

SURVEYOR'S REPORT

Specific Purpose Survey of the United States Geological Survey Recorder Well G-3608 in Miami-Dade County, Florida

Prepared for:

South Florida Water Management District

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Prepared by:

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State of Florida

Biscayne Engineering Company, Inc. LB No 0129 529 West Flagler Street, Miami, FL. 33130 Tel (305) 324-7671

> Field Date: March 18, 2019 Report Date: April 18, 2019 BEC Order #: 03-86445

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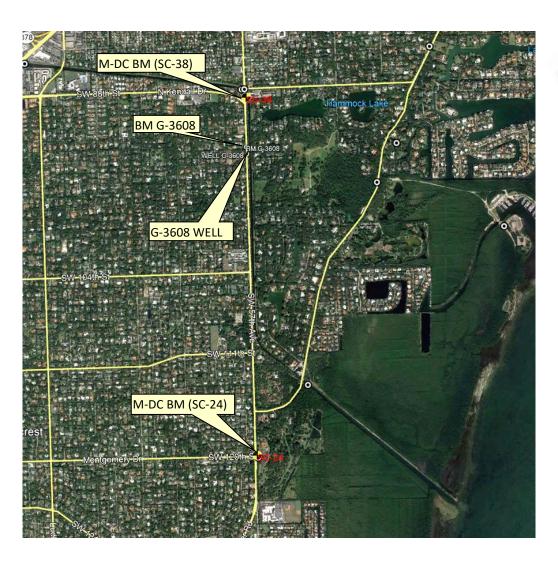
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PURPOSE

The purpose of this survey is to set an Elevation Reference Mark (Benchmark) consisting of a mag nail and washer and to establish a North American Vertical Datum of 1988 (NAVD 88) elevation on said Benchmark and on an additional Reference Point with a Brass plate, both at United States Geological Survey Well **G-3608**.

LOCATION OF PROJECT

The United States Geological Survey's Recorder Well **G-3608** is located in Section 6, Township 55 South, Range 41 East, Miami-Dade County, Florida.





PROJECT VERTICAL DATUM

The project vertical datum is the North American Vertical Datum (NAVD) of 1988.

To convert the NAVD 88 elevation to the National Geodetic Vertical Datum of 1929 at station **G-3608 add 1.54**. These values are based on Corpscon 6.0.1 a US. 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 US. Army Corps of Engineers South Atlantic Division, Jacksonville FI.

PROJECT HORIZONTAL DATUM

The project horizontal datum is the North American Datum 83 (NAD 83(2011)) (EPOCH:2010.0000).

LEVELING METHODS

The leveling for this project was performed in accordance with standard survey practice using conventional third order methods, techniques and equipment.

The allowable error (.05 √miles) on this project meets or exceeds third order closures as required by SFWMD for this project per executed SOW for 4600003705-WO04 and discussions with SFWMD.

A level loop was run from the Miami-Dade County Benchmark SC-24, through the well site, and to the Miami-Dade County Benchmark SC-38. The measurements were collected using an Automatic Level and were hand written in Biscayne Engineering Co, Inc. Field Book 2990 pages 37-46, dated March 18, 2019, reduced and adjusted electronically. Additional data was manually recorded in the field book.

GPS METHODS

Latitude and Longitude for Benchmark G-3608 were established by observing a 3-minute session of GPS data on March 18, 2019, using a Trimble R-8-S and The Florida Permanent Reference Network (FPRN). The FPRN network consists of nearly 100 Continuously Operating Reference Stations (CORS) located throughout Florida.

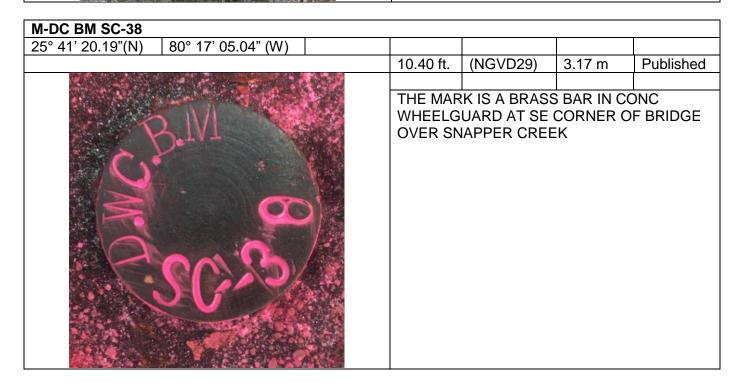
EQUIPMENT USED

- Trimble GPS unit R-8-S, Serial Number 5625R066188.
- TOPCON DL-502 digital level Serial Number 512386 and a folding bar code rod.
- TOPCON Total Station ES 103, Serial Number ZQ000748.
- TOPCON Auto-level ATG3, Serial Number 5F9515.

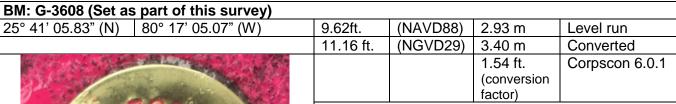
VERTICAL CONTROL POINT

The Vertical Control point utilized and set as part of this survey is the:

M-DC BM SC-24				
25° 39' 36.59" (N) 80° 17' 01.44" (W)	14.08 ft.	(NAVD88)	4.29 m	Published
	15.62 ft.	(NGVD29)	4.76 m	Published
	NORTH (SW 57 A) 53.5' NE	VE 35' EAS	ST OF C/L NER IN IN	LOST 42.5'

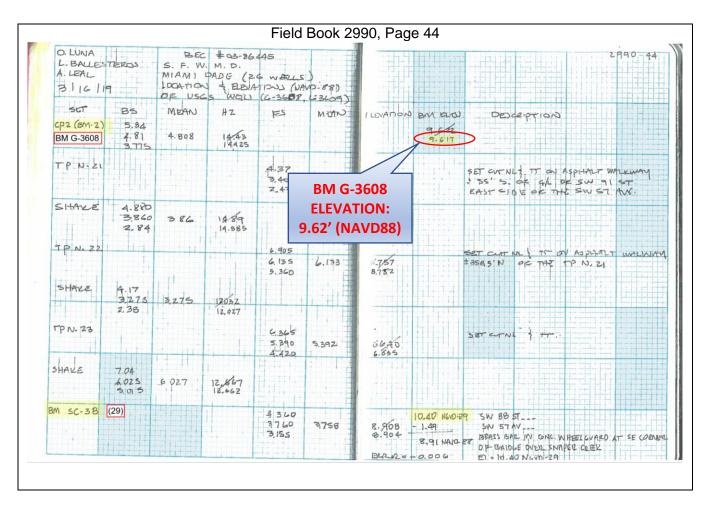


SURVEYOR'S REPORT



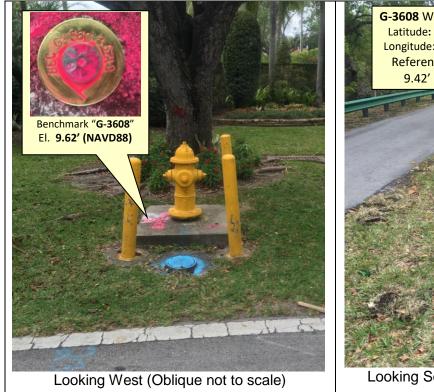
STATION IS A MAG NAIL AND WASHER STAMPED "BEC 0129 AND G-3608"

LOCATED: RED ROAD TRAIL --- 15' WEST OF C/L SW 91ST STREET --- 580' SOUTH OF C/L



PROJECT RESULTS

Overall Site





Looking Southerly (Oblique not to scale)

SURVEYOR'S REPORT

Tabular Form

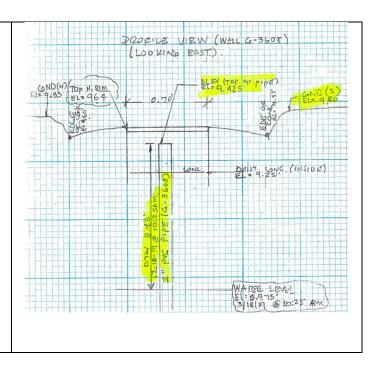
Reference and Ground Elevations: (NAVD88)										
Well	Ground Elevation	Refer	ence Elevation	Comments						
G-3608	9.83 ft.	9.42 f	t.	Top of 2" PVC PIPE						
Offset to NGVD	29: +1.54' (See Proje	ct Verti	cal Datum Notes	in Page: 4)						
Well diameter			Casing materia	I DTW						
2"			Metal	8.45 ft. (03/18/19 at 10:25 AM)						

USGS Published: (Per USGS Report Site #: 254108080170601 G-3608) (NGVD29)										
Well	Well Ground Elevation Reference Elevation Comments									
G-3608	-	10.95 ft.	Top of Casing at land surface							

Source & Site	NAVD88	NGVD29 (Published)	NGVD29 (Corpscon)
Benchmark			
SC -24 (M-DC)	14.08 ft. (Published)		15.62 ft.
SC-38 (M-DC)	8.86 ft. (Published)	10.40 ft.	
G-3608 (SFWMD)	9.62 ft. (Measured)		11.16 ft.

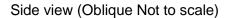
Well Photos and Diagrams





Well Photos and Diagrams (Continued)







Top view (Not to scale)

Surveyor's Notes:

- 1. All measurements herein are in United States Survey feet and decimal thereof, unless otherwise specified.
- 2. Underground utilities were not located as part of this survey.
- 3. This survey report or copies thereof are not valid without the original signature and seal of a Florida licensed Surveyor and Mapper.
- 4. Additions or deletions to this survey report by other than the signing party (or parties) is prohibited without written consent of the signing party (or parties).
- 5. To convert from NAVD 88 to NGVD 29 add 1.54 feet. This value is based on 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 FI.
- 6. Date of last field work: March 18, 2019, BEC job No. 03-86445.
- 7. SFWMD Data records (on file at the District's headquarters):
 - A. Electronic Data files:

Miscellaneous picture files

B. Conventional reporting

Field Book: 2990 pages 37-46

Abbreviations:

EI. - Elevation

DTW - Distance to the water table inside the well

M-DC - Miami-Dade County

NAVD88 - North American Vertical Datum of 1988 NGVD29 - National Geodetic Vertical Datum of 1929

NGS - National Geodetic Survey

PSM - Professional Surveyor & Mapper

PID - Permanent Identifiers

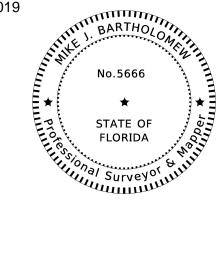
SFWMD - South Florida Water Management District

USGS - United States Geological SurveyBEC - Biscayne Engineering Company, Inc.

SURVEYOR'S CERTIFICATION

In my professional opinion this Specific Purpose Survey meets applicable portions of the Standards of Practice set forth by the Florida Board of Professional Surveyors and Mappers in Chapter 5J-17, Florida Administrative Code. This report is prepared for the sole and specific use of the South Florida Water Management District and is not assignable.

Last date of Survey March 18, 2019



Mike Bartholomew, PSM, President Florida Professional Surveyor and Mapper License Number 5666 State of Florida Biscayne Engineering Company, Inc. LB No 0129 529 West Flagler Street, Miami, FL. 33130 Tel (305) 324-7671



SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Rev. 4/18

DESIGNATION: G-3608		PROJECT: G-3608							
ESTABLISHED BY: SOUTH FLORIDA DISTRICT	WATER MANAGEMENT	SURVEYOR: Mike Bartholomew							
RECOVERED BY: BISCAYNE ENG	SINEERING CO.	DATE: 03/18/19							
	GEOGRAPH	IC POSITION							
SECTION 1	TOWNSHIP 55 SOUTH	RANGE 40 EAST							
COUNTY/AMANU DADE	NAME OF QUADRANG	GLE: SOUTH MIAMI							
COUNTY:MIAMI-DADE	GEOGRAPHIC INDEX OF QUAD:								
HORIZONTAL DATUM: 1927	983 2022 Other	(circle one) ZONE E or W							
VERTICAL DATUM: MSL 1929	1988 2022 Other	(circle one)							
VERTICAL ACCURACY: 1 2	3)								
OTATE DI ANE GOODDINATE	(NI))/ 404004 00	(E) V 004700 40	NAVD 88 EL.9.62'						
STATE PLANE COORDINATE	(N) Y= 491824.66	(E) X= 891720.13	NGVD 29 EL. 11.16'						
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.) ACTUAL NGS or (ngvd29.txt file) OPUS Ortho Height									
LATITUDE: 25 ° 41 ° 05.83 " (N)	LONGITUDE: 80° 17'	05.07" (W) (Source) GPS	RTK (FPRN)						
RECOVERY DATA									
Stamping: G-3608 BEC 0129									

To Reach: STATION IS A MAG NAIL AND WASHER STAMPED "BEC 0129 AND G-3608"

LOCATED: RED ROAD TRAIL --- 15' WEST OF C/L, SW 91ST STREET --- 580' SOUTH OF C/L

NOTABLE LAND MARKS: RED ROAD LINEAR PARK

MDC-SOURCE BENCHMARKS: SC-24, SC-38

FIELD BOOK PAGE 2990-44

PICTURES

Aerial Overall Site



NOT TO SCALE (Google Earth product)



SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Rev. 4/18

Overall Site



Looking West (Oblique not to scale)

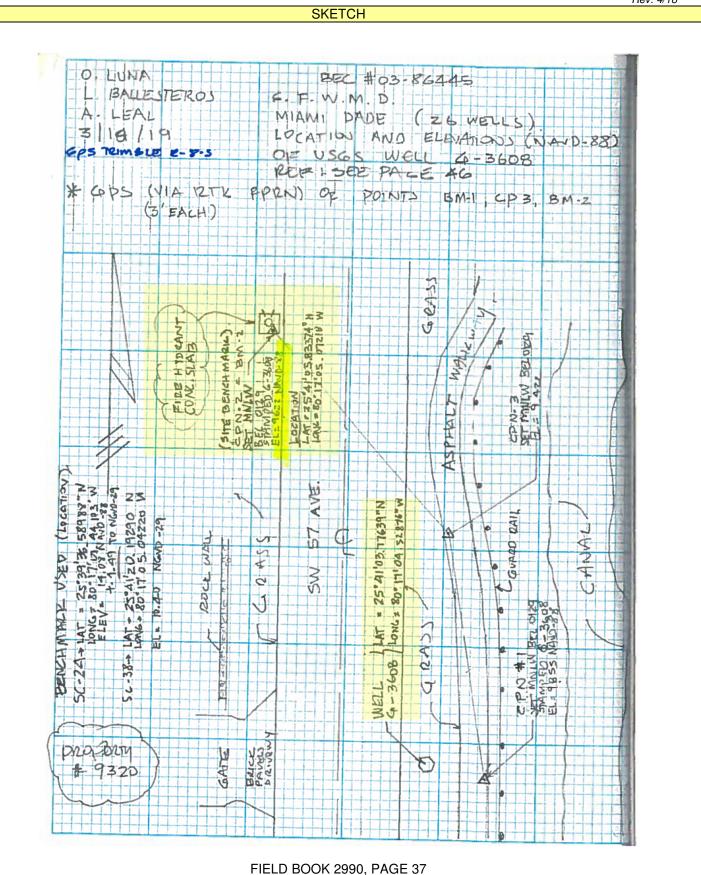


Looking Southerly (Oblique not to scale)



SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Rev. 4/18



Office

Project

15 May 2019

INPUT

Geographic, NAD83 Vertical - NAVD88, U.S. Feet

OUTPUT

Geographic, NAD83 Vertical - NGVD29 (Vertcon94), U.S. Feet

BM G-3608

1/1

Latitude: 25 41 05.83 **Longitude:** 80 17 05.07

Latitude: 25 41 05.83000 **Longitude:** 80 17 05.07000

Elevation/Z: 9.62

Elevation/Z: 11.165

Office

Project

15 May 2019

INPUT

Geographic, NAD83 Vertical - NAVD88, U.S. Feet

OUTPUT

Geographic, NAD83 Vertical - NGVD29 (Vertcon94), U.S. Feet

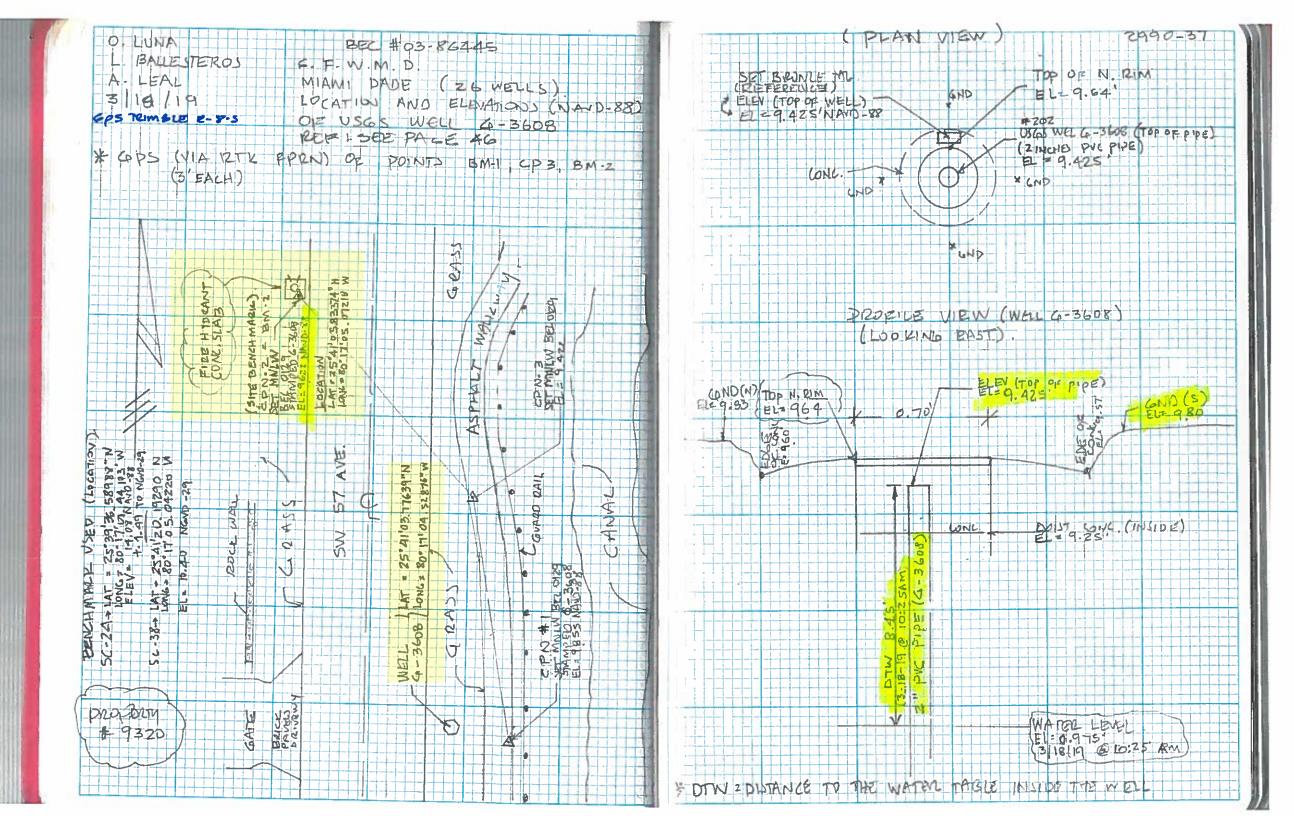
WELL G-3608

1/1

Latitude: 25 41 03.78 Longitude: 80 17 04.53 **Latitude:** 25 41 03.78000 **Longitude:** 80 17 04.53000

Elevation/Z: 9.42

Elevation/Z: 10.965



O. LUNA		BEC	# 63.86	145				2990-38
L. BALLES	IEROS	S, F. W.						
3/16/19	4	MIAMI	ADE (26	MELLS				
Decen conve		LUCATION	1 DEAT	5V7 (NA	(88-CV			
11111111			UEUS (G	3608,63	667)			
SET	B\$	MEAN	HIZ	FS.	MEAN	ELEVATIONS	BMERO	PEDCRIPTION.
sc 24	4.40						14 08	SU 120 ST 42,5' NORTH OF E/L
NAVD88	3.59	3.588	17.668				17-08	SW ST AV 35' EAST OF CIL
	2.775							535 NE OF SET, CORNER IN INTRINET TION
TP N. I								BRASS BAR W CONC. MON. EL- 12-08 NAWO-84
				3.37				SCT CITAL & ITON ASPHALT WALKWAY
				2.345	234 S	15 323		
				1.32				
SHAKE	4 17							
	5.13	5.13	20,453					
	4.09							
TPN.Z				7.34				SET CUT IN 2 TT ON ASPHALT WATEUR
				640	640Z	14.052		SU CORNER OR THE INTORURTION OF
				5.445				Sw 116 57 & Sw 57 AV.
SHAKE	3.195							
	2150	2.152	16.203					
	1.110		10.20					
TP N. 3				6.725	2 2			
				5.730	5732	10,472		SET CUT NESS IT AN ASPHALT WALLAND
				4.740	4-1-1-1-1	70, 4 12		LUCATED WOT SIDE OF THE SW ST AUG = 3871 NUTTH OF THE C DE SW 116 ST
SUAL					1 1 1 3	14 14 14		
SHAILE	5.70							
	4.65	4.65	15.122					
TPN. 4				3.670				
				2.670	7113			
				1.665	2,668	12.453		
				the state of the s	A STATE OF THE PARTY OF THE PAR			The state of the s

O-LUNA L-BALLESTEROS A-LEAL 3 16 19	MIAMI LOCATION	EC # 03 W.M. D. DADE (: DEDW WELLS (7005 (N	I KRECIVAL			29.90-39
TIP N. 4 G.T.T. 5.615 4.58	MEAN)	18.128	=3	MeAu	HLU ATION	12.453	December
TPN:5			7.555 6.560 5.560	6.558	11.57		SET GANG TO ASPHALE WALKWAW 1 418' NWALL OF TO N. 4, WOT SLOST OF THE SW 57 AVE
SHAKE Z158 1978 1.195	1.975	13,545	8 405				SEAT CAN'L & TT ON ASPITATE WALKWAU
5HAKE 756	6,505	12.60	7.450 6.495	7.45	6.095		\$ 86' SOUTH OF SU 112 TRENTES, WEST.
TP N=1			7.25 624 5.28	624	6.36		3 403' NULLE ON ASPIADET WALKING
5+ACS 4705 3650 2,595	3,65	10 01		7 0 0 0 1 1 1 1 2 2 2 3			
TP N-8			6.590 5.605 4.625	5607	4.403		EST CITILE TIT ON ASPITALT WALLEST

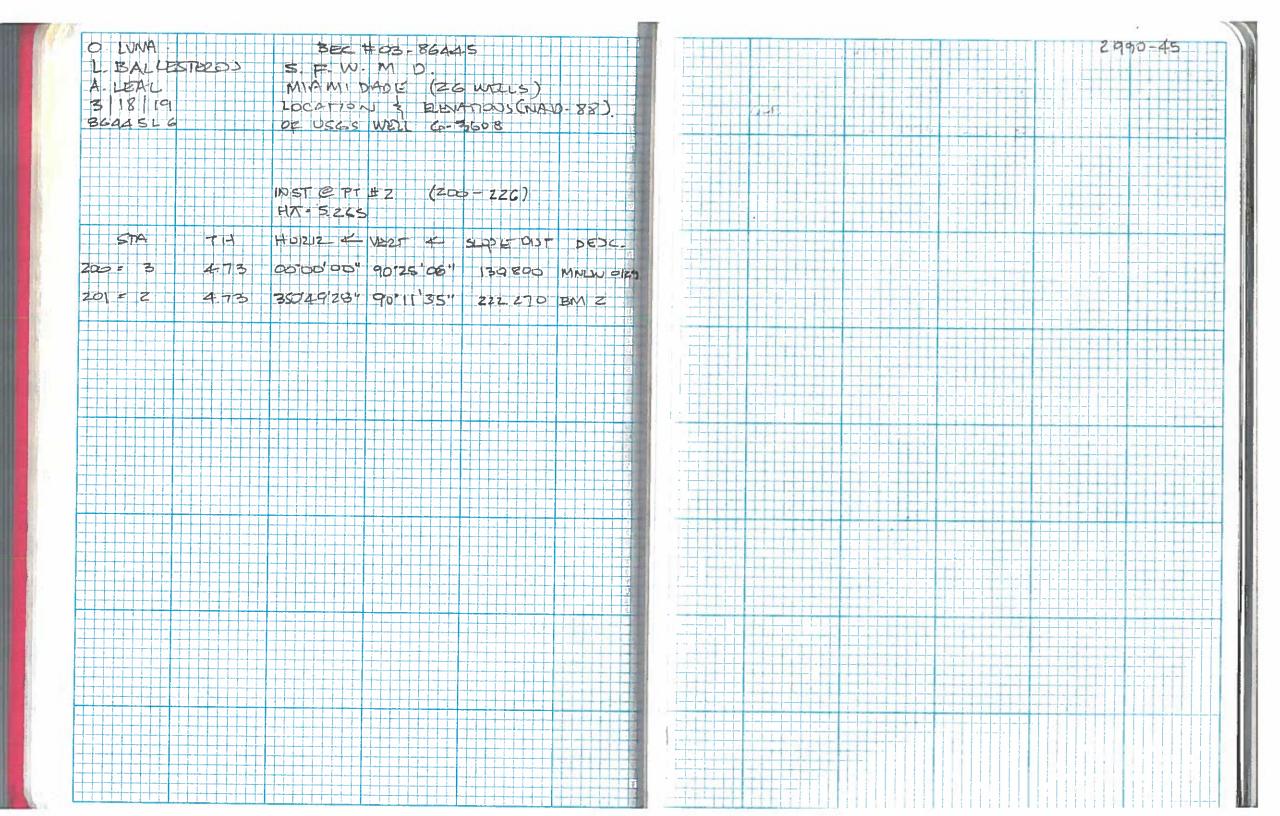
DILINIA LIBALLUSTES A LIPAI B/16/19	1205	MIAMI LOCATION	BER N. 03 W. M. D DADE (2 N & ELEVA	4 m 20 L	A IA SMILE								2990	-43
TP N. 8 45	\$70 830 79	MEAN 3.83	HI 8. 233	760	Menu	11EVÄTT.10N	BM ELW	Q	€ > C¢	79719	2			
TPNIG				5. 2 80 4.3 10 3.335	4308	3.925	-11.	5 5 7	CUTINL	\$ -11- 8	⊃N A	PHALT	WAL	cwaij
3HAKE 62 5.1 4.1	175	5.07	9-102	6555										
5 HAKE 6.3 5.2 48.2	7	5.27	8:882	5.49 D 4.42 S	549	3.612		± 421'	W-NU S	E TP	P - C1	FIVE	WALL	way
TP N-11				5.570 4.610 3.655	4.612	4.27		7 100,	50V717	OF 4.	Sy Su	PHAZT N 107 THE SL	PROC	7
5HAKE 6.27 5.18 4.10	'5	5.197	9.457											
				5.885 4.88 5.88	4-88z	4576								

O. LUNA L BALLE A LENL 3/16/19		S. F. W. MIAWI I LOCATION	# 03-864 M. D ADE (2 & ELEV > WOLL) (G WELL)	VAV5- 887			2999-41
TP N. 12	BS 6 BZ 5.39 3.965	MEAN.	HT. 9.967	#4	MEGN	2.64710N 4.575	em elu	Descrip Tip N
BM SC Z3-R	NGVD29			7.545 5.960 4.375	5,960	4.007	5.50 N4VD-1	29 SW 104 ST 38' NORTH OF C/IL SU ST AV 34' WEST OF C/L BLAS BAE IN COUR MON B = 5,50 NGNO-29
TPN, 13	5.20 4.265	5.20	9.272	5.055				sa-any to positive was way
SHALE	6.215 5.190 4.165	5.19	10.263	4.140 3.220	A. 138	5.069		+ 370' N. 0 F F OF DU 10#- 5T
TP.N: 14				6 495 5.525 4.550	5,523	4.74 4.735		SON CUT NL & TT ON ASPHAUT WALELMY = 430° N. 04 TOP 11. 13
TP N. IS	6225 5.185 4.15	5.187	9.922					
				6.52 5.525 4.53	5,525	4 40 Z 4,397		\$ T CUTIVES TON ASPITALT WALLEYAY 1 406.50' N. OF TP N. 14

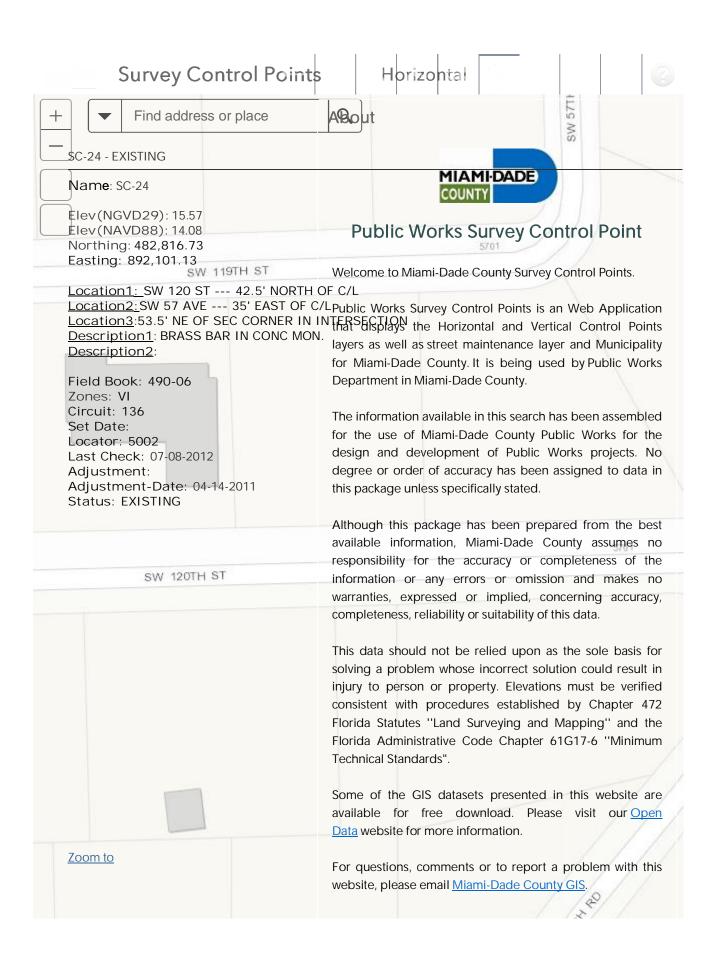
O LUNA L. BALLE A.LUNC 3/16/1	7 CONST	MIAMI	#03-86. M.D. M.D. J. L.D. D. D. C. D. D. C. D. D. C. D. C. C. C. D. C. C. C. C. D. C. C. C. C. C. D. C.	(26 WE)	NATO-82			2,990-42
TP No. 15	5 48 4.475 3,475	4-4-17	8.878 8.874		M&A-S	ILLVATION)	BM (12) 4.407 4.397	peer , too
TPN: 16				5.615 4.665 3.72	4,667	4.242		SET GUTNLESTE ON ASPHALT WALKWAY, ±390'N. OF TON, 15
SHAVE TPN-17	6.325 5.245 4.165	5245	9 457 9.452					
SHALE	5.97			5.70 4.735 3.765	4.733	1.723 4.719		± 409 S' N. DE TPN. 16
†PN, 18	9,85	491	9.633	5.205				SET CUTY IT ON ASPHALT WALKWAY
SHAKE	6.585 5.560	5,55%	10.905	428 33G	4-28Z	5-35Z 5-347		± 396,5' N. OF TP N. 17
TP N. 19	4.530		10.905	3.36 <i>0</i> 2.43 <i>0</i> 1.495	2,428	<u>8.482</u> 8.477		SET CUTAL TON ASPHALT WALKWAY + 392'N. OF TP N. 18

O. LUNA. L. BALLE A. LEAL 3/16/19	STEROS	EDCATION		WELLS	4AD-88)				2 F(d) = 43
7P N. 19	BS 7. 45 6. 35 5.130	MEAN 6.137	HI 14 14 14 14 14 14 14 1		MEAN	ILEMATION	5M ELEV 8.482 8.477	DEPERIPTION	
TP N. 20				6 845 5 9 80 4 9 50	5.898	8/2 8/15		set evinue & H	
SHALE CPI(BM-1)	7.235 6.215 5.195	4.215	14-93S 11.930	5.56				SET MOLW SMAMPE	0.251.012.0
SHAKE	5.09 4.18 4.41	4.78	14:630	5.08	9.08	9.850		6-3608 ON ASPHV	
CP 3	5 43			5.56 3.21 4.87	52)3	9.417		SET MAZN W BO	
SI+AUE CP 2 (BM-2)	5.43 4.815 4.20	A.815	14.23 ⁻ 7 14.23 2	4.905	4.615	9.817			
				4.325					

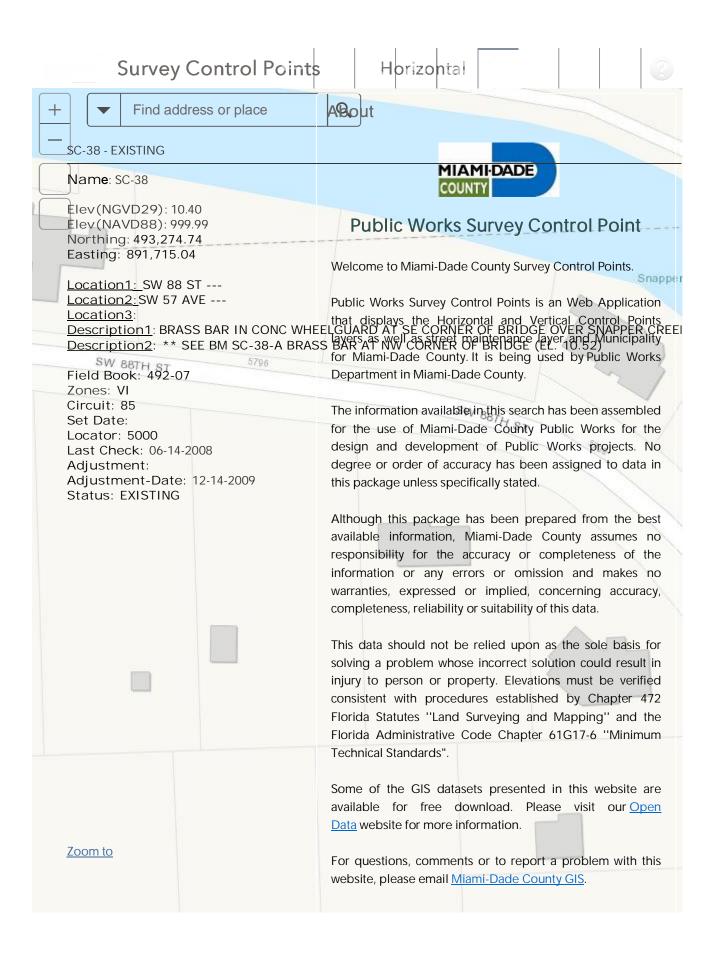
O. LUNA L. BALLES A. LEAL 3/16/18		S. F. W.	PADE (20	w ELLS	10-88)			2990 44
567	BS	MEAN	HZ	ES	MOON	LEVATION	BM BO	DESCRIPTION
CP2 (BM·2) BM G-3608	5,94 4,81 3,775	4.808	14.43				9-622	
TP N.ZI				4-37 3.40 2.43	3.40	11.025		SET CUT NL & TT ON ASPITALT WALKINGY SS'S. OR GILDE SW 91 ST. EAST SIDE OR THE SW ST ANG.
SHARE	4.820	386	14.885					
TPN. 22				6.905 6.135 5.360	6.133	8.757 8.752		SET CUT IN IN OV ASPIGAT WAZINIMY #358,5 N OF THE TP N. 21
SHAKE	4.17 3.275 2.38	3,275	12022					
PN- 23				5.390 4.420	5.392	0670 6.635		SET C-NL 4 TT.
HAZE	7.04 6.025 5.015	6 027	12,667					
M SC-38	(29)			4360 3760 3,155	37 \$8	8,908 3,904 Beron=	1.49 NGVD-2 - 1.49 NAVO	SW 57 AV



O. LUNG. L. BALLESTERDS S. E-W. M. D. A. LIDAL MIAMIDADE (20 3/18/9 DEUSCOS WELL G-	DAYD. 88)			2990-46
PT N	MEAN TO THE STATE OF THE STATE	1.4EMTION BM 19.6V	DECEIPTEN SE MNLW BE, 0129, 9 SE PACE N. 43	21/4-W 6RD CO-3RDS
ENO (WEITH) EIM (WEITH) CON C. WELL 4-3608	4.80 S 4.99 S 5.385		(NSIDE THE CAURIC)	
SI-ACS 553 5.19 5.19 14.615	5485 5 21 5 21 4 9 3 5	9425	OPOE Z" PVC PIPE	
4.85 Cp 3	5.195 5.195 5.195	9.42 9.417	SET MNLW BEC 0129, SEE PAGE 43	SMMPE 6-3608



100ft -80.284 25.660 Degrees



100ft -80.284 25.689 Degrees