

GROUND CONTROL SURVEY REPORT

GROUND TRUTH SURVEY FOR LIDAR CONTROL

Professional Management and LiDAR Data Collection and Processing Services

Block 9

PROJECT TITLE:	Professional Management and LiDAR Data Collection and Processing Services
WORK ORDER NAME:	Task Order A
WORK ORDER NUMBER:	2007058492720
CONSULTANT NAME:	3001, Inc., CH2M Hill, Inc.
PROJECT MANAGERS:	Jeremy Conner, 3001 Project Manager JoLee Gardner, CH2M Hill Project Manager

Services provided by:



3001, INC. THE GEOSPATIAL COMPANY
501 Robert Blvd. 2nd Floor
Slidell, Louisiana 70458



March 2008

Florida Division of Emergency Management
2555 Shumard Oak Boulevard
Tallahassee, Florida 32399-2100

Re: Professional Management and LiDAR Data Collection and Processing Services,
Block 9

This photogrammetric mapping ground control survey is certified as meeting or exceeding, in quality and precision, the standards applicable for this work as set forth in Chapter 61G17-6, Florida Administrative Code.

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Florida Professional Surveyor and Mapper
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(770) 631-0903

Signed: _____ Date: _____

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ABSTRACT

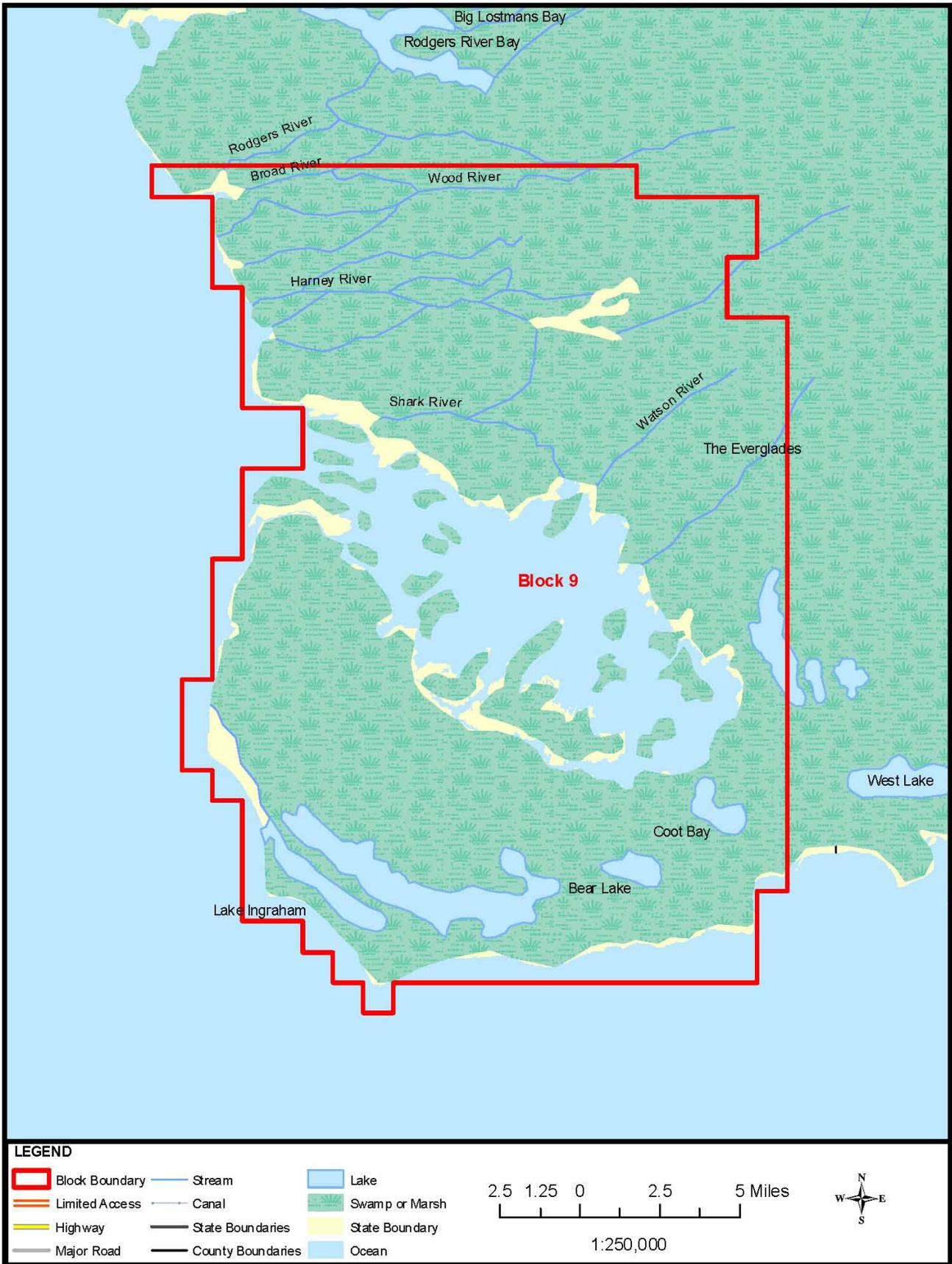
ABSTRACT

This report documents the GPS ground surveys conducted in support of LIDAR data collection for the Professional Management and LiDAR Data Collection and Processing Services project, Block 9. The data was collected between December 4 and December 8, 2007. The ground control stations were established utilizing one Trimble 4700 GPS receiver, five Trimble 4000 series receivers, one Trimble microcentered L1/L2 antenna without ground plane, and five Trimble Compact L1/L2 antennas with ground plane. There were no problems encountered during this survey.

Following the control network surveys, surveys were conducted at 6 sites utilizing the base stations established in the static network. These surveys established "Ground Truth" data at each site on different surface types, including bare-earth / low grass, brush lands / low trees, forested areas fully covered by trees, and urban areas.

In Blocks 9 and 10, there was an approved deviation from the required accuracy in the Baseline Specifications. The deviation extended the GPS base station spacing for LiDAR gathering from 20 miles to 30 miles. It was approved by Richard Butgereit on an email to JoLee Gardner on February 4, 2008.

BLOCK 9 SITE MAP



SURVEY METHODOLOGY

SURVEY METHODOLOGY

Prior to beginning the survey collection, a reconnaissance was done of the existing control in the project area, and surrounding areas. Based on the results of the findings, the controls to be included in the network were selected based on their locations, horizontal and vertical orders, and their accessibility. In addition to the survey control, several Continuously Operating Reference Stations (CORS) were included into the GPS network. All control monuments and CORS can be found in the Fully-Constrained Adjustment table, found in Section 4-B, and can also be seen on the GPS Network Map shown in Section 4-A.

The GPS network was then planned to coincide with the following set of standards:

- FGCC, GEOMETRIC GEODETIC ACCURACY STANDARDS AND SPECIFICATIONS FOR USING GPS RELATIVE POSITIONING TECHNIQUES, VERSION 5.0, AUGUST 1989
- FGDC, GEOSPATIAL POSITIONING ACCURACY STANDARDS, NATIONAL STANDARD FOR SPATIAL DATA ACCURACY (NSSDA)
- NGS-58, GUIDELINES FOR ESTABLISHING GPS-DERIVED ELLIPSOID HEIGHTS (2CM AND 5CM)
- NGS-59, GUIDELINES FOR ESTABLISHING GPS-DERIVED ORTHOMETRIC HEIGHTS (2CM AND 5CM)
- FGCC STANDARDS AND SPECIFICATIONS FOR GEODETIC CONTROL NETWORKS, 1984
- FEMA FLOOD HAZARD MAPPING PROGRAM, GUIDELINES AND SPECIFICATIONS FOR FLOOD HAZARD MAPPING PARTNERS, APPENDIX

A

Control monuments were tied together with several sessions, for at least five hours each. These monuments were then tied to newly established monuments, or secondary control monuments, with one hour occupations.

After the static GPS network was completed, the ground truth data points were collected using a total station and data collector. This data was collected from base stations tied into the static GPS network, and additional “check-in” points were collected and compared to positions established in the static network. The ground truth data was then processed and used to verify the LIDAR positions.

The horizontal and vertical datums used for this project are listed below:

Coordinate System: US State Plane
Zone: Florida East 0901
Horizontal Datum: NAD83 (1999) / HARN Adjustment
Vertical Datum: NAVD88
Geoid Model: Geoid03
Units: US Survey Feet

MAIN REPORT

STATIC GPS SUMMARY

The Standard Operating Procedure for the data collection includes a geodetic control network plan designed to maximize the use of the highest order control points in the area of interest, and to optimize the spatial distribution of geodetic control across the network. Also included is the simultaneous occupation of points designed to provide redundant vectors and loop closures, as well as a collection of a superfluity of points to compare observed values against published values of geodetic control points.

In addition, the static GPS network was established to verify the compatibility and correlation of existing published NGS controls in the project area. Horizontal and vertical constraints were selected based on the order of accuracy and correlation of the controls selected.

PRELIMINARY ANALYSIS

The baselines were processed using Trimble Geomatics Offices's baseline processing module, WAVE (*Weighted Ambiguity Vector Estimator*). Ionosphere-free fixed solutions were found to provide the best results. Preliminary blunder detections were undertaken using "Redundant Vectors" and Global Network Closures and any extremely large errors were eliminated.

MINIMALLY CONSTRAINED ADJUSTMENT

The data are then processed using a minimally constrained geodetic control network to test the network internally, without external constraints, and produce a statistical summary. The statistics from this process are required to be within the tolerance outlined in the Geometric Geodetic Accuracy Standards and Specifications for using GPS Relative Positioning Techniques, published by the FGCC. These tolerances are represented as ellipsoids showing the margin of error value on a graph of the theoretical points, covariance values that indicate the degree of error of the vectors relative to the other vectors in the network, and a chi-squared test that compares the predicted variance determined through a least-squares analysis to the observed variance. The summary is evaluated to eliminate vectors that are outside of the error tolerances to be replaced with redundant vectors that are within the tolerances until all tolerances are met.

FULLY CONSTRAINED ADJUSTMENT

The quality of the existing horizontal controls is assessed before undertaking the constrained adjustment. Geodetic inverses between the published NAD83 (1999) coordinates of existing stations were compared with the geodetic inverses derived from the minimally constrained least square adjustment results. This distance analysis is especially useful, since it provides a datum invariant means of comparison.

Once the minimally constrained network satisfies the requirements of the above tests, the highest order control points in the control network are selected with an optimum

spatial relationship to fully constrain the network to known control points, and have their published values entered as the position for those points and the network re-adjusted. The fully constrained report is given in Section 4-B. The same statistical tests are rerun on the adjusted network, as well as visually comparing adjusted values of geodetic control points to published values of control points not used as constraints. Again, the summary is evaluated to identify vectors outside of the tolerances and constraining points reselected to obtain the best fit to the geoid where all vectors are within the prescribed tolerances.

ERROR ELLIPSES

The adjustment results show that the a posteriori variance factor of the network was close to 1.0, as should be desired, and passed the χ^2 test. None of the residual components in the network were flagged for possible rejection under the τ -max test at the 0.05 level of significance. The relative confidence ellipses reveal that the horizontal positional accuracy between all directly connected pairs of stations in the network were better than (1:100,000) at the 95% level of confidence. The horizontal and vertical Error ellipses are included in this report in Section 4-D.

GROUND TRUTH SUMMARY

Surveys were conducted to establish ground truth data at representative sites throughout the project area. These sites were selected on the basis of the various types of ground surfaces and vegetation covers that would be encountered by the LIDAR surveys. As a quality control measure, a number of “check-in” points consisted of published horizontal and vertical control points within the area. The base stations used to collect survey data were included in the static GPS network, and were selected on the basis of their having an unobstructed view of the sky, as well as being in a location considered favorable for collecting ground truth data. The vertical and horizontal accuracy of each base station was determined by the statistical tests performed in the least squares adjustment process.

SAMPLE POINTS / TEST POINTS

The test points were distributed and categorized into sites as shown in the Map of Ground Truth Locations attached in this report (Section 5-A). These sites were selected on the basis of various types of ground surfaces and vegetation covers. At the time of LIDAR data acquisition, checkpoints were collected on surfaces with bare-earth / low grass, brush lands / low trees, forested areas fully covered by trees, and urban areas.

GPS NETWORK

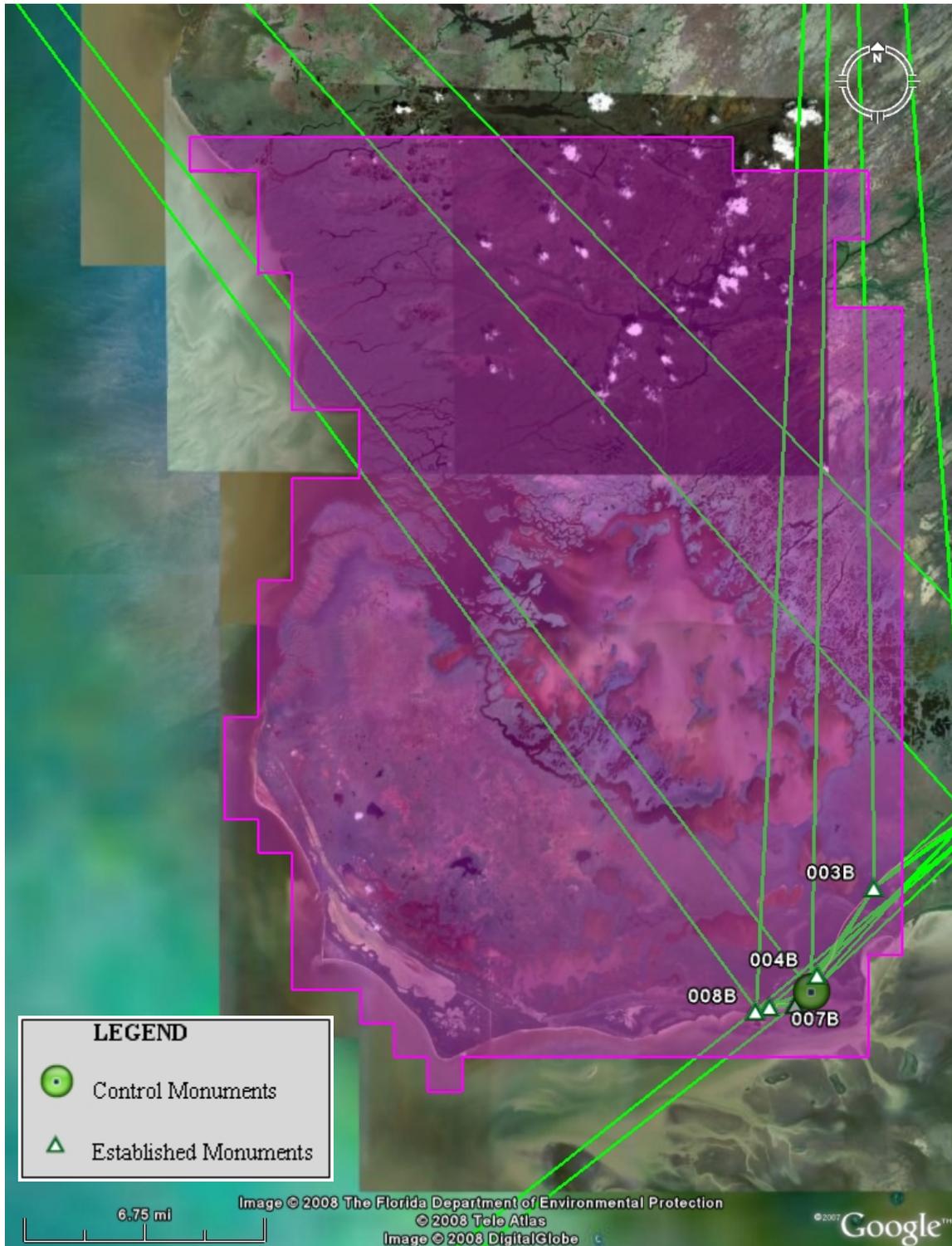
A. GPS Network Map

GPS Network Map

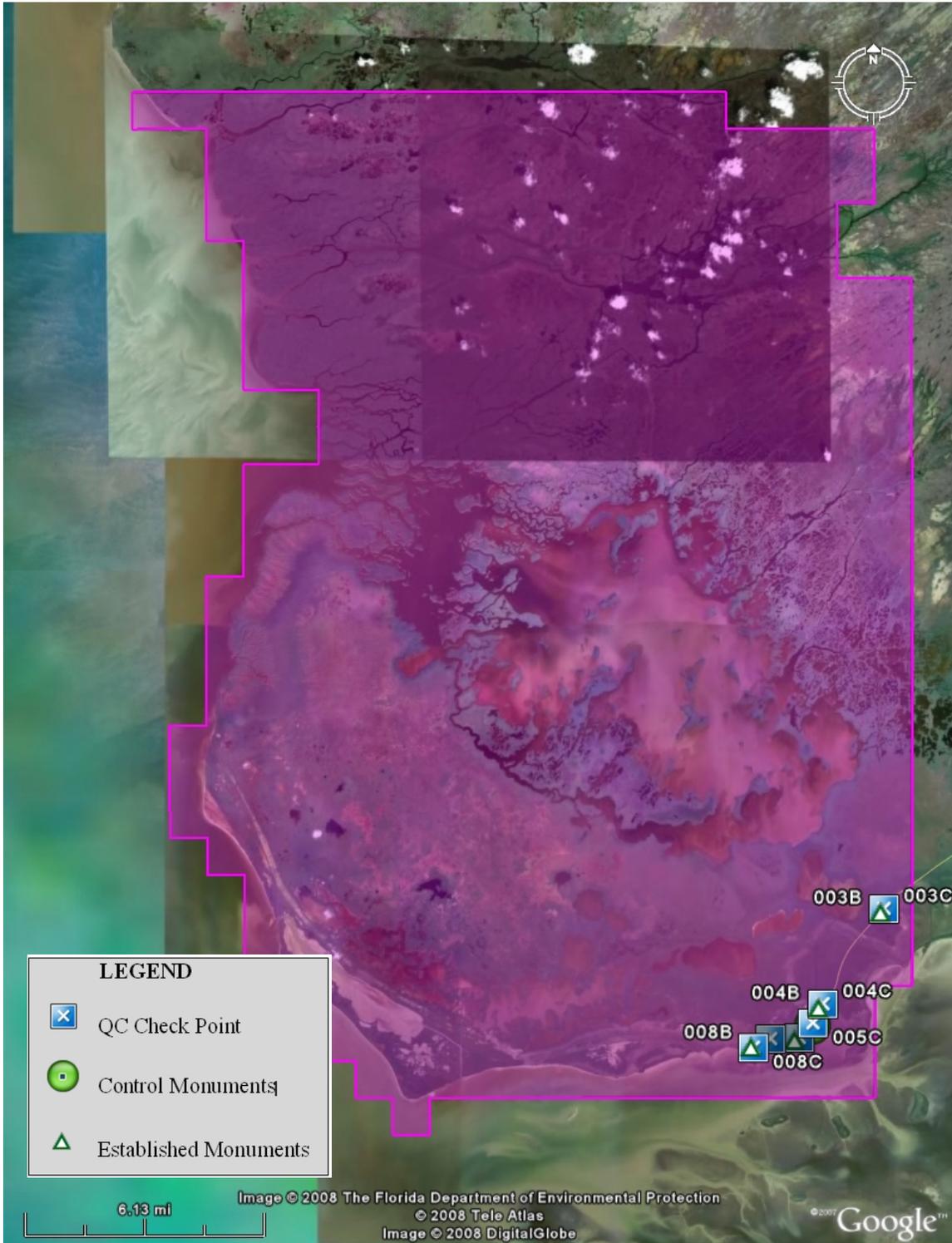


This map shows the GPS baselines processed for this network. The CORS and control monuments can be distinguished from the newly established monuments (see the legend above). The project area can be seen more closely on the next page.

GPS Network Map – project area



QC Check Points



The QC check points can be seen in the above map. The QC procedures are described in Section 3, in the Ground Truth Summary. The individual check sites can be seen in detail in Section 5-B.

B. Fully Constrained

GPS Control Network
Fully-Constrained Adjustment

Coordinate System: US State Plane
Zone: Florida East 0901
Horizontal Datum: NAD83 (1999)
HARN Adjustment
Vertical Datum: NAVD88
Geoid Model: Geoid03
Units: US Survey Feet

Name	Latitude	Longitude	Northing	Easting	Elevation	Ellipsoid ht	Northing error	Easting error	Ellip error	Fix
KWST	24°33'13.26749"N	81°45'15.40020"W	80757.09	405464.64	38.03	-33.35	0.00	0.00	0.00	LLh
MTNT	25°51'56.76081"N	80°54'25.18701"W	556914.06	686748.36	17.53	-62.15	0.00	0.00	0.00	LLh
NAPL	26°08'55.10356"N	81°46'34.62742"W	660475.38	401512.49	19.92	-57.21	0.00	0.00	0.00	LLh
RMND	25°36'49.58921"N	80°23'02.14117"W	465790.41	859175.16	35.96	-46.22	0.00	0.00	0.00	LLh
THOM	25°14'45.07510"N	80°48'04.34416"W	331654.87	721871.69	2.68	-74.28	0.00	0.00	0.00	LLh
TID1	25°08'36.88685"N	80°55'21.97739"W	294445.42	681713.48	2.76	-72.42	0.00	0.00	0.00	LLh
003B	25°11'10.55841"N	80°53'39.44555"W	309964.72	691122.71	3.04	-72.64	0.01	0.01	0.02	
003C	25°11'12.82426"N	80°53'37.29576"W	310193.61	691320.00	2.81	-72.88	0.02	0.02	0.06	
004B	25°09'03.53253"N	80°55'10.88101"W	297135.85	682731.49	2.25	-72.99	0.01	0.01	0.02	
004C	25°09'05.94818"N	80°55'07.30377"W	297379.90	683060.03	2.88	-72.38	0.04	0.02	0.11	
005C	25°08'40.52026"N	80°55'22.03299"W	294812.20	681708.16	2.36	-72.82	0.02	0.02	0.02	
006B	25°08'20.40147"N	80°55'46.19153"W	292780.03	679489.37	4.21	-70.88	0.01	0.01	0.01	
006C	25°08'20.92012"N	80°55'42.18166"W	292832.58	679857.81	4.18	-70.93	0.02	0.02	0.03	
007B	25°08'17.41014"N	80°56'27.51868"W	292476.24	675691.91	2.92	-72.06	0.01	0.01	0.02	
007C	25°08'19.48203"N	80°56'24.39493"W	292685.52	675978.86	3.02	-71.97	0.02	0.02	0.03	
008B	25°08'11.18007"N	80°56'50.32950"W	291846.46	673596.03	3.65	-71.27	0.01	0.01	0.02	
008C	25°08'07.96326"N	80°56'49.79081"W	291521.75	673645.66	3.10	-71.81	0.02	0.02	0.03	
PP 2	25°12'53.08856"N	80°51'07.26406"W	320328.21	705090.06	2.37	-73.88	0.01	0.01	0.02	

ERRORS ARE REPORTED AT THE 95% CONFIDENCE LEVEL.

C. NGS Published Positions vs GPS Derived Positions

NGS Positions vs GPS Derived Positions

NGS Positions

Designation	Northing	Easting	Elev	Ellip Ht	Horiz Order	Vert Order	Ellip Order
KEY WEST CORS ARP	80757.09	405464.64		-33.35	CORS	CORS	CORS
MIAMI TNT CORS ARP	556914.05	686748.36		-62.15	CORS	CORS	CORS
NAPLES CORS ARP	660475.38	401512.49	20.0	-57.21	CORS	CORS	CORS
RICHMOND CORS ARP	465790.41	859175.16		-46.22	CORS	CORS	CORS
872 3644 TIDAL 1	294445.42	681713.48	2.79	-72.42		1	
FLGPS THOMPSON	331654.87	721871.69	2.69	-74.28		1	

GPS Derived Positions

Northing	Easting	Elev	Ellip Ht
80757.09	405464.64	38.03	-33.35
556914.06	686748.36	17.53	-62.15
660475.38	401512.49	19.92	-57.21
465790.41	859175.16	35.96	-46.22
294445.42	681713.48	2.76	-72.42
331654.87	721871.69	2.68	-74.28

delta Northing	delta Easting	delta Elev	delta Ellip
0.00	0.00		0.00
0.00	0.00		0.00
0.00	0.00	0.08	0.00
0.00	0.00		0.00
0.00	0.00	0.03	0.00
0.00	0.00	0.01	0.00

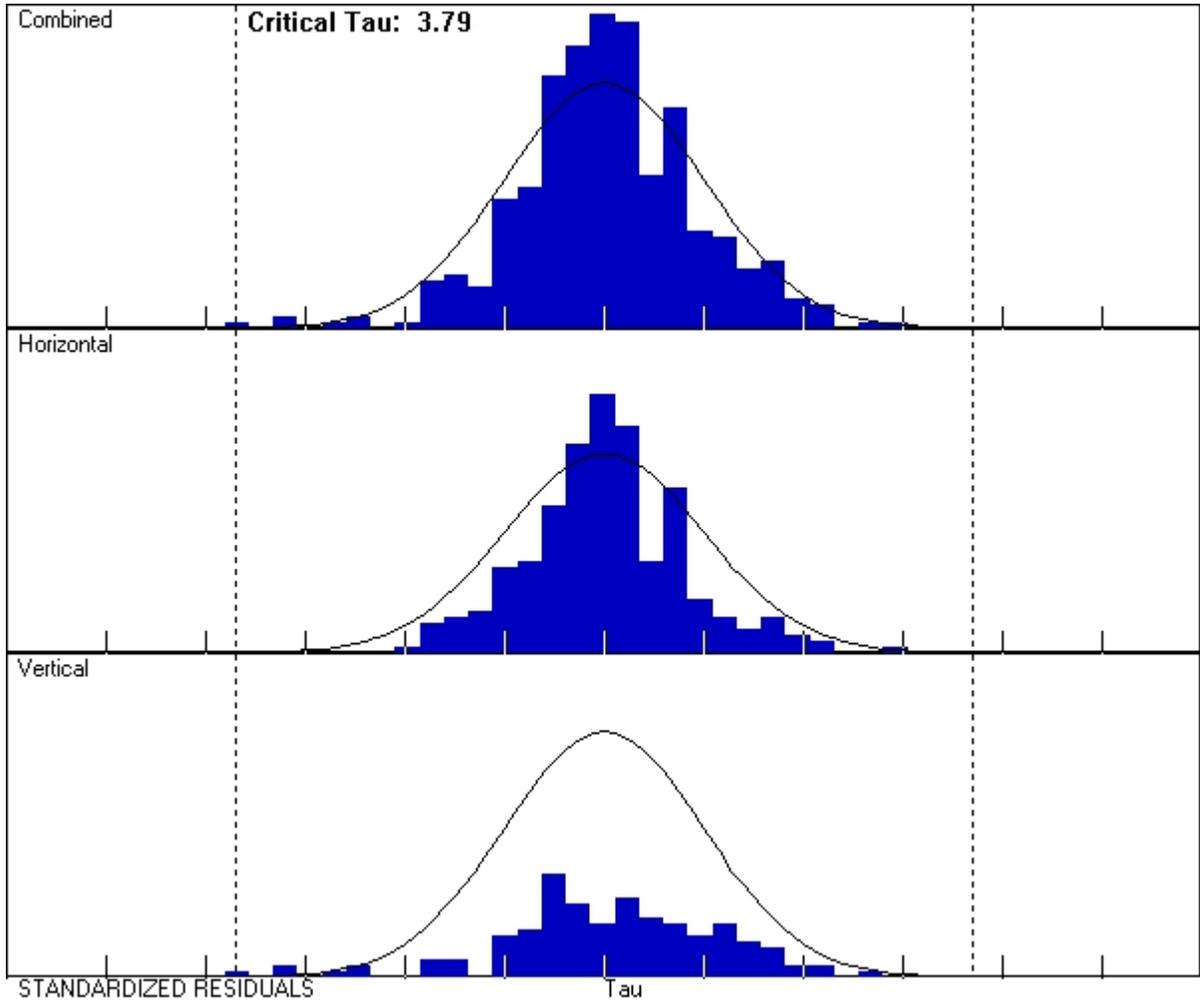
D. Error Ellipses

Point Error Ellipses

005C	006B	006C
Tick Size: 0.0100sft Horizontal Bivariate Scalar: 2.45σ Vertical Univariate Scalar: 1.96σ		
003B	003C	004B
Tick Size: 0.0100sft Horizontal Bivariate Scalar: 2.45σ Vertical Univariate Scalar: 1.96σ		
004C	007B	007C
Tick Size: 0.0100sft Horizontal Bivariate Scalar: 2.45σ Vertical Univariate Scalar: 1.96σ		
008B	008C	PP 2
Tick Size: 0.0100sft Horizontal Bivariate Scalar: 2.45σ Vertical Univariate Scalar: 1.96σ		

E. Histograms of Standardized Residuals

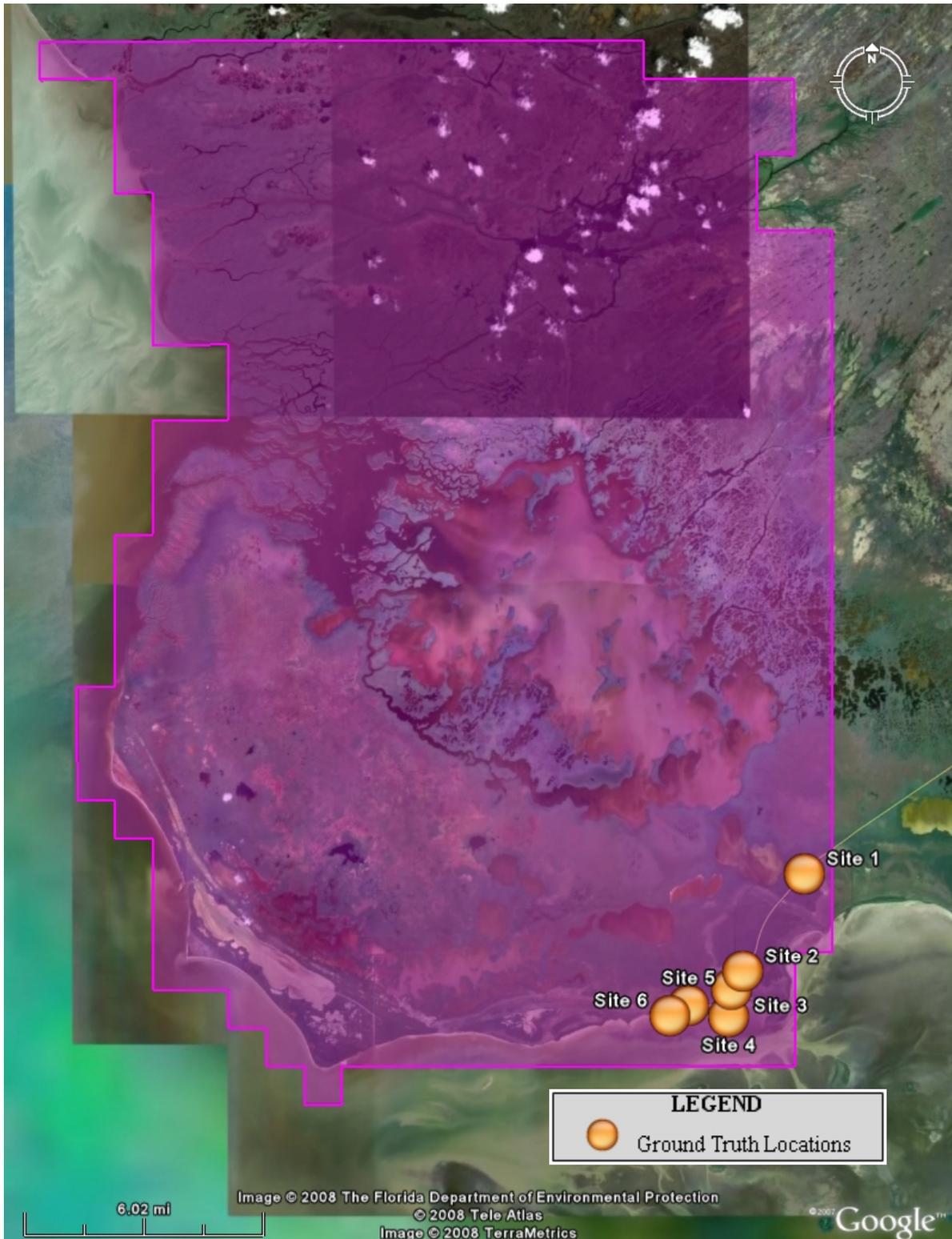
Histograms of Standardized Residuals



GROUND TRUTH SURVEY

A. Map of Ground Truth Locations

Ground Control Areas



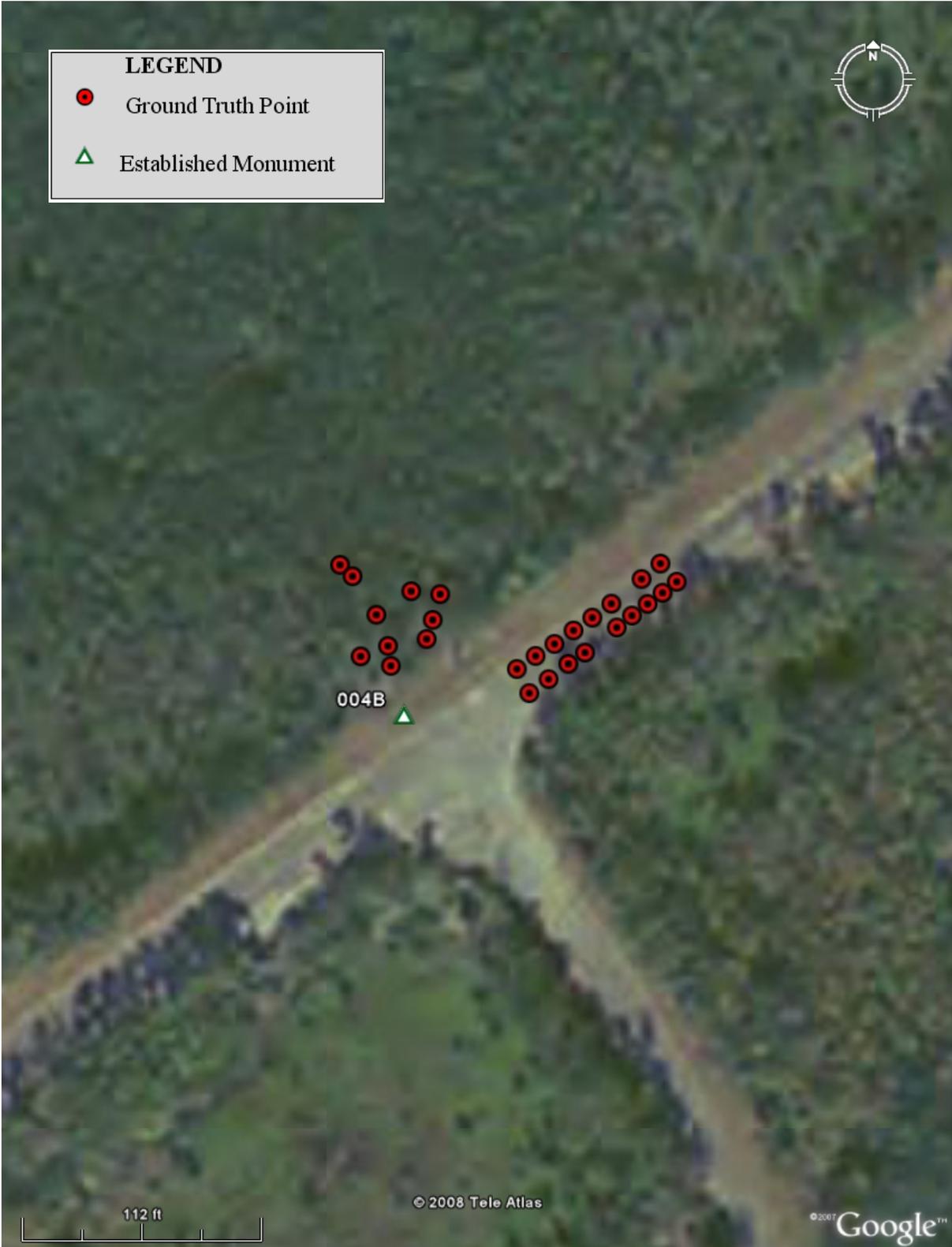
The individual check sites can be seen in detail on the following pages.

B. Ground Truth Site Maps

SITE 1 - Ground Truth Points



SITE 2 - Ground Truth Points



SITE 3 - Ground Truth Points



SITE 4 - Ground Truth Points



SITE 5 - Ground Truth Points



SITE 6 - Ground Truth Points



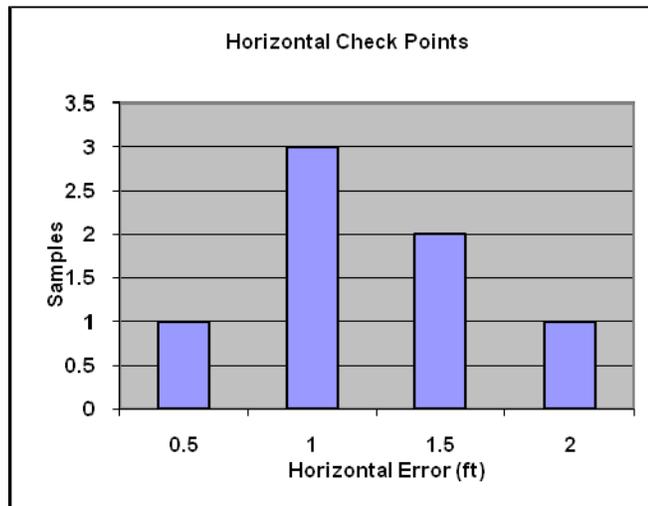
C. Horizontal Accuracy Assessment

HORIZONTAL ACCURACY CHECK POINTS

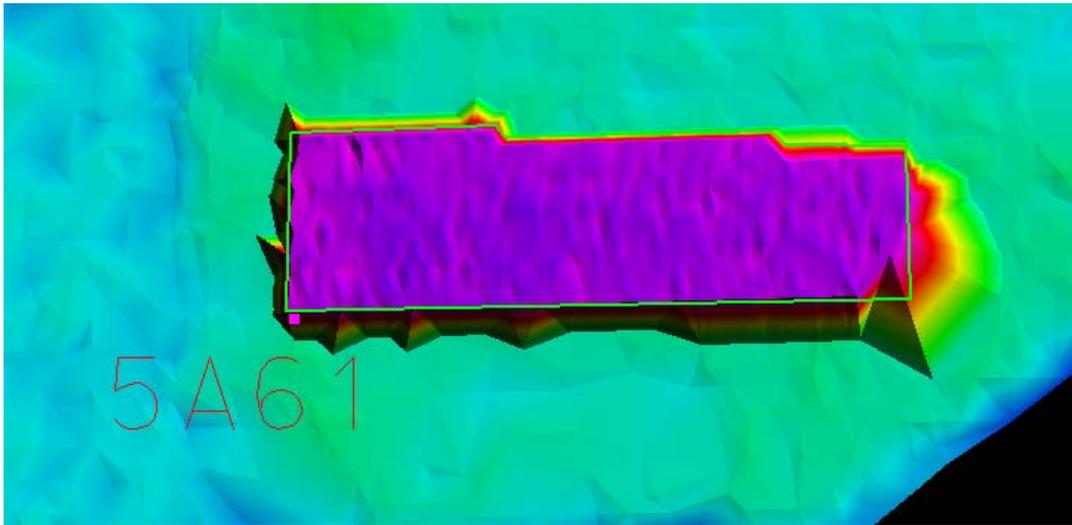
Horizontal check points were collected at several sites within the project area, in order to verify the horizontal accuracy of the LiDAR data. These check points are collected in the same locations as the vertical ground truth data, from base stations that were established in the static GPS network. The horizontal check points were collected with a total station and data collector.

After the LiDAR data has been processed these horizontal check points are plotted and compared to the approximate positions from the LiDAR data set. For this purpose building corners are most often used, because they can be identified from the LiDAR data and the corners can be estimated. Distances are measured from the estimated LiDAR positions to the surveyed positions. The statistics are shown below, and screen captures of the LiDAR derived features are shown on the following pages.

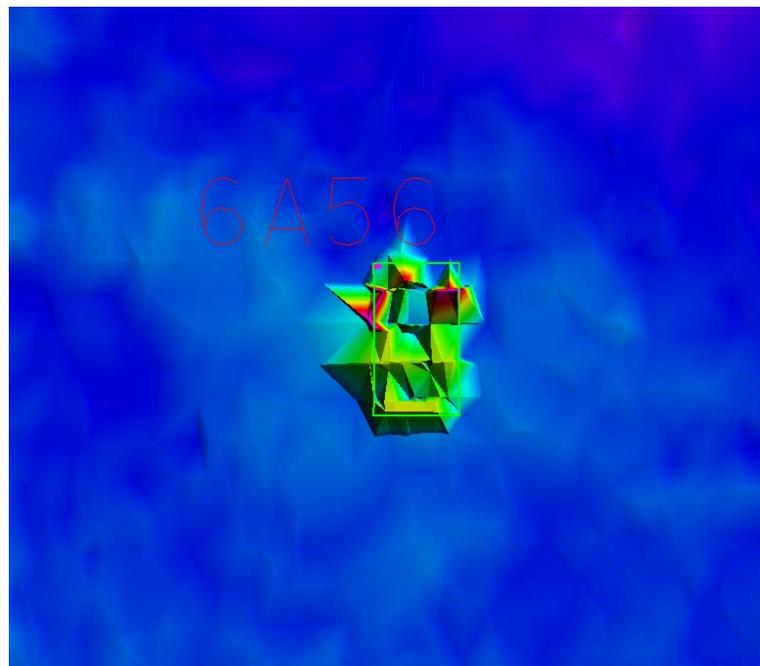
Horizontal Check Points (ft)	
RMSEr	1.37
Mean	1.29
Standard Error	0.18
Median	1.21
Standard Deviation	0.49
Sample Variance	0.24
Kurtosis	0.70
Skewness	-0.81
Range	1.44
Minimum	0.41
Maximum	1.85



Site 3 – Horizontal Check Point

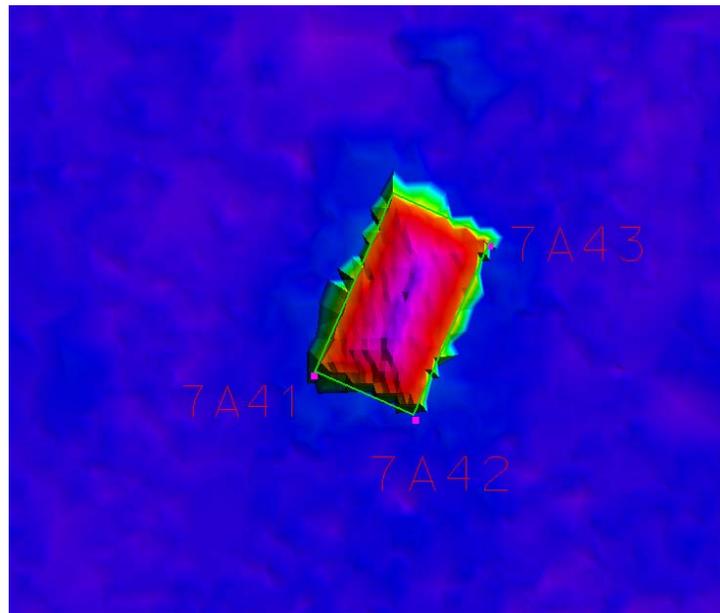


Site 4 – Horizontal Check Point

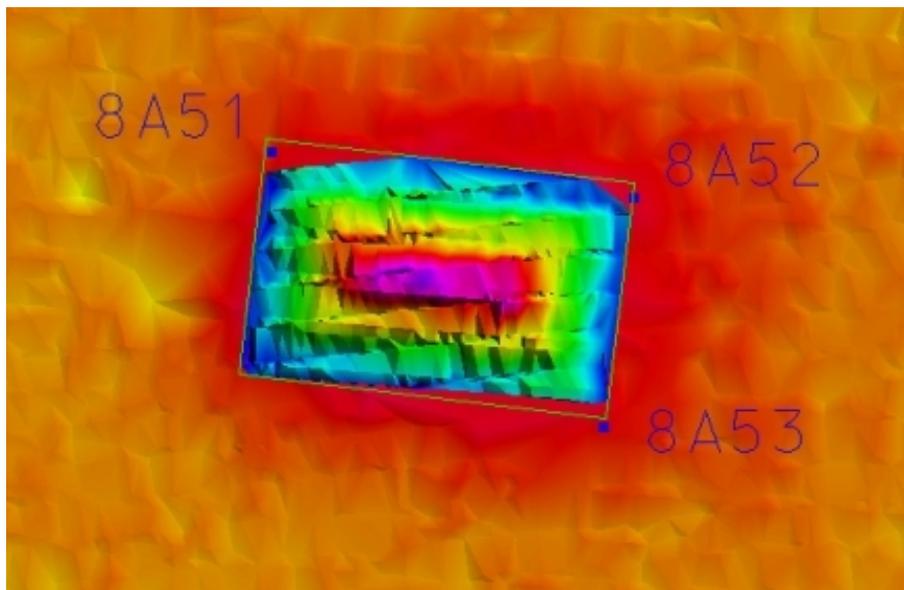


Building cannot be determined from LiDAR data.

Site 5 – Horizontal Check Points



Site 6 – Horizontal Check Points



CONTROL MARK DATA SHEETS

DE9146 *****

DE9146 CORS - This is a GPS Continuously Operating Reference Station.

DE9146 DESIGNATION - KEY WEST CORS ARP

DE9146 CORS_ID - KWST

DE9146 PID - DE9146

DE9146 STATE/COUNTY- FL/MONROE

DE9146 USGS QUAD - KEY WEST (1971)

DE9146

DE9146 *CURRENT SURVEY CONTROL

DE9146* NAD 83(CORS)- 24 33 13.26749(N) 081 45 15.40020(W) ADJUSTED

DE9146* NAVD 88 -

DE9146 EPOCH DATE - 2002.00

DE9146 X - 832,506.096 (meters) COMP

DE9146 Y - -5,744,714.917 (meters) COMP

DE9146 Z - 2,634,183.202 (meters) COMP

DE9146 ELLIP HEIGHT- -10.164 (meters) (12/??/02) ADJUSTED

DE9146 GEOID HEIGHT- -21.75 (meters) GEOID03

DE9146 HORZ ORDER - SPECIAL (CORS)

DE9146 ELLP ORDER - SPECIAL (CORS)

DE9146

DE9146. ITRF positions are available for this station.

DE9146. The coordinates were established by GPS observations

DE9146. and adjusted by the National Geodetic Survey in December 2002.

DE9146. The coordinates are valid at the epoch date displayed above.

DE9146. The epoch date for horizontal control is a decimal equivalence

DE9146. of Year/Month/Day.

DE9146

DE9146

DE9146. The PID for the CORS L1 Phase Center is DE9147.

DE9146

DE9146. The XYZ, and position/ellipsoidal ht. are equivalent.

DE9146

DE9146. The ellipsoidal height was determined by GPS observations

DE9146. and is referenced to NAD 83.

DE9146

DE9146. The geoid height was determined by GEOID03.

DE9146

DE9146;	North	East	Units	Scale	Factor	Converg.
DE9146;SPC FL E	- 24,614.810	123,585.870	MT	1.00001327	-0 18 48.4	
DE9146;SPC FL E	- 80,757.09	405,464.64	sFT	1.00001327	-0 18 48.4	

DE9146

DE9146! - Elev Factor x Scale Factor = Combined Factor

DE9146!SPC FL E - 1.00000160 x 1.00001327 = 1.00001487

DE9146

DE9146 SUPERSEDED SURVEY CONTROL

DE9146

DE9146. No superseded survey control is available for this station.

DE9146

DE9146 _U.S. NATIONAL GRID SPATIAL ADDRESS: 17RMH2361215738(NAD 83)

DE9146 _MARKER: STATION IS THE ANTENNA REFERENCE POINT OF THE GPS ANTENNA

DE9146

DE9146 STATION DESCRIPTION

DE9146

DE9146'DESCRIBED BY NATIONAL GEODETIC SURVEY 2002

DE9146' STATION IS A GPS CORS. LATEST INFORMATION INCLUDING POSITIONS AND
DE9146' VELOCITIES ARE AVAILABLE IN THE COORDINATE AND LOG FILES ACCESSIBLE
DE9146' BY ANONYMOUS FTP OR THE WORLDWIDE WEB.
DE9146' FTP CORS.NGS.NOAA.GOV: CORS/COORD AND CORS/STATION_LOG
DE9146' HTTP://WWW.NGS.NOAA.GOV UNDER PRODUCTS AND SERVICES.

DF7050 *****

DF7050 CORS - This is a GPS Continuously Operating Reference Station.

DF7050 DESIGNATION - MIAMI TNT CORS ARP

DF7050 CORS_ID - MTNT

DF7050 PID - DF7050

DF7050 STATE/COUNTY- FL/COLLIER

DF7050 USGS QUAD - FIFTYMILE BEND (1995)

DF7050

DF7050 *CURRENT SURVEY CONTROL

DF7050* NAD 83(CORS)- 25 51 56.76081(N) 080 54 25.18701(W) ADJUSTED

DF7050* NAVD 88 -

DF7050 EPOCH DATE - 2002.00

DF7050 X - 907,579.127 (meters) COMP

DF7050 Y - -5,670,639.703 (meters) COMP

DF7050 Z - 2,765,679.841 (meters) COMP

DF7050 ELLIP HEIGHT- -18.942 (meters) (08/??/03) ADJUSTED

DF7050 GEOID HEIGHT- -24.29 (meters) GEOID03

DF7050 HORZ ORDER - SPECIAL (CORS)

DF7050 ELLP ORDER - SPECIAL (CORS)

DF7050

DF7050.ITRF positions are available for this station.

DF7050.The coordinates were established by GPS observations

DF7050.and adjusted by the National Geodetic Survey in August 2003.

DF7050.The coordinates are valid at the epoch date displayed above.

DF7050.The epoch date for horizontal control is a decimal equivalence

DF7050.of Year/Month/Day.

DF7050

DF7050

DF7050.The PID for the CORS L1 Phase Center is DF7051.

DF7050

DF7050.The XYZ, and position/ellipsoidal ht. are equivalent.

DF7050

DF7050.The ellipsoidal height was determined by GPS observations

DF7050.and is referenced to NAD 83.

DF7050

DF7050.The geoid height was determined by GEOID03.

DF7050

DF7050;	North	East	Units	Scale	Factor	Converg.
DF7050;SPC FL E	- 169,747.743	209,321.320	MT	0.99994225	+0 02 26.1	
DF7050;SPC FL E	- 556,914.05	686,748.36	sFT	0.99994225	+0 02 26.1	

DF7050

DF7050! - Elev Factor x Scale Factor = Combined Factor

DF7050!SPC FL E - 1.00000298 x 0.99994225 = 0.99994523

DF7050

DF7050 SUPERSEDED SURVEY CONTROL

DF7050

DF7050.No superseded survey control is available for this station.

DF7050

DF7050_U.S. NATIONAL GRID SPATIAL ADDRESS: 17RNJ0931860822(NAD 83)

DF7050_MARKER: STATION IS THE ANTENNA REFERENCE POINT OF THE GPS ANTENNA

DF7050

DF7050 STATION DESCRIPTION

DF7050

DF7050'DESCRIBED BY NATIONAL GEODETIC SURVEY 2003

DF7050 STATION IS A GPS CORS. LATEST INFORMATION INCLUDING POSITIONS AND
DF7050 VELOCITIES ARE AVAILABLE IN THE COORDINATE AND LOG FILES ACCESSIBLE
DF7050 BY ANONYMOUS FTP OR THE WORLDWIDE WEB.
DF7050 FTP CORS.NGS.NOAA.GOV: CORS/COORD AND CORS/STATION_LOG
DF7050 HTTP://WWW.NGS.NOAA.GOV UNDER PRODUCTS AND SERVICES.

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DF7052 *****
DF7052 CORS      - This is a GPS Continuously Operating Reference Station.
DF7052 DESIGNATION - NAPLES CORS ARP
DF7052 CORS_ID   - NAPL
DF7052 PID       - DF7052
DF7052 STATE/COUNTY- FL/COLLIER
DF7052 USGS QUAD  - NAPLES NORTH (1987)
DF7052
DF7052                *CURRENT SURVEY CONTROL
DF7052
DF7052* NAD 83(CORS)- 26 08 55.10356(N) 081 46 34.62742(W)  ADJUSTED
DF7052* NAVD 88   -    6.1 (meters)  20. (feet) GPS OBS
DF7052
DF7052 EPOCH DATE -    2002.00
DF7052 X          - 819,477.897 (meters)          COMP
DF7052 Y          - -5,670,157.335 (meters)       COMP
DF7052 Z          - 2,793,845.936 (meters)       COMP
DF7052 ELLIP HEIGHT- -17.439 (meters)          (08/??/03) ADJUSTED
DF7052 GEOID HEIGHT- -23.51 (meters)          GEOID03
DF7052 HORZ ORDER - SPECIAL (CORS)
DF7052 ELLP ORDER - SPECIAL (CORS)
DF7052
DF7052. ITRF positions are available for this station.
DF7052. The coordinates were established by GPS observations
DF7052. and adjusted by the National Geodetic Survey in August 2003.
DF7052. The coordinates are valid at the epoch date displayed above.
DF7052. The epoch date for horizontal control is a decimal equivalence
DF7052. of Year/Month/Day.
DF7052
DF7052. The orthometric height was determined by GPS observations and a
DF7052. high-resolution geoid model.
DF7052
DF7052. The PID for the CORS L1 Phase Center is DF7053.
DF7052
DF7052. The XYZ, and position/ellipsoidal ht. are equivalent.
DF7052
DF7052. The ellipsoidal height was determined by GPS observations
DF7052. and is referenced to NAD 83.
DF7052
DF7052. The geoid height was determined by GEOID03.
DF7052
DF7052;           North    East    Units Scale Factor Converg.
DF7052; SPC FL E - 201,313.299 122,381.251 MT 1.00001554 -0 20 31.7
DF7052; SPC FL E - 660,475.38 401,512.49 sFT 1.00001554 -0 20 31.7
DF7052
DF7052!           - Elev Factor x Scale Factor = Combined Factor
DF7052! SPC FL E - 1.00000274 x 1.00001554 = 1.00001828
DF7052
DF7052                SUPERSEDED SURVEY CONTROL
DF7052
DF7052. No superseded survey control is available for this station.
DF7052
DF7052_U.S. NATIONAL GRID SPATIAL ADDRESS: 17RMJ2240892377(NAD 83)
DF7052_MARKER: STATION IS THE ANTENNA REFERENCE POINT OF THE GPS ANTENNA
DF7052
DF7052                STATION DESCRIPTION

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DF7052

DF7052 DESCRIBED BY NATIONAL GEODETIC SURVEY 2003

DF7052 STATION IS A GPS CORS. LATEST INFORMATION INCLUDING POSITIONS AND
DF7052 VELOCITIES ARE AVAILABLE IN THE COORDINATE AND LOG FILES ACCESSIBLE
DF7052 BY ANONYMOUS FTP OR THE WORLDWIDE WEB.

DF7052' FTP CORS.NGS.NOAA.GOV: CORS/COORD AND CORS/STATION_LOG

DF7052' HTTP://WWW.NGS.NOAA.GOV UNDER PRODUCTS AND SERVICES.

DF7988 *****
 DF7988 CORS - This is a GPS Continuously Operating Reference Station.
 DF7988 DESIGNATION - RICHMOND CORS ARP
 DF7988 CORS_ID - RMND
 DF7988 PID - DF7988
 DF7988 STATE/COUNTY- FL/MIAMI-DADE
 DF7988 USGS QUAD - GOULDS (1994)
 DF7988
 DF7988 *CURRENT SURVEY CONTROL
 DF7988
 DF7988* NAD 83(CORS)- 25 36 49.58921(N) 080 23 02.14117(W) ADJUSTED
 DF7988* NAVD 88 -
 DF7988
 DF7988 EPOCH DATE - 2002.00
 DF7988 X - 961,335.300 (meters) COMP
 DF7988 Y - -5,674,075.696 (meters) COMP
 DF7988 Z - 2,740,535.349 (meters) COMP
 DF7988 ELLIP HEIGHT- -14.088 (meters) (09/??/03) ADJUSTED
 DF7988 GEOID HEIGHT- -25.05 (meters) GEOID03
 DF7988 HORZ ORDER - SPECIAL (CORS)
 DF7988 ELLP ORDER - SPECIAL (CORS)
 DF7988
 DF7988. ITRF positions are available for this station.
 DF7988. The coordinates were established by GPS observations
 DF7988. and adjusted by the National Geodetic Survey in September 2003.
 DF7988. The coordinates are valid at the epoch date displayed above.
 DF7988. The epoch date for horizontal control is a decimal equivalence
 DF7988. of Year/Month/Day.
 DF7988
 DF7988
 DF7988. The PID for the CORS L1 Phase Center is DF7989.
 DF7988
 DF7988. The XYZ, and position/ellipsoidal ht. are equivalent.
 DF7988
 DF7988. The ellipsoidal height was determined by GPS observations
 DF7988. and is referenced to NAD 83.
 DF7988
 DF7988. The geoid height was determined by GEOID03.
 DF7988
 DF7988;
 DF7988; SPC FL E - 141,973.202 261,877.112 MT 0.99998844 +0 15 58.8
 DF7988; SPC FL E - 465,790.41 859,175.16 sFT 0.99998844 +0 15 58.8
 DF7988
 DF7988! - Elev Factor x Scale Factor = Combined Factor
 DF7988! SPC FL E - 1.00000221 x 0.99998844 = 0.99999065
 DF7988
 DF7988 SUPERSEDED SURVEY CONTROL
 DF7988
 DF7988. No superseded survey control is available for this station.
 DF7988
 DF7988 _U.S. NATIONAL GRID SPATIAL ADDRESS: 17RNJ6185633057(NAD 83)
 DF7988 _MARKER: STATION IS THE ANTENNA REFERENCE POINT OF THE GPS ANTENNA
 DF7988
 DF7988 STATION DESCRIPTION
 DF7988
 DF7988'DESCRIBED BY NATIONAL GEODETIC SURVEY 2003

DF7988 STATION IS A GPS CORS. LATEST INFORMATION INCLUDING POSITIONS AND
DF7988 VELOCITIES ARE AVAILABLE IN THE COORDINATE AND LOG FILES ACCESSIBLE
DF7988 BY ANONYMOUS FTP OR THE WORLDWIDE WEB.
DF7988' FTP CORS.NGS.NOAA.GOV: CORS/COORD AND CORS/STATION_LOG
DF7988' HTTP://WWW.NGS.NOAA.GOV UNDER PRODUCTS AND SERVICES.

AB2404 *****
 AB2404 TIDAL BM - This is a Tidal Bench Mark.
 AB2404 DESIGNATION - 872 3644 TIDAL 1
 AB2404 PID - AB2404
 AB2404 STATE/COUNTY- FL/MONROE
 AB2404 USGS QUAD - FLAMINGO (1990)
 AB2404
 AB2404 *CURRENT SURVEY CONTROL
 AB2404
 AB2404* NAD 83(2007)- 25 08 36.88685(N) 080 55 21.97739(W) ADJUSTED
 AB2404* NAVD 88 - 0.849 (meters) 2.79 (feet) ADJUSTED
 AB2404
 AB2404 EPOCH DATE - 2002.00
 AB2404 X - 911,452.116 (meters) COMP
 AB2404 Y - -5,704,903.439 (meters) COMP
 AB2404 Z - 2,693,471.373 (meters) COMP
 AB2404 LAPLACE CORR- -2.81 (seconds) DEFLEC99
 AB2404 ELLIP HEIGHT- -22.072 (meters) (02/10/07) ADJUSTED
 AB2404 GEOID HEIGHT- -22.91 (meters) GEOID03
 AB2404 DYNAMIC HT - 0.847 (meters) 2.78 (feet) COMP
 AB2404
 AB2404 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----
 AB2404 Type PID Designation North East Ellip
 AB2404 -----
 AB2404 NETWORK AB2404 872 3644 TIDAL 1 0.61 0.59 1.65
 AB2404 -----
 AB2404 MODELED GRAV- 978,988.3 (mgal) NAVD 88
 AB2404
 AB2404 VERT ORDER - FIRST CLASS II
 AB2404
 AB2404.The horizontal coordinates were established by GPS observations
 AB2404.and adjusted by the National Geodetic Survey in February 2007.
 AB2404
 AB2404.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).
 AB2404.See National Readjustment for more information.
 AB2404.The horizontal coordinates are valid at the epoch date displayed above.
 AB2404.The epoch date for horizontal control is a decimal equivalence
 AB2404.of Year/Month/Day.
 AB2404
 AB2404.The orthometric height was determined by differential leveling
 AB2404.and adjusted in April 1996.
 AB2404
 AB2404.This Tidal Bench Mark is designated as VM 5940
 AB2404.by the Center for Operational Oceanographic Products and Services.
 AB2404
 AB2404.The X, Y, and Z were computed from the position and the ellipsoidal ht.
 AB2404
 AB2404.The Laplace correction was computed from DEFLEC99 derived deflections.
 AB2404
 AB2404.The ellipsoidal height was determined by GPS observations
 AB2404.and is referenced to NAD 83.
 AB2404
 AB2404.The geoid height was determined by GEOID03.
 AB2404
 AB2404.The dynamic height is computed by dividing the NAVD 88
 AB2404.geopotential number by the normal gravity value computed on the

AB2404'EVERGLADES NATIONAL PARK. TO REACH THE MARK FROM THE INTERSECTION OF
AB2404'U.S. HIGHWAY 1 AND PALM DRIVE (SW. 3 STREET) IN FLORIDA CITY, GO
AB2404'WEST ON PALM DRIVE (STATE ROAD 27, SW. 3 STREET) FOR 1.7 MI (2.7 KM)
AB2404'TO THE INTERSECTION OF TOWER ROAD (SW. 192 AVENUE) , TURN LEFT ON
AB2404'TOWER ROAD (STATE ROAD 27, SW 192 AVENUE) AND GO SOUTH FOR 2.1 MI (3.4
AB2404'KM) TO THE JUNCTION OF SW. 376 STREET (STATE ROAD 27) ON THE RIGHT,
AB2404'TURN RIGHT ON SW. 376 STREET (STATE ROAD 27, PARK ROAD) AND GO WEST
AB2404'FOR 5.4 MI (8.7 KM) TO THE EVERGLADES NATIONAL PARK ENTRANCE BUILDING,
AB2404'CONTINUE WEST-NORTHWEST ON PARK ROAD (STATE ROAD 27) FOR 4.75 MI (7.64
AB2404'KM) TO THE TURNOFF FOR LONG PINE KEY, CONTINUE WEST-NORTHWEST ON PARK
AB2404'ROAD (STATE ROAD 27) FOR 8.45 MI (13.60 KM) TO THE JUNCTION OF THE
AB2404'ROAD TO PA-HAY-OKEE LOOKOUT TOWER ON THE RIGHT, CONTINUE SOUTHWEST ON
AB2404'PARK ROAD (STATE ROAD 27) FOR 7.15 MI (11.51 KM) TO THE JUNCTION OF A
AB2404'ROAD ON THE RIGHT TO MAHOGANY HAMMOCK, CONTINUE SOUTH ON PARK ROAD
AB2404'(STATE ROAD 27) FOR 4.5 MI (7.2 KM) TO THE JUNCTION OF A ROAD TO
AB2404'POURATIS POND ON THE RIGHT, CONTINUE SOUTH ON PARK ROAD (STATE ROAD
AB2404'27) FOR 6.5 MI (10.5 KM) TO THE JUNCTION OF A ROAD TO WEST LAKE ON THE
AB2404'LEFT, CONTINUE SOUTHWEST ON PARK ROAD (STATE ROAD 27) FOR 3.65 MI
AB2404'(5.87 KM) TO THE PARKING AREA FOR COOT BAY, CONTINUE SOUTHWEST ON PARK
AB2404'ROAD (STATE ROAD 27) FOR 2.75 MI (4.43 KM) TO THE BRIDGE OVER
AB2404'BUTTONWOOD CANAL, CONTINUE SOUTHWEST ON PARK ROAD (STATE ROAD 27) FOR
AB2404'0.35 MI (0.56 KM) TO THE JUNCTION OF A PAVED ROAD ON THE LEFT, TURN
AB2404'LEFT ON THE PAVED ROAD AND GO EAST FOR 0.05 MI (0.08 KM) TO THE
AB2404'JUNCTION OF A PAVED ROAD ON THE RIGHT, TURN RIGHT ON THE PAVED ROAD
AB2404'AND GO SOUTH FOR 0.05 MI (0.08 KM) TO THE FIRST PAVED ROAD ON THE
AB2404'LEFT, TURN LEFT ON THE PAVED ROAD AND GO EAST FOR 0.05 MI (0.08 KM) TO
AB2404'THE MARK ON THE RIGHT, SET FLUSH IN A 11.0 FT (3.4 M) X 8.0 FT (2.4 M)
AB2404'CONCRETE PAD WHICH IS ATTACHED TO THE SEAWALL AND LEVEL WITH THE PAVED
AB2404'ROAD. LOCATED 79.2 FT (24.1 M) WEST OF THE SOUTHEAST CORNER OF THE
AB2404'NORTH BOAT BASIN, 56.0 FT (17.1 M) WEST OF THE SOUTHWEST CORNER OF THE
AB2404'HOUSEBOAT RENTAL BUILDING AND 9.5 FT (2.9 M) NORTH OF THE SOUTH EDGE
AB2404'OF THE CONCRETE SEAWALL.

AB2404

STATION RECOVERY (2002)

AB2404

AB2404

AB2404'RECOVERY NOTE BY MAPTECH INCORPORATED 2002 (RLT)

AB2404'RECOVERED AS DESCRIBED

AB2404'

AB2404'

AB2404'

AB2404

AB2404

STATION RECOVERY (2002)

AB2404

AB2404'RECOVERY NOTE BY MAPTECH INCORPORATED 2002 (CDP)

AB2404'RECOVERED AS DESCRIBED.

AB2404'

AB2404

AB2404

STATION RECOVERY (2004)

AB2404

AB2404'RECOVERY NOTE BY INTERNATIONAL HURRICANE CENTER 2004 (WRV)

AB2404'RECOVERED IN GOOD CONDITION.

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AC4648 *****
AC4648 CBN      - This is a Cooperative Base Network Control Station.
AC4648 DESIGNATION - FLGPS THOMPSON
AC4648 PID      - AC4648
AC4648 STATE/COUNTY- FL/MIAMI-DADE
AC4648 USGS QUAD  - WEST LAKE (1972)
AC4648
AC4648                *CURRENT SURVEY CONTROL
AC4648
AC4648* NAD 83(2007)- 25 14 45.07510(N)  080 48 04.34416(W)  ADJUSTED
AC4648* NAVD 88   -    0.819 (meters)    2.69 (feet) ADJUSTED
AC4648
AC4648 EPOCH DATE -    2002.00
AC4648 X      - 922,783.106 (meters)          COMP
AC4648 Y      - -5,698,195.364 (meters)       COMP
AC4648 Z      - 2,703,722.813 (meters)       COMP
AC4648 LAPLACE CORR-    -3.00 (seconds)          DEFLEC99
AC4648 ELLIP HEIGHT-  -22.639 (meters)        (02/10/07) ADJUSTED
AC4648 GEOID HEIGHT-  -23.45 (meters)          GEOID03
AC4648 DYNAMIC HT -    0.818 (meters)    2.68 (feet) COMP
AC4648
AC4648 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----
AC4648 Type  PID  Designation              North East Ellip
AC4648 -----
AC4648 NETWORK AC4648 FLGPS THOMPSON              0.47  0.47  1.43
AC4648 -----
AC4648 MODELED GRAV-  978,987.1 (mgal)              NAVD 88
AC4648
AC4648 VERT ORDER - FIRST CLASS II
AC4648
AC4648.The horizontal coordinates were established by GPS observations
AC4648.and adjusted by the National Geodetic Survey in February 2007.
AC4648
AC4648.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).
AC4648.See National Readjustment for more information.
AC4648.The horizontal coordinates are valid at the epoch date displayed above.
AC4648.The epoch date for horizontal control is a decimal equivalence
AC4648.of Year/Month/Day.
AC4648
AC4648.The orthometric height was determined by differential leveling
AC4648.and adjusted in April 1996.
AC4648
AC4648.The X, Y, and Z were computed from the position and the ellipsoidal ht.
AC4648
AC4648.The Laplace correction was computed from DEFLEC99 derived deflections.
AC4648
AC4648.The ellipsoidal height was determined by GPS observations
AC4648.and is referenced to NAD 83.
AC4648
AC4648.The geoid height was determined by GEOID03.
AC4648
AC4648.The dynamic height is computed by dividing the NAVD 88
AC4648.geopotential number by the normal gravity value computed on the
AC4648.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
AC4648.degrees latitude (g = 980.6199 gals.).
AC4648

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AC4648.The modeled gravity was interpolated from observed gravity values.

AC4648

AC4648; North East Units Scale Factor Converg.
AC4648;SPC FL E - 101,088.606 220,026.930 MT 0.99994613 +0 05 05.2
AC4648;SPC FL E - 331,654.87 721,871.69 sFT 0.99994613 +0 05 05.2
AC4648;UTM 17 - 2,792,186.096 520,020.097 MT 0.99960495 +0 05 05.2

AC4648

AC4648! - Elev Factor x Scale Factor = Combined Factor

AC4648!SPC FL E - 1.00000356 x 0.99994613 = 0.99994969

AC4648!UTM 17 - 1.00000356 x 0.99960495 = 0.99960851

AC4648

AC4648: Primary Azimuth Mark Grid Az
AC4648:SPC FL E - FLGPS THOMPSON AZ MK 235 08 10.9
AC4648:UTM 17 - FLGPS THOMPSON AZ MK 235 08 10.9

AC4648

AC4648|-----|
AC4648|PID Reference Object Distance Geod. Az |
AC4648| dddmmss.s |
AC4648| AC4659 FLGPS THOMPSON AZ MK APPROX. 0.6 KM 2351316.1 |
AC4648|-----|

AC4648

AC4648 SUPERSEDED SURVEY CONTROL

AC4648

AC4648 NAD 83(1999)- 25 14 45.07522(N) 080 48 04.34413(W) AD() A
AC4648 ELLIP H (04/12/01) -22.639 (m) GP() 4 1
AC4648 NAD 83(1990)- 25 14 45.07359(N) 080 48 04.34378(W) AD() B
AC4648 ELLIP H (09/13/90) -22.638 (m) GP() 4 1
AC4648 NAVD 88 (04/12/01) 0.82 (m) 2.7 (f) LEVELING 3
AC4648 NGVD 29 (09/10/92) 1.0 (m) 3. (f) GPS OBS

AC4648

AC4648.Superseded values are not recommended for survey control.

AC4648.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

AC4648.See file dsdata.txt to determine how the superseded data were derived.

AC4648

AC4648_U.S. NATIONAL GRID SPATIAL ADDRESS: 17RNH2002092186(NAD 83)

AC4648_MARKER: F = FLANGE-ENCASED ROD

AC4648_SETTING: 59 = STAINLESS STEEL ROD IN SLEEVE (10 FT.+)

AC4648_SP_SET: STAINLESS STEEL ROD IN SLEEVE

AC4648_STAMPING: FLGPS THOMPSON 1989

AC4648_MARK LOGO: NGS

AC4648_PROJECTION: FLUSH

AC4648_MAGNETIC: M = MARKER EQUIPPED WITH BAR MAGNET

AC4648_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL

AC4648_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

AC4648+SATELLITE: SATELLITE OBSERVATIONS - September 30, 2003

AC4648_ROD/PIPE-DEPTH: 4 meters

AC4648_SLEEVE-DEPTH : .91 meters

AC4648

AC4648 HISTORY - Date Condition Report By
AC4648 HISTORY - 1989 MONUMENTED NGS
AC4648 HISTORY - 19911126 GOOD NOS
AC4648 HISTORY - 19930303 GOOD NGS
AC4648 HISTORY - 19941017 GOOD FLDEP
AC4648 HISTORY - 19990405 GOOD FLDT
AC4648 HISTORY - 20020301 GOOD MAPTEC
AC4648 HISTORY - 20020524 GOOD MAPTEC

AC4648 HISTORY - 20030930 GOOD WEIDEN

AC4648

AC4648 STATION DESCRIPTION

AC4648

AC4648'DESCRIBED BY NATIONAL GEODETIC SURVEY 1989

AC4648'THE STATION IS LOCATED 40 KM (24.85 MI) SOUTHWEST OF FLORIDA CITY,
AC4648'17.70 KM (11.00 MI) NORTHEAST OF FLAMINGO, IN THE EVERGLADES NATIONAL
AC4648'PARK, WITHIN THE RIGHT-OF-WAY OF THE MAIN PARK ROAD.

AC4648'OWNERSHIP--NATIONAL PARK SERVICE, KEITH WHISENET, PHONE 305-247-6211.

AC4648'TO REACH THE STATION FROM THE TOLL STATION AT THE ENTRANCE TO THE
AC4648'EVERGLADES NATIONAL PARK (WHERE STATE ROAD 9336 ENDS AND MAIN PARK
AC4648'ROAD STARTS), GO SOUTH FOR 19.47 KM (12.10 MI) ON THE PARK ROAD TO THE
AC4648'ENTRANCE TO THE PA-HAY-OKEE OVERLOOK. CONTINUE SOUTH FOR 21.16 KM
AC4648'(13.15 MI) ON THE PARK ROAD TO THE ENTRANCE TO NINE MILE POND.

AC4648'CONTINUE SOUTH FOR 1.05 KM (0.65 MI) ON THE PARK ROAD TO THE STATION
AC4648'ON LEFT.

AC4648'THE STATION IS RECESSED 10 CM BELOW GROUND. LOCATED 27.28 M
AC4648'(89.5 FT) SOUTHWEST FROM THE SOUTHWEST END OF THE SOUTHEAST HEADWALL
AC4648'OF A CONCRETE CULVERT UNDER THE PARK ROAD, 27.07 M (88.8 FT) SOUTHWEST
AC4648'FROM A REFLECTOR POST AT THE EDGE OF A HEADWALL WITH STATION DISK
AC4648'PINKS NO 1, 7.07 M (23.2 FT) SOUTHEAST FROM THE APPROXIMATE CENTER OF
AC4648'THE PARK ROAD, 1.22 M (4.0 FT) NORTHWEST FROM THE EDGE OF MARSH AND
AC4648'1.98 M (6.5 FT) NORTHWEST FROM A CARSONITE WITNESS POST. NOTE--ACCESS
AC4648'TO DATUM POINT IS HAD THROUGH A 5-INCH LOGO CAP.

AC4648'DESCRIBED BY R.L. MALLOY.

AC4648

AC4648 STATION RECOVERY (1991)

AC4648

AC4648'RECOVERY NOTE BY NATIONAL OCEAN SERVICE 1991

AC4648'THE STATION IS LOCATED 24.85 MI (39.99 KM) SOUTHWEST OF FLORIDA CITY,
AC4648'11.0 MI (17.70 KM) NORTHEAST OF FLAMINGO, IN THE EVERGLADES NATIONAL
AC4648'PARK, WITHIN THE RIGHT OF WAY OF THE MAIN PARK ROAD.

AC4648'TO REACH THE

AC4648'STATION FROM THE TOLL STATION AT THE ENTRANCE TO THE EVERGLADES
AC4648'NATIONAL PARK, GO SOUTH FOR 12.1 MI (19.47 KM) ON THE PARK ROAD TO THE
AC4648'ENTRANCE TO THE PA-HAY-OKEE OVERLOOK. CONTINUE SOUTH FOR 13.5 MI
AC4648'(21.73 KM) ON THE PARK ROAD TO THE ENTRANCE TO NINE MILE POND.

AC4648'CONTINUE SOUTH FOR 0.65 MI (1.05 KM) ON THE PARK ROAD TO THE STATION
AC4648'ON THE LEFT.

AC4648'THE STATION IS RECESSED 10 CM BELOW GROUND. LOCATED 89.5
AC4648'FT (27.28 M) SOUTHWEST FROM THE SOUTHWEST END OF THE SOUTHEAST
AC4648'HEADWALL OF A CONCRETE CULVERT UNDER THE PARK ROAD, 88.8 FT (27.07 M)
AC4648'SOUTHWEST FROM A REFLECTOR POST AT THE EDGE OF A HEADWALL WITH STATION
AC4648'DISK PINKS NO 1, 23.2 FT (7.07 M) SOUTHEAST FROM THE APPROXIMATE
AC4648'CENTER OF THE PARK ROAD AND 6.5 FT (1.98 M) NORTHWEST OF A WITNESS
AC4648'POST. THE DATUM POINT IS A STAINLESS STEEL ROD AND IS HAD THROUGH A 5
AC4648'INCH LOGO CAP.

AC4648

AC4648 STATION RECOVERY (1993)

AC4648

AC4648'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1993

AC4648'THE STATION IS LOCATED 40 KM (24.85 MI) SOUTHWEST OF FLORIDA CITY,
AC4648'17.70 KM (11.00 MI) NORTHEAST OF FLAMINGO, IN THE EVERGLADES NATIONAL
AC4648'PARK, WITHIN THE RIGHT-OF-WAY OF THE MAIN PARK ROAD.

AC4648'OWNERSHIP--NATIONAL PARK SERVICE, KEITH WHISENET, PHONE 305-247-6211.

AC4648'TO REACH THE STATION FROM THE TOLL STATION AT THE ENTRANCE TO THE

AC4648'EVERGLADES NATIONAL PARK (WHERE STATE ROAD 9336 ENDS AND MAIN PARK
AC4648'ROAD STARTS), GO SOUTH FOR 19.8 KM (12.30 MI) ON THE PARK ROAD TO THE
AC4648'ENTRANCE TO THE PA-HAY-OKEE OVERLOOK. CONTINUE SOUTH FOR 21.97 KM
AC4648'(13.65 MI) ON THE PARK ROAD TO THE ENTRANCE TO NINE MILE POND.
AC4648'CONTINUE SOUTH FOR 1.05 KM (0.65 MI) ON THE PARK ROAD TO THE STATION
AC4648'ON LEFT.

AC4648'THE STATION IS RECESSED 10 CM BELOW GROUND. LOCATED 27.28 M
AC4648'(89.50 FT) SOUTHWEST FROM THE SOUTHWEST END OF THE SOUTHEAST HEADWALL
AC4648'OF A CONCRETE CULVERT UNDER THE PART ROAD, 27.07 M (88.81 FT)
AC4648'SOUTHWEST FROM A REFLECTOR POST AT THE EDGE OF A HEADWALL WITH STATION
AC4648'DISK PINKS NO 1, 7.01 M (23.00 FT) SOUTHEAST FROM THE APPROXIMATE
AC4648'CENTER OF THE PARK ROAD, 1.22 M (4.00 FT) NORTHWEST FROM THE EDGE OF
AC4648'MARSH AND 2.1 M (6.9 FT) NORTHWEST FROM A CARSONITE WITNESS POST.
AC4648'NOTE--ACCESS TO DATUM POINT IS HAD THROUGH A 5-INCH LOGO CAP.

AC4648

STATION RECOVERY (1994)

AC4648

AC4648'RECOVERY NOTE BY FL DEPT OF ENV PRO 1994 (LGB)

AC4648'RECOVERED AS DESCRIBED.

AC4648

STATION RECOVERY (1999)

AC4648

AC4648'RECOVERY NOTE BY FLORIDA DEPARTMENT OF TRANSPORTATION 1999

AC4648'RECOVERED AS DESCRIBED.

AC4648

STATION RECOVERY (2002)

AC4648

AC4648'RECOVERY NOTE BY MAPTECH INCORPORATED 2002 (RLT)

AC4648'RECOVERED AS DESCRIBED

AC4648'

AC4648'

AC4648

STATION RECOVERY (2002)

AC4648

AC4648'RECOVERY NOTE BY MAPTECH INCORPORATED 2002 (CDP)

AC4648'RECOVERED AS DESCRIBED.

AC4648'

AC4648

STATION RECOVERY (2003)

AC4648

AC4648'RECOVERY NOTE BY WEIDENER SURVEYING AND MAPPING 2003 (MM)

AC4648'RECOVERED AS DESCRIBED

SURVEY INFORMATION

A. Field Personnel

The following field personnel worked on this GPS network, and related survey collection:

Field Supervisor: J. Purpera

Party Chief: M. Havard

Instrument Man: V. McNeal

Instrument Man: C. LaPrarie

The point of contact for survey related questions is:

Josh Hardy

Operations Supervisor

(985) 661-3001

B. GPS Logsheets