000003538849 331.07+0000000000058021  
390...+00000000000000000003 391.07+0000000000000004  
\*110017+0000000000000000TP4 32...7+0000000003539917 332.07+0000000000052936  
390...+00000000000000000004 391.07+0000000000000006  
\*110018+0000000000000000TP4 573.07-0000000000053591 574.07+0000000021996028  
83..07+00000000000653464  
\*110019+0000000000000000TP4 32...7+0000000003537395 331.07+0000000000047225  
390...+00000000000000000004 391.07+0000000000000007  
\*110020+0000000000000000TP5 32...7+0000000003542520 332.07+0000000000060898  
390...+00000000000000000003 391.07+0000000000000001  
\*110021+0000000000000000TP5 573.07-0000000000058716 574.07+0000000029075942  
83..07+00000000000639791  
\*110022+0000000000000000TP5 32...7+0000000003562714 331.07+0000000000059857  
390...+00000000000000000004 391.07+0000000000000005  
\*110023+0000000000000000TP6 32...7+0000000003519618 332.07+0000000000049667  
390...+00000000000000000003 391.07+0000000000000005  
\*110024+0000000000000000TP6 573.07-0000000000015619 574.07+0000000036158274  
83..07+00000000000649981  
\*110025+0000000000000000TP6 32...7+0000000002403493 331.07+0000000000057125  
390...+00000000000000000003 391.07+0000000000000001  
\*110026+0000000000BM JOEL 32...7+0000000002338897 332.07+0000000000022927

OSF-22 Raw Level Data.GSI

390...+0000000000000003 391.07+0000000000000002 71...+000000000EL68.44  
\*110027+000000000BM JOEL 573.07+000000000048977 574.07+0000000040900664  
83..07+0000000000684179  
\*110028+000000000BM JOEL 32...7+0000000001803472 331.07+000000000020552  
390...+0000000000000004 391.07+0000000000000003  
\*110029+000000000000000TP7 32...7+0000000001808279 332.07+0000000000056327  
390...+0000000000000003 391.07+0000000000000002  
\*110030+000000000000000TP7 573.07+000000000044171 574.07+0000000044512415  
83..07+0000000000648405  
\*110031+000000000000000TP7 32...7+0000000001061958 331.07+000000000049137  
390...+0000000000000003 391.07+0000000000000000  
\*110032+00000TOP OF WELL 32...7+0000000000880151 332.07+000000000048325  
390...+0000000000000003 391.07+0000000000000000  
\*110033+00000TOP OF WELL 573.07+0000000000225978 574.07+0000000046454523  
83..07+0000000000649217  
\*110034+00000TOP OF WELL 32...7+0000000000885799 331.07+000000000046776  
390...+0000000000000003 391.07+0000000000000001  
\*110035+000000000000000TP7B 32...7+0000000001061120 332.07+000000000047581  
390...+0000000000000003 391.07+0000000000000001  
\*110036+000000000000000TP7B 573.07+0000000000050657 574.07+0000000048401442  
83..07+0000000000648412  
\*110037+000000000000000TP7B 32...7+0000000001825330 331.07+0000000000055743  
390...+0000000000000003 391.07+0000000000000002  
\*110038+0000000BM JOEL B 32...7+0000000001812314 332.07+0000000000019963  
390...+0000000000000003 391.07+0000000000000002 71...+000000000EL68.44  
\*110039+0000000BM JOEL B 573.07+0000000000063673 574.07+0000000052039086  
83..07+0000000000684191

<b>Project File Data</b>		<b>Coordinate System</b>	
Name:	J:\2017\171204.05 - SFWMD USGS Phase 4 Wells\TBC\OSF 22.vce	Name:	Default
Size:	47 KB	Datum:	WGS 1984
Modified:	8/12/2020 1:41:25 PM (UTC:-4)	Zone:	Default
Time zone:	Eastern Standard Time	Geoid:	
Reference number:		Vertical datum:	
Description:		Calibrated site:	
Comment 1:			
Comment 2:			
Comment 3:			

## Level Report

Imported file: [M 171204.05ED8520.GSI](#)

Instrument:

Creation option: Delta elevations

Description usage: Feature codes

### Run - 0002 Raw Observations

Standard error per kilometer of double leveling: 0.00230 ft

Standard error per turn/station setup: 0.00000 ft

Raw Misclosure: -0.02234 ft

Σ BS Distances: 2047.478 ft

Σ FS Distances: 2042.580 ft

Run Length: 4090.058 ft

Reduction: Raw Elevations

Create	Point ID	BS	HI	IS	FS	Δ Elevation	Raw Elevation	Misclosure	Adj. Elevation	Type	Distance	Description
✓	OS99	✓ 2.24250 ft	73.36235 ft			0.00000 ft	71.11986 ft	0.00000 ft	71.11986 ft	Benchmark	37.204 ft	
✓	TP1				✓ 6.36519 ft	-4.12269 ft	66.99717 ft			Computed	38.187 ft	
	TP1	✓ 4.35839 ft	71.35556 ft								353.617 ft	
✓	TP2				✓ 5.92989 ft	-1.57150 ft	65.42567 ft			Computed	357.777 ft	
	TP2	✓ 5.26329 ft	70.68896 ft								352.414 ft	
✓	TP3				✓ 5.85129 ft	-0.58800 ft	64.83767 ft			Computed	352.524 ft	
	TP3	✓ 5.80209 ft	70.63976 ft								353.884 ft	
✓	TP4				✓ 5.29359 ft	0.50850 ft	65.34617 ft			Computed	353.991 ft	
	TP4	✓ 4.72249 ft	70.06866 ft								353.739 ft	
✓	TP5				✓ 6.08979 ft	-1.36730 ft	63.97887 ft			Computed	354.251 ft	
	TP5	✓ 5.98569 ft	69.96456 ft								356.271 ft	
✓	TP6				✓ 4.96669 ft	1.01900 ft	64.99787 ft			Computed	351.961 ft	
	TP6	✓ 5.71249 ft	70.71036 ft								240.349 ft	
✓	BM JOEL				✓ 2.29270 ft	3.41979 ft	68.41766 ft	-0.02234 ft	68.44000 ft	Benchmark	233.889 ft	

### Run - 0002 (N3) Reduced Observations

Observation	Status	Raw Δ Elevation	Correction	Final Δ Elevation	Setups	Length	Σ BS Readings	Σ FS Readings	Std. Error
OS99-TP1 (E14)	Enabled	-4.12269 ft	0.00000 ft	-4.12269 ft	1	75.391 ft	2.24250 ft	6.36519 ft	0.00035 ft
TP1-TP2 (E15)	Enabled	-1.57150 ft	0.00000 ft	-1.57150 ft	1	711.394 ft	4.35839 ft	5.92989 ft	0.00107 ft
TP2-TP3 (E16)	Enabled	-0.58800 ft	0.00000 ft	-0.58800 ft	1	704.938 ft	5.26329 ft	5.85129 ft	0.00106 ft
TP3-TP4 (E17)	Enabled	0.50850 ft	0.00000 ft	0.50850 ft	1	707.875 ft	5.80209 ft	5.29359 ft	0.00107 ft
TP4-TP5 (E18)	Enabled	-1.36730 ft	0.00000 ft	-1.36730 ft	1	707.990 ft	4.72249 ft	6.08979 ft	0.00107 ft
TP5-TP6 (E19)	Enabled	1.01900 ft	0.00000 ft	1.01900 ft	1	708.232 ft	5.98569 ft	4.96669 ft	0.00107 ft
TP6-BM JOEL (E20)	Enabled	3.41979 ft	0.00000 ft	3.41979 ft	1	474.238 ft	5.71249 ft	2.29270 ft	0.00087 ft

### Run - 0002 (N3) Reduced Coordinates

Point ID	Status	Elevation
OS99	Enabled	71.11986 ft
BM JOEL	Enabled	68.44000 ft

### Run - 0002\_1 Raw Observations

Standard error per kilometer of double leveling: 0.00230 ft

Standard error per turn/station setup: 0.00000 ft

Raw Misclosure: 0.00120 ft

Σ BS Distances: 557.655 ft

Σ FS Distances: 556.185 ft

Run Length: 1113.840 ft

Reduction: Raw Elevations

Create	Point ID	BS	HI	IS	FS	Δ Elevation	Raw Elevation	Misclosure	Adj. Elevation	Type	Distance	Description
✓	BM JOEL	✓ 2.05520 ft	70.49520 ft			0.00000 ft	68.44000 ft	0.00000 ft	68.44000 ft	Benchmark	180.347 ft	
✓	TP7				✓ 5.63269 ft	-3.57749 ft	64.86251 ft			Computed	180.828 ft	
	TP7	✓ 4.91369 ft	69.77620 ft								106.196 ft	

✓	TOP OF WELL			✓ 4.83249 ft	0.08120 ft	64.94371 ft			Computed	88.015 ft
	TOP OF WELL	✓ 4.67759 ft	69.62130 ft							88.580 ft
✓	TP7B			✓ 4.75809 ft	-0.08050 ft	64.86321 ft			Computed	106.112 ft
	TP7B	✓ 5.57429 ft	70.43750 ft							182.533 ft
✓	BM JOEL B			✓ 1.99630 ft	3.57799 ft	68.44120 ft	0.00120 ft	68.44000 ft	Benchmark	181.231 ft

**Run - 0002\_1 (N4) Reduced Observations**

Observation	Status	Raw Δ Elevation	Correction	Final Δ Elevation	Setups	Length	Σ BS Readings	Σ FS Readings	Std. Error
BM JOEL-TP7 (E21)	Enabled	-3.57749 ft	0.00000 ft	-3.57749 ft	1	361.174 ft	2.05520 ft	5.63269 ft	0.00076 ft
TP7-TOP OF WELL (E22)	Enabled	0.08120 ft	0.00000 ft	0.08120 ft	1	194.211 ft	4.91369 ft	4.83249 ft	0.00056 ft
TOP OF WELL-TP7B (E23)	Enabled	-0.08050 ft	0.00000 ft	-0.08050 ft	1	194.692 ft	4.67759 ft	4.75809 ft	0.00056 ft
TP7B-BM JOEL B (E24)	Enabled	3.57799 ft	0.00000 ft	3.57799 ft	1	363.764 ft	5.57429 ft	1.99630 ft	0.00076 ft

**Run - 0002\_1 (N4) Reduced Coordinates**

Point ID	Status	Elevation
BM JOEL B	Enabled	68.44000 ft

Date: 8/16/2020 10:50:27 AM	Project: J:\2017\171204.05 - SFWMD USGS Phase 4 Wells\TBC\OSF 22.vce	Trimble Business Center
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**Office**

**Project**

28 August 2020

**INPUT**

State Plane, NAD83  
0901 - Florida East, U.S. Feet  
Vertical - NAVD88, U.S. Feet

**OUTPUT**

State Plane, NAD83  
0901 - Florida East, U.S. Feet  
Vertical - NGVD29 (Vertcon94), U.S. Feet

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**JOEL1**

1/1

**Northing/Y:** 1437011.315  
**Easting/X:** 605463.359  
**Elevation/Z:** 68.44  
**Convergence:** -0 04 28.77213  
**Scale Factor:** 0.999944123  
**Combined Factor:** 0.999945255

**Northing/Y:** 1437011.315  
**Easting/X:** 605463.359  
**Elevation/Z:** 69.493  
**Convergence:** -0 04 28.77213  
**Scale Factor:** 0.999944123  
**Combined Factor:** 0.999945204

Grid Shift (U.S. ft.): X/Easting = 0.0, Y/Northing = 0.0

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Remark: