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SURVEYOR'S REPORT

USGS Wells Phase 4

USGS Station No:	282738081341401
Station Name:	82713405
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 field work 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.

SCOTT R URQUHART License Number 6524 STATE OF FLORIDA Professional Surveyor and Mapper

Digitally signed by Scott R. Urquhart, P.S.M.
Date: 2020.09.29 14:06:18 -04'00'

Scott Urquhart
Professional Surveyor & Mapper
Florida Certificate No. 6524

Date Signed

(For the firm – LB 8336)

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 **82713405**, 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 Q 629, ran through site benchmark 82713405 and closed on Orange County Benchmark P1638008. 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 feet times the square root in miles (0.02*SQRT(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:

- S629 (DI9166)
- T627 (DI9119)
- S1260025 (DI9118)

See page 24 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 then uploaded to the OPUS site for processing. See pages 25-28 for 82713405 OPUS Report.

DATES OF FIELD DATA COLLECTION

Field survey work by T2 was performed between July 30th & August 25th, 2020. Field notes are contained in Field Book 555, pages 25-28, 49-51, 59, and 76.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Rev. 1/19

U.S.G.S. Station Name: 82713405	U.S.G.S. Station Number: 282738081341401	Agency: T2 UES, Inc.	Date of Field Work: 8-12-2020
Party Chief: ABREU	Field Book: 555	Page(s): **25-28, 49-51, 59, 76**	Report Prepared by: CHAMBLESS

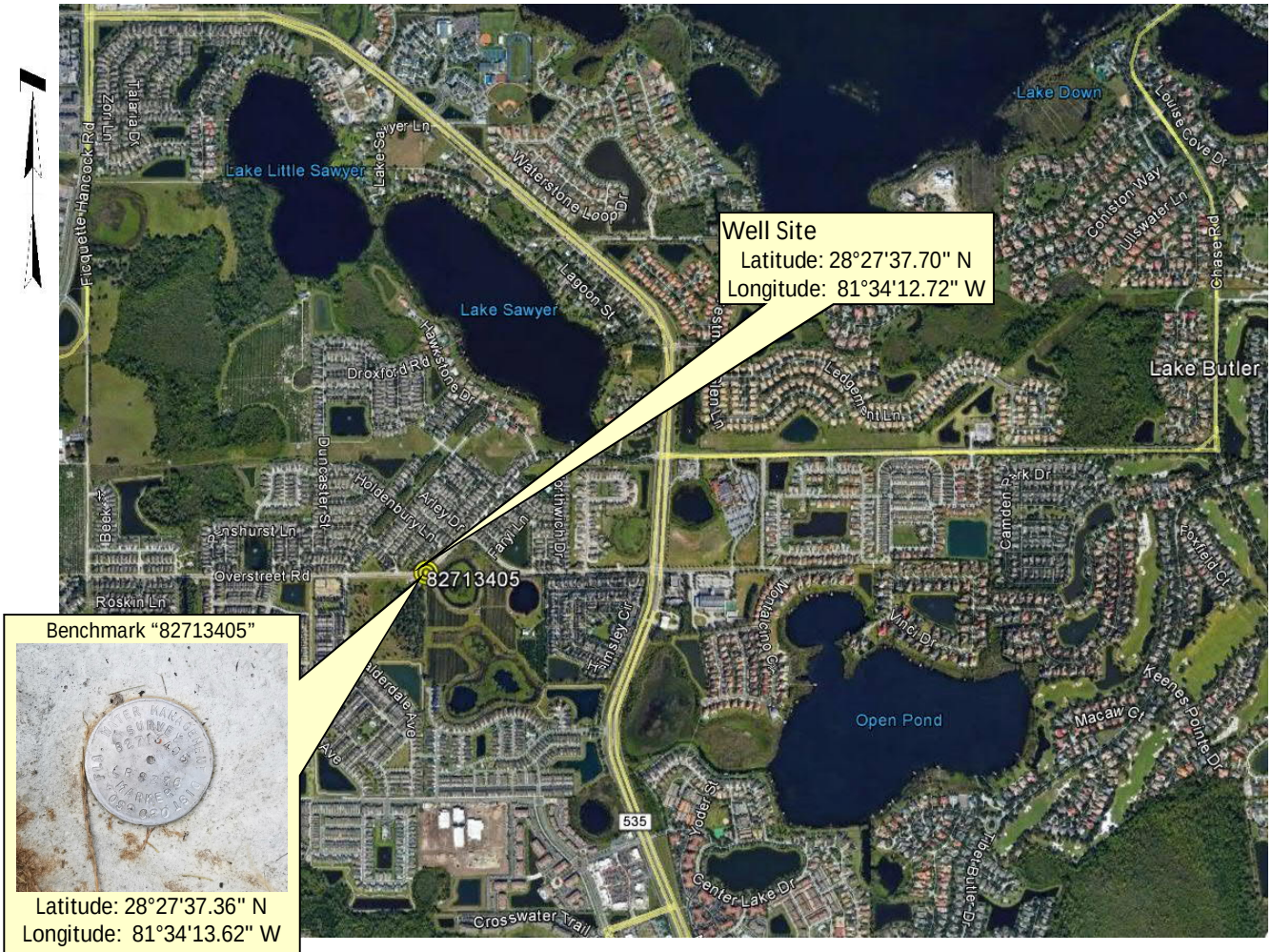
SITE SPECIFIC DATA			
Site Benchmark: 82713405	Benchmark Elevation(s) *(NAVD88)*: 118.33	Corpscon 6.0.1 Conversion Factor (*NAVD88 to NGVD29*) + 0.87	
Well Reference Elevation (*NAVD88*): 118.47	DTW: 45.60 (08/12/2020 at 9:00 AM)	Ground Elevation *(NAVD88)*: 118.70	Pad Elevation (*NAVD88*): N/A

GEOGRAPHIC DATA		
Section 25	Township 23S	Range 27E
Well Latitude: 28°27'37.70"N	Well Longitude: 81°34'12.72" W	Location Source: RTK GPS
State Plane Coordinates:	Northing (Y) = 1500552.960	Easting (X) = 472955.369

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: “82713405”
Reference Point: N. RIM OF 2” PVC PIPE

Reference Point El. = 118.47 feet NAVD88

Distance to Water = 45.60 feet from reference point (08/12/2020 at 9:00 AM)

New Aluminum Tag

USGS RMs

RM 2 – LAG BOLT IN TREE

Latitude: N 28°27'38.31"
Longitude: W 81°34'13.14"
NAVD88 EL = 119.46

RM 3 – "SQUARE IN CURB

Latitude: N 28°27'38.33"
Longitude: W 81°34'12.69"
NAVD88 EL = 118.05

RM 1 – "X" CUT IN SIDEWALK

Latitude: N 28°27'37.68"
Longitude: W 81°34'12.72"
NAVD88 EL = 118.84

Well

Site Benchmark

Site Benchmark Overall Photo

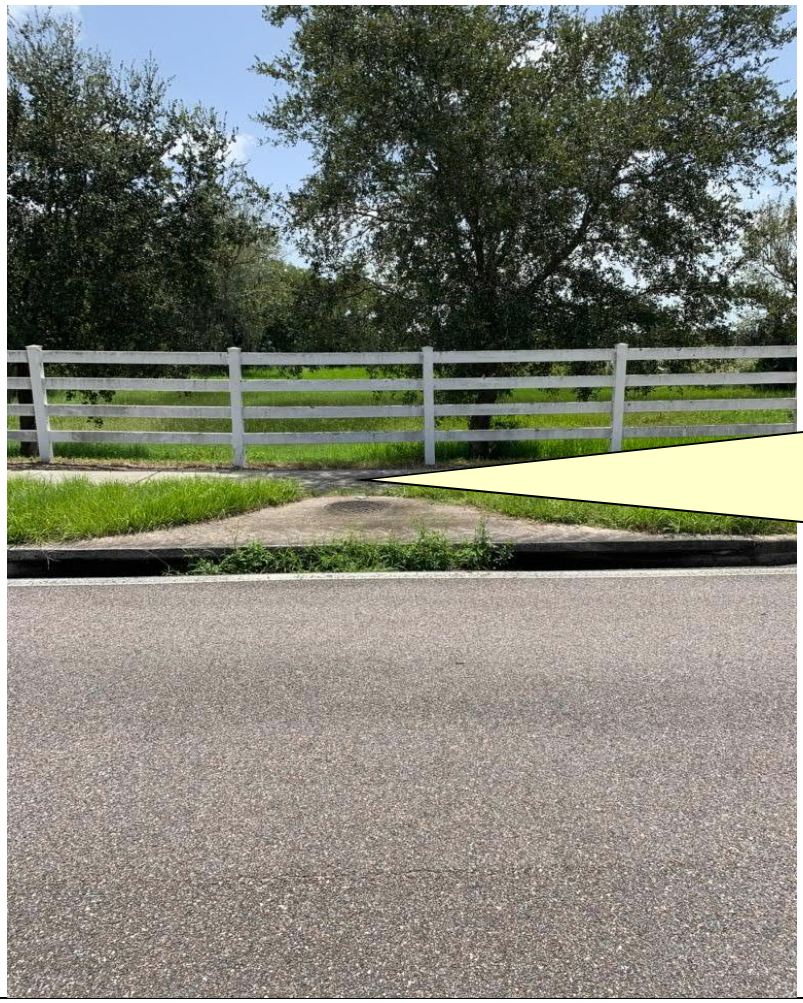
Site BM:

Latitude: 28°27'37.36" N
Longitude: 81°34'13.62" W
NAVD88 EL = 118.33

Source Benchmarks

NGS Benchmark "Q629" (DI9164)

Latitude: 28°28'02" N SCALED
Longitude: 81°35'00" W SCALED
NAVD88 EL = 102.87 feet



Orange County Benchmark
"P1638008"

Latitude: 28°27'41.07" N SCALED
Longitude: 81°34'08.32" W SCALED
NAVD88 EL = 117.39 feet

"Q629" Benchmark Datasheet (1 of 2)

The NGS Data Sheet

See file dsdata.pdf for more information about the datasheet.

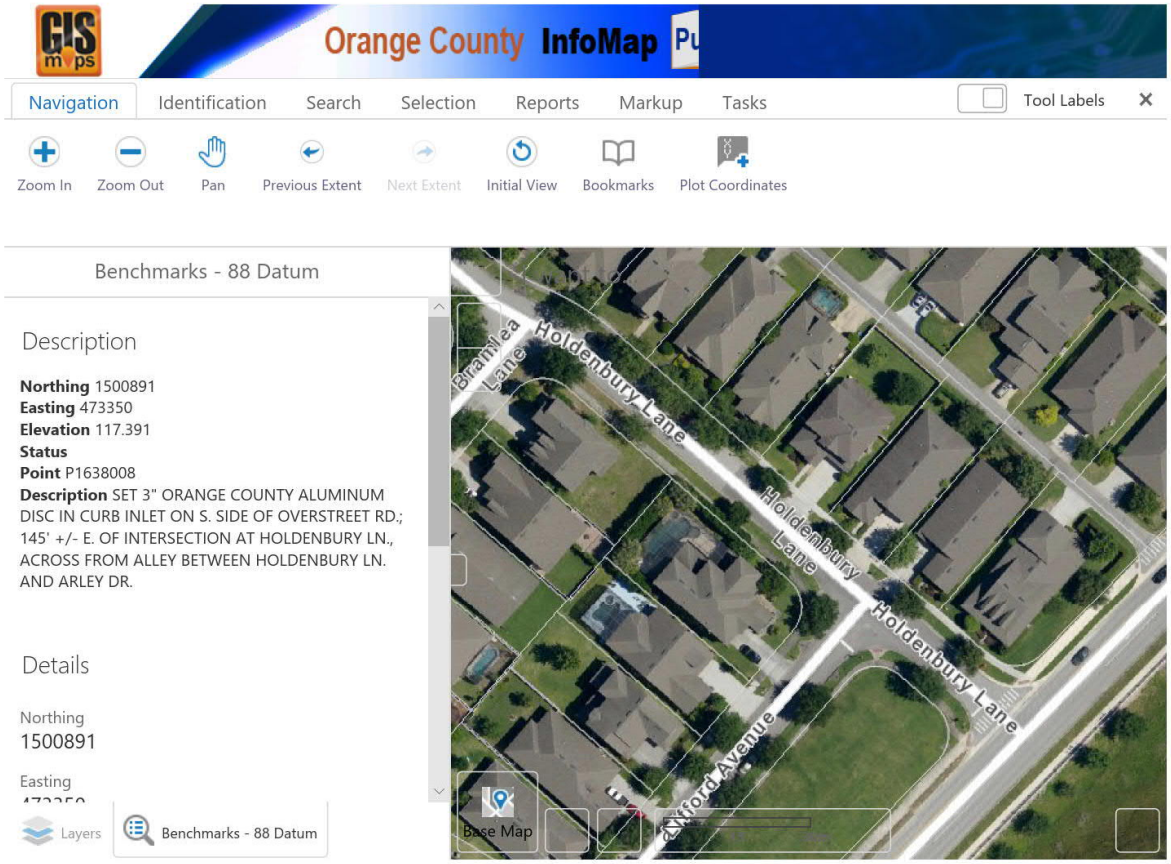
```
PROGRAM = datasheet95, VERSION = 8.12.5.9
Starting Datasheet Retrieval...
1        National Geodetic Survey,   Retrieval Date = JULY 30, 2020
 DI9164 ***********************************************************************
 DI9164  DESIGNATION -  Q 629
 DI9164  PID         -  DI9164
 DI9164  STATE/COUNTY-  FL/ORANGE
 DI9164  COUNTRY     -  US
 DI9164  USGS QUAD   -  WINDERMERE (2018)
 DI9164
 DI9164                        *CURRENT SURVEY CONTROL
 DI9164  ______________________________________________________________________
 DI9164* NAD 83(1986) POSITION- 28 28 02.     (N) 081 35 00.     (W)   SCALED
 DI9164* NAVD 88 ORTHO HEIGHT -    31.354 (meters)      102.87  (feet) ADJUSTED
 DI9164  ______________________________________________________________________
 DI9164  GEOID HEIGHT    -        -27.484 (meters)                     GEOID18
 DI9164  DYNAMIC HEIGHT  -         31.309 (meters)      102.72  (feet) COMP
 DI9164  MODELED GRAVITY -    979,191.5   (mgal)                       NAVD 88
 DI9164
 DI9164  VERT ORDER      -  FIRST     CLASS II
 DI9164
 DI9164.The horizontal coordinates were scaled from a map and have
 DI9164.an estimated accuracy of +/- 6 seconds.
 DI9164.
 DI9164.The orthometric height was determined by differential leveling and
 DI9164.adjusted by the NATIONAL GEODETIC SURVEY
 DI9164.in April 2010.
 DI9164
 DI9164.Significant digits in the geoid height do not necessarily reflect accuracy.
 DI9164.GEOID18 height accuracy estimate available here.
 DI9164
 DI9164.Click photographs - Photos may exist for this station.
 DI9164
 DI9164.The dynamic height is computed by dividing the NAVD 88
 DI9164.geopotential number by the normal gravity value computed on the
 DI9164.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 DI9164.degrees latitude (g = 980.6199 gals.).
 DI9164
 DI9164.The modeled gravity was interpolated from observed gravity values.
 DI9164
 DI9164;                   North         East     Units  Estimated Accuracy
 DI9164;SPC FL E     -   458,120.      142,870.      MT  (+/- 180 meters Scaled)
 DI9164
 DI9164_U.S. NATIONAL GRID SPATIAL ADDRESS: 17RMM428490(NAD 83)
 DI9164
 DI9164                           SUPERSEDED SURVEY CONTROL
 DI9164
 DI9164.No superseded survey control is available for this station.
 DI9164
```

"Q629" Benchmark Datasheet (2 of 2)

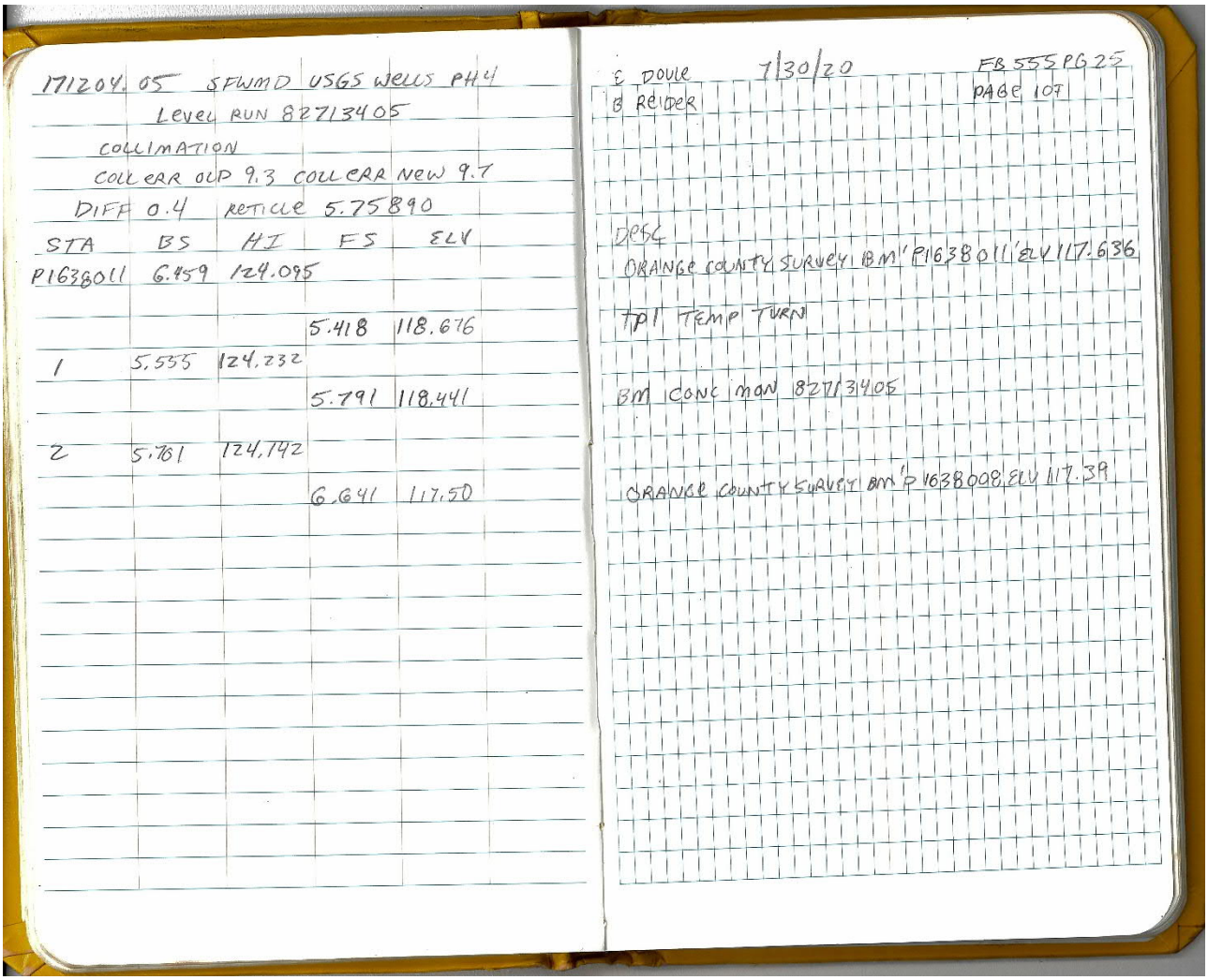
```
DI9164_MARKER: F = FLANGE-ENCASED ROD
DI9164_SETTING: 49 = STAINLESS STEEL ROD W/O SLEEVE (10 FT.+)
DI9164_STAMPING: Q 629 2005
DI9164_MARK LOGO: NGS
DI9164_PROJECTION: FLUSH
DI9164_MAGNETIC: M = MARKER EQUIPPED WITH BAR MAGNET
DI9164_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
DI9164_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
DI9164+SATELLITE: SATELLITE OBSERVATIONS - May 06, 2005
DI9164_ROD/PIPE-DEPTH:  6.5 meters
DI9164
DI9164  HISTORY     - Date     Condition        Report By
DI9164  HISTORY     - 20050506 MONUMENTED       FLDEP
DI9164
DI9164                          STATION DESCRIPTION
DI9164
DI9164'DESCRIBED BY FL DEPT OF ENV PRO 2005
DI9164'THE MARK IS ABOUT 6.3 MI (10.1 KM) SOUTH OF WINTER GARDEN, 3.5 MI (5.6
DI9164'KM) SOUTHWEST OF WINDERMERE, IN SECTION 23, TOWNSHIP 23 SOUTH, RANGE
DI9164'27 EAST.
DI9164'
DI9164'TO REACH THE MARK FROM THE INTERSECTION OF STATE HIGHWAY 50 (WEST
DI9164'COLONIAL DRIVE) AND COUNTY ROAD 535 (WINTER GARDEN-VINELAND ROAD) IN
DI9164'WINTER GARDEN, GO SOUTH ON COUNTY ROAD 535 (WINTER GARDEN-VINELAND
DI9164'ROAD) FOR 0.4 MI (0.6 KM) TO THE UNDERPASS OF THE FLORIDA TURNPIKE,
DI9164'CONTINUE SOUTH ON COUNTY ROAD 535 (WINTER GARDEN-VINELAND ROAD) FOR
DI9164'5.15 MI (8.3 KM) TO THE JUNCTION OF HANCOCK ROAD, (COUNTY ROAD 535
DI9164'TURNS LEFT) CONTINUE SOUTH ON HANCOCK ROAD (HANCOCK TURNS INTO
DI9164'FIQUETTE ROAD) FOR 0.8 MI (1.3 KM) TO THE JUNCTION OF OVERSTREET ROAD
DI9164'ON THE LEFT, CONTINUE SOUTHWEST ON FIQUETTE ROAD FOR 0.05 MI (0.1 KM)
DI9164'TO THE MARK ON THE LEFT, A STAINLESS STEEL ROD DRIVEN TO REFUSAL AT A
DI9164'DEPTH OF 21.2 FT (6.5 M) WITH A NGS LOGO CAP FLUSH WITH THE GROUND AND
DI9164'ABOUT LEVEL WITH FIQUETTE ROAD, THE DATUM POINT IS RECESSED 0.7 FT
DI9164'(0.2 M) BELOW THE LEVEL OF THE NGS LOGO CAP.
DI9164'
DI9164'LOCATED ABOUT 335.0 FT (102.1 M) SOUTHWEST OF THE CENTERLINE OF
DI9164'OVERSTREET ROAD, 23.3 FT (7.1 M) WEST OF A SPRINT CABLE BOX NUMBER
DI9164'51869, 20.0 FT (6.1 M) EAST OF SPRINT CABLE BOX NUMBER LAGOON PT ROAD,
DI9164'17.5 FT (5.3 M) SOUTH-SOUTHEAST OF THE SOUTH EDGE OF FIQUETTE ROAD,
DI9164'14.0 FT (4.3 M) WEST OF A POWER POLE NUMBER 6620902, 1.7 FT (0.5 M)
DI9164'NORTH-NORTHWEST OF A BARBWIRE FENCE AND 1.0 FT (0.3 M) NORTH-NORTHWEST
DI9164'OF A CARSONITE WITNESS POST.
DI9164'
DI9164'NOTE A MAGNET WAS PLACED INSIDE OF THE NGS LOGO CAP.
DI9164'
DI9164'NOTE ACCESS TO THE DATUM POINT IS HAD THROUGH A 5-INCH (13 CM) NGS
DI9164'LOGO CAP.

*** retrieval complete.
Elapsed Time = 00:00:02
```

?

"P1638008" Benchmark Datasheet (2 of 2)



Field Notes (1 of 9)



171204.05 SFWMD USGS WELLS PH4
Level RUN 82713405
COLLIMATION
COLLER OLD 9.3 COLLER NEW 9.7
DIFF 0.4 RETICLE 5.75890

STA	BS	HI	FS	ELV
P1638011	6.459	124.095		
			5.418	118.676
1	5.535	124.232		
			5.791	118.441
2	5.781	124.742		
			6.641	117.50

C DOYLE 7/30/20 FB 555 PG 25
B REIDER PAGE 107

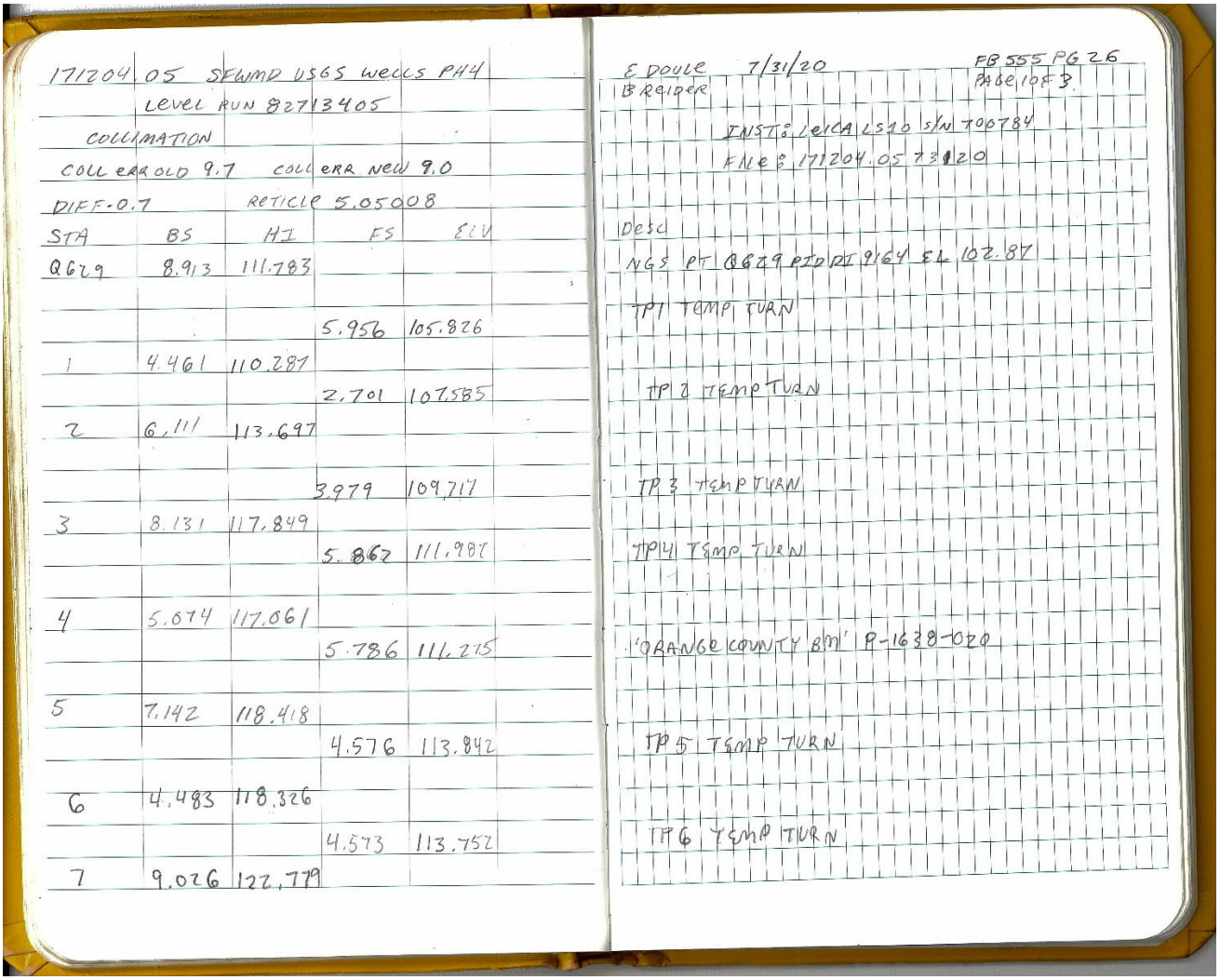
DOSC
ORANGE COUNTY SURVEY BM "P1638011" ELV 117.636

TP1 TEMP TURN

BM CONC MON 82713405

ORANGE COUNTY SURVEY BM "P1638008" ELV 117.39

Field Notes (2 of 9)

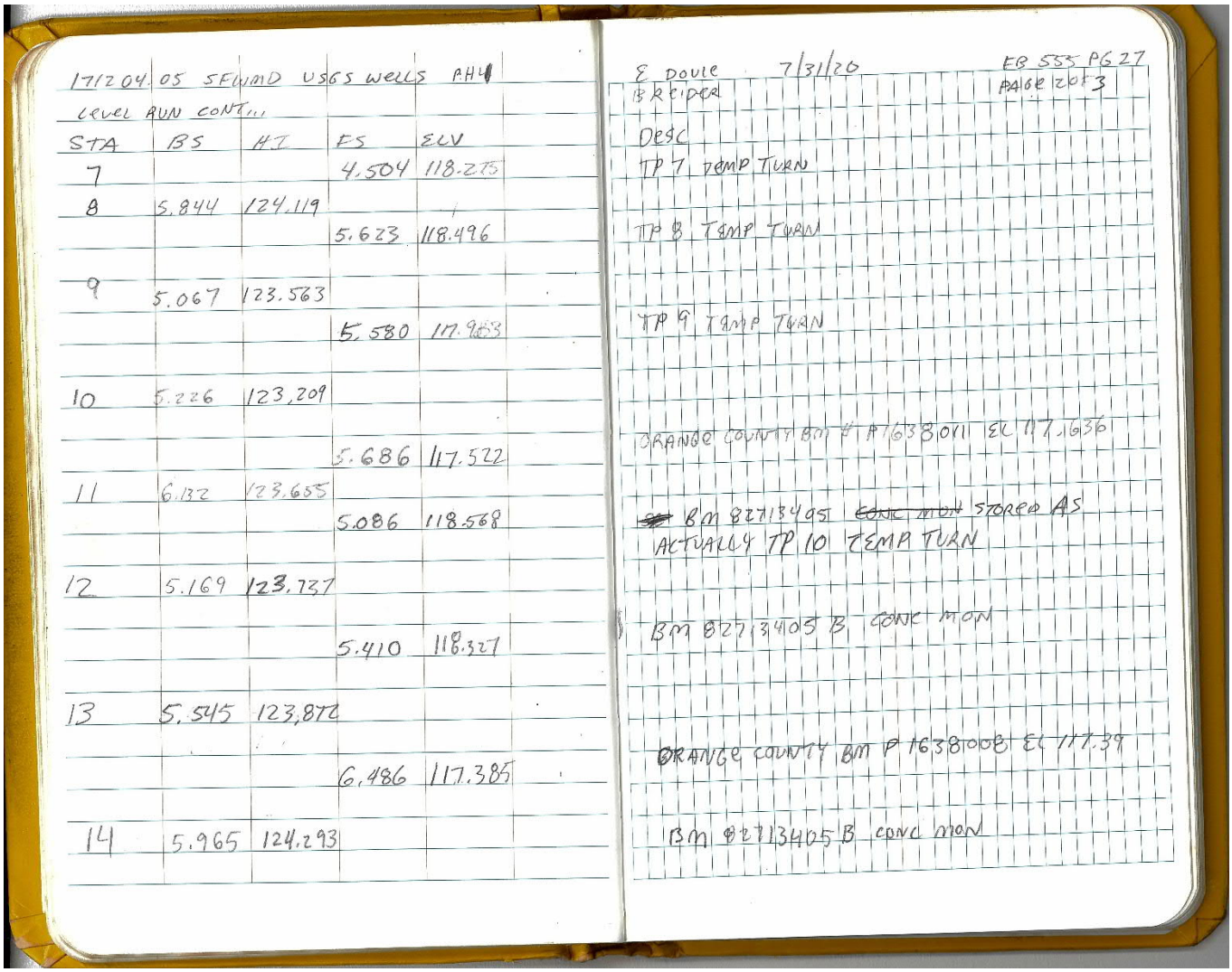


171204.05 SFWMD USGS WELLS PH4
LEVEL RUN 827/3405
COLLIMATION
COLL ERR OLD 9.7 COLL ERR NEW 9.0
DIFF -0.7 RETICLE 5.05008

STA	BS	HI	FS	ELV
QG29	8.913	111.783		
			5.956	105.826
1	4.461	110.287		
			2.701	107.585
2	6.111	113.697		
			3.979	109.717
3	8.131	117.849		
			5.867	111.982
4	5.074	117.061		
			5.786	111.275
5	7.142	118.418		
			4.576	113.842
6	4.483	118.326		
			4.573	113.752
7	9.026	122.779		

E DOULE 7/31/20 FB 555 PG 26
BREIDER Page 10 of 3
INST: LeicA LS20 S/N 709784
FILE: 171204.05 7/31/20
Desc
NGS PT QG29 RID DI 9164 EL 102.87
TP1 TEMP TURN
TP2 TEMP TURN
TP3 TEMP TURN
TP4 TEMP TURN
'ORANGE COUNTY BM' P-1638-020
TP5 TEMP TURN
TP6 TEMP TURN

Field Notes (3 of 9)



17/20 04 05 SFWMD USGS WELLS AHA
LEVEL RUN CONT...

STA	BS	HI	FS	ELV
7			4.504	118.275
8	5.844	124.119		
			5.623	118.496
9	5.067	123.563		
			5.580	117.983
10	5.226	123.209		
			5.686	117.522
11	6.132	123.655		
			5.086	118.568
12	5.169	123.737		
			5.410	118.327
13	5.545	123.872		
			6.486	117.385
14	5.965	124.293		

E Doyle 7/31/20 EB 555 PG 27
Bkeiper PAGE 2 OF 3
DESC
TP 7 TEMP TURN

TP 8 TEMP TURN

TP 9 TEMP TURN

ORANGE COUNTY BM # AA 1638011 EL 117.1636

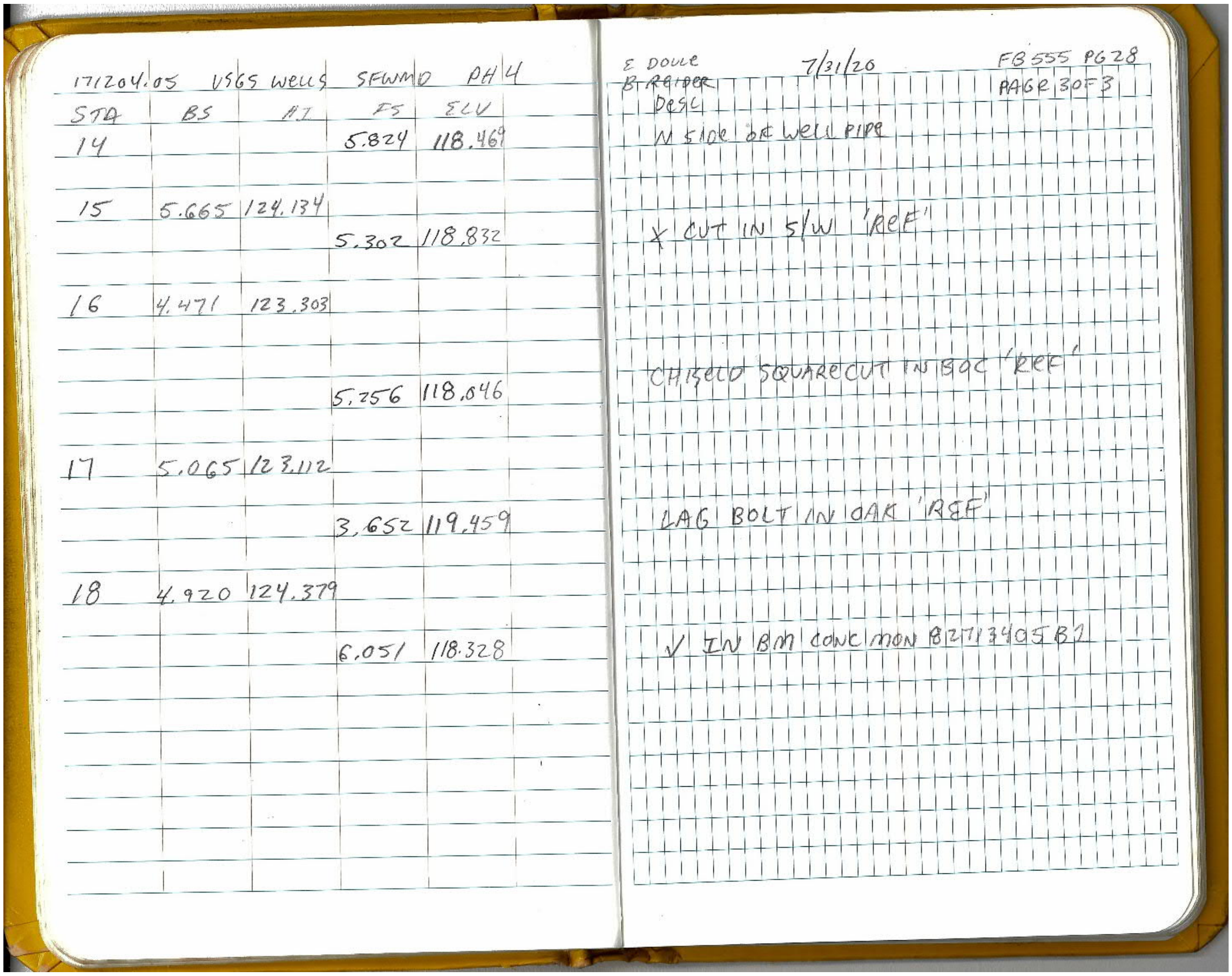
~~BM~~ BM 827134951 ~~CONC MON~~ STORED AS
ACTUALLY TP 10 TEMP TURN

BM 827134053 B CONC MON

ORANGE COUNTY BM P 1638008 EL 117.39

BM 827134053 B CONC MON

Field Notes (4 of 9)



171204.05 USGS WELLS SFWMD PH 4

STA	BS	HI	FS	ELV
14			5.824	118.469
15	5.665	124.134		
			5.302	118.832
16	4.471	123.303		
			5.256	118.046
17	5.065	123.112		
			3.652	119.459
18	4.920	124.379		
			6.051	118.328

E DOULE
B REIDER
7/31/20
FB 555 PG 28
PAGE 3 OF 3

DESC
N SIDE OF WELL PIPE

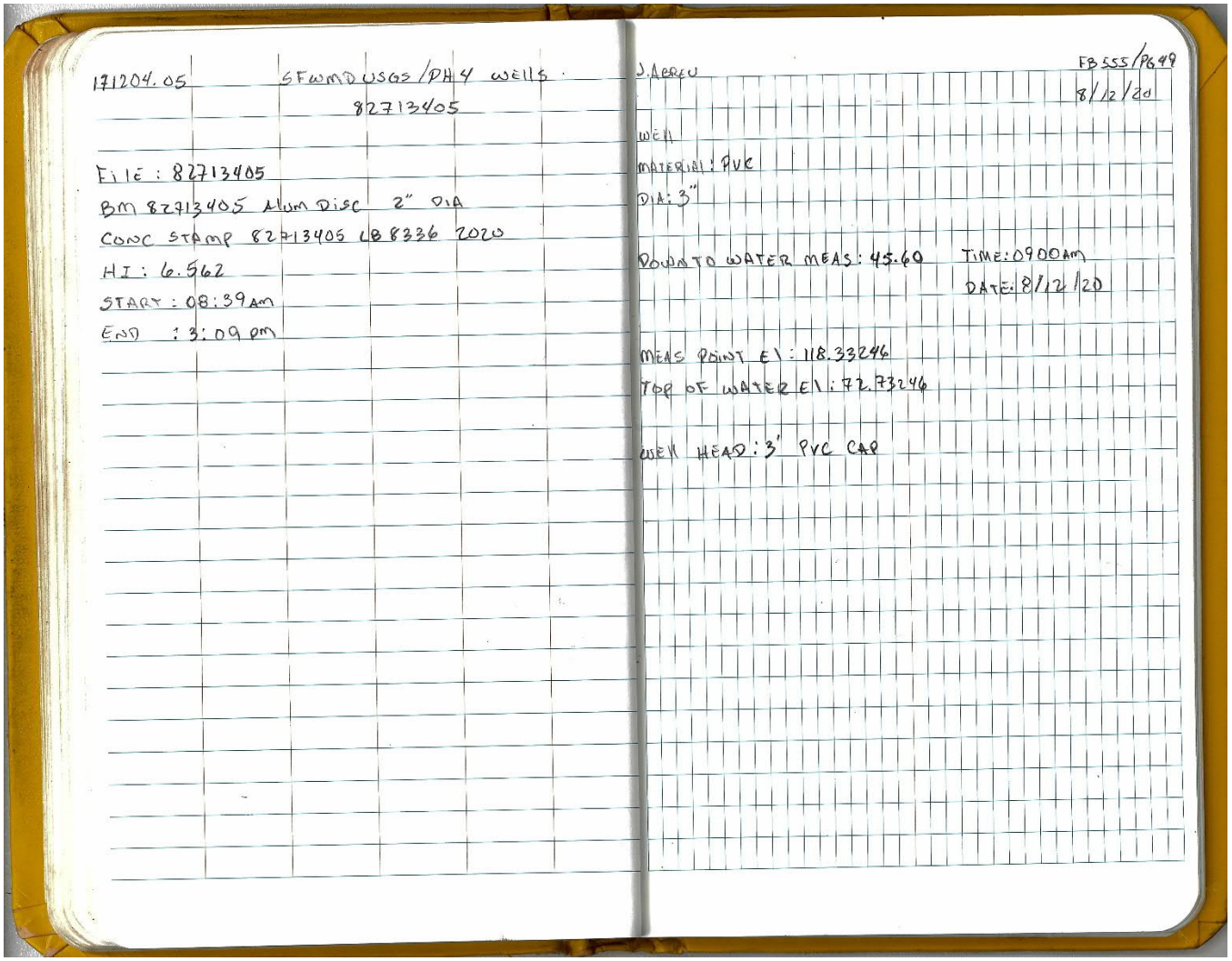
X CUT IN S/W 'REF'

CHISELD SQUARECUT IN BOC 'REF'

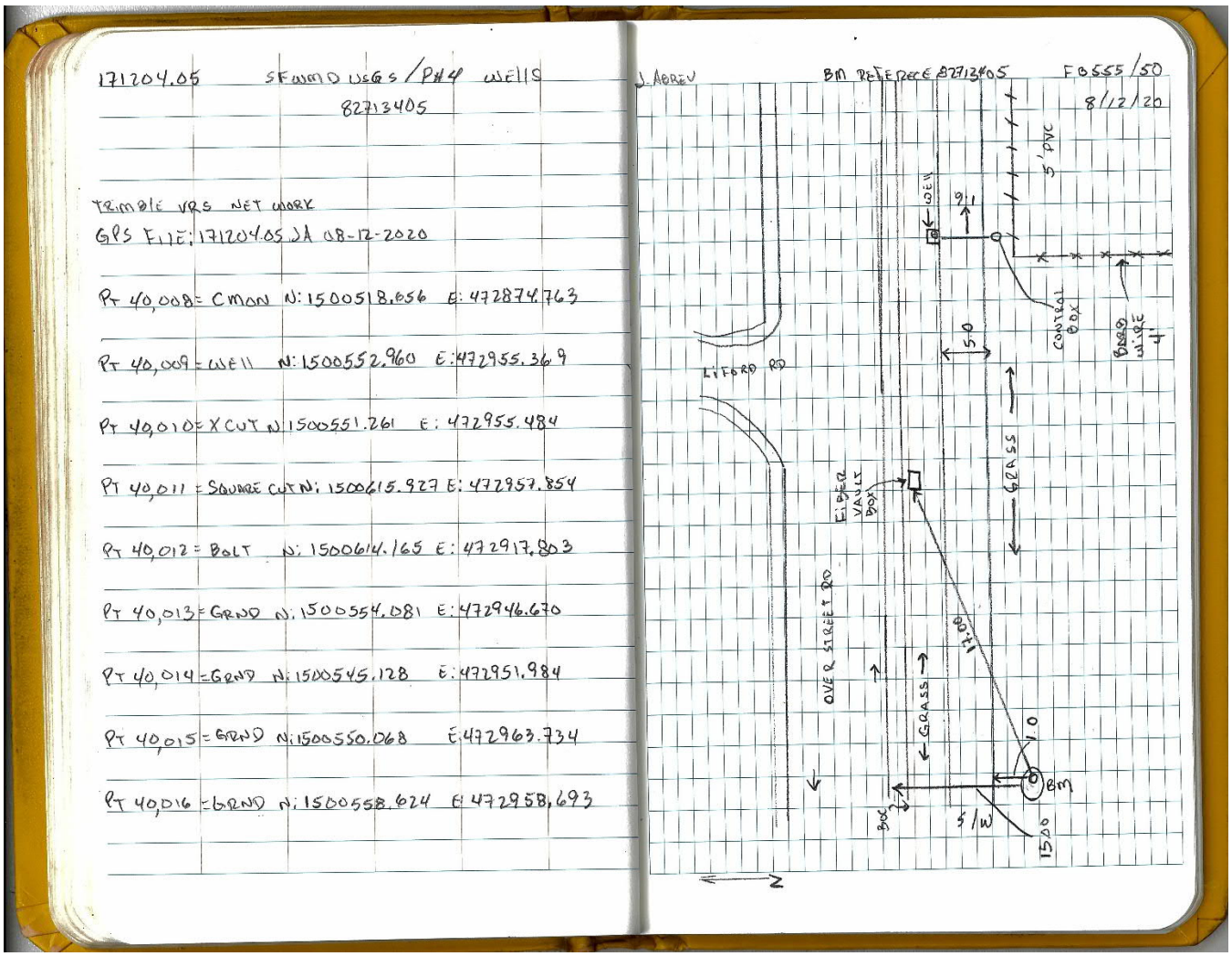
LAG BOLT IN OAK 'REF'

✓ IN BM CONC MON 8271340 5B2

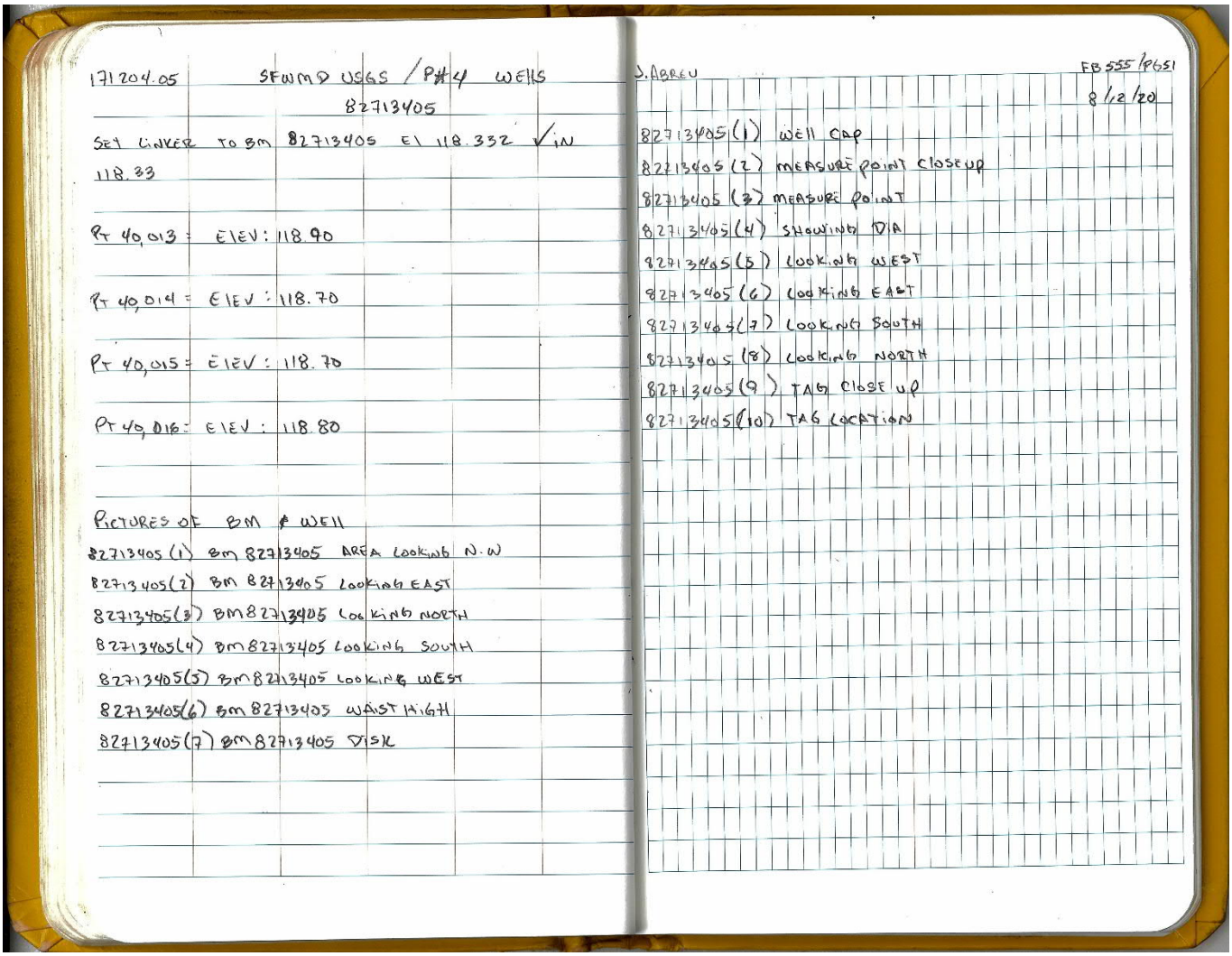
Field Notes (5 of 9)



Field Notes (6 of 9)



Field Notes (7 of 9)



171204.05 SFWMD USGS / P#4 WELLS
82713405

SET LINKER TO BM 82713405 EL 118.332 ✓IN
118.33

PT 40,013 = ELEV: 118.90

PT 40,014 = ELEV: 118.70

PT 40,015 = ELEV: 118.70

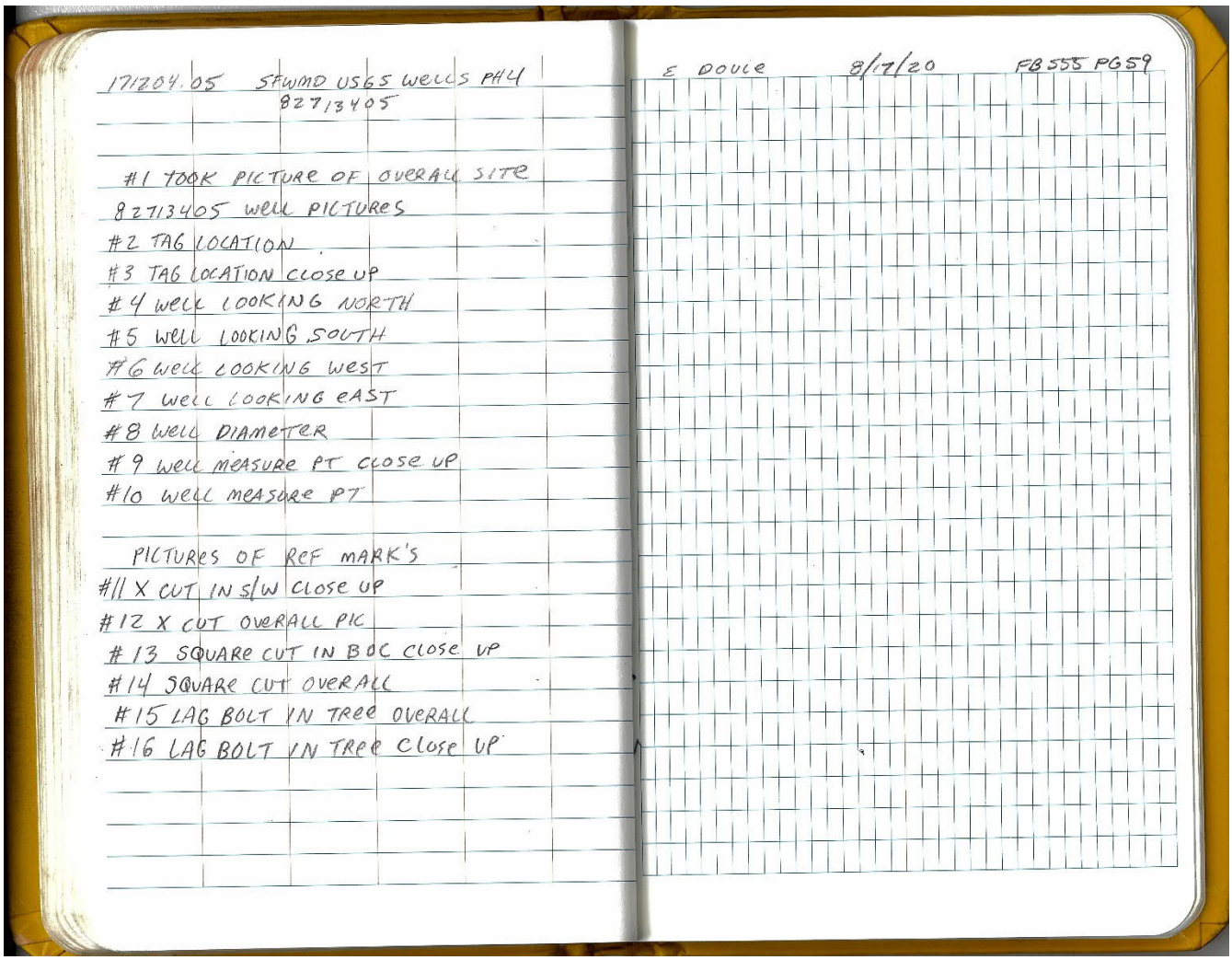
PT 40,016 = ELEV: 118.80

PICTURES OF BM & WELL
82713405 (1) BM 82713405 AREA LOOKING N.W
82713405 (2) BM 82713405 LOOKING EAST
82713405 (3) BM 82713405 LOOKING NORTH
82713405 (4) BM 82713405 LOOKING SOUTH
82713405 (5) BM 82713405 LOOKING WEST
82713405 (6) BM 82713405 WAAS HIGH
82713405 (7) BM 82713405 DISK

J. ABREU FB 555 PG 51
8/12/20

82713405 (1) WELL CAP
82713405 (2) MEASURE POINT CLOSEUP
82713405 (3) MEASURE POINT
82713405 (4) SHOWING DIA
82713405 (5) LOOKING WEST
82713405 (6) LOOKING EAST
82713405 (7) LOOKING SOUTH
82713405 (8) LOOKING NORTH
82713405 (9) TAG CLOSE UP
82713405 (10) TAG LOCATION

Field Notes (8 of 9)



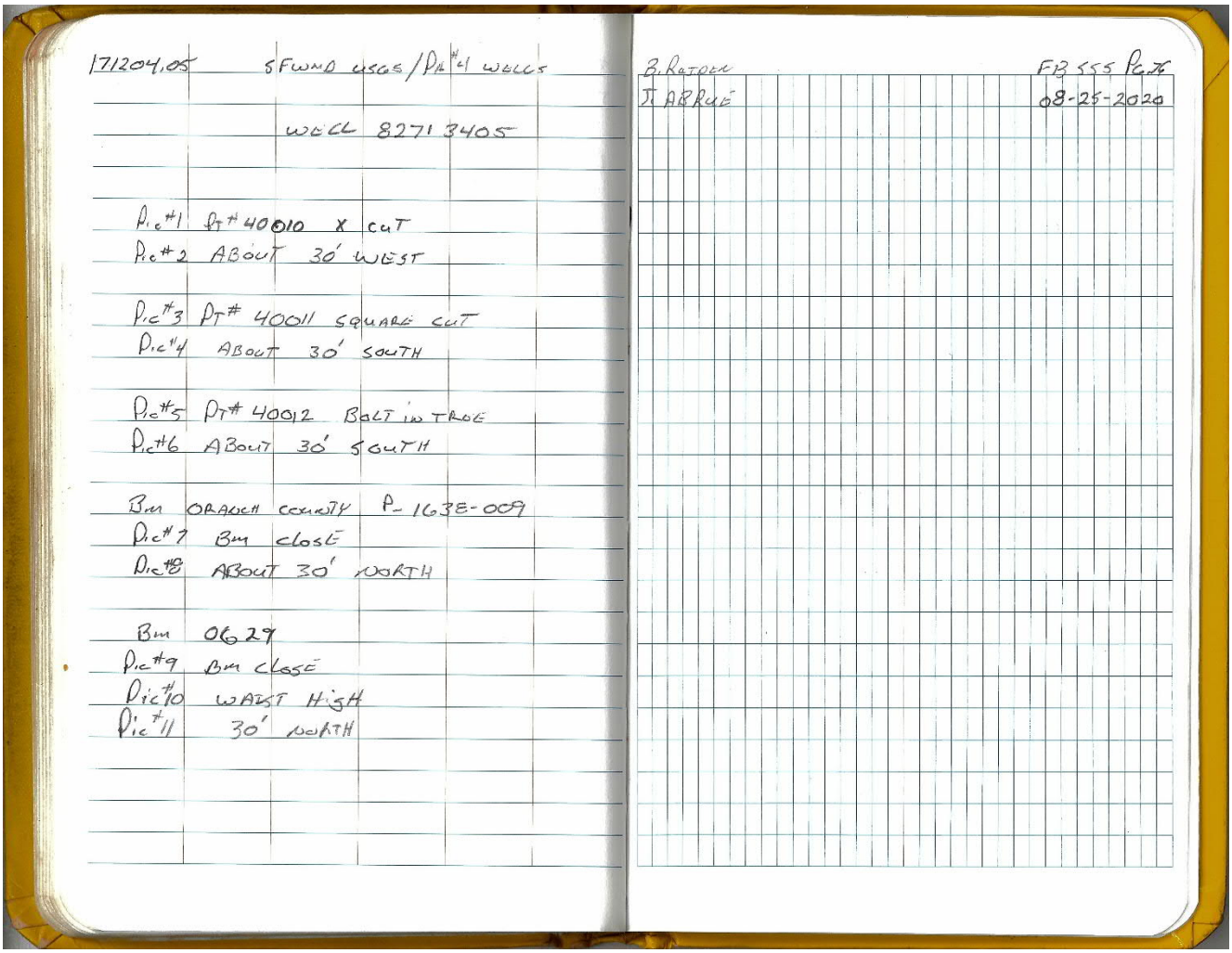
171204.05 SFWMD USGS WELLS PH4
8271340S

#1 TOOK PICTURE OF OVERALL SITE
8271340S WELL PICTURES
#2 TAG LOCATION
#3 TAG LOCATION CLOSE UP
#4 WELL LOOKING NORTH
#5 WELL LOOKING SOUTH
#6 WELL LOOKING WEST
#7 WELL LOOKING EAST
#8 WELL DIAMETER
#9 WELL MEASURE PT CLOSE UP
#10 WELL MEASURE PT

PICTURES OF REF MARK'S
#11 X CUT IN S/W CLOSE UP
#12 X CUT OVERALL PIC
#13 SQUARE CUT IN BOC CLOSE UP
#14 SQUARE CUT OVERALL
#15 LAG BOLT IN TREE OVERALL
#16 LAG BOLT IN TREE CLOSE UP

E DOVLE 8/17/20 FB 555 PG 59

Field Notes (9 of 9)



171204.05 SFWMD USGS/PAL #41 WELLS

WELL 8271 3405

Pic #1 PT # 40010 X CUT
Pic #2 ABOUT 30' WEST

Pic #3 PT # 40011 SQUARE CUT
Pic #4 ABOUT 30' SOUTH

Pic #5 PT # 40012 BOLT IN TROE
Pic #6 ABOUT 30' SOUTH

Bm ORANGE COUNTY P-1638-009
Pic #7 Bm close
Pic #8 ABOUT 30' NORTH

Bm 0629
Pic #9 Bm close
Pic #10 WAIST HIGH
Pic #11 30' NORTH

B. RATCLIFF
T ABRUE

FB 555 Pg 74
08-25-2020

South Florida Water Management District Benchmark Datasheet

Designation:	82713405	Project Name:	USGS PHASE 4 WELLS	Type:	V	State Plane Zone:	FL East
Stamping:	82713405 LB 8336	Field Book Name:	555	Field Book Page:	25-28, 49-51, 59, 76		
Established By:	T2ues	Recovered By:		Recovery Date:			
Surveyor:	ABREU	Established Date:	08/12/20	Status:	New		

GEOGRAPHIC POSITION INFORMATION

Section:	25	Township:	23S			Range:	27E
County:	ORANGE	Quadrangle:	WINDERMERE	Quad Index:	3613	NGS Source BM(s):	Q 629
NAD83 Adj. Year:	2011	Vertical Datum:	NAVD1988	Horizontal Datum:	NAD1983	NGS PID(s):	DI9164
NAVD88 Elevation (feet):	118.332	NGVD29 Elevation (feet):	119.202	2022 Elevation:		NGS NAVD88 Elev (ft):	102.87
NAVD88 Class:		NGVD29 Class:		Other Elevation:		NGS NAVD88 Elev (m):	31.354
NAVD88 Order:	3RD	NGVD29 Order:		Other Elevation Type:		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.)

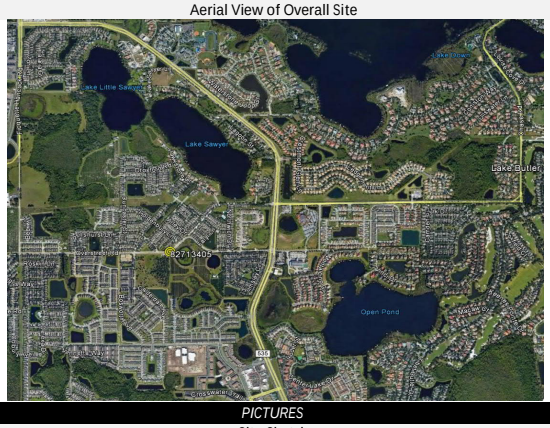
Vertical Datum Offset: +	0.87	Actual NGS Elevation or ngvd29.txt file:		OPUS Ortho Height:	36.055(m)		
Northing (Y) (feet):	1500518.649	Easting (X) (feet):	472874.756	Source of Latitude & Longitude:	OPUS SOLUTION		
Latitude:	28	27	37.35832	Longitude:	81	34	13.62054
	DD°	MM'	SS"		DD°	MM'	SS"
Latitude (Decimal Degrees):	28.46037731			Longitude (Decimal Degrees):	-81.57045015		

RECOVERY DATA

How to Reach:	FROM THE PHYSICAL INTERSECTION OF WINTER GARDEN VINELAND RD AND OVERSTREET RD, GO EAST ALIONG OVERSTREET RD FOR 0.6 MILES TO THE MARK ON THE LEFT. BENCHMARK 82713405 IS A SFWMD DISK SET IN A 1 1/2 INCH PIPE WITH A 10 INCH CONCRETE COLLAR 17.0 FEET SOUTHWEST OF A FIBEROPTIC VAULT BOX, 15.0 FEET SOUTH OF SOUTHERLY EDGE OF PAVEMENT OF OVERSTREET RD AND 1 FOOT SOUTH OF THE SOUTHERLY EDGE OF SIDEWALK.
Description/Notes:	OTHER SOURCE BENCHMARKS UTILIZED: ORANGE COUNTY BENCHMARK P1638011, ELEVATION = 117.636 (NAVD88) & ORANGE COUNTY BENCHMARK P1638008, ELEVATION = 117.391 (NAVD88).
Notable Landmarks:	
Other Source Benchmarks:	

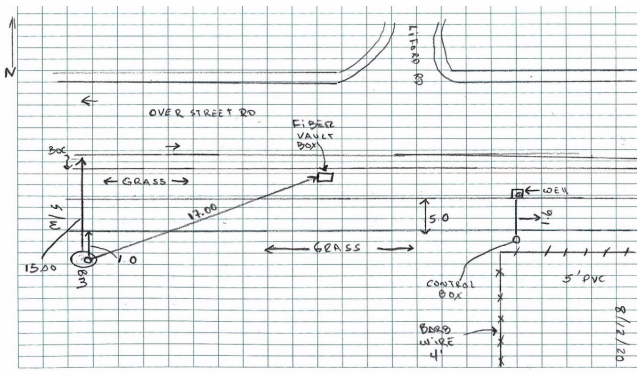
PICTURES

Aerial View of Overall Site



PICTURES

Site Sketch



Haywood, Joshua

From: opus <opus@ngs.noaa.gov>
Sent: Monday, August 17, 2020 2:33 PM
To: Haywood, Joshua
Subject: OPUS solution : 42732251.20o OP1597689067625

FILE: 42732251.20o OP1597689067625

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%7C420b2904ba2f43a7bef808d842dc0a90%7Ce64791d699864645a1a068c1175eda41%7C1%7C0%7C637332860125749793&sdata=5Np88VnZTdfa5UcenYiEYFK8pi8lTDsYQgkY9aamaVM%3D&reserved=0

USER: josh.haywood@t2ue.com DATE: August 17, 2020
RINEX FILE: 4273225m.20o TIME: 18:33:20 UTC

SOFTWARE: page5 1801.18 master71.pl 160321 START: 2020/08/12 12:40:00
EPHEMERIS: igr21183.eph [rapid] STOP: 2020/08/12 19:10:00
NAV FILE: brdc2250.20n OBS USED: 14616 / 15857 : 92%
ANT NAME: TRMR6-3 NONE # FIXED AMB: 73 / 89 : 82%
ARP HEIGHT: 2.000 OVERALL RMS: 0.018(m)

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) ITRF2014 (EPOCH:2020.6138)

X:	822621.630(m)	0.009(m)	822620.787(m)	0.009(m)
Y:	-5550971.192(m)	0.009(m)	-5550969.635(m)	0.009(m)
Z:	3021461.042(m)	0.010(m)	3021460.884(m)	0.010(m)

LAT:	28 27 37.35832	0.005(m)	28 27 37.37956	0.005(m)
E LON:	278 25 46.37946	0.008(m)	278 25 46.35721	0.008(m)
W LON:	81 34 13.62054	0.008(m)	81 34 13.64279	0.008(m)
EL HGT:	8.550(m)	0.013(m)	7.012(m)	0.013(m)
ORTHO HGT:	36.055(m)	0.050(m)	[NAVD88 (Computed using GEOID18)]	

	UTM COORDINATES (UTM (Zone 17))	STATE PLANE COORDINATES (SPC (0901 FL E))
Northing (Y) [meters]	3148334.932	457358.999
Easting (X) [meters]	444151.576	144132.514
Convergence [degrees]	-0.27185556	-0.27185556
Point Scale	0.99963849	0.99997968
Combined Factor	0.99963715	0.99997834

US NATIONAL GRID DESIGNATOR: 17RMM4415148334(NAD 83)

BASE STATIONS USED

PID	DESIGNATION	LATITUDE	LONGITUDE	DISTANCE(m)
DQ7965	FLWE WEDGEFIELD FL CORS ARP	N282626.477	W0810533.176	46861.0
DH3757	WACH WAUCHULA CORS ARP	N273051.042	W0815256.615	109253.8
DF5773	ORMD ORMOND BEACH CORS ARP	N291753.469	W0810632.013	103196.5

NEAREST NGS PUBLISHED CONTROL POINT

DI9166	S 629	N282737.000	W0813412.000	45.4

BASE STATION INFORMATION

STATION NAME: flwe a 1 (Wedgefield FL; Wedgefield, Florida USA)
MONUMENT: NO DOMES NUMBER

XYZ	869051.4451	-5544931.6701	3019536.5503	MON @ 2010.0000 (M)
XYZ	-0.0120	-0.0006	0.0021	VEL (M/YR)
NEU	0.0000	0.0000	0.0000	MON TO ARP (M)
NEU	0.0014	-0.0002	0.0880	ARP TO L1 PHASE CENTER (M)
NEU	0.0006	0.0002	0.0812	ARP TO L2 PHASE CENTER (M)
XYZ	-0.1274	-0.0064	0.0223	VEL TIMES 10.6139 YRS
XYZ	0.0000	0.0000	0.0000	MON TO ARP
XYZ	0.0116	-0.0759	0.0432	ARP TO L1 PHASE CENTER
XYZ	869051.3294	-5544931.7523	3019536.6158	L1 PHS CEN @ 2020.6138
XYZ	0.0000	0.0000	0.0000	+ XYZ ADJUSTMENTS

XYZ 869051.3294 -5544931.7523 3019536.6158 NEW L1 PHS CEN @ 2020.6138
XYZ 869051.3177 -5544931.6764 3019536.5726 NEW ARP @ 2020.6138
XYZ 869051.3177 -5544931.6764 3019536.5726 NEW MON @ 2020.6138
LLH 28 26 26.49884 278 54 26.80195 -4.9993 NEW L1 PHS CEN @ 2020.6138
LLH 28 26 26.49880 278 54 26.80196 -5.0873 NEW ARP @ 2020.6138
LLH 28 26 26.49880 278 54 26.80196 -5.0873 NEW MON @ 2020.6138

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 -0.1234 0.0180 0.0123 VEL TIMES 10.6140 YRS
XYZ 0.0000 0.0000 0.0000 MON TO ARP
XYZ 0.0148 -0.1091 0.0575 ARP TO L1 PHASE CENTER
XYZ 799335.3414 -5604081.3887 2928868.6648 L1 PHS CEN @ 2020.6138
XYZ 0.0000 0.0000 0.0000 + XYZ ADJUSTMENTS
XYZ 799335.3414 -5604081.3887 2928868.6648 NEW L1 PHS CEN @ 2020.6138
XYZ 799335.3266 -5604081.2796 2928868.6072 NEW ARP @ 2020.6138
XYZ 799335.3266 -5604081.2796 2928868.6072 NEW MON @ 2020.6138
LLH 27 30 51.06303 278 7 3.36196 9.2827 NEW L1 PHS CEN @ 2020.6138
LLH 27 30 51.06302 278 7 3.36199 9.1585 NEW ARP @ 2020.6138
LLH 27 30 51.06302 278 7 3.36199 9.1585 NEW MON @ 2020.6138

STATION NAME: ormd a 2 (Ormond Beach; Ormond Beach, Florida, U.S.A.)
MONUMENT: 49527S001
XYZ 860375.6967 -5499831.8460 3102756.7698 MON @ 2010.0000 (M)
XYZ -0.0118 -0.0002 0.0022 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 -0.1252 -0.0021 0.0235 VEL TIMES 10.6140 YRS
XYZ 0.0000 0.0000 0.0000 MON TO ARP
XYZ 0.0160 -0.1071 0.0609 ARP TO L1 PHASE CENTER
XYZ 860375.5875 -5499831.9552 3102756.8542 L1 PHS CEN @ 2020.6138
XYZ 0.0000 -0.0000 -0.0000 + XYZ ADJUSTMENTS
XYZ 860375.5875 -5499831.9552 3102756.8542 NEW L1 PHS CEN @ 2020.6138
XYZ 860375.5716 -5499831.8481 3102756.7933 NEW ARP @ 2020.6138
XYZ 860375.5716 -5499831.8481 3102756.7933 NEW MON @ 2020.6138
LLH 29 17 53.49195 278 53 27.96469 -19.7389 NEW L1 PHS CEN @ 2020.6138
LLH 29 17 53.49195 278 53 27.96472 -19.8632 NEW ARP @ 2020.6138
LLH 29 17 53.49195 278 53 27.96472 -19.8632 NEW MON @ 2020.6138

REMOTE STATION INFORMATION

STATION NAME: 4273 1
MONUMENT: NO DOMES NUMBER
XYZ 822620.6153 -5550969.6410 3021460.7809 MON @ 2020.6135 (M)
NEU -0.0022 -0.0003 2.0000 MON TO ARP (M)
NEU 0.0022 0.0003 0.0855 ARP TO L1 PHASE CENTER (M)
NEU 0.0017 -0.0018 0.0828 ARP TO L2 PHASE CENTER (M)
XYZ 0.2576 -1.7403 0.9512 MON TO ARP
XYZ 0.0111 -0.0733 0.0427 ARP TO L1 PHASE CENTER
XYZ 822620.8841 -5550971.4547 3021461.7747 L1 PHS CEN @ 2020.6138

BASELINE NAME: flwe 4273
XYZ 0.1657 0.0080 0.1027 + XYZ ADJUSTMENTS
XYZ 822621.0498 -5550971.4467 3021461.8774 NEW L1 PHS CEN @ 2020.6138
XYZ 822621.0386 -5550971.3734 3021461.8347 NEW ARP @ 2020.6138
XYZ 822620.7810 -5550969.6330 3021460.8836 NEW MON @ 2020.6138
LLH 28 27 37.37960 278 25 46.35700 9.0951 NEW L1 PHS CEN @ 2020.6138
LLH 28 27 37.37953 278 25 46.35699 9.0096 NEW ARP @ 2020.6138
LLH 28 27 37.37960 278 25 46.35700 7.0096 NEW MON @ 2020.6138

BASELINE NAME: wach 4273
XYZ 0.1740 0.0094 0.0985 + XYZ ADJUSTMENTS
XYZ 822621.0581 -5550971.4453 3021461.8732 NEW L1 PHS CEN @ 2020.6138
XYZ 822621.0469 -5550971.3720 3021461.8305 NEW ARP @ 2020.6138
XYZ 822620.7893 -5550969.6316 3021460.8794 NEW MON @ 2020.6138
LLH 28 27 37.37948 278 25 46.35731 9.0930 NEW L1 PHS CEN @ 2020.6138
LLH 28 27 37.37941 278 25 46.35730 9.0074 NEW ARP @ 2020.6138
LLH 28 27 37.37948 278 25 46.35731 7.0075 NEW MON @ 2020.6138

BASELINE NAME: ormd 4273
XYZ 0.1746 0.0003 0.1087 + XYZ ADJUSTMENTS
XYZ 822621.0587 -5550971.4544 3021461.8834 NEW L1 PHS CEN @ 2020.6138
XYZ 822621.0476 -5550971.3810 3021461.8408 NEW ARP @ 2020.6138
XYZ 822620.7899 -5550969.6407 3021460.8896 NEW MON @ 2020.6138
LLH 28 27 37.37963 278 25 46.35728 9.1058 NEW L1 PHS CEN @ 2020.6138
LLH 28 27 37.37956 278 25 46.35727 9.0203 NEW ARP @ 2020.6138
LLH 28 27 37.37963 278 25 46.35728 7.0203 NEW MON @ 2020.6138

G-FILES

```
Axx2020 812  20 812
B2020 8121240  20 8121910 1 page5 v1801.18IGS    132 1 2 27NGS   2020 817IFDDPX
IITRF2014_2114        IGS  20200712
C00090005 464305368   7  60379566  26 -19243109  14 X2250A4273X2250AFLWE
D  1  2 -4911526  1  3  4408404  2  3 -9333705

Axx2020 812  20 812
B2020 8121240  20 8121910 1 page5 v1801.18IGS    132 1 2 27NGS   2020 817IFDDPX
IITRF2014_2114        IGS  20200712
C00090002 -232854627   5 -531116479  24 -925922721  13 X2250A4273X2250AWACH
D  1  2 -6409895  1  3  6272501  2  3 -8228789

Axx2020 812  20 812
B2020 8121240  20 8121910 1 page5 v1801.18IGS    132 1 2 27NGS   2020 817IFDDPX
IITRF2014_2114        IGS  20200712
C00090004 377547816   6 511377926  30  812959037  15 X2250A4273X2250AORMD
D  1  2 -6389867  1  3  6811057  2  3 -8597468
```

POST-FIT RMS BY SATELLITE VS. BASELINE

```
       OVERALL   01   02   03   05   06   07   09   12
flwe-4273|  0.018 0.020 0.017 0.020 0.019 0.014 0.022 0.022 0.019
         13   15   17   18   19   22   24   25   28
flwe-4273|  0.030 0.024 0.013 0.033 0.014 0.028 0.021 0.017 0.025
         29   30
flwe-4273|  0.024 0.015

       OVERALL   01   02   03   05   06   07   09   12
wach-4273|  0.016 0.023 0.013 0.022 0.015 0.013   ... 0.018 0.014
         13   15   17   18   19   22   24   25   28
wach-4273|  0.021 0.025 0.015 0.015 0.018 0.027 0.020 0.018 0.012
         29   30
wach-4273|  0.018 0.019

       OVERALL   01   02   03   05   06   07   09   12
ormd-4273|  0.021 0.017 0.017 0.020 0.021 0.016 0.022 0.029 0.021
         13   15   17   18   19   22   24   25   28
ormd-4273|  0.019 0.030 0.031   ... 0.017 0.026 0.021 0.023 0.013
         29   30
ormd-4273|  0.039 0.022
```

OBS BY SATELLITE VS. BASELINE

```
       OVERALL   01   02   03   05   06   07   09   12
flwe-4273|  5118   88  281  254  501  608   30  102  503
         13   15   17   18   19   22   24   25   28
flwe-4273|  200  130  558   21  671  128  231  372   55
         29   30
flwe-4273|  231  154
       OVERALL   01   02   03   05   06   07   09   12
wach-4273|  4593   39  502  128  493  588  ...   24  460
         13   15   17   18   19   22   24   25   28
wach-4273|  209  114  566   23   81   65  160  364  388
         29   30
wach-4273|  229  160
       OVERALL   01   02   03   05   06   07   09   12
ormd-4273|  4905   53  415  220  464  614   29   93  519
         13   15   17   18   19   22   24   25   28
ormd-4273|  217  136   82  ...  658  118  151  379  404
         29   30
ormd-4273|  210  143
```

ITRF position of 4273 as determined by individual baselines

```
          X           Y           Z
flwe    822620.781  -5550969.633   3021460.884
wach    822620.789  -5550969.632   3021460.879
ormd    822620.790  -5550969.641   3021460.890
```

Residuals of position determined by individual baselines from the final position

```
          X           Y           Z        East       North          Up
flwe      -0.006       0.002      -0.001      -0.005       0.001      -0.003
wach       0.003       0.004      -0.005       0.003      -0.003      -0.005
ormd       0.003      -0.006       0.005       0.002       0.002       0.008
```

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

```
  0.0000001911   -0.0000000440    0.0000000252
 -0.0000000440    0.0000036489   -0.0000001658
  0.0000000252   -0.0000001658    0.0000010200
```

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

```
  0.0000002527    0.0000002184   -0.0000004041
```

0.0000002184 0.0000014570 -0.0000009793
-0.0000004041 -0.0000009793 0.0000031503

Horizontal network accuracy = 0.00244 meters.
Vertical network accuracy = 0.00348 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)	
FLWE	869052.16310	-5544933.23543	3019536.72788	2010.00
WACH	799336.16445	-5604082.87126	2928868.78053	2010.00
ORMD	860376.41709	-5499833.40048	3102756.94186	2010.00

Position of reference station monument in NAD_83(2011)(EPOCH:2010.0000).

	Xr(m)	Yr(m)	Zr(m)	
FLWE	869052.16310	-5544933.23543	3019536.72788	2010.00
WACH	799336.16445	-5604082.87126	2928868.78053	2010.00
ORMD	860376.41709	-5499833.40048	3102756.94186	2010.00

Velocity of reference station monument in NAD_83(2011)(EPOCH:2010.0000).

	Vx (m/yr)	Vy (m/yr)	Vz (m/yr)
FLWE	0.00120	0.00039	-0.00096
WACH	0.00128	0.00265	-0.00157
ORMD	0.00169	0.00081	-0.00084

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)	
FLWE	46430.53310	6037.95657	-1924.31412	2010.00
WACH	-23285.46555	-53111.67926	-92592.26147	2010.00
ORMD	37754.78709	51137.79152	81295.89986	2010.00

STATE PLANE COORDINATES - U.S. Survey Foot
SPC (0901 FL E)
Northing (Y) [feet] 1500518.649
Easting (X) [feet] 472874.756
Convergence [degrees] -0.27185556
Point Scale 0.99997968
Combined Factor 0.99997834

********** 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%7C420b2904ba2f43a7bef808d842dc0a90%7Ce64791d699864645a1a068c1175eda41%7C1%7C0%7C637332860125749793&sdata=mn9YmDiN2KOhhp6MfuywVBQ5cKUM72Tqq41NrxJ04pk%3D&reserved=0

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

APPROX ORTHO HGT: 36.039 (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.

*110001+0000000000000001 32...7+0000000000325806 331.27+0000000000050081
390...+0000000000000004 391.27+0000000000000001 *110002+0000000000000002
32...7+0000000000321492 332.27+0000000000052149 390...+0000000000000003
391.27+0000000000000001 *110003+0000000000000003 32...7+0000000000644116
332.27+0000000000052567 390...+0000000000000003 391.27+0000000000000000
*110004+0000000000000004 32...7+0000000001289903 331.27+0000000000050496
390...+0000000000000004 391.27+0000000000000002 *410005+00000000?......1
*110006+000000000000Q629 83..17+0000000001028700
*110007+000000000000Q629 32...7+0000000002832750 331.07+0000000000089134
390...+0000000000000003 391.07+0000000000000001 *110008+000000000000TP1
32...7+0000000002855391 332.07+0000000000059569 390...+0000000000000003
391.07+0000000000000003 *110009+000000000000TP1 573.07-0000000000022641
574.07+0000000005688141 83..07+0000000001058264 *110010+000000000000TP1
32...7+0000000003456768 331.07+0000000000044614 390...+0000000000000004
391.07+0000000000000006 *110011+000000000000TP2 32...7+0000000003463361
332.07+0000000000027019 390...+0000000000000004 391.07+0000000000000007
*110012+000000000000TP2 573.07-0000000000029233 574.07+0000000012608270
83..07+0000000001075859 *110013+000000000000TP2 32...7+0000000003468825
331.07+0000000000061114 390...+0000000000000003 391.07+0000000000000004
*110014+000000000000TP3 32...7+0000000003459300 332.07+0000000000039793
390...+0000000000000003 391.07+0000000000000003 *110015+000000000000TP3
573.07-0000000000019708 574.07+0000000019536396 83..07+0000000001097180
*110016+000000000000TP3 32...7+0000000003268489 331.07+0000000000081312
390...+0000000000000003 391.07+0000000000000004 *110017+000000000000TP4
32...7+0000000003480113 332.07+0000000000058618 390...+0000000000000003
391.07+0000000000000001 *110018+000000000000TP4 573.07-0000000000231333
574.07+0000000026284998 83..07+0000000001119874 *110019+000000000000TP4
32...7+0000000001837452 331.07+0000000000050746 390...+0000000000000002
391.07+0000000000000001 *110020+000000000000C BM 32...7+0000000001849035
332.07+0000000000057863 390...+0000000000000003 391.07+0000000000000001
*110021+000000000000C BM 573.07-0000000000242916 574.07+0000000029971485
83..07+0000000001112757
*110022+000000000000C BM 32...7+0000000002321418 331.07+0000000000071430
390...+0000000000000004 391.07+0000000000000004 *110023+000000000000TP5
32...7+0000000002302813 332.07+0000000000045761 390...+0000000000000004
391.07+0000000000000004 *110024+000000000000TP5 573.07-0000000000224311
574.07+0000000034595716 83..07+0000000001138426 *110025+000000000000TP5
32...7+0000000003475328 331.07+0000000000044836 390...+0000000000000003
391.07+0000000000000006 *110026+000000000000TP6 32...7+0000000003457396
332.07+0000000000045735 390...+0000000000000003 391.07+0000000000000002
*110027+000000000000TP6 573.07-0000000000206378 574.07+0000000041528440
83..07+0000000001137528 *110028+000000000000TP6 32...7+0000000003469699
331.07+0000000000090265 390...+0000000000000003 391.07+0000000000000003
*110029+000000000000TP7 32...7+0000000003462358 332.07+0000000000045043
390...+0000000000000003 391.07+0000000000000004 *110030+000000000000TP7
573.07-0000000000199037 574.07+0000000048460497 83..07+0000000001182750
*110031+000000000000TP7 32...7+0000000003500341 331.07+0000000000058449
390...+0000000000000003 391.07+0000000000000005 *110032+000000000000TP8
32...7+0000000003461949 332.07+0000000000056238 390...+0000000000000004
391.07+0000000000000007 *110033+000000000000TP8 573.07-0000000000160645
574.07+0000000055422787 83..07+0000000001184961 *110034+000000000000TP8
32...7+0000000001998052 331.07+0000000000050673 390...+0000000000000003
391.07+0000000000000003 *110035+000000000000TP9 32...7+0000000001994289
332.07+0000000000055803 390...+0000000000000003 391.07+0000000000000002

```
*110036+0000000000000TP9 573.07-0000000000156881 574.07+0000000059415129
83..07+0000000001179831 *110037+0000000000000TP9 32...7+0000000001954630
331.07+0000000000052263 390...+0000000000000003 391.07+0000000000000001
*110038+00000000P1638011 32...7+0000000001890716 332.07+0000000000056867
390...+0000000000000003 391.07+0000000000000002 71....+0000000EL117.636
*110039+00000000P1638011 573.07-0000000000092967 574.07+0000000063260475
83..07+0000000001175227 *110040+00000000P1638011 32...7+0000000002516406
331.07+0000000000061324 390...+0000000000000004 391.07+0000000000000004
*110041+000000BM82713405 32...7+0000000002483132 332.07+0000000000050863
390...+0000000000000004 391.07+0000000000000005 *110042+000000BM82713405
573.07-0000000000059694 574.07+0000000068260012 83..07+0000000001185687
*110043+000000BM82713405 32...7+0000000000247758 331.07+0000000000051692
390...+0000000000000003 391.07+0000000000000000 *110044+00000BM82713405B
32...7+0000000000240386 332.07+0000000000054102 390...+0000000000000003
391.07+0000000000000000 *110045+00000BM82713405B 573.07-0000000000052322
574.07+0000000068748156 83..07+0000000001183277 *110046+00000BM82713405B
32...7+0000000003036267 331.07+0000000000055451 390...+0000000000000003
391.07+0000000000000002 *110047+00000000P1638008 32...7+0000000003060608
332.07+0000000000064870 390...+0000000000000003 391.07+0000000000000004
71....+00000000EL117.39 *110048+00000000P1638008 573.07-0000000000076663
574.07+0000000074845031 83..07+0000000001173858 *410049+00000000?......1
*110050+00000BM82713405B 83..07+0000000001183277
*110051+00000BM82713405B 32...7+0000000000444724 331.07+0000000000059657
390...+0000000000000004 391.07+0000000000000001 *110052+0000000000000WELL
32...7+0000000000430366 332.07+0000000000058244 390...+0000000000000003
391.07+0000000000000001 *110053+0000000000000WELL 573.07+0000000000014358
574.07+0000000000875090 83..07+0000000001184690 *110054+0000000000000WELL
32...7+0000000000434160 331.07+0000000000056657 390...+0000000000000003
391.07+0000000000000001 *110055+00000000000X CUT 32...7+0000000000428573
332.07+0000000000053025 390...+0000000000000003 391.07+0000000000000000
*110056+00000000000X CUT 573.07+0000000000019944 574.07+0000000001737824
83..07+0000000001188322
*110057+00000000000X CUT 32...7+0000000000296774 331.07+0000000000044717
390...+0000000000000003 391.07+0000000000000000 *110058+000000SQUARE CUT
32...7+0000000000351330 332.07+0000000000052568 390...+0000000000000003
391.07+0000000000000001 *110059+000000SQUARE CUT 573.07-0000000000034611
574.07+0000000002385928 83..07+0000000001180470 *110060+000000SQUARE CUT
32...7+0000000000201544 331.07+0000000000050651 390...+0000000000000003
391.07+0000000000000000 *110061+0000000000000LAG 32...7+0000000000217770
332.07+0000000000036526 390...+0000000000000003 391.07+0000000000000000
*110062+0000000000000LAG 573.07-0000000000050837 574.07+0000000002805242
83..07+0000000001194594 *110063+0000000000000LAG 32...7+0000000000761231
331.07+0000000000049203 390...+0000000000000003 391.07+0000000000000001
*110064+00000082713405B1 32...7+0000000000916877 332.07+0000000000060513
390...+0000000000000003 391.07+0000000000000002 *110065+00000082713405B1
573.07-0000000000206483 574.07+0000000004483349 83..07+0000000001183284
```

Project File Data		Coordinate System	
Name:	J:\2017\171204.05 - SFWMD USGS Phase 4 Wells\TBC\82713405.vce	Name:	Default
Size:	49 KB	Datum:	WGS 1984
Modified:	8/4/2020 9:49:28 AM (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_171204.05ED73120.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: -0.00533 ft
Σ BS Distances: 3738.411 ft
Σ FS Distances: 3746.077 ft
Run Length: 7484.488 ft
Reduction: Adjusted Values

Create	Point ID	BS	HI	IS	FS	Δ Elevation	Raw Elevation	Correction	Adj. Elevation	Type	Distance	Description
✓	Q629	✓ 8.91338 ft	111.78318 ft			0.00000 ft	102.86979 ft	0.00000 ft	102.86979 ft	Benchmark	283.274 ft	
✓	TP1				✓ 5.95689 ft	2.95649 ft	105.82629 ft	0.00041 ft	105.82669 ft	Computed	285.539 ft	
	TP1	✓ 4.46139 ft	110.28768 ft								345.676 ft	
✓	TP2				✓ 2.70189 ft	1.75950 ft	107.58578 ft	0.00090 ft	107.58668 ft	Computed	346.335 ft	
	TP2	✓ 6.11139 ft	113.69717 ft								346.882 ft	
✓	TP3				✓ 3.97929 ft	2.13210 ft	109.71788 ft	0.00139 ft	109.71927 ft	Computed	345.929 ft	
	TP3	✓ 8.13118 ft	117.84906 ft								326.848 ft	
✓	TP4				✓ 5.86179 ft	2.26940 ft	111.98728 ft	0.00187 ft	111.98915 ft	Computed	348.011 ft	
	TP4	✓ 5.07459 ft	117.06187 ft								183.745 ft	
✓	OC BM				✓ 5.78629 ft	-0.71170 ft	111.27558 ft	0.00214 ft	111.27771 ft	Computed	184.903 ft	
	OC BM	✓ 7.14299 ft	118.41856 ft								232.141 ft	
✓	TP5				✓ 4.57609 ft	2.56689 ft	113.84247 ft	0.00247 ft	113.84494 ft	Computed	230.281 ft	
	TP5	✓ 4.48359 ft	118.32606 ft								347.532 ft	
✓	TP6				✓ 4.57349 ft	-0.08990 ft	113.75257 ft	0.00296 ft	113.75553 ft	Computed	345.739 ft	
	TP6	✓ 9.02648 ft	122.77905 ft								346.969 ft	
✓	TP7				✓ 4.50429 ft	4.52219 ft	118.27476 ft	0.00345 ft	118.27822 ft	Computed	346.235 ft	
	TP7	✓ 5.84489 ft	124.11965 ft								350.033 ft	
✓	TP8				✓ 5.62379 ft	0.22110 ft	118.49586 ft	0.00395 ft	118.49981 ft	Computed	346.194 ft	
	TP8	✓ 5.06729 ft	123.56315 ft								199.805 ft	
✓	TP9				✓ 5.58029 ft	-0.51300 ft	117.98286 ft	0.00423 ft	117.98710 ft	Computed	199.429 ft	
	TP9	✓ 5.22629 ft	123.20915 ft								195.463 ft	
✓	P1638011				✓ 5.68669 ft	-0.46040 ft	117.52246 ft	0.00451 ft	117.52697 ft	Computed	189.071 ft	
	P1638011	✓ 6.13239 ft	123.65485 ft								251.640 ft	
✓	TP10				✓ 5.08629 ft	1.04610 ft	118.56856 ft	0.00487 ft	118.57343 ft	Computed	248.313 ft	
	TP10	✓ 5.16919 ft	123.73775 ft								24.776 ft	
✓	BM82713405				✓ 5.41019 ft	-0.24100 ft	118.32756 ft	0.00490 ft	118.33246 ft	Computed	24.039 ft	
	BM82713405	✓ 5.54509 ft	123.87265 ft								303.626 ft	
✓	P1638008				✓ 6.48699 ft	-0.94190 ft	117.38567 ft	0.00533 ft	117.39100 ft	Benchmark	306.060 ft	

Run - 0002 (N4) Reduced Observations

Observation	Status	Raw Δ Elevation	Correction	Final Δ Elevation	Setups	Length	Σ BS Readings	Σ FS Readings	Std. Error
Q629-TP1 (E22)	Enabled	2.95649 ft	0.00041 ft	2.95690 ft	1	568.813 ft	8.91338 ft	5.95689 ft	0.00096 ft
TP1-TP2 (E23)	Enabled	1.75950 ft	0.00049 ft	1.75999 ft	1	692.012 ft	4.46139 ft	2.70189 ft	0.00105 ft
TP2-TP3 (E24)	Enabled	2.13210 ft	0.00049 ft	2.13259 ft	1	692.811 ft	6.11139 ft	3.97929 ft	0.00106 ft
TP3-TP4 (E25)	Enabled	2.26940 ft	0.00048 ft	2.26988 ft	1	674.859 ft	8.13118 ft	5.86179 ft	0.00104 ft
TP4-OC BM (E26)	Enabled	-0.71170 ft	0.00026 ft	-0.71144 ft	1	368.648 ft	5.07459 ft	5.78629 ft	0.00077 ft
OC BM-TP5 (E27)	Enabled	2.56689 ft	0.00033 ft	2.56722 ft	1	462.422 ft	7.14299 ft	4.57609 ft	0.00086 ft
TP5-TP6 (E28)	Enabled	-0.08990 ft	0.00049 ft	-0.08941 ft	1	693.271 ft	4.48359 ft	4.57349 ft	0.00106 ft
TP6-TP7 (E29)	Enabled	4.52219 ft	0.00049 ft	4.52269 ft	1	693.204 ft	9.02648 ft	4.50429 ft	0.00106 ft
TP7-TP8 (E30)	Enabled	0.22110 ft	0.00050 ft	0.22160 ft	1	696.228 ft	5.84489 ft	5.62379 ft	0.00106 ft
TP8-TP9 (E31)	Enabled	-0.51300 ft	0.00028 ft	-0.51271 ft	1	399.233 ft	5.06729 ft	5.58029 ft	0.00080 ft
TP9-P1638011 (E32)	Enabled	-0.46040 ft	0.00027 ft	-0.46012 ft	1	384.534 ft	5.22629 ft	5.68669 ft	0.00079 ft
P1638011-TP10 (E33)	Enabled	1.04610 ft	0.00036 ft	1.04645 ft	1	499.953 ft	6.13239 ft	5.08629 ft	0.00090 ft

TP10-BM82713405 (E34)	Enabled	-0.24100 ft	0.00003 ft	-0.24096 ft	1	48.814 ft	5.16919 ft	5.41019 ft	0.00028 ft
BM82713405-P1638008 (E35)	Enabled	-0.94190 ft	0.00043 ft	-0.94146 ft	1	609.686 ft	5.54509 ft	6.48699 ft	0.00099 ft

Run - 0002 (N4) Reduced Coordinates

Point ID	Status	Elevation
Q629	Enabled	102.86979 ft
P1638008	Enabled	117.39100 ft

Run - 0003 Raw Observations

Standard error per kilometer of double leveling: 0.00230 ft
Standard error per turn/station setup: 0.00000 ft
Raw Misclosure: 0.00090 ft
Σ BS Distances: 213.843 ft
Σ FS Distances: 234.491 ft
Run Length: 448.334 ft
Reduction: Raw Elevations

Create	Point ID	BS	HI	IS	FS	Δ Elevation	Raw Elevation	Misclosure	Adj. Elevation	Type	Distance	Description
☑	82713405	☑ 5.96569 ft	124.29769 ft			0.00000 ft	118.33200 ft	0.00000 ft	118.33200 ft	Benchmark	44.472 ft	
☑	WELL				☑ 5.82439 ft	0.14130 ft	118.47330 ft			Computed	43.037 ft	
	WELL	☑ 5.66569 ft	124.13899 ft								43.416 ft	
☑	RM1 X CUT				☑ 5.30249 ft	0.36320 ft	118.83650 ft			Computed	42.857 ft	
	RM1 X CUT	☑ 4.47169 ft	123.30819 ft								29.677 ft	
☑	RM3 SQUARE CUT				☑ 5.25679 ft	-0.78510 ft	118.05140 ft			Computed	35.133 ft	
	RM3 SQUARE CUT	☑ 5.06509 ft	123.11649 ft								20.154 ft	
☑	RM2 LAG				☑ 3.65259 ft	1.41250 ft	119.46390 ft			Computed	21.777 ft	
	RM2 LAG	☑ 4.92029 ft	124.38419 ft								76.123 ft	
	82713405				☑ 6.05129 ft	-1.13100 ft	118.33290 ft	0.00090 ft	118.33200 ft	Benchmark	91.688 ft	

Run - 0003 (N5) Reduced Observations

Observation	Status	Raw Δ Elevation	Correction	Final Δ Elevation	Setups	Length	Σ BS Readings	Σ FS Readings	Std. Error
82713405-WELL (E36)	Enabled	0.14130 ft	0.00000 ft	0.14130 ft	1	87.509 ft	5.96569 ft	5.82439 ft	0.00038 ft
WELL-RM1 X CUT (E37)	Enabled	0.36320 ft	0.00000 ft	0.36320 ft	1	86.273 ft	5.66569 ft	5.30249 ft	0.00037 ft
RM1 X CUT-RM3 SQUARE CUT (E38)	Enabled	-0.78510 ft	0.00000 ft	-0.78510 ft	1	64.810 ft	4.47169 ft	5.25679 ft	0.00032 ft
RM3 SQUARE CUT-RM2 LAG (E39)	Enabled	1.41250 ft	0.00000 ft	1.41250 ft	1	41.931 ft	5.06509 ft	3.65259 ft	0.00026 ft
RM2 LAG-82713405 (E40)	Enabled	-1.13100 ft	0.00000 ft	-1.13100 ft	1	167.810 ft	4.92029 ft	6.05129 ft	0.00052 ft

Run - 0003 (N5) Reduced Coordinates

Point ID	Status	Elevation
82713405	Enabled	118.33200 ft

Office

Project

26 August 2020

INPUT	OUTPUT
State Plane, NAD83	State Plane, NAD83
0901 - Florida East, U.S. Feet	0901 - Florida East, U.S. Feet
Vertical - NAVD88, U.S. Feet	Vertical - NGVD29 (Vertcon94), U.S. Feet

82713405 -bm 1/1

Northing/Y:	1500552.96	**Northing/Y:**	1500552.960
Easting/X:	472955.369	**Easting/X:**	472955.369
Elevation/Z:	118.33	**Elevation/Z:**	119.203
Convergence:	-0 16 18.25356	**Convergence:**	-0 16 18.25356
Scale Factor:	0.999979648	**Scale Factor:**	0.999979648
Combined Factor:	0.999978301	**Combined Factor:**	0.999978259

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

Remark: