MINIMUM TECHNICAL STANDARDS, VOL. 1
FINAL REPORT OF LIDAR CONTROL AND QA/QC CHECKPOINT SURVEY

PASCO COUNTY COASTAL TILES

STATE OF FLORIDA
DIVISION OF EMERGENCY MANAGEMENT

TASK ORDER C: 20070525-492718C
CONTRACT NO. 07-HS-34-14-00-22-469

APRIL 1, 2009

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PREPARED BY:
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LB 0006777

APRIL 1, 2009

QUALITY

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NOTICE OF PROPRIETARY INFORMATION

MINIMUM TECHNICAL STANDARDS REPORT OF LiDAR GROUND CONTROL SURVEY

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PASCO COUNTY COASTAL TILES

For:
State of Florida, Division of Emergency Management
"State Emergency Response Team"
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Tallahassee, Florida 32399-2100

By:
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Florida Professional Surveyor and Mapper PSM 5670

Summary of Contents

LiDAR Ground Control Survey and QA/QC Survey Report Page

REPORT OF LiDAR GROUND CONTROL SURVEY
PASCO COUNTY COASTAL TILES
FOR THE
FLORIDA DIVISION OF EMERGENCY MANGEMENT

Introduction

This report contains an outline of the QA/QC Survey that supported LiDAR Data Acquisition in the general area of:

- Pasco County Coastal Tiles – Western Coastal Pasco County not included in Project Area A.

Project Area

Pasco County Coastal Tiles encompassed approximately +/-30 square miles of the approximately +/-3,774 square miles of the FY2007 State of Florida Division of Emergency Management Ground Control QA/QC Survey Mapping Project.

Purpose

The purpose of this survey was to acquire a minimum of twenty (20) independently surveyed LiDAR Control Points and a minimum of one-hundred twenty (120) three-dimensional LiDAR QA/QC Checkpoints per 500 square miles of project area. To the extent allowed by the terrain, the LiDAR Control Points and Checkpoints were distributed so that points were spaced at intervals of at least 10% of the diagonal distance across the dataset and at least 20% of the points were located in each quadrant of the +/-30 square-mile project area. All field surveying and related activities conformed to the *FEMA Flood Hazard Mapping Program, Guidelines and Specifications for Flood Hazard Mapping Partners Appendix A*.

LiDAR Control Points were defined as observations made on unobstructed, relatively flat, light-colored, hard uniform surfaces. Three-dimensional coordinate values were calculated for these points and then incorporated in the initial processing of the LiDAR data to ensure the proper horizontal and vertical geographical location of the LiDAR data set.

LiDAR QA/QC Checkpoints were ground truth observations distributed within the land cover classes of urban, bare-earth/low grass, brush land/sparse trees and dense trees/forested. These QA/QC Checkpoints were used to verify the accuracy of the LiDAR missions for final DTM and contour deliverables.

Date of Survey

All LiDAR Control Point and LiDAR QA/QC Checkpoint field operations took place on May 27, 2008.

Map Reference

Maps illustrating project boundaries, LiDAR QA/QC Checkpoints, LiDAR Control Points and GPS control stations for this project area can be found in Appendix E of this report.

Name of Responsible Surveyor

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Professional Surveyor and Mapper Number 5670

Name of Company

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Florida Certificate of Authorization No. LB-0006777

Field and Office Personnel

Alex Antonio
Matthew Brown
Dave Bruno
Jason Kail
Wes Miller

Abbreviations

1-D – One-Dimensional
2-D – Two-Dimensional
3-D – Three-Dimensional
cm – Centimeter
CP – Certified Photogrammetrist
DOI – Digital Orthophoto Imagery
FAC – Florida Administrative Code
FDEM – Florida Division of Emergency Mapping
FGDC – Federal Geodetic Control Committee
FL – Florida
GPS – Global Positioning System
Inc. – Incorporated
LiDAR – Light Detecting and Ranging
MTS – Florida Minimum Technical Standards (FAC 61G17)
NAD 83/99-HARN – North American Datum 1983 High Accuracy Reference Network 1999 adjustment
NAVD 88 – North American Vertical Datum of 1988
NGS – National Geodetic Survey
NOAA – National Oceanic and Atmospheric Administration
NSSDA – National Standards for Spatial Data Accuracy
PID – Photo Identifiable Point (feature)
QC – Quality Control

RMSE – Root Mean Square Error
STD – Standard Deviations
TGO – Trimble Geomatics Office
TTC – Trimble Total Control
U.S. – United States
Woolpert – Woolpert, Inc

Data Sources

Existing Control Point Coordinates:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282
Phone: (301) 713-3242
Fax: (301) 713-4172
Email: info_center@ngs.noaa.gov
http://www.ngs.noaa.gov/

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Monumentation

Woolpert field crews performed a field reconnaissance to verify the existence and suitability of pre-selected existing National Geodetic Survey (NGS) control stations. These existing control stations were utilized to insure that quality X, Y, and Z coordinate values were computed for each of the newly established QA/QC Checkpoints throughout the project area. During the field reconnaissance, field crews recovered and verified two (2) existing NGS control stations suitable for GPS observations: **PINCO D** and **RICHEY.** The NGS Data Sheets for these stations can be found in Appendix A of this report.

Woolpert field crews recovered and incorporated three (3) existing semi-permanent Woolpert control stations. Two of these stations, **NW11** and **NW19** were established by Woolpert for the 'North District B Topographic Aerial Mapping Project – SWFWMD (Southwest Florida Water Management District) Work Order 3 – North District B (B089)' in March 2005. **ND11_2K7** was established by Woolpert for the 'FY2007 Digital Orthophoto (B089) and Hernando County LiDAR (L776) Project and FY2007 Remainder of 2005 Polk District LiDAR and Polk County Contours (L672) Project and 2007 Polk County Board of Commissioners LiDAR and DOI Mapping Project' in July 2007. All of these stations, **NW11**, **NW19** and **ND11_2K7**, consisted of an 18-inch long, 5/8-inch diameter rebar with a plastic Woolpert survey cap (LB6777) and were set flush with the ground. All of these stations were recovered in good condition and in suitable locations for inclusion in the GPS network. The station recovery information sheets for these points can be found in Appendix B of this report.

Woolpert established a total of ten (10) LiDAR Control Points and nineteen (19) LiDAR QA/QC Checkpoints. All of these stations consisted of one of the following: a PK Nail, 6" spike with a plastic washer, a paint mark, a railroad spike, a hub and tack or a scribe mark.

Methodology

All field reconnaissance, monumentation, observations, data adjustments, and final report development was performed under the direct supervision of David Bruno, PSM 5670, Professional Surveyor and Mapper in Charge. Two types of survey techniques, Rapid Static GPS and conventional survey methods were utilized in collecting the LiDAR Control Points and the LiDAR QA/QC Checkpoints for this project. Woolpert's ISO 9001 2000 certified QA/QC process for ground control and GPS surveys was used as a guideline for this project.

All surveying was performed in such a way as to conform to the *Standards and Specifications for Geodetic Control Networks (1984),* published by the Federal Geodetic Control Committee (FGCC). All GPS measurements pertaining to horizontal photogrammetric ground control were performed to meet or exceed Second Order Horizontal Control as set forth by the FGCC, *Geometric Geodetic Accuracy Standards and Specifications for using GPS Relative Positioning Techniques*, Version 5.0, August 1989. All GPS measurements for establishing vertical control were performed to meet or exceed Third Order Vertical Control Accuracy Standards and Specifications. Furthermore, the procedures used for GPS-Derived elevation differences met or exceeded the *Guidelines for Establishing GPS-Derived Ellipsoidal Heights (Standards: 2 centimeters and 5 centimeters), NGS-58*, November 1977, and/or *Guidelines for Establishing GPS-Derived Orthometric Heights (Standards: 2 centimeters and 5 centimeters), NGS-59*, October 2005.

Rapid Static GPS

Woolpert field crews utilized Rapid Static GPS surveying techniques for measuring twelve (12) of the nineteen (19) LiDAR QA/QC Checkpoints and all of the LiDAR Control Points. Rapid Static GPS surveying required a minimum of two receivers to occupy NGS control stations and LiDAR QA/QC Checkpoints or LiDAR Control Points for a minimum of 30 minutes, depending upon baseline length, number of satellites, and satellite geometry. This method is comparable in accuracy to static surveying; however, shorter observation time is made possible due to advancements in hardware and software. The final coordinates for the LiDAR Control Points, LiDAR QA/QC Checkpoints and intermediate (traverse) control stations can be found in Appendix C of this report.

For this survey, Woolpert field crews utilized one (1) Woolpert-owned, Trimble Navigation 4000ssi dual-frequency geodetic GPS receiver, one (1) Woolpert-owned, Trimble Navigation 4700 dual-frequency geodetic GPS receiver and two (2) Woolpert-owned, Trimble Navigation R8 model 2 GNSS dual-frequency geodetic GPS receivers three as base stations and four (4) Woolpert-owned, Trimble Navigation R8 model 2 GNSS dual-frequency geodetic GPS receivers as rovers. Each observation session utilized a 5-second sync rate, lasting between 30-45 minutes each depending on distance from the furthest base station.

Using rapid-static GPS techniques, the field crews also observed two (2) existing NGS control stations and three (3) existing Woolpert control stations in the GPS network in an effort to establish survey quality control coordinates throughout the project. The Rapid Static GPS control network consisted of the following NGS and newly established stations: **PINCO D, RICHEY, NW 11, NW19** and **ND11_2K7.**

Conventional Surveying

Using intervisable pairs of LiDAR QA/QC Checkpoints and/or LiDAR Control Points set with Rapid-Static GPS, Woolpert field crews used a Woolpert-owned Topcon GTS-701 Total Station or a Woolpert-owned Topcon GTS-711 Total Station to acquire seven (7) LiDAR QA/QC Checkpoints. Four (4) of the seven (7) were in obscured areas (dense trees/forested) where GPS observations was limited, two (2) of the seven (7) were in brush areas and one (1) of the seven (7) was in an urban area. The final coordinates for the LiDAR QA/QC Checkpoints can be found in Appendix C of this report.

Datum Reference and Final Coordinates

All horizontal GPS control was based on the Florida State Plane Coordinate System (West Zone), referenced to North American Datum 1983, adjustment of 1999 (NAD83/99) HARN, expressed in U.S. Survey Feet. All vertical control was based on the North American Vertical Datum of 1988 (NAVD88), also expressed in U.S. Survey Feet.

GPS Data Analysis and Processing

The field crew chief processed all session baselines each day using *Trimble Navigation's* Trimble Geomatics Office (TGO) Version 1.63 baseline processor with the broadcast ephemeris. *Trimble Navigation's* Trimble Geomatics Office (TGO) Wave Software User's Guide (November 1999) was used as a reference. The ratio and root-mean-square error (RMSE) criteria on pages 3-4 to 3-6 of the guide were followed. Other criteria used a maximum of 10.5 percent rejections, along with float-versus-fixed deltas of 10 cm. All cases that failed to meet any of these criteria were rejected and not used. Fixed solutions were obtained for all vector baselines.

Daily processing allowed the field crews to discover any weak links in the network and immediately schedule re-observations of the affected baselines. Once the fieldwork was complete, the processed baselines were then run through a rigorous loop closure analysis. Any baselines that failed this analysis were either reprocessed or removed from the network.

Rapid Static Adjustment

Upon completion of all field data processing, Woolpert performed a minimally constrained and fully constrained least-squares adjustments using *Trimble Navigation's* Trimble Geomatics Office (TGO) version 1.63. After an acceptable minimally constrained least-squares adjustment was obtained, a fully constrained least-squares adjustment was performed by fixing the GPS networks to existing NGS/County control stations. Geoid 03 was used to convert ellipsoidal heights to orthometric heights. For this survey the following stations were held fixed:

DIMENSIONS	EXISTING NGS CONTROL STATIONS
3-D Control Stations	PINCO D (AL0294) and RICHEY (AL6168)
2-D Control Stations	NW19 and ND11_2K7

Accuracy Statement

The positional accuracy of the LiDAR Control Points was 0.09-feet (avg. 0.05-feet) horizontally and 0.20-feet (avg. 0.10-feet) vertically at the 95% confidence level. The positional accuracy of the LiDAR QA/QC Checkpoints was 0.09-feet (avg. 0.05-feet) horizontally and 0.17-feet (avg. 0.09-feet) vertically at the 95% confidence level.

The ground control survey meets positional accuracies necessary to support a DTM to meet or exceed a 3.8-foot horizontal accuracy and 0.6-foot fundamental vertical accuracy at the 95% confidence level.

The positional accuracies information can be found in Appendix D of this report.

Notes

1. **THIS REPORT OF SURVEY IS PART OF THE LiDAR MAPPING QA/QC GROUND CONTROL SURVEY. SEVEN (7) GROUND CONTROL LAYOUT MAPS SHALL ACCOMPANY THE SURVEY REPORT. NEITHER THE MAPS NOR THIS REPORT OF SURVEY IS FULL AND COMPLETE WITHOUT THE OTHER. THIS REPORT OF SURVEY IS NOT VALID WITHOUT THE SIGNATURE AND ORIGINAL RAISED SEAL OF A FLORIDA LICENSED SURVEYOR AND MAPPER IN RESPONSIBLE CHARGE.**

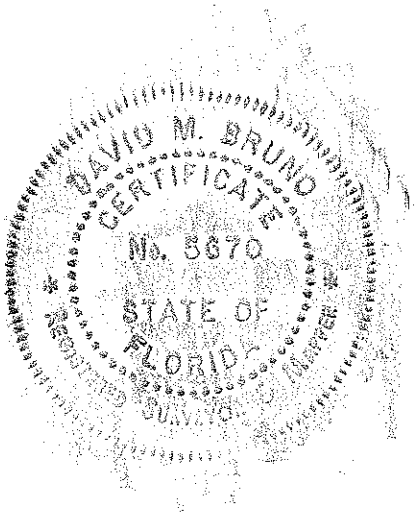
2. **THIS REPORT OF SURVEY CONSISTS OF FOURTY-THREE (43) PAGES AND EACH PAGE SHALL NOT BE CONSIDERED FULL OR COMPLETE UNLESS ATTACHED TO THE OTHER(S). ADDITIONS OR DELETIONS TO SURVEY MAPS AND REPORTS BY OTHER THAN THE SIGNING PARTY OR PARTIES IS PROHIBITED WITHOUT THE WRITTEN CONSENT OF THE SIGNING PARTY OR PARTIES.**

3. **THIS LiDAR MAPPING QA/QC GROUND CONTROL SURVEY DATA AND REPORT IS CERTIFIED TO THE FLORIDA DIVISION OF EMERGENCY MANAGEMENT AS MEETING OR EXCEEDING, IN QUALITY AND PRECISION, THE STANDARDS APPLICABLE FOR THIS WORK, AS SET FORTH IN CHAPTER 61G17, FLORIDA ADMINISTRATIVE CODE & FEMA GUIDELINES AND SPECIFICATIONS FOR FLOOD HAZARD MAPPING PARTNERS.**

Surveyor and Mapper in Responsible Charge:
David Bruno PSM
Professional Surveyor and Mapper
License Number: LS 5670

Signed: _____

Seal:



APPENDIX A: EXISTING GROUND CONTROL INFORMATION

This appendix contains the published National Geodetic Survey (NGS) data sheets for the control utilized in the Pasco County Coastal Tiles of the FY2007 State of Florida Division of Emergency Management Ground Control QA/QC Survey Mapping Project.

The NGS Data Sheet

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

```
DATABASE =  ,PROGRAM = datasheet, VERSION = 7.61
1        National Geodetic Survey,   Retrieval Date = SEPTEMBER 16, 2008
 AL0294 ***********************************************************************
 AL0294  DESIGNATION -  PINCO D
 AL0294  PID         -  AL0294
 AL0294  STATE/COUNTY-  FL/PINELLAS
 AL0294  USGS QUAD   -  TARPON SPRINGS (1995)
 AL0294
 AL0294                        *CURRENT SURVEY CONTROL
 AL0294  ______________________________________________________________________
 AL0294* NAD 83(1990)-  28 10 22.64053(N)    082 46 05.25216(W)     ADJUSTED
 AL0294* NAVD 88     -         3.311  (meters)      10.86   (feet)  ADJUSTED
 AL0294  ______________________________________________________________________
 AL0294  LAPLACE CORR-          -1.75  (seconds)                    DEFLEC99
 AL0294  GEOID HEIGHT-         -25.14  (meters)                     GEOID03
 AL0294  DYNAMIC HT  -           3.307 (meters)      10.85  (feet)  COMP
 AL0294  MODELED GRAV-     979,196.7   (mgal)                       NAVD 88
 AL0294
 AL0294  HORZ ORDER  -  SECOND
 AL0294  VERT ORDER  -  FIRST     CLASS II
 AL0294
 AL0294.The horizontal coordinates were established by classical geodetic methods
 AL0294.and adjusted by the National Geodetic Survey in May 1991.
 AL0294
 AL0294.The orthometric height was determined by differential leveling
 AL0294.and adjusted in August 2008.
 AL0294
 AL0294.The Laplace correction was computed from DEFLEC99 derived deflections.
 AL0294
 AL0294.The geoid height was determined by GEOID03.
 AL0294
 AL0294.The dynamic height is computed by dividing the NAVD 88
 AL0294.geopotential number by the normal gravity value computed on the
 AL0294.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 AL0294.degrees latitude (g = 980.6199 gals.).
 AL0294
 AL0294.The modeled gravity was interpolated from observed gravity values.
 AL0294
 AL0294;                    North         East     Units Scale Factor Converg.
 AL0294;SPC FL W     -   425,613.686   124,569.885   MT  1.00001137   -0 21 45.6
 AL0294;SPC FL W     - 1,396,367.57    408,693.03    sFT  1.00001137   -0 21 45.6
 AL0294;UTM  17      - 3,117,626.608   326,416.415   MT  0.99997189   -0 50 06.0
 AL0294
 AL0294!             -  Elev Factor  x  Scale Factor =   Combined Factor
 AL0294!SPC FL W     -   1.00000343  x   1.00001137  =   1.00001480
 AL0294!UTM  17      -   1.00000343  x   0.99997189  =   0.99997532
 AL0294
 AL0294:                Primary Azimuth Mark                     Grid Az
 AL0294:SPC FL W     -  PINCO E                                  268 14 54.4
 AL0294:UTM  17      -  PINCO E                                  268 43 14.8
 AL0294
```

```
AL0294|----------------------------------------------------------------------|
AL0294| PID    Reference Object                    Distance      Geod. Az   |
AL0294|                                                          dddmmss.s  |
AL0294| AL0295 PINCO E                          APPROX. 0.8 KM 2675308.8   |
AL0294|----------------------------------------------------------------------|
AL0294
AL0294                          SUPERSEDED SURVEY CONTROL
AL0294
AL0294  NAD 83(1986)-  28 10 22.64799(N)    082 46 05.26185(W) AD(       ) 2
AL0294  NAD 27      -  28 10 21.60183(N)    082 46 05.89558(W) AD(       ) 2
AL0294  NAVD 88 (06/15/91)    3.376  (m)           11.08   (f) UNKNOWN     2 2
AL0294  NGVD 29 (??/??/92)    3.634  (m)           11.92   (f) ADJ UNCH    2 2
AL0294
AL0294.Superseded values are not recommended for survey control.
AL0294.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
AL0294.See file dsdata.txt to determine how the superseded data were derived.
AL0294
AL0294_U.S. NATIONAL GRID SPATIAL ADDRESS: 17RLM2641617627(NAD 83)
AL0294_MARKER: DD = SURVEY DISK
AL0294_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
AL0294_SP_SET: SET IN TOP OF CONCRETE MONUMENT
AL0294_STAMPING: PINCO D
AL0294_MARK LOGO: FL-103
AL0294_PROJECTION: RECESSED 20 CENTIMETERS
AL0294_MAGNETIC: M = MARKER EQUIPPED WITH BAR MAGNET
AL0294_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
AL0294+STABILITY: SURFACE MOTION
AL0294_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
AL0294+SATELLITE: SATELLITE OBSERVATIONS - September 21, 2006
AL0294
AL0294  HISTORY     - Date     Condition        Report By
AL0294  HISTORY     - 1974     MONUMENTED       FL-103
AL0294  HISTORY     - 1975     GOOD             FLDT
AL0294  HISTORY     - 1984     GOOD             USPSQD
AL0294  HISTORY     - 1984     MARK NOT FOUND   USPSQD
AL0294  HISTORY     - 1990     GOOD             USPSQD
AL0294  HISTORY     - 20060921 GOOD             FLDEP
AL0294  HISTORY     - 20080611 GOOD             PINCPW
AL0294
AL0294                          STATION DESCRIPTION
AL0294
AL0294'DESCRIBED BY PINELLAS COUNTY FLORIDA 1974 (DF)
AL0294'THE STATION IS ABOUT 2.0 MILES NORTH/NORTHEAST OF TARPON
AL0294'SPRINGS, JUST SOUTH OF PINELLAS-PASCO COUNTY LINE, ON THE NORTH
AL0294'SIDE OF ANCLOTE BOULEVARD, 1.25 MILE WEST OF U.S. ALTERNATE
AL0294'HIGHWAY 19.
AL0294'
AL0294'TO REACH FROM THE JUNCTION OF U.S. HIGHWAY 19 AND STATE ROUTE
AL0294'582 IN TARPON SPRINGS, GO NORTH ON U.S. HIGHWAY 19 FOR 2.4 MILES
AL0294'TO THE JUNCTION OF U.S. HIGHWAY 19 AND U.S. ALTERNATE HIGHWAY
AL0294'19.  TURN SHARP LEFT, GO SOUTHWEST ON U.S. ALTERNATE HIGHWAY
AL0294'19 FOR 0.7 MILE TO ANCLOTE BOULEVARD.  TURN RIGHT AND GO WEST
AL0294'ON ANCLOTE BOULEVARD, WHICH IS JUST SOUTH OF, AND PARALLEL WITH,
AL0294'THE PINELLAS PASCO COUNTY LINE AND A SEABOARD COAST LINE
AL0294'RAILROAD SPUR TRACK FOR 1.2 MILES TO THE STATION ON THE RIGHT AS
AL0294'DESCRIBED.
AL0294'
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```
AL0294'BRONZE DISK STAMPED PINCO D SET IN THE TOP OF A 12-INCH DIAMTER
AL0294'ROUND CONCRETE MONUMENT THAT IS FLUSH WITH THE GROUND.  IT IS
AL0294'ABOUT 36 FEET NORTH OF CENTER OF ANCLOTE BOULEVARD, 31 FEET SOUTH
AL0294'OF THE SOUTH RAIL OF MAIN LINE OF SEABOARD COAST LINE RAILROAD
AL0294'SPUR TRACK, 10 FEET SOUTHEAST OF A GAS METAL POST SIGN, AND
AL0294'2.0 FEET NORTHEAST OF NORTHEAST CORNER OF A BOX CULVERT.
AL0294'
AL0294'HEIGHT OF LIGHT ABOVE STATION MARK 1.0 METER.
AL0294
AL0294                          STATION RECOVERY (1975)
AL0294
AL0294'RECOVERY NOTE BY FLORIDA DEPARTMENT OF TRANSPORTATION 1975
AL0294'2 MI NNE FROM TARPON SPRINGS.
AL0294'THE STATION IS ABOUT 2 MILES NORTH/NORTHEAST OF TARPON SPRINGS,
AL0294'JUST SOUTH OF PINELLAS/PASCO COUNTY LINE, ON THE NORTH SIDE
AL0294'OF ANCLOTE B.VD., 1 1/4 MILE WEST OF U.S. ALTERNATE HIGHWAY 19.
AL0294'TO REACH STATION FROM THE JUNCTION OF U.S. HIGHWAY 19 AND
AL0294'U.S. ALTERNATE HIGHWAY 19, RUN SOUTHWESTERLY ON ALTERNATE
AL0294'HIGHWAY 19 FOR 0.9 MILE TO ANCLOTE BLVD.  TURN RIGHT AND GO
AL0294'WEST ON ANCLOTE BLVD. 1.2 MILES.  STATION ON RIGHT, 36 FEET
AL0294'NORTH OF CENTER OF ANCLOTE BLVD., 31 FEET SOUTH OF THE SOUTH
AL0294'RAIL OF MAIN LINE OF SEABOARD COASTLINE RAILROAD SPUR TRACK,
AL0294'10 FEET SOUTHEAST OF A GAS BLOWOFF PIPE, 2 FEET NORTHEAST OF
AL0294'NORTHEAST CORNER OF BOX CULVERT. SET IN CONCRETE POST THAT
AL0294'IS FLUSH WITH THE GROUND.  SECTION 2, T 27 S, R 15E
AL0294
AL0294                          STATION RECOVERY (1984)
AL0294
AL0294'RECOVERY NOTE BY US POWER SQUADRON 1984
AL0294'RECOVERED IN GOOD CONDITION.
AL0294
AL0294                          STATION RECOVERY (1984)
AL0294
AL0294'RECOVERY NOTE BY US POWER SQUADRON 1984 (ECP)
AL0294'UNABLE TO LOCATE.  NO CULVERT BOX.  GROUND TORN UP FOR
AL0294'ROAD REPAIRS.
AL0294
AL0294                          STATION RECOVERY (1990)
AL0294
AL0294'RECOVERY NOTE BY US POWER SQUADRON 1990 (LUG)
AL0294'RECOVERED IN GOOD CONDITION.
AL0294
AL0294                          STATION RECOVERY (2006)
AL0294
AL0294'RECOVERY NOTE BY FL DEPT OF ENV PRO 2006 (JLM)
AL0294'THE MARK IS ABOUT 2.0 MI NORTH-NORTHWEST OF TARPON SPRINGS, 2.0 MI
AL0294'SOUTHWEST OF  HOLIDAY, IN SECTION 2, TOWNSHIP 27 SOUTH, RANGE 15 EAST.
AL0294'TO REACH THE MARK FROM THE JUNCTION OF U.S. HIGHWAY 19 (SOUTH PINELLAS
AL0294'AVENUE) AND U.S.  ALTERNATE HIGHWAY 19 (PINELLAS AVENUE) ON THE SOUTH
AL0294'SIDE OF HOLIDAY, GO SOUTHWEST ON  U.S. ALTERNATE HIGHWAY 19 (PINELLAS
AL0294'AVENUE) FOR 0.9 MI TO THE JUNCTION OF ANCLOTE  BOULEVARD ON THE RIGHT,
AL0294'TURN RIGHT ON ANCLOTE BOULEVARD AND GO WEST FOR 1.1 MI TO THE
AL0294'ENTRANCE TO FLORIDA ROCK INDUSTRIES PLANT ON THE LEFT AND THE MARK ON
AL0294'THE RIGHT, SET IN  THE TOP OF A ROUND CONCRETE MONUMENT RECESSED 0.8
AL0294'FT BELOW THE LEVEL OF THE GROUND  AND BELOW THE LEVEL OF ANCLOTE
AL0294'BOULEVARD.
AL0294'
```

```
AL0294'LOCATED 123.0 FT WEST OF THE EXTENDED CENTERLINE OF THE FLORIDA ROCK
AL0294'INDUSTRIES PLANT,  35.5 FT NORTH OF THE CENTERLINE OF ANCLOTE
AL0294'BOULEVARD, 10.0 FT SOUTHEAST OF A GAS  BLOW-OFF PIPE, 2.0 FT NORTHEAST
AL0294'OF THE NORTHEAST CORNER OF A BOX CULVERT AND 1.2 FT  SOUTH OF A
AL0294'PINELLAS COUNTY METAL WITNESS POST.
AL0294'
AL0294'NOTE A MAGNET WAS IMBEDDED IN THE GROUND ON THE SOUTH SIDE OF THE
AL0294'MONUMENT.
AL0294
AL0294                          STATION RECOVERY (2008)
AL0294
AL0294'RECOVERY NOTE BY PINELLAS COUNTY PUBLIC WORKS 2008 (BE)
AL0294'RECOVERED IN GOOD CONDITION.

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

The NGS Data Sheet

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

```
DATABASE =  ,PROGRAM = datasheet, VERSION = 7.61
1        National Geodetic Survey,   Retrieval Date = SEPTEMBER 16, 2008
 AL6168 ***********************************************************************
 AL6168  DESIGNATION -  RICHEY
 AL6168  PID         -  AL6168
 AL6168  STATE/COUNTY-  FL/PASCO
 AL6168  USGS QUAD   -  PORT RICHEY (1988)
 AL6168
 AL6168                        *CURRENT SURVEY CONTROL
 AL6168  ______________________________________________________________________
 AL6168* NAD 83(2007)-  28 19 53.70237(N)    082 38 38.44368(W)     ADJUSTED
 AL6168* NAVD 88     -         9.628  (meters)      31.59   (feet)  ADJUSTED
 AL6168  ______________________________________________________________________
 AL6168  EPOCH DATE  -        2002.00
 AL6168  X           -     719,340.018 (meters)                     COMP
 AL6168  Y           - -5,572,120.095 (meters)                     COMP
 AL6168  Z           -   3,008,893.050 (meters)                     COMP
 AL6168  LAPLACE CORR-          -1.52  (seconds)                    DEFLEC99
 AL6168  ELLIP HEIGHT-         -16.151 (meters)          (02/10/07) ADJUSTED
 AL6168  GEOID HEIGHT-         -25.79  (meters)                     GEOID03
 AL6168  DYNAMIC HT  -           9.614 (meters)      31.54  (feet)  COMP
 AL6168
 AL6168  ------- Accuracy Estimates (at 95% Confidence Level in cm) --------
 AL6168  Type    PID    Designation                        North   East  Ellip
 AL6168  ----------------------------------------------------------------------
 AL6168  NETWORK AL6168 RICHEY                              1.72   1.72   3.45
 AL6168  ----------------------------------------------------------------------
 AL6168  MODELED GRAV-     979,195.9   (mgal)                       NAVD 88
 AL6168
 AL6168  VERT ORDER  -  FIRST     CLASS II
 AL6168
 AL6168.The horizontal coordinates were established by GPS observations
 AL6168.and adjusted by the National Geodetic Survey in February 2007.
 AL6168
 AL6168.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).
 AL6168.See National Readjustment for more information.
 AL6168.The horizontal coordinates are valid at the epoch date displayed above.
 AL6168.The epoch date for horizontal control is a decimal equivalence
 AL6168.of Year/Month/Day.
 AL6168
 AL6168.The orthometric height was determined by differential leveling
 AL6168.and adjusted in August 2008.
 AL6168
 AL6168.The X, Y, and Z were computed from the position and the ellipsoidal ht.
 AL6168
 AL6168.The Laplace correction was computed from DEFLEC99 derived deflections.
 AL6168
 AL6168.The ellipsoidal height was determined by GPS observations
 AL6168.and is referenced to NAD 83.
 AL6168
 AL6168.The geoid height was determined by GEOID03.
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AL6168
AL6168.The dynamic height is computed by dividing the NAVD 88
AL6168.geopotential number by the normal gravity value computed on the
AL6168.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
AL6168.degrees latitude (g = 980.6199 gals.).
AL6168
AL6168.The modeled gravity was interpolated from observed gravity values.
AL6168
AL6168;                    North         East     Units Scale Factor Converg.
AL6168;SPC FL W     -   443,122.099   136,851.707   MT  0.99999037   -0 18 20.3
AL6168;SPC FL W     - 1,453,809.75    448,987.64   sFT  0.99999037   -0 18 20.3
AL6168;UTM  17      - 3,135,031.967   338,841.837   MT  0.99992055   -0 46 49.3
AL6168
AL6168!             -  Elev Factor  x  Scale Factor =   Combined Factor
AL6168!SPC FL W     -   1.00000254  x   0.99999037  =   0.99999291
AL6168!UTM  17      -   1.00000254  x   0.99992055  =   0.99992309
AL6168
AL6168:                Primary Azimuth Mark                    Grid Az
AL6168:SPC FL W     -  V 102                                   091 01 01.6
AL6168:UTM  17      -  V 102                                   091 29 30.6
AL6168
AL6168|---------------------------------------------------------------------|
AL6168| PID    Reference Object                    Distance      Geod. Az   |
AL6168|                                                          dddmmss.s  |
AL6168| AL6172 V 102                                             0904241.3  |
AL6168| AL6170 RICHEY RM 1                        65.084 METERS 11410      |
AL6168| AL6169 RICHEY RM 2                        54.038 METERS 20235      |
AL6168| AL6171 RICHEY RM 3                        34.988 METERS 20516      |
AL6168| AL0548 NEW PORT RICHEY MUN TANK          APPROX.10.7 KM 2174631.7  |
AL6168| AL0552 BURNS ESTATE WATER TANK           APPROX.11.3 KM 2234937.5  |
AL6168| CW6336 RICHEY AZ MK RESET                               2630957.7  |
AL6168| AL6167 RICHEY RM 4                        34.756 METERS 26341      |
AL6168| CW6335 RICHEY AZ MK                                     2644020.0  |
AL6168|---------------------------------------------------------------------|
AL6168
AL6168                          SUPERSEDED SURVEY CONTROL
AL6168
AL6168  NAD 83(1999)-  28 19 53.70297(N)    082 38 38.44376(W) AD(       ) 1
AL6168  ELLIP H (07/06/01)  -16.160  (m)                       GP(       ) 4 2
AL6168  ELLIP H (10/07/92)  -16.186  (m)                       GP(       ) 4 2
AL6168  NAD 83(1990)-  28 19 53.70253(N)    082 38 38.44533(W) AD(       ) 1
AL6168  NAD 83(1986)-  28 19 53.70894(N)    082 38 38.45392(W) AD(       ) 1
AL6168  NAD 27      -  28 19 52.69012(N)    082 38 39.09678(W) AD(       ) 1
AL6168  NAVD 88 (06/15/91)    9.644  (m)           31.64   (f) UNKNOWN     2 0
AL6168  NGVD 29 (??/??/92)    9.902  (m)           32.49   (f) ADJ UNCH    2 0
AL6168
AL6168.Superseded values are not recommended for survey control.
AL6168.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
AL6168.See file dsdata.txt to determine how the superseded data were derived.
AL6168
AL6168_U.S. NATIONAL GRID SPATIAL ADDRESS: 17RLM3884235032(NAD 83)
AL6168_MARKER: DS = TRIANGULATION STATION DISK
AL6168_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
AL6168_SP_SET: CONCRETE POST
AL6168_STAMPING: RICHEY 1934
AL6168_MARK LOGO: CGS
AL6168_PROJECTION: PROJECTING 15 CENTIMETERS
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AL6168_MAGNETIC: M = MARKER EQUIPPED WITH BAR MAGNET
AL6168_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
AL6168+STABILITY: SURFACE MOTION
AL6168_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
AL6168+SATELLITE: SATELLITE OBSERVATIONS - July 20, 2006
AL6168
AL6168  HISTORY     - Date     Condition        Report By
AL6168  HISTORY     - 1934     MONUMENTED       CGS
AL6168  HISTORY     - 1937     GOOD             CGS
AL6168  HISTORY     - 1940     GOOD             CGS
AL6168  HISTORY     - 1958     GOOD             CGS
AL6168  HISTORY     - 1960     GOOD             CGS
AL6168  HISTORY     - 1960     GOOD             CGS
AL6168  HISTORY     - 1966     GOOD             CGS
AL6168  HISTORY     - 1966     GOOD             NGS
AL6168  HISTORY     - 1974     GOOD             NGS
AL6168  HISTORY     - 1977     GOOD             NGS
AL6168  HISTORY     - 1979     GOOD             FLDNR
AL6168  HISTORY     - 1981     GOOD             FLDNR
AL6168  HISTORY     - 1984     GOOD             USPSQD
AL6168  HISTORY     - 1984     GOOD             LOCSUR
AL6168  HISTORY     - 1987     GOOD             FLDT
AL6168  HISTORY     - 1987     GOOD             USPSQD
AL6168  HISTORY     - 19910516 GOOD             GEOBAS
AL6168  HISTORY     - 20060720 GOOD             FLDEP
AL6168  HISTORY     - 20070224 GOOD             GEOCAC
AL6168
AL6168                          STATION DESCRIPTION
AL6168
AL6168'DESCRIBED BY COAST AND GEODETIC SURVEY 1934 (GLA)
AL6168'THIS STATION IS ABOUT 6 MILES NE OF NEW PORT RICHEY, 4 MILES SE
AL6168'OF HUDSON AND 9 MILES W OF GOWERS CORNERS, AT THE JUNCTION OF
AL6168'U.S. HIGHWAY 41 AND STATE HIGHWAY 210.  IT IS ABOUT 0.15 MILE W
AL6168'OF A TRANSMISSION LINE SUPPORTED ON STEEL TOWERS, 55 FEET N OF
AL6168'THE CENTER LINE OF STATE HIGHWAY 210, AND 13 FEET E OF THE BASE
AL6168'OF A 24-INCH SCRUB JACK OAK TREE MARKED WITH A TRIANGULAR
AL6168'BLAZE.  THE TREE IS LEANING TO THE NW.  THE MARK PROJECTS 5
AL6168'INCHES.
AL6168'
AL6168'SURFACE, UNDERGROUND, REFERENCE, AND AZIMUTH MARKS ARE STANDARD
AL6168'BRONZE DISKS SET IN CONCRETE.
AL6168'
AL6168'REFERENCE MARK NO. 1 IS SE OF THE STATION, 35 FEET S OF THE
AL6168'CENTER LINE OF THE HIGHWAY, AT THE E END OF HIGHWAY CUT THROUGH
AL6168'SMALL SAND BANK.  THE MARK PROJECTS 8 INCHES.
AL6168'
AL6168'REFERENCE MARK NO.2 IS SW OF THE STATION, 108 FEET S OF THE
AL6168'CENTER LINE OF THE HIGHWAY.  THE MARK PROJECTS 6 INCHES.
AL6168'
AL6168'AZIMUTH MARK IS ABOUT 0.2 MILE W OF THE STATION, AT THE W END
AL6168'OF A CURVE IN THE HIGHWAY, 24 FEET N OF THE CENTER LINE OF THE
AL6168'HIGHWAY, AND 20 FEET SW OF A 6-INCH POST OAK TREE.  THE MARK
AL6168'PROJECTS 6 INCHES.
AL6168'
AL6168'TO REACH FROM NEW PORT RICHEY GO N ON HIGHWAY 19 FOR 6.4 MILES
AL6168'TO T-ROAD E, TURN RIGHT ON STATE HIGHWAY 210 AND PROCEED E 3.5
AL6168'MILES TO THE STATION.  TO REACH FROM THE E FOLLOW U.S.
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AL6168'HIGHWAY 41 TO GOWERS CORNERS, THENCE W 9.0 MILES TO THE STATION.
AL6168'
AL6168'HEIGHT OF LIGHT ABOVE STATION MARK 38 METERS.
AL6168
AL6168                          STATION RECOVERY (1937)
AL6168
AL6168'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1937 (RAE)
AL6168'AZIMUTH MARK DESTROYED BY GRADING ACTIVITIES.  NO POINTS VISIBLE
AL6168'FROM THE GROUND SUITABLE FOR RE-LOCATING THIS MARK.
AL6168'
AL6168'THE STATION MARK AND REFERENCE MARKS ARE IN GOOD CONDITION AND
AL6168'ARE NOT LIKELY TO BE DISTURBED BY FUTURE GRADING.
AL6168
AL6168                          STATION RECOVERY (1940)
AL6168
AL6168'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1940 (KGC)
AL6168'RECOVERED.  NEW DESCRIPTION FOLLOWS--THE STATION IS LOCATED
AL6168'ABOUT 9.4 MILES N AND E OF NEW PORT RICHEY, ABOUT 5.5 MILES S
AL6168'AND E OF HUDSON, ABOUT 3.3 MILES E OF JUNCTION OF STATE HIGHWAYS
AL6168'15 AND 210, ABOUT 8.8 MILES W OF GOWERS CORNER AT THE JUNCTION
AL6168'OF STATE HIGHWAY 210 AND U.S. HIGHWAY 41, ABOUT 0.15 MILE W OF
AL6168'A TRANSMISSION LINE SUPPORTED ON STEEL TOWERS, AND 55 FEET N OF
AL6168'CENTER LINE OF STATE HIGHWAY 210.
AL6168'
AL6168'STATION MARK IS A STANDARD DISK, STAMPED RICHEY 1934 SET IN THE
AL6168'TOP OF A 10-INCH ROUND CONCRETE MONUMENT WHICH EXTENDS 5 INCHES
AL6168'ABOVE GROUND.
AL6168'
AL6168'REFERENCE MARK NO.1 IS A STANDARD DISK, STAMPED RICHEY NO.1 1934,
AL6168'SET IN THE TOP OF A 10-INCH ROUND CONCRETE MONUMENT WHICH EXTENDS
AL6168'8 INCHES ABOVE GROUND.  IT IS 213.42 FEET SE OF THE STATION, 35
AL6168'FEET S OF CENTER LINE OF THE HIGHWAY AT THE E END OF A HIGHWAY
AL6168'CUT THROUGH SMALL SAND BANK.
AL6168'
AL6168'REFERENCE MARK NO.2 IS A STANDARD DISK, STAMPED RICHEY NO.2 1934,
AL6168'SET IN THE TOP OF A 10-INCH ROUND CONCRETE MONUMENT WHICH EXTENDS
AL6168'8 INCHES ABOVE GROUND.  IT IS 277.25 FEET SW OF THE STATION AND
AL6168'108 FEET S OF CENTER LINE OF THE HIGHWAY.
AL6168'
AL6168'AZIMUTH MARK HAS BEEN DESTROYED BY GRADING OPERATIONS.
AL6168'
AL6168'TO REACH FROM NEW PORT RICHEY, GO N ON U.S. HIGHWAY 19 FOR 6.1
AL6168'MILES TO JUNCTION WITH STATE HIGHWAY 210, TURN RIGHT OR E, GO
AL6168'3.3 MILES TO THE STATION.  TO REACH FROM THE E, GO W FROM U.S.
AL6168'HIGHWAY 41 AT GOWERS CORNER FOR 8.8 MILES ALONG STATE HIGHWAY
AL6168'210 TO THE STATION.
AL6168'
AL6168'NOTE.--THE STATION MARK IS ALSO A U.S.E.D. BENCH MARK (M.S.L.,
AL6168'C. AND G.S., ELEVATION 32.515 FEET.)
AL6168
AL6168                          STATION RECOVERY (1958)
AL6168
AL6168'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1958 (ALW)
AL6168'THIS STATION AND BOTH REFERENCE MARKS WERE RECOVERED IN AUGUST
AL6168'1958 AND FOUND TO BE IN GOOD CONDITION.  THE AZIMUTH MARK WAS
AL6168'FOUND DESTROYED IN 1940.
AL6168'
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AL6168'THE STATION IS LOCATED 7.9 MILES WEST OF FIVAY, 0.2 MILE EAST
AL6168'OF A CURVE IN THE HIGHWAY, 0.15 MILE NORTHWEST OF A STEEL POWER
AL6168'LINE TOWER, 116 FT. NORTH OF A POWER POLE, 54 FT. NORTH OF THE
AL6168'CENTER LINE OF THE HIGHWAY 5.5 FT. SOUTH OF A FENCE, 1.2 FT. SOUTH
AL6168'OF A WOODEN WITNESS POST, A TRIANGULATION STATION DISK SET IN THE
AL6168'TOP OF A ROUND CONCRETE POST WHICH PROJECTS 0.4 FT. ABOVE THE
AL6168'GROUND, STAMPED RICHEY 1934.
AL6168'
AL6168'R.M.1 IS 213.42 FT. OR 65.048 METERS SOUTHEAST OF THE STATION,
AL6168'0.2 MILE EAST OF A CURVE IN THE HIGHWAY, 0.1 MILE WEST OF A STEEL
AL6168'POWER LINE TOWER, 250 YARDS NORTH OF THE NORTH SIDE OF A SMALL
AL6168'LAKE, 34.5 FT. SOUTH OF THE CENTER LINE OF THE HIGHWAY, 16.5
AL6168'FT. NORTH OF A FENCE, 1.1 FT. NORTH OF A WOODEN WITNESS POST, A
AL6168'REFERENCE MARK DISK SET IN THE TOP OF A ROUND CONCRETE POST
AL6168'WHICH PROJECTS 0.5 FT. ABOVE THE GROUND, STAMPED RICHEY NO 1
AL6168'1934.
AL6168'
AL6168'R.M. 2 IS 277.25 FT. OR 84.506 METERS SOUTHWEST OF THE STATION,
AL6168'0.2 MILE EAST OF A CURVE IN THE HIGHWAY, 0.15 MILE WEST OF A
AL6168'STEEL POWER LINE TOWER, 107 FT. SOUTH OF THE CENTER LINE OF THE
AL6168'HIGHWAY, 72.5 FT. SOUTHWEST OF A POWER POLE, 56 FT. SOUTH OF A
AL6168'FENCE, 1.1 FT. NORTH OF A WITNESS POST (WOODEN) A REFERENCE
AL6168'MARK DISK SET IN THE TOP OF A ROUND CONCRETE POST WHICH PROJECTS
AL6168'0.4 FT. ABOVE THE GROUND, STAMPED RICHEY NO 2 1934.
AL6168'
AL6168'TO REACH THE STATION FROM THE CROSSING OF STATE HIGHWAY 52 AND
AL6168'THE SEABOARD AIR LINE RAILROAD AT FIVAY, GO 7.9 MILES WEST ALONG
AL6168'STATE HIGHWAY 52 TO THE STATION ON THE RIGHT.
AL6168
AL6168                          STATION RECOVERY (1960)
AL6168
AL6168'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1960 (ALW)
AL6168'THIS STATION, R.M. 1 AND R.M. 2 WERE RECOVERED AS DESCRIBED IN
AL6168'AUGUST 1958 AND WERE FOUND IN GOOD CONDITION.  STEEL WITNESS
AL6168'POSTS WERE SET BY ALL MARKS.
AL6168
AL6168                          STATION RECOVERY (1960)
AL6168
AL6168'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1960 (HRL)
AL6168'STATION RECOVERED AS DESCRIBED BY K.G.C. IN 1940 AND ALL MARKS
AL6168'FOUND IN GOOD CONDITION.  A NEW AZIMUTH MARK WAS ESTABLISHED TO
AL6168'REPLACE THE OLD AZIMUTH MARK THAT WAS REPORTED DESTROYED IN THE
AL6168'1940 DESCRIPTIONS.  A CHECK WAS MADE OF THE DISTANCE AND
AL6168'DIRECTION TO THE REFERENCE MARKS AND FOUND TO BE CORRECT.
AL6168'
AL6168'DUE TO CHANGES IN HIGHWAY NUMBERS, A NEW DESCRIPTION FOLLOWS--
AL6168'
AL6168'STATION IS LOCATED ON THE RIGHT-OF-WAY ALONG THE NORTH SIDE OF
AL6168'STATE HIGHWAY NO. 52 ABOUT 8 MILES NORTHEAST OF NEW PORT RICHEY,
AL6168'ABOUT 4 MILES SOUTHEAST OF HUDSON AND ABOUT 3 MILES EAST OF THE
AL6168'JUNCTION OF U.S. HIGHWAY NO. 19 AND STATE HIGHWAY NO. 52.
AL6168'STATION, A STANDARD DISK SET IN A 10 INCH ROUND CONCRETE MONUMENT
AL6168'AND STAMPED RICHEY 1934, IS 55 FEET NORTH OF THE
AL6168'APPROXIMATE CENTERLINE OF STATE HIGHWAY NO. 52, 5 FEET
AL6168'SOUTH OF FENCE AND 1.3 FEET SOUTH OF WITNESS MARKER.  THE MARK
AL6168'PROJECTS 2 INCHES.
AL6168'
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AL6168'TO REACH FROM THE JUNCTION OF U.S. HIGHWAY NO. 19 AND STATE
AL6168'HIGHWAY NO. 52 WHICH IS ABOUT 6 MILES NORTH OF NEW PORT RICHEY,
AL6168'GO EAST ON STATE HIGHWAY NO. 52 FOR 2.95 MILES TO SIDE ROAD LEFT
AL6168'AND AZIMUTH MARK ON LEFT (NORTH) SIDE OF HIGHWAY AS
AL6168'DESCRIBED. CONTINUE EASTERLY ON STATE HIGHWAY NO. 52 FOR 0.35
AL6168'MILE TO STATION ON LEFT (NORTH) SIDE OF HIGHWAY.
AL6168'
AL6168'REFERENCE MARK NO. 1, A STANDARD DISK SET IN A 10 INCH ROUND
AL6168'CONCRETE MONUMENT AND STAMPED RICHEY 1934 NO 1, IS 35 FEET SOUTH
AL6168'OF THE APPROXIMATE CENTERLINE OF STATE HIGHWAY NO. 52, 18 FEET
AL6168'NORTHWEST OF AN 18 INCH OAK TREE, 16 FEET NORTH OF FENCE AND 1.1
AL6168'FEET NORTH OF WITNESS POST. THE MARK PROJECTS 8 INCHES.
AL6168'
AL6168'REFERENCE MARK NO. 2, IS A STANDARD DISK SET IN A 10 INCH ROUND
AL6168'CONCRETE MONUMENT AND STAMPED RICHEY 1934 NO 2, IS 56 FEET SOUTH
AL6168'OF FENCE, 107 FEET SOUTH OF CENTERLINE OF STATE HIGHWAY NO. 52,
AL6168'10 FEET NORTH OF THE APPROXIMATE CENTERLINE OF SAND ROAD AND 1.0
AL6168'FOOT NORTH OF WITNESS POST. THE MARK PROJECTS 8 INCHES.
AL6168'
AL6168'BENCH MARK V 102 1942, A STANDARD DISK SET IN A 6X6 INCH
AL6168'CONCRETE MONUMENT AND STAMPED V 102 1942, IS 38 FEET NORTH OF THE
AL6168'CENTERLINE OF STATE HIGHWAY NO. 52, 17 FEET SOUTH OF FENCE AND
AL6168'1.3 FEET SOUTH OF A WITNESS POST. THE MARK PROJECTS 6 INCHES.
AL6168'
AL6168'AZIMUTH MARK, A STANDARD DISK SET IN A 12X12 INCH CONCRETE
AL6168'MONUMENT AND STAMPED RICHEY 1934 RESET 1960, IS 43 FEET NORTH
AL6168'OF THE CENTERLINE OF STATE HIGHWAY NO. 52, 33 FEET SOUTH OF
AL6168'FENCE, 24 FEET EAST OF APPROXIMATE CENTERLINE OF GRADED ROAD,
AL6168'2.9 FEET EAST OF A UTILITY POLE AND 2.1 FEET SOUTHEAST OF A
AL6168'WITNESS POST. THE MARK PROJECTS 3 INCHES.
AL6168'
AL6168'HEIGHT OF LIGHT ABOVE STATION MARK 34 METERS.
AL6168
AL6168   STATION RECOVERY (1966)
AL6168
AL6168'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1966 (JB)
AL6168'RECOVERED ALL MARKS IN GOOD CONDITION ESSENTIALLY AS DESCRIBED
AL6168'BY H.R. LIPPOLD, 60.
AL6168'
AL6168'ABOUT 3.0 MILES E ALONG NO. 52 FLORIDA HWY. FROM ITS JUNCTION
AL6168'WITH NO. 19 U.S. HWY. AT BAYONET POINT, ABOUT 91 YARDS E OF
AL6168'T-JUNCTION OF HWY. AND PAVED ROAD S, 55 FEET N OF CENTER LINE
AL6168'OF THE HWY., 1.5 FEET HIGHER THAN SAME, ON CREST OF SLIGHT RIDGE,
AL6168'11 FEET ESE OF ONE STEEL WITNESS POST, ONE FOOT N OF ANOTHER,
AL6168'STANDARD DISKS STAMPED RICHEY 1934 ARE SET
AL6168'WITH THE SURFACE MARK PROJECTING 0.4 FOOT ABOVE GROUND.
AL6168'
AL6168'R.M. NO. 1 IS AT E END OF HWY. SHALLOW DITCH CUT, 35 FEET S OF
AL6168'CENTER LINE OF 20-FOOT HWY. PAVEMENT, 0.5 FOOT LOWER THAN SAME,
AL6168'1.3 FEET W OF STEEL WITNESS POST, AND PROJECTS 0.7 FOOT ABOVE
AL6168'GROUND.
AL6168'
AL6168'R.M. NO. 2 WAS DESTROYED AFTER OBSERVATIONS AND THE DISK WILL BE
AL6168'RETURNED TO THE MARINE CENTER OFFICE, NORFOLK, VIRGINIA.
AL6168'
AL6168'R.M. NO. 3 IS 34-1/2 FEET E OF PROJECTED PLANE OF E WALL OF
AL6168'CONCRETE BLOCK HOUSE THAT IS SSW OF THE MARK, 48.5 FEET S OF C/L

AL6168'OF HWY., 0.9 FOOT HIGHER THAN SAME, 3 FEET NNW OF CREOSOTED
AL6168'POWER POLE, 1.7 FEET N OF PROPERTY LOT CORNER (IRON PIN), 1.6 FEET
AL6168'SE OF STEEL WITNESS POST, AND FLUSH WITH THE GROUND.
AL6168'
AL6168'BENCH MARK V 102 IS 79 FEET WNW OF C/L OF HIGH-TENSION POWER
AL6168'LINE, 38 FEET N OF C/L OF HWY., 0.5 FOOT HIGHER THAN SAME, 1.2
AL6168'FEET W OF STEEL WITNESS POST, AND PROJECTS 0.6 FOOT ABOVE GROUND.
AL6168'
AL6168'THE AZIMUTH MARK IS ABOUT 0.3 MILE S 83 DEG 09 MIN 57.0 SEC W
AL6168'FROM THE STATION, PROJECTS 0.2 FOOT, IS 43
AL6168'FEET N-NW OF C/L OF HWY., 0.1 FOOT HIGHER THAN SAME, 23 FEET E
AL6168'OF C/L OF HICKS ROAD, 3.3 FEET E OF CREOSOTED TELEPHONE POLE,
AL6168'AND 2.0 FEET SE OF STEEL WITNESS POST.
AL6168'
AL6168'NOTE THAT ALL MARKS ABOVE MENTIONED ARE BENCH MARKS EXCEPT THE
AL6168'AZIMUTH MARK.
AL6168'
AL6168'AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN
AL6168'ABOUT 6 MILES NE OF NEW PORT RICHEY.
AL6168
AL6168 STATION RECOVERY (1966)
AL6168
AL6168'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1966
AL6168'3 MI E FROM BAYONET POINT.
AL6168'ABOUT 3.0 MILES E ALONG NO. 52 FLORIDA HWY. FROM ITS T-JUNCTION
AL6168'WITH NO. 19 U.S. HWY. IN BAYONET POINT, ABOUT 91 YARDS E OF THE
AL6168'T-JUNCTION OF HWY. AND A PAVED ROAD S, 55 FEET N OF CENTER LINE
AL6168'OF 20-FOOT ASPHALT HWY. PAVEMENT, 1.5 FEET HIGHER THAN SAME,
AL6168'ON CREST OF A SLIGHT RIDGE, 11 FEET ESE OF ONE STEEL WITNESS
AL6168'POST, ONE FOOT N OF ANOTHER, AND PROJECTING 0.4 FOOT ABOVE
AL6168'GROUND. RECOVERED IN APPARENTLY GOOD CONDITION ESSENTIALLY AS
AL6168'RECOVERED IN AUG. 1958, THE LEVELING TO CLOSE-BY NOS. 1 AND 2
AL6168'REFERENCE MARKS INDICATES POSSIBLY A LOWERING OF THE MARK OF
AL6168'SLIGHTLY MORE THAN 0.1 FOOT.
AL6168
AL6168 STATION RECOVERY (1974)
AL6168
AL6168'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1974 (CLN)
AL6168'STATION MARK, AZIMUTH AND REFERENCE MARK 3 WERE RECOVERED AND
AL6168'FOUND IN GOOD CONDITION. REFERENCE MARK 1 AND BENCH MARK V
AL6168'102 1942 WERE FOUND DESTROYED. REFERENCE MARK 4 WAS ESTABLISHED
AL6168'AT THIS TIME. DUE TO CHANGES, A COMPLETE NEW DESCRIPTION FOLLOWS.
AL6168'
AL6168'STATION IS ABOUT 28 MILES NORTHWEST OF TAMPA, 10 MILES WEST OF
AL6168'GOWERS CORNER, 8 MILES NORTHEAST OF NEW PORT RICHEY, 3-1/2 MILES
AL6168'EAST OF BAYONET POINT AND ON PRIVATE PROPERTY THAT IS NOW FOR SALE.
AL6168'
AL6168'TO REACH THE STATION FROM THE JUNCTION OF U.S. HIGHWAY 19 AND
AL6168'STATE HIGHWAY 52 IN BAYONET POINT, GO EAST ON STATE HIGHWAY 52
AL6168'FOR 3.05 MILES TO HICKS ROAD ON THE LEFT AND AZIMUTH MARK.
AL6168'CONTINUE EAST ON STATE HIGHWAY 19 FOR 0.35 MILE TO A SIDE ROAD LEFT
AL6168'AND STATION.
AL6168'
AL6168'STATION MARK, A STANDARD DISK STAMPED RICHEY 1934, IS SET IN
AL6168'THE TOP OF A 10-INCH ROUND CONCRETE MONUMENT THAT IS SET FLUSH
AL6168'WITH THE GROUND SURFACE. IT IS 154 FEET EAST OF A GRAVELED ROAD
AL6168'TO NORTH, 116 FEET EAST OF POWER LINE POLE 12, 55 FEET NORTH OF

AL6168'THE CENTER OF STATE HIGHWAY 52, 42.5 FEET EAST-SOUTHEAST OF A
AL6168'15-INCH GUM TREE, 12.5 FEET NORTH OF A POWER LINE, 2 FEET SOUTH
AL6168'OF A METAL WITNESS POST AND 1.2 FEET NORTH OF A METAL WITNESS
AL6168'POST.
AL6168'
AL6168'REFERENCE MARK 3, A STANDARD DISK STAMPED RICHEY 1934 NO 3 1966,
AL6168'IS SET IN THE TOP OF A 12-INCH ROUND CONCRETE MONUMENT THAT IS
AL6168'SET FLUSH. IT IS 47.8 FEET SOUTH OF THE CENTER OF STATE
AL6168'HIGHWAY 52, 40.5 FEET EAST OF THE CENTER OF DRIVEWAY, 4.5 FEET
AL6168'SOUTH OF A TELEPHONE JUNCTION BOX, 3 FEET NORTHWEST OF A POWER
AL6168'LINE POLE AND 1.6 FEET SOUTHEAST OF A METAL WITNESS POST.
AL6168'
AL6168'REFERENCE MARK 4, A STANDARD DISK STAMPED RICHEY 1934 NO 4 1974,
AL6168'IS SET IN THE TOP OF A 12-INCH CYLINDRICAL CONCRETE MONUMENT THAT
AL6168'IS SET 2-INCHES BELOW THE GROUND SURFACE. IT IS 44.3 FEET NORTH
AL6168'OF THE CENTER OF STATE HIGHWAY 52, 43 FEET EAST OF THE CENTER
AL6168'OF A GRAVELED ROAD, 2 FEET EAST OF POWER LINE POLE 12 AND 2
AL6168'FEET WEST OF A METAL WITNESS POST.
AL6168'
AL6168'AZIMUTH MARK, A STANDARD DISK STAMPED RICHEY 1934 RESET 1960,
AL6168'IS SET IN THE TOP OF A 12-INCH SQUARE CONCRETE MONUMENT THAT
AL6168'PROJECTS 12 INCHES ABOVE THE GROUND SURFACE. IT IS 52 FEET
AL6168'NORTHEAST OF THE CENTER OF JUNCTION OF STATE HIGHWAY 52 AND HICKS
AL6168'ROAD, 43 FEET NORTH OF THE CENTER OF HIGHWAY 52, 17.5 FEET EAST
AL6168'OF THE CENTER OF HICKS ROAD, 3 FEET SOUTHWEST OF POWER LINE
AL6168'POLE 362-1 AND 1 FOOT EAST OF A METAL WITNESS POST.
AL6168'
AL6168'AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN
AL6168'3-1/2 MILES EAST OF BAYONET POINT.
AL6168
AL6168   STATION RECOVERY (1977)
AL6168
AL6168'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1977 (CLN)
AL6168'STATION MARK, REFERENCE MARK 3 AND 4 WERE RECOVERED AND FOUND
AL6168'IN GOOD CONDITION. THE AZIMUTH MARK HAD BEEN HIT AND APPEARED
AL6168'LEANING SLIGHTLY TO THE NORTH. THE STATION WAS VISITED DUE TO
AL6168'AZIMUTH MARK IN WAY OF ROAD CONSTRUCTION. AN AZIMUTH MARK WAS
AL6168'SET AND A POLARIS OBSERVATION WAS OBSERVED. THE DISK WAS
AL6168'RECLAIMED FROM THE 1960 RESET AZIMUTH MARK. DUE TO CHANGES, A
AL6168'COMPLETE NEW DESCRIPTION FOLLOWS.
AL6168'
AL6168'STATION IS ABOUT 28 MILES NORTHWEST OF TAMPA, 21 MILES
AL6168'SOUTHWEST OF BROOKSVILLE, 7 MILES NORTHEAST OF NEW PORT RICHEY
AL6168'AND ON PRIVATE PROPERTY ON THE NORTH SIDE OF STATE HIGHWAY 52.
AL6168'
AL6168'TO REACH THE STATION FROM THE JUNCTION OF U.S. HIGHWAY 19 AND
AL6168'STATE HIGHWAY 52 AT BAYONET POINT, GO EAST ON STATE HIGHWAY 52
AL6168'FOR 3.45 MILES TO THE STATION ON LEFT.
AL6168'
AL6168'STATION MARK, A STANDARD DISK STAMPED RICHEY 1934, IS SET IN
AL6168'THE TOP OF A 12-INCH ROUND CONCRETE MONUMENT THAT PROJECTS
AL6168'4-INCHES ABOVE THE GROUND SURFACE. IT IS 155 FEET EAST OF THE
AL6168'CENTER OF DRIVEWAY TO THE NORTH, 116.5 FEET EAST-NORTHEAST OF
AL6168'POWER LINE POLE NUMBERED 11, 55 FEET NORTH OF THE CENTER OF
AL6168'STATE HIGHWAY 52, 2.2 FEET SOUTH OF A METAL WITNESS POST AND
AL6168'1.1 FEET NORTH OF A METAL WITNESS POST.
AL6168'

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AL6168'REFERENCE MARK 3, A STANDARD DISK STAMPED RICHEY 1934 NO 3
AL6168'1966, IS SET IN THE TOP OF A 12-INCH ROUND CONCRETE MONUMENT
AL6168'THAT IS SET FLUSH WITH THE GROUND SURFACE.  IT IS 48 FEET SOUTH
AL6168'OF THE CENTER OF STATE HIGHWAY 52, 40.5 FEET EAST OF THE
AL6168'CENTER OF DRIVEWAY, 6.5 FEET SOUTHWEST OF A POWER LINE POLE, 4.5
AL6168'FEET SOUTH OF A TELEPHONE JUNCTION BOX AND 1.6 FEET SOUTHEAST
AL6168'OF A METAL WITNESS POST.
AL6168'
AL6168'REFERENCE MARK 4, A STANDARD DISK STAMPED RICHEY 1934 NO 4 1974,
AL6168'IS SET IN THE TOP OF A 12-INCH ROUND CONCRETE MONUMENT THAT IS SET
AL6168'6-INCHES BELOW THE GROUND SURFACE.  IT IS 44 FEET NORTH OF THE
AL6168'CENTER OF STATE HIGHWAY 52, 43 FEET EAST OF THE CENTER OF DRIVEWAY
AL6168'TO NORTH, 2.5 FEET EAST OF THE POWER LINE POLE NUMBERED 12 AND
AL6168'2 FEET WEST OF A METAL WITNESS POST.
AL6168'
AL6168'AZIMUTH MARK, A STANDARD DISK STAMPED RICHEY 1934 1977, IS SET
AL6168'IN THE TOP OF A 12-INCH ROUND CONCRETE MONUMENT THAT IS SET FLUSH
AL6168'WITH THE GROUND SURFACE.  IT IS 66 FEET EAST OF THE CENTER OF A
AL6168'PROJECTED LINE OF DRIVEWAY ON THE NORTH SIDE OF HIGHWAY 52, 44.5
AL6168'FEET SOUTH OF THE CENTER OF HIGHWAY 52, 2 FEET WEST OF A POWER
AL6168'LINE POLE AND 1.5 FEET NORTH OF A METAL WITNESS POST.
AL6168'
AL6168'AZIMUTH MARK IS 0.3 MILE EAST ON HIGHWAY 52 ON RIGHT.
AL6168'
AL6168'AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN
AL6168'3.5 MILES EAST OF BAYONET POINT.
AL6168
AL6168                          STATION RECOVERY (1979)
AL6168
AL6168'RECOVERY NOTE BY FL DEPT OF NAT RES 1979
AL6168'RECOVERED IN GOOD CONDITION.
AL6168
AL6168                          STATION RECOVERY (1981)
AL6168
AL6168'RECOVERY NOTE BY FL DEPT OF NAT RES 1981 (JWM)
AL6168'RICHEY 1934 RECOVERED GOOD.
AL6168'
AL6168'STATION, ALL THE R.M.S, AND THE AZIMUTH MARK WERE RECOVERED AS
AL6168'DESCRIBED.
AL6168'
AL6168'DISTANCE AND DIRECTION FROM NEAREST TOWN--7 MILES NORTHEAST OF NEW
AL6168'PORT RICHEY.
AL6168
AL6168                          STATION RECOVERY (1984)
AL6168
AL6168'RECOVERY NOTE BY US POWER SQUADRON 1984 (CBF)
AL6168'RICHEY 1934 - TRIANGULATION STATION RECOVERED GOOD.
AL6168'
AL6168'STANDARD USCGS TRIANGULATION STATION DISK SET IN 12 INCH DIA.
AL6168'CONCRETE MONUMENT 3 INCHES ABOVE GROUND, 1 FOOT 1 INCH N OF WITNESS
AL6168'POST, 2 FEET 2 INCHES S OF WITNESS POST, 10 FEET 11 INCHES ON
AL6168'MAGNETIC BEARING 115 DEG FROM WITNESS POST SET IN 18 INCH DIA.
AL6168'CONCRETE MONUMENT WITH CONICAL TOP.
AL6168
AL6168                          STATION RECOVERY (1984)
AL6168
AL6168'RECOVERY NOTE BY LOCAL SURVEYOR (INDIVIDUAL OR FIRM) 1984
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AL6168'RECOVERED IN GOOD CONDITION.
AL6168
AL6168                          STATION RECOVERY (1987)
AL6168
AL6168'RECOVERY NOTE BY FLORIDA DEPARTMENT OF TRANSPORTATION 1987 (RCB)
AL6168'RECOVERED IN GOOD CONDITION.
AL6168
AL6168                          STATION RECOVERY (1987)
AL6168
AL6168'RECOVERY NOTE BY US POWER SQUADRON 1987 (RHA)
AL6168'RECOVERED IN GOOD CONDITION.
AL6168
AL6168                          STATION RECOVERY (1991)
AL6168
AL6168'RECOVERY NOTE BY GEOBASE CONTROL INCORPORATED 1991
AL6168'THE STATION IS LOCATED 6 MI (9.66 KM) NORTHEAST OF NEW PORT RICHEY AND
AL6168'4 MI (6.44 KM)SOUTHEAST OF HUDSON.
AL6168'TO REACH THE STATION FROM THE INTERSECTION OF U.S. HIGHWAY 19 AND
AL6168'STATE ROAD 52 IN BAYONET POINT, GO EAST ON STATE ROAD 52, 3.3 MI
AL6168'(5.31 KM) TO THE STATION ON THE LEFT.
AL6168'THE STATION IS A C.G.S. TRIANGULATION DISK STAMPED ---RICHEY 1934---
AL6168'SET IN A 12-INCH ROUND CONCRETE MONUMENT THAT IS 3-INCHES ABOVE THE
AL6168'GROUND. IT IS 55.0 FT (16.76 M) NORTH OF THE CENTER OF STATE ROAD 52,
AL6168'5.2 FT (1.58 M)SOUTH OF A 6 FT (1.83 M) HIGH CHAINLINK FENCE, 1.5 FT
AL6168'(0.46 M) NORTH OF A METAL WITNESS POST AND 2.0 FT (0.61 M) SOUTH OF A
AL6168'METAL WITNESS POST.
AL6168'REFERENCE MARK NO 3 IS A C.G.S. REFERENCE MARK DISK STAMPED ---RICHEY
AL6168'1934 NO 3 1966--- SET IN A 12-INCH ROUND CONCRETE MONUMENT THAT IS
AL6168'FLUSH WITH THE THE GROUND. IT IS 47 FT (14.33 M) SOUTH OF THE CENTER
AL6168'OF STATE ROAD 52, 40 FT (12.19 M) EAST OF THE CENTER OF A DIRT
AL6168'DRIVEWAY AND 6.5 FT (1.98 M) SOUTHWEST OF A POWER POLE.
AL6168'REFERENCE MARK NO 4 IS A C.G.S. REFERENCE MARK DISK STAMPED ---RICHEY
AL6168'1934 NO 4 1974--- SET IN A 12-INCH ROUND CONCRETE MONUMENT THAT IS
AL6168'RECESSD 3-INCHES BELOW THE GROUND. IT IS 45 FT (13.72 M) NORTH OF THE
AL6168'CENTER OF STATE ROAD 52, AND 1.3 FT (0.40 M) SOUTH OF A METAL WITNESS
AL6168'POST.
AL6168
AL6168                          STATION RECOVERY (2006)
AL6168
AL6168'RECOVERY NOTE BY FL DEPT OF ENV PRO 2006 (PBM)
AL6168'THE MARK IS ABOUT 21.2 MI WEST OF SAN ANTONIO, 9.1 MI WEST OF GOWERS
AL6168'CORNER, 3.4 MI EAST  OF BAYONET POINT, IN SECTION 6, TOWNSHIP 25
AL6168'SOUTH, RANGE 17 EAST.
AL6168'
AL6168'TO REACH THE MARK FROM THE JUNCTION OF U.S. HIGHWAY 19 AND STATE
AL6168'HIGHWAY 52 IN BAYONET  POINT, GO EAST ON STATE HIGHWAY 52 FOR 3.35 MI
AL6168'TO THE MARK ON THE LEFT, SET IN THE TOP OF A  ROUND CONCRETE MONUMENT
AL6168'PROJECTING 0.6 FT ABOVE THE LEVEL OF THE GROUND AND ABOVE  THE LEVEL
AL6168'OF STATE HIGHWAY 52 WESTBOUND LANES.
AL6168'
AL6168'LOCATED 277.0 FT EAST OF THE EXTENDED CENTERLINE OF PINE FOREST DRIVE,
AL6168'45.0 FT  EAST-NORTHEAST OF A WOODEN POWER POLE NUMBER 4536,2927, 18.0
AL6168'FT EAST OF THE SOUTHWEST  CORNER OF THE CHAINLINK FENCE, 14.5 FT NORTH
AL6168'OF THE NORTH CONCRETE CURB GUTTER OF  STATE HIGHWAY 52 WESTBOUND
AL6168'LANES, 7.0 FT NORTH OF THE NORTH EDGE OF THE SIDEWALK, 5.5  FT SOUTH
AL6168'OF THE 6.0 FT TALL CAINLINK FENCE WITH 3 STRANDS OF BARBWIRE ON THE
AL6168'TOP, 2.0 FT  SOUTH OF A NGS METAL WITNESS POST AND 2.0 FT SOUTH OF A
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AL6168'CARSONITE WITNESS POST.
AL6168'
AL6168'NOTE A MAGNET WAS IMBEDDED IN THE GROUND ON THE SOUTH SIDE OF THE
AL6168'MONUMENT.
AL6168
AL6168                          STATION RECOVERY (2007)
AL6168
AL6168'RECOVERY NOTE BY GEOCACHING 2007 (NJE)
AL6168'RECOVERED IN GOOD CONDITION.

*** retrieval complete.
Elapsed Time = 00:00:00
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APPENDIX B: NEW GROUND CONTROL STATION INFORMATION

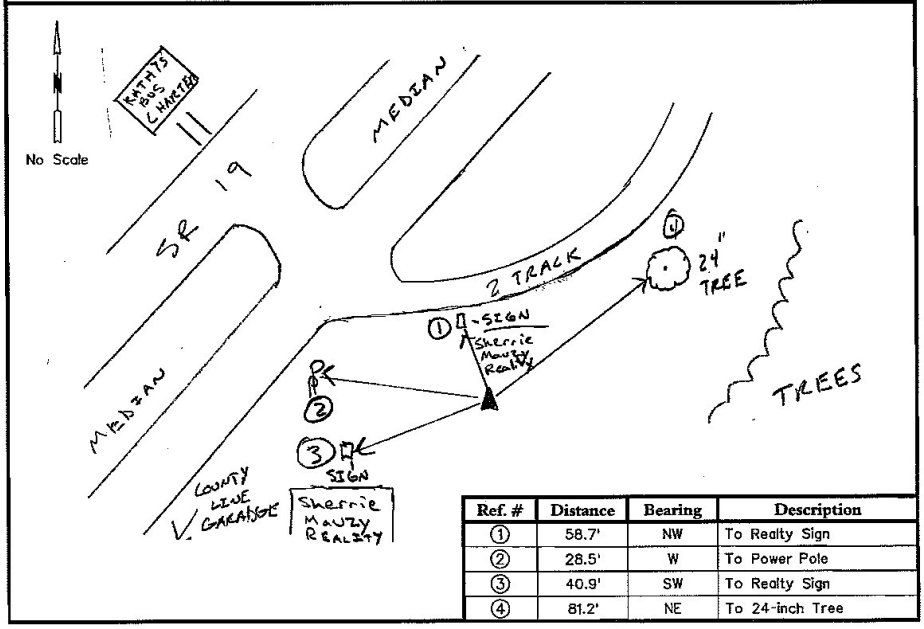
This appendix contains the recovery information sheets for the existing Woolpert ground control stations utilized in the Pasco County Coastal Tiles of the FY2007 State of Florida Division of Emergency Management Ground Control QA/QC Survey Mapping Project.

Specific Purpose Survey
Control Monument Information Sheet

SWFWMD 2007 NORTH DISTRICT ORTHOPHOTO (B089) AND LIDAR (L776) PROJECT WORK ORDER 1 APRIL 2007

WOOLPERT

Site /Quad	Station Description			Station Designation	
ARIPEKA	ND11-2K7 is located east of Aripeka and south of Spring Hill on the southeast side of US 19/SR 55. From the intersection of Aripeka Road (CR 595) and US 19/SR 55, go north-northeast on US 19/SR 55 for +/-1.2mi. to the station on the right. The station is near a large 'Sherrie Mauzy Realty' sign. The mark is a 5/8" diameter, 24" long rebar with a plastic logo cap and is set flush with the ground.			ND11-2K7	
Locality /County				**Stamping on Mark**	
HERNANDO				WOOLPERT LB-0006777	
Date Set or Found	**Latitude**	**Longitude**	**Horiz. Datum**	**Zone**	**Vert. Datum**
1-06-07	28° 25'53.64043"N	82° 38'25.85635"W	NAD 83 (1999)	FLW0902	NAVD 88
Section-Town-Range	**Northing (State Plane)**	**Easting (State Plane)**	**Elevation**	**Order Accuracy**	
06-24S-17E	1490156.67 (U.S. feet)	450305.67 (U.S. feet)	15.77 (U.S. feet)	Horz-2nd Vert-3rd (GPS Derived)	
Person filling out form	**Scale Factor**	**Back Station I.D.**	**Grid Azimuth & Distance to back station**		
GREG FOX	0.999989750	N/A	N/A		
Established by Agency	**Convergence Angle**	**Ahead Station I.D.**	**Grid Azimuth & Distance to ahead station**		
WOOLPERT, INC.	-0° 18'17.87436"	N/A	N/A		
Florida Professional Surveyor and Mapper	CHRISTOPHER M. O'NEILL			**Fla. Registration No.** LS6497	



Ref. #	Distance	Bearing	Description
①	58.7'	NW	To Realty Sign
②	28.5'	W	To Power Pole
③	40.9'	SW	To Realty Sign
④	81.2'	NE	To 24-inch Tree

Specific Purpose Survey
Control Station Information Sheet

SWFWMD
WORK ORDER 3 (B089)
NORTH DISTRICT B ORTHOPHOTO
MARCH 2005

WOOLPERT

Site /Quad	Station Description	Station Designation
PORT RICHEY	NW11 is located in Port Richey and is northeast of the intersection of US 19 and CR 587A. From the intersection of SR 54 and US 19 south of New Port Richey, go north on US 19 for +/-5.0mi. to the station on the left. The station is northeast of an entrance drive to a Wal-Mart and is northeast of a creek. The mark is a 5/8" diameter, 30" long iron rebar with a plastic logo cap and is set flush with the ground.	NW11
Locality /County PASCO		**Stamping on Mark** WOOLPERT LLP LB-0006777

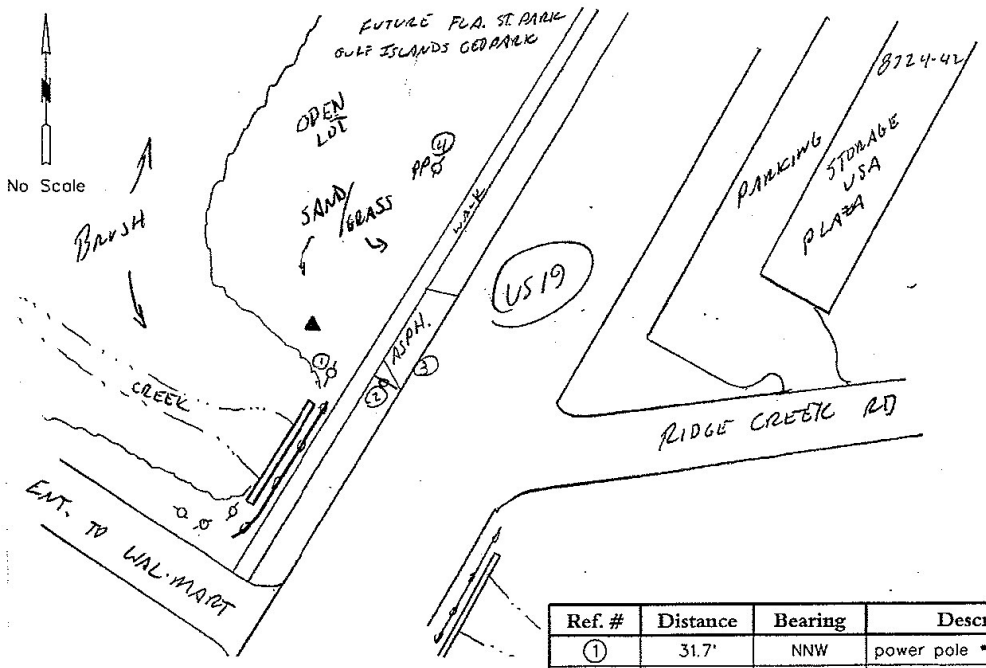
Date Set or Found	Latitude	Longitude	Horiz. Datum	Zone	Vert. Datum
01-28-05	28° 17'4.12998"N	82° 42'54.65735"W	NAD 83 (1990)	FLW0902	NAVD 88

Section-Town-Range	Northing (State Plane)	Easting (State Plane)	Elevation	Order Accuracy
28-25S-16E	1436812.27 (U.S. feet)	425990.06 (U.S. feet)	10.66 (U.S. feet)	Horz-2nd Vert-3rd (GPS Derived)

Person filling out form	Scale Factor	Back Station I.D.	Grid Azimuth & Distance to back station
JIM SPEELMAN	1.000001906	N/A	N/A

Established by Agency	Convergence Angle	Ahead Station I.D.	Grid Azimuth & Distance to ahead station
WOOLPERT, INC.	-0° 20'20.05052"	N/A	N/A

Florida Professional Surveyor and Mapper		Fla. Registration No.
	JOHN CESTNICK	#5994



Ref. #	Distance	Bearing	Description
①	31.7'	NNW	power pole *A77169
②	42.0'	NW	Ridge Rd./Richey Rd. sign
③	45.4'	NW	BOC US 19
④	125.1'	SW	power pole *2-11386

Specific Purpose Survey
Control Station Information Sheet

SWFWMD
WORK ORDER 3 (B089)
NORTH DISTRICT B ORTHOPHOTO
MARCH 2005

WOOLPERT

Site /Quad	Station Description	Station Designation
WEEKI WACHEE SPRING	NW19 is located west of Brooksville and is in the southeast quadrant of the intersection of US 19, SR 50, and CR 550. From the intersection of US 19 and County Line Road, go northeast on US 19 for +/-7.3mi. to the intersection and the station on the right. The station is in a concrete median triangle. The mark is a 5/8" diameter, 30" long iron rebar with a plastic logo cap and is set flush with the ground.	NW19
Locality /County		**Stamping on Mark**
HERNANDO		WOOLPERT LLP LB-0006777

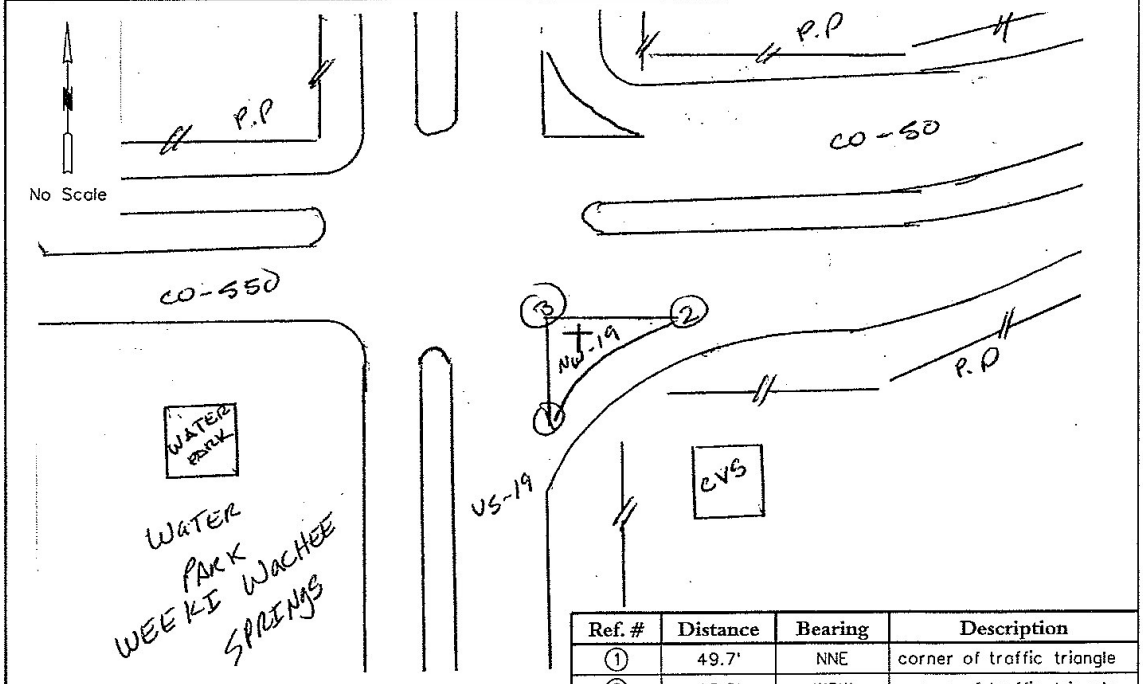
Date Set or Found	Latitude	Longitude	Horiz. Datum	Zone	Vert. Datum
01-28-05	28° 31'07.14707"N	82° 34'16.48188"W	NAD 83 (1990)	FLW0902	NAVD 88

Section–Town–Range	Northing (State Plane)	Easting (State Plane)	Elevation	Order Accuracy
2-23S-17E	1521708.22 (U.S. feet)	472720.14 (U.S. feet)	21.67 (U.S. feet)	Horz-2nd Vert-3rd (GPS Derived)

Person filling out form	Scale Factor	Back Station I.D.	Grid Azimuth & Distance to back station
JIM SPEELMAN	0.999979750	N/A	N/A

Established by Agency	Convergence Angle	Ahead Station I.D.	Grid Azimuth & Distance to ahead station
WOOLPERT, INC.	-0° 16'21.88214"	N/A	N/A

Florida Professional Surveyor and Mapper: JOHN CESTNICK — Fla. Registration No. *5994



Ref. #	Distance	Bearing	Description
①	49.7'	NNE	corner of traffic triangle
②	42.2'	WSW	corner of traffic triangle
③	21.3'	SE	corner of traffic triangle

APPENDIX C: FINAL GROUND QA/QC AND GEODETIC CONTROL COORDINATE LISTING

This appendix contains the final coordinate listings for the LiDAR QA/QC Checkpoints, LiDAR Control Points and the geodetic control stations utilized in the Pasco County Coastal Tiles of the FY2007 State of Florida Division of Emergency Management Ground Control QA/QC Survey Mapping Project.

HORIZONTAL DATUM: NAD83 (1999)
VERTICAL DATUM: NAVD 88
UNITS: US SURVEY FEET
STATE PLANE ZONE: FLORIDA WEST (0902)
GEOID: GEOID 03
COORDINATE SYSTEM: GRID
DATE: 5-30-08

STATIONS IN BLUE = CONVENTIONAL METHODS
STATIONS IN RED = RAPID STATIC GPS METHODS

QA/QC GROUND CONTROL POINTS:

STATION NAME	GRID NORTHING (US FT)	GRID EASTING (US FT)	STATION ELEVATION (US FT)	Y Std. Dev. (US FT)	X Std. Dev. (US FT)	Z Std. Dev. (US FT)	STATION CLASSIFICATION
10361	1442252.64	424312.65	7.98	0.04	0.03	0.06	LiDAR CONTROL POINT
10362	1436653.16	423350.23	7.79	0.04	0.03	0.08	URBAN AREAS
10363	1434579.49	420134.99	3.49	0.04	0.04	0.14	LiDAR CONTROL POINT
10364	1435120.50	420807.65	2.93	0.04	0.03	0.08	BRUSH LANDS AND LOW TREES
10365	1432104.17	418866.98	3.59	0.03	0.03	0.07	BRUSH LANDS AND LOW TREES
10366	1425802.76	412555.13	3.47	0.04	0.05	0.13	BARE EARTH AND LOW GRASS
10367	1425829.53	412653.92	3.89	0.04	0.05	0.12	LiDAR CONTROL POINT
10368	1472827.86	434085.64	6.54	0.04	0.04	0.09	URBAN AREAS
10369	1466468.32	434190.04	6.10	N/A	N/A	N/A	BRUSH LANDS AND LOW TREES
10370	1466330.65	434182.95	8.57	N/A	N/A	N/A	FORESTED AREAS
10371	1466311.45	434065.64	8.30	N/A	N/A	N/A	FORESTED AREAS
10372	1472473.16	434080.52	4.55	N/A	N/A	N/A	URBAN AREAS
10373	1472379.32	434012.07	4.45	N/A	N/A	N/A	FORESTED AREAS
10374	1425813.93	412433.05	4.59	N/A	N/A	N/A	FORESTED AREAS
10375	1425767.51	412405.70	6.06	N/A	N/A	N/A	BRUSH LANDS AND LOW TREES
20128	1419505.94	410735.08	7.90	0.04	0.04	0.11	LiDAR CONTROL POINT
20129	1419501.00	410928.79	7.92	0.03	0.03	0.07	BRUSH LANDS AND LOW TREES
20130	1411216.33	414702.27	8.56	0.05	0.03	0.12	LiDAR CONTROL POINT
20131	1405297.16	409508.23	8.74	0.03	0.03	0.06	BARE EARTH AND LOW GRASS
20132	1405345.94	409357.43	9.22	0.03	0.03	0.06	LiDAR CONTROL POINT
20133	1405357.25	409111.51	10.15	0.05	0.05	0.08	URBAN AREAS
20134	1405470.77	409231.71	9.82	0.04	0.05	0.08	BARE EARTH AND LOW GRASS
20135	1403505.23	402777.78	11.90	0.03	0.03	0.08	LiDAR CONTROL POINT
30120	1472450.30	434043.34	5.12	0.03	0.03	0.10	BARE EARTH AND LOW GRASS
30121	1472486.40	433947.51	4.69	0.04	0.04	0.10	LiDAR CONTROL POINT
30122	1466407.71	434022.41	9.27	0.05	0.04	0.09	URBAN AREAS
30123	1466357.54	434074.55	8.29	0.03	0.03	0.09	BRUSH LANDS AND LOW TREES
30124	1465283.04	433070.36	8.32	0.04	0.05	0.13	LiDAR CONTROL POINT
30126	1462972.42	426678.03	4.50	0.04	0.04	0.08	LiDAR CONTROL POINT

EXISTING NGS CONTROL POINTS:

STATION NAME	GRID NORTHING (US FT)	GRID EASTING (US FT)	STATION ELEVATION (US FT)	Y Std. Dev. (US FT)	X Std. Dev. (US FT)	Z Std. Dev. (US FT)	STATION CLASSIFICATION
PINCO D	1396367.57	408693.03	11.08	0.00	0.00	0.00	NGS CONTROL STATION
RICHEY	1453809.75	448987.64	31.64	0.00	0.00	0.00	NGS CONTROL STATION

EXISTING WOOLPERT CONTROL POINTS:

STATION NAME	GRID NORTHING (US FT)	GRID EASTING (US FT)	STATION ELEVATION (US FT)	Y Std. Dev. (US FT)	X Std. Dev. (US FT)	Z Std. Dev. (US FT)	STATION CLASSIFICATION
ND11_2K7	1490156.67	450305.67	15.80	0.00	0.00	0.07	WOOLPERT IPC
NW19	1521708.22	472720.14	21.72	0.00	0.00	0.06	WOOLPERT IPC

APPENDIX D: POSITIONAL ACCURACIES

This appendix contains the final positional accuracies for the LiDAR QA/QC Checkpoints (except the forest points and any LiDAR QA/QC Checkpoints collected by conventional methods) and the LiDAR Control Points for the Pasco County Coastal Tiles of the FY2007 State of Florida Division of Emergency Management Ground Control QA/QC Survey Mapping Project.

QA/QA POINTS (NO FOREST POINTS)*

CALCULATED ACCURACIES:	
0.01	Meters RMSEx
0.01	Meters RMSEy
0.02	Meters RMSExy
0.03	Meters at 95% C.I.
0.03	RMSEz
0.05	Meters at 95% C.I.

CALCULATED ACCURACIES:	
0.04	Feet RMSEx
0.04	Feet RMSEy
0.05	Feet RMSExy
0.09	Feet at 95% C.I.
0.09	RMSEz
0.17	Feet at 95% C.I.

METERS

STATION	Vx	Vy	Vxy	Vz
10362	0.01	0.01	0.01	0.02
10364	0.01	0.01	0.01	0.02
10365	0.01	0.01	0.01	0.02
10366	0.01	0.01	0.02	0.04
10368	0.01	0.01	0.02	0.03
20129	0.01	0.01	0.01	0.02
20131	0.01	0.01	0.01	0.02
20133	0.01	0.02	0.02	0.02
20134	0.01	0.01	0.02	0.02
30120	0.01	0.01	0.01	0.03
30122	0.01	0.01	0.02	0.03
30123	0.01	0.01	0.01	0.03
SUMSQ	**0.00**	**0.00**	**0.00**	**0.01**
COUNT	**12.00**	**12.00**	**12.00**	**12.00**
AVG ERROR	**0.01**	**0.01**	**0.02**	**0.03**
MAX ERROR	**0.01**	**0.02**	**0.02**	**0.04**
MIN ERROR	**0.01**	**0.01**	**0.01**	**0.02**
RMSE	**0.01**	**0.01**	**0.02**	**0.03**

US FEET

STATION	Vx	Vy	Vxy	Vz
10362	0.04	0.03	0.05	0.08
10364	0.04	0.03	0.05	0.08
10365	0.03	0.03	0.04	0.07
10366	0.04	0.05	0.06	0.13
10368	0.04	0.04	0.06	0.09
20129	0.03	0.03	0.04	0.07
20131	0.03	0.03	0.04	0.06
20133	0.05	0.05	0.07	0.08
20134	0.04	0.05	0.06	0.08
30120	0.03	0.03	0.04	0.10
30122	0.05	0.04	0.06	0.09
30123	0.03	0.03	0.05	0.09
SUMSQ	**0.02**	**0.02**	**0.03**	**0.09**
COUNT	**12.00**	**12.00**	**12.00**	**12.00**
AVG ERROR	**0.04**	**0.04**	**0.05**	**0.09**
MAX ERROR	**0.05**	**0.05**	**0.07**	**0.13**
MIN ERROR	**0.03**	**0.03**	**0.04**	**0.06**
RMSE	**0.04**	**0.04**	**0.05**	**0.09**

* NOTE: THREE (3) LiDAR QA/QC CHECKPOINTS (2 BRUSH AND 1 URBAN) WERE OBSERVED CONVENTIONALLY, THEREFORE ALSO NOT INCLUDED IN THIS TABLE.

LiDAR CONTROL POINTS ONLY

CALCULATED ACCURACIES:

0.01	Meters RMSEx
0.01	Meters RMSEy
0.02	Meters RMSExy
0.03	Meters at 95% C.I.
0.03	RMSEz
0.06	Meters at 95% C.I.

CALCULATED ACCURACIES:

0.04	Feet RMSEx
0.04	Feet RMSEy
0.05	Feet RMSExy
0.09	Feet at 95% C.I.
0.10	RMSEz
0.20	Feet at 95% C.I.

METERS

STATION	Vx	Vy	Vxy	Vz
10361	0.01	0.01	0.01	0.02
10363	0.01	0.01	0.02	0.04
10367	0.01	0.02	0.02	0.04
20128	0.01	0.01	0.02	0.03
20130	0.02	0.01	0.02	0.04
20132	0.01	0.01	0.01	0.02
20135	0.01	0.01	0.01	0.02
30121	0.01	0.01	0.02	0.03
30124	0.01	0.01	0.02	0.04
30126	0.01	0.01	0.02	0.02
SUMSQ	**0.00**	**0.00**	**0.00**	**0.01**
COUNT	**10.00**	**10.00**	**10.00**	**10.00**
AVG ERROR	**0.01**	**0.01**	**0.02**	**0.03**
MAX ERROR	**0.02**	**0.02**	**0.02**	**0.04**
MIN ERROR	**0.01**	**0.01**	**0.01**	**0.02**
RMSE	**0.01**	**0.01**	**0.02**	**0.03**

US FEET

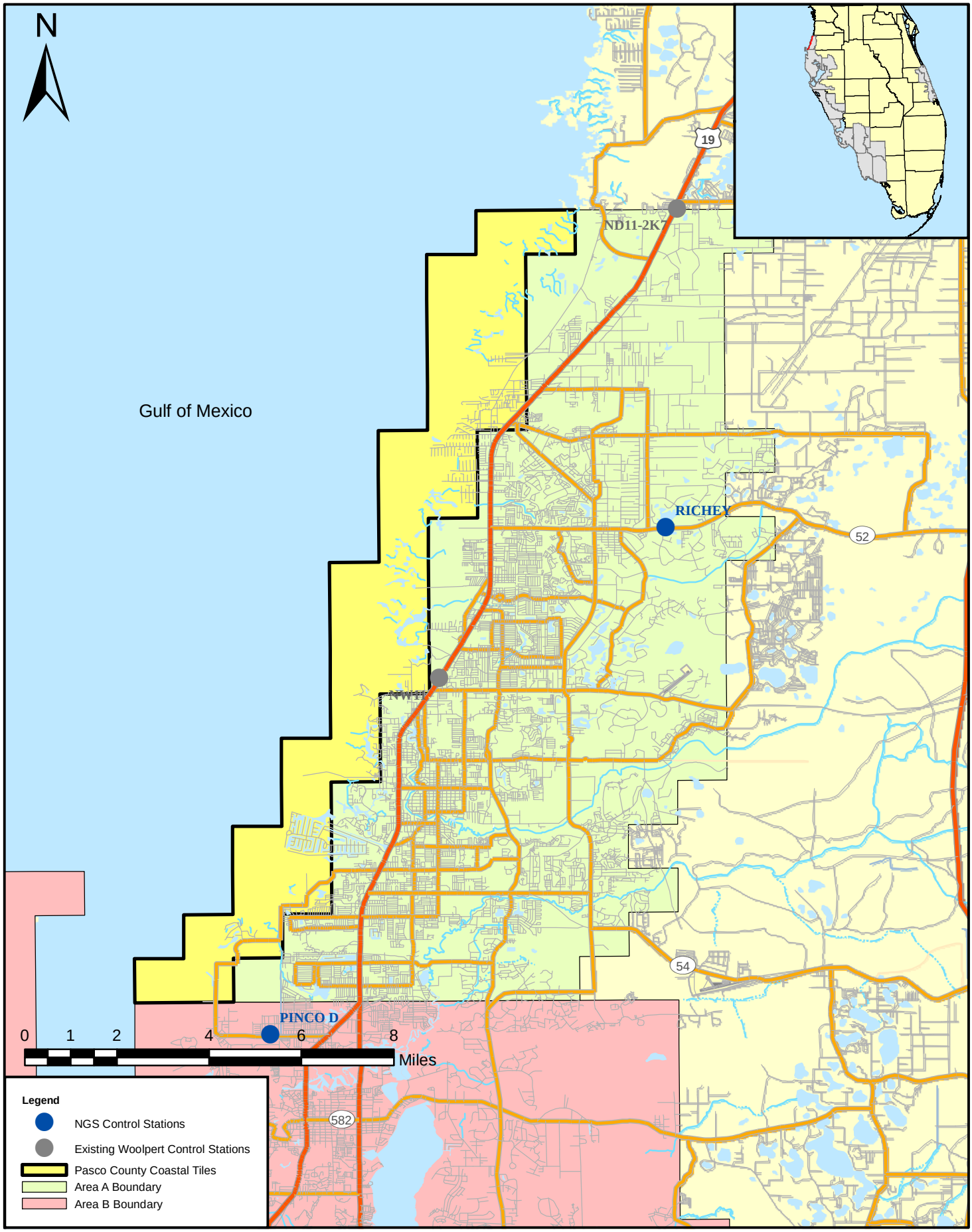
STATION	Vx	Vy	Vxy	Vz
10361	0.04	0.03	0.05	0.06
10363	0.04	0.04	0.05	0.14
10367	0.04	0.05	0.07	0.12
20128	0.04	0.04	0.05	0.11
20130	0.05	0.03	0.06	0.12
20132	0.03	0.03	0.04	0.06
20135	0.03	0.03	0.05	0.08
30121	0.04	0.04	0.06	0.10
30124	0.04	0.05	0.06	0.13
30126	0.04	0.04	0.05	0.08
SUMSQ	**0.02**	**0.01**	**0.03**	**0.11**
COUNT	**10.00**	**10.00**	**10.00**	**10.00**
AVG ERROR	**0.04**	**0.04**	**0.05**	**0.10**
MAX ERROR	**0.05**	**0.05**	**0.07**	**0.14**
MIN ERROR	**0.03**	**0.03**	**0.04**	**0.06**
RMSE	**0.04**	**0.04**	**0.05**	**0.10**

APPENDIX E: LAYOUT MAPS

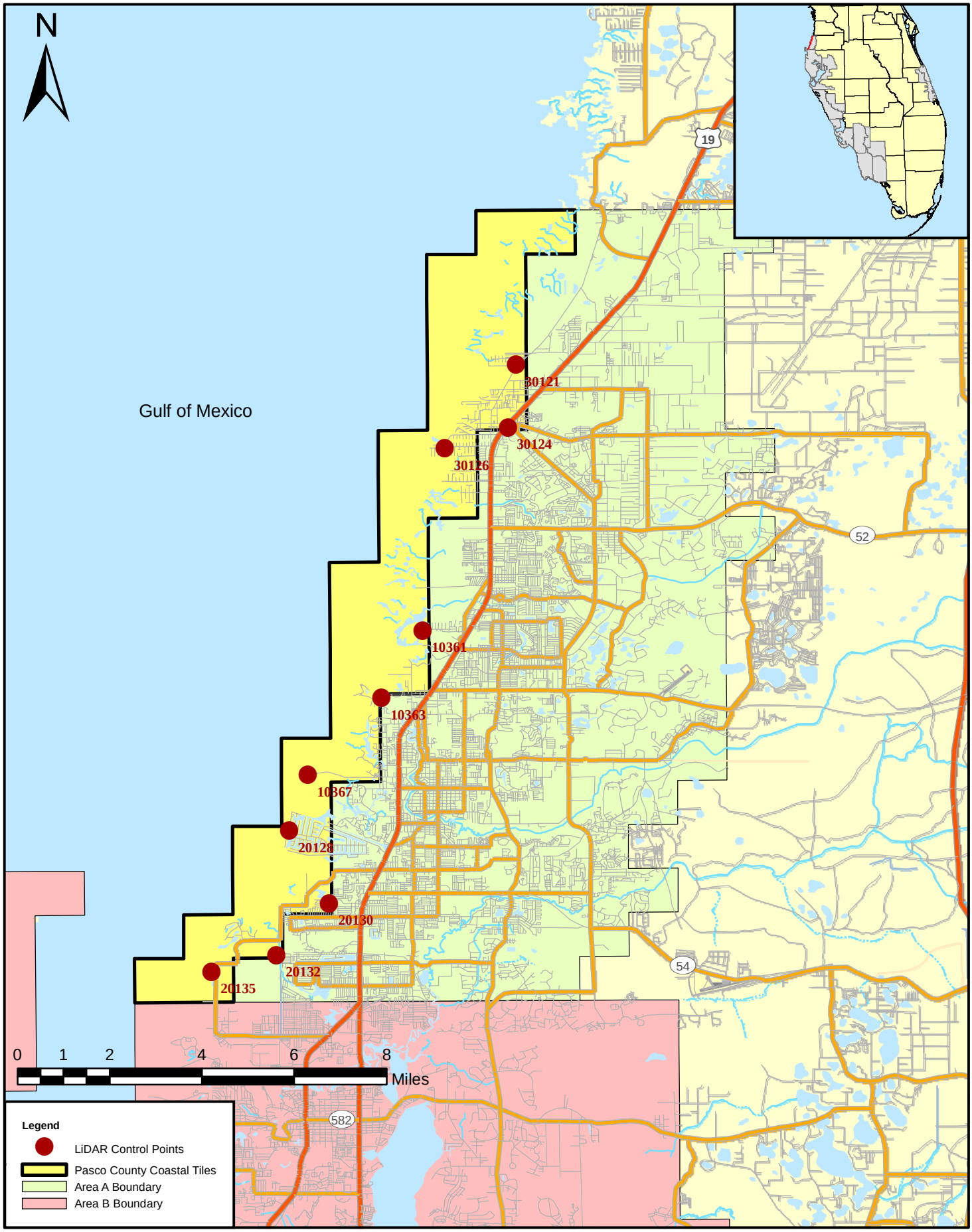
This appendix contains layout maps of the GPS ground control stations, LiDAR Control Points, LiDAR QA/QC Checkpoints (see below) and a GPS network diagram for the Pasco County Coastal Tiles of the FY2007 State of Florida Division of Emergency Management Ground Control QA/QC Survey Mapping Project.

- GPS Control Stations
- LiDAR Control Points
- Brush Observations
- Forested Observations
- Low Grass or Bare Earth Observations
- Urban Observations
- GPS Network Diagram

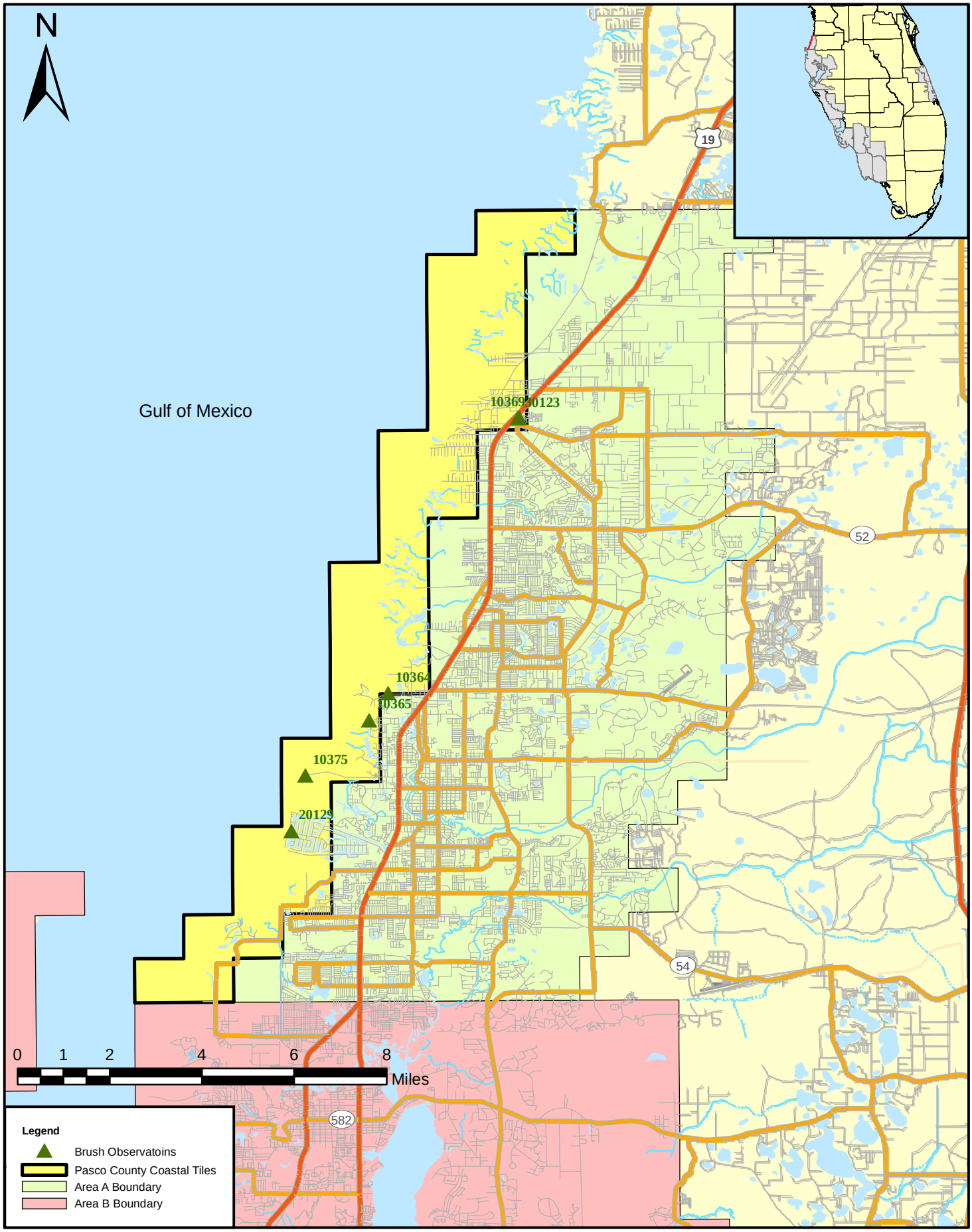
PASCO COUNTY COASTAL TILES - GPS CONTROL STATIONS



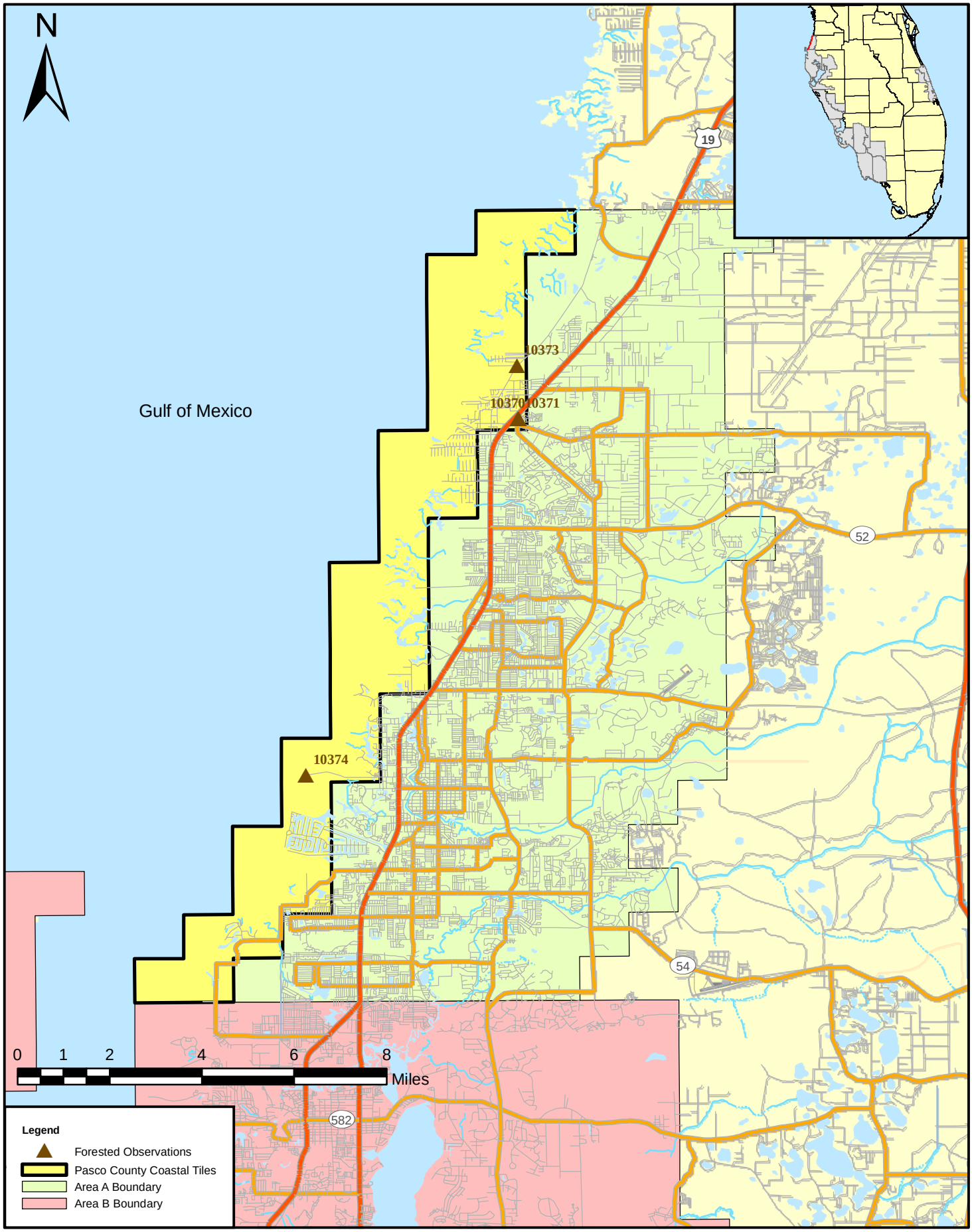
PASCO COUNTY COASTAL TILES - LiDAR CONTROL POINTS



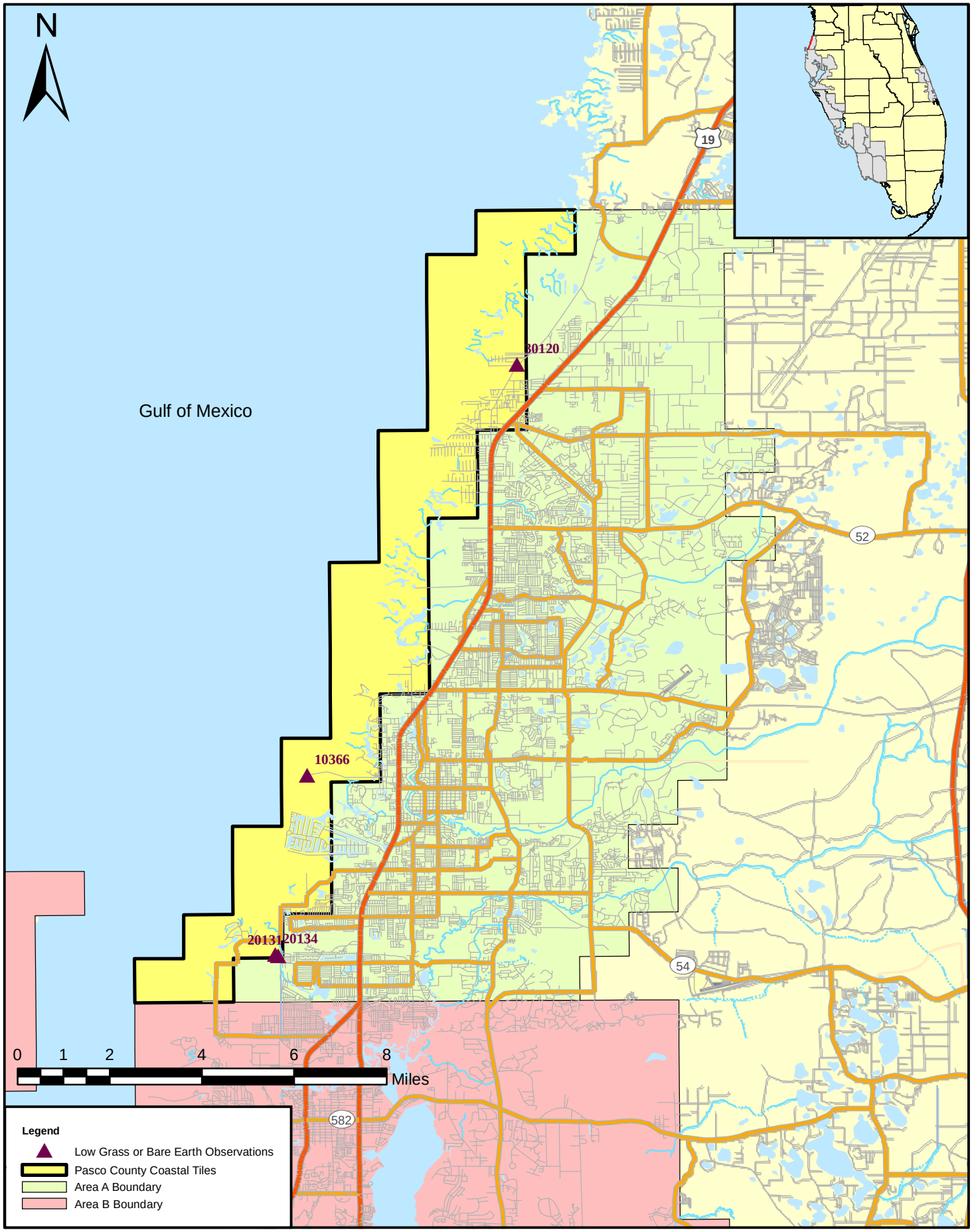
PASCO COUNTY COASTAL TILES - BRUSH



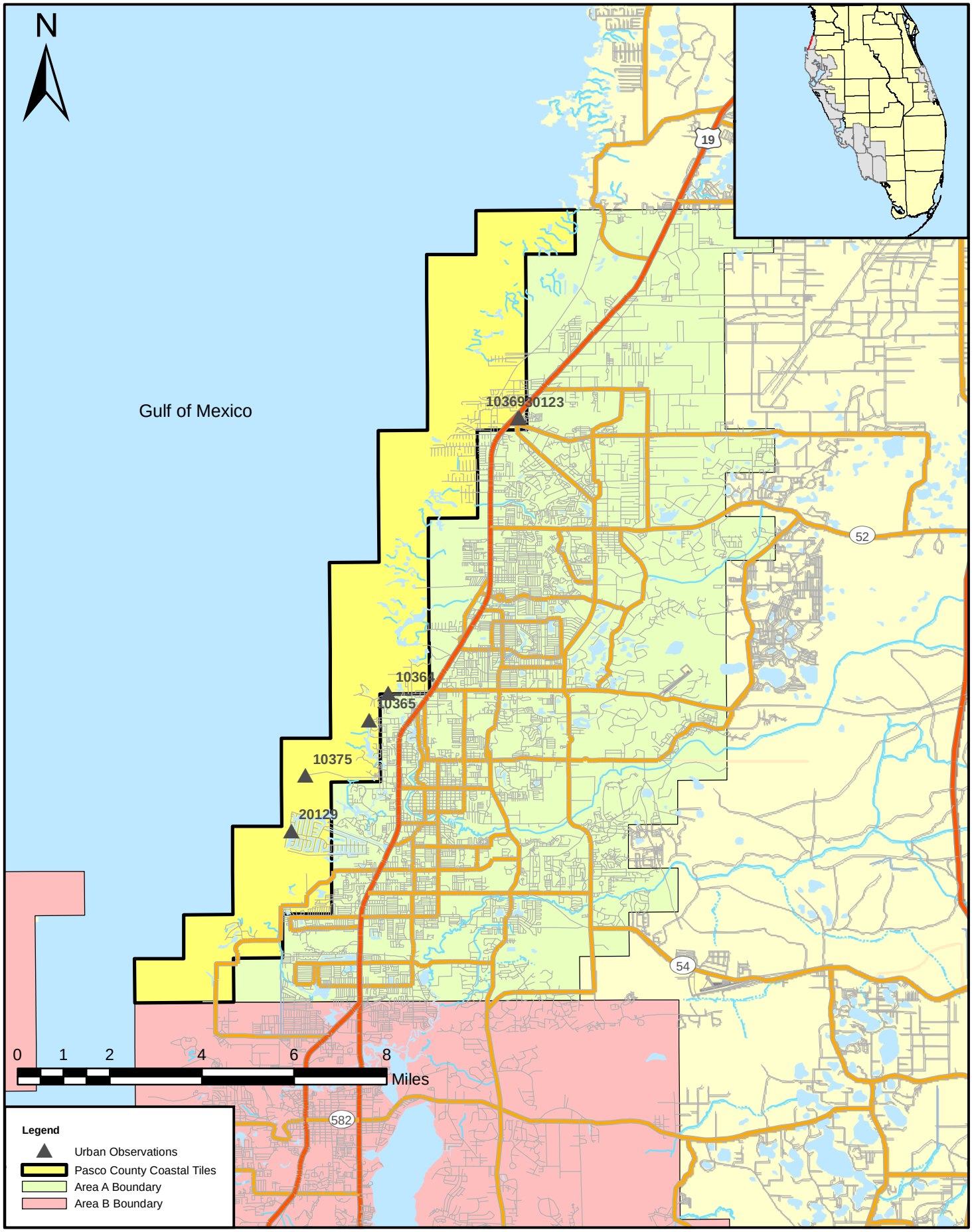
PASCO COUNTY COASTAL TILES - FORESTED

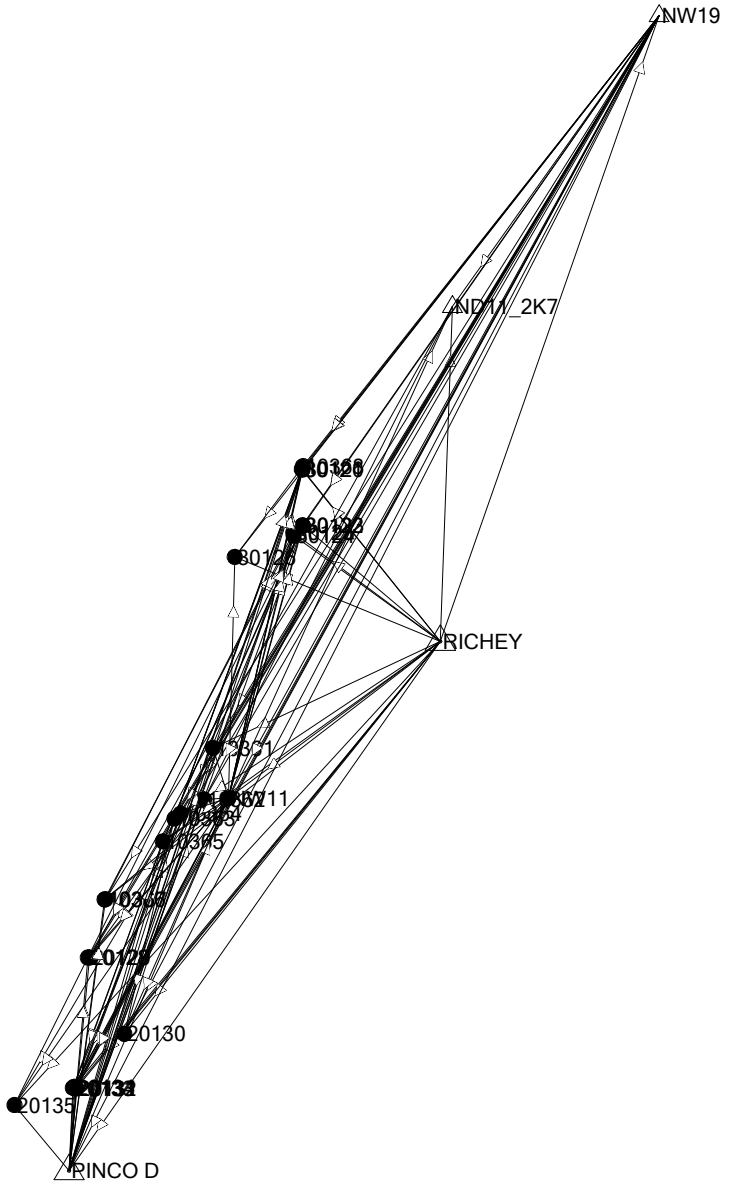


PASCO COUNTY COASTAL TILES - LOW GRASS OR BARE EARTH



PASCO COUNTY COASTAL TILES - URBAN





Field surveyor:

Computer operator:

Reference:

Scale 1" to 20833 ft

0 35000 sft

US survey feet

0°00'00"

Plot Scale: 1" to 20833 ft
Printed on 4/2/2009, at 9:33:18 AM

Printed from Trimble Geomatics Office

Site: Not selected, System: US State Plane 1983
Zone: Florida West 0902, Datum: NAD 1983 (Conus)

Project: PASCO COUNTY COASTAL TILES QAQC
USFeet Template