

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



PROJECT AREA F

**STATE OF FLORIDA
DIVISION OF EMERGENCY MANAGEMENT**

**TASK ORDER NO. 20070525-492720
CONTRACT NO. 07-HS-34-14-00-22-469**

DECEMBER 9, 2008

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PREPARED BY:
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LB 0006777

DECEMBER 9, 2008

QUALITY

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MINIMUM TECHNICAL STANDARDS REPORT OF LiDAR GROUND CONTROL SURVEY

Task Order No. 20070525-492720
Contract No. 07-HS-34-14-00-22-469

PROJECT AREA F

For:

State of Florida, Division of Emergency Management
“State Emergency Response Team”
2555 Shumard Oak Boulevard
Tallahassee, Florida 32399-2100

By:

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Florida Certificate of Authorization LB 6777

Prepared by:

David Bruno, PSM
Florida Professional Surveyor and Mapper PSM 5670

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REPORT OF LiDAR GROUND CONTROL SURVEY PROJECT AREA F 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:

- Project Area F – South Central Charlotte County and the Eastern Central portion of Lee County.

Project Area

Project Area F encompassed approximately +/-518 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 +/-518 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 between December 13, 2007 and December 20, 2007.

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

David Bruno, PSM
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Orlando, Florida 32817-1484
Professional Surveyor and Mapper Number 5670

Name of Company

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Orlando, Florida 32817-1484
Florida Certificate of Authorization No. LB-0006777

Field and Office Personnel

Brian Beckman
Dave Bruno
Scott Lamb
Ben Messer
Steve Roberts

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
RTK – Real-Time Kinematics
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](mailto:info_center@ngs.noaa.gov)
<http://www.ngs.noaa.gov/>

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 four (4) existing NGS control stations suitable for GPS observations: **GPS HOLT, H 415, I75 81 A13, and W 247**. These NGS Data Sheets, which contain information such as coordinates, error estimates and to-reach descriptions, can be found in Appendix A of this report.

Woolpert installed two (2) new semi-permanent control stations in a pre-determined location for both GPS checkpoint observations and to ensure for a uniform GPS network triangulation consisting of a minimum of 3 GPS base stations. These newly established geodetic control stations, **OZZY** and **QUARRY**, 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. The station recovery information sheets for these points can be found in Appendix B of this report.

Woolpert established a total of 21 LiDAR Control Points and 124 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. Rapid Static GPS survey techniques, along with 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) with further reference to *FGDC Standards for Geodetic Networks (FGDC-STD-007.02-1998)* and *Geospatial Positioning Accuracy Standards, Part 3: National Standards for Spatial Data Accuracy (NSSDA)*, published by the Federal Geographic Data Committee (FGDC-STD-007.3-1998). 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 93 of the 124 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 and the LiDAR QA/QC Checkpoints can be found in Appendix C of this report.

For this survey, Woolpert field crews utilized three (3) Woolpert-owned, Trimble Navigation R8 model 2 GNSS dual-frequency geodetic GPS receivers as base stations and up to 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 observed four (4) existing NGS Control Stations and two (2) newly established control station 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: **GPS HOLT, H 415, I75 81 A13, W 247, OZZY and QUARRY.**

Conventional Surveying

Using inter-visible pairs of LiDAR QA/QC Checkpoints, Woolpert field crews used a Woolpert-owned Topcon GTS-701 Total Station or a Woolpert-owned Topcon GTS-711 Total Station to acquire thirty-one (31) LiDAR QA/QC Checkpoints in obscured areas (dense trees/forested) where GPS observations were limited. 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 Total Control (TTC) version 2.73. 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	GPS HOLT (AD8700), H 415 (AD 8292) and W 247 (AD1509)
1-D Control Station	I75 81 A13 (AD5969)

Accuracy Statement

The positional accuracy of the LiDAR Control Points was 0.04-feet (avg. 0.02-feet) horizontally and 0.10-feet (avg. 0.05-feet) vertically at the 95% confidence level. The positional accuracy of the LiDAR QA/QC checkpoints was 0.04-feet (avg. 0.02-feet) horizontally and 0.10-feet (avg. 0.05-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 FORTY-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.

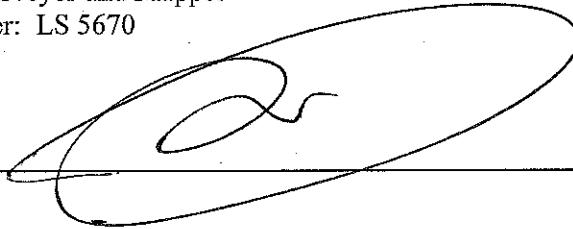
Surveyor and Mapper in Responsible Charge:

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 for Project Area F 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 = AUGUST 15, 2008
AD8700 *****
AD8700 DESIGNATION - GPS HOLT
AD8700 PID - AD8700
AD8700 STATE/COUNTY- FL/LEE
AD8700 USGS QUAD - FORT MYERS NW (1987)
AD8700
AD8700 *CURRENT SURVEY CONTROL
AD8700
AD8700* NAD 83(2007)- 26 41 50.77906(N) 081 59 24.69543(W) ADJUSTED
AD8700* NAVD 88 - 4.02 (meters) 13.2 (feet) LEVELING
AD8700
AD8700 EPOCH DATE - 2002.00
AD8700 X - 794,532.757 (meters) COMP
AD8700 Y - -5,646,381.735 (meters) COMP
AD8700 Z - 2,848,296.343 (meters) COMP
AD8700 LAPLACE CORR- -2.33 (seconds) DEFLEC99
AD8700 ELLIP HEIGHT- -19.930 (meters) (02/10/07) ADJUSTED
AD8700 GEOID HEIGHT- -23.96 (meters) GEOID03
AD8700
AD8700 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----
AD8700 Type PID Designation North East Ellip
AD8700 -----
AD8700 NETWORK AD8700 GPS HOLT 0.98 0.98 2.06
AD8700 -----
AD8700 VERT ORDER - THIRD ?
AD8700
AD8700.The horizontal coordinates were established by GPS observations
AD8700.and adjusted by the National Geodetic Survey in February 2007.
AD8700
AD8700.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).
AD8700.See National Readjustment for more information.
AD8700.The horizontal coordinates are valid at the epoch date displayed above.
AD8700.The epoch date for horizontal control is a decimal equivalence
AD8700.of Year/Month/Day.
AD8700
AD8700.The orthometric height was determined by differential leveling.
AD8700.The vertical network tie was performed by a horz. field party for horz.
AD8700.obs reductions. Reset procedures were used to establish the elevation.
AD8700
AD8700.The X, Y, and Z were computed from the position and the ellipsoidal ht.
AD8700
AD8700.The Laplace correction was computed from DEFLEC99 derived deflections.
AD8700
AD8700.The ellipsoidal height was determined by GPS observations
AD8700.and is referenced to NAD 83.
AD8700
AD8700.The geoid height was determined by GEOID03.
AD8700
AD8700; North East Units Scale Factor Converg.
AD8700;SPC FL W - 261,881.914 200,975.909 MT 0.99994119 +0 00 15.9
AD8700;SPC FL W - 859,190.91 659,368.46 sFT 0.99994119 +0 00 15.9
AD8700;UTM 17 - 2,953,306.958 401,493.294 MT 0.99971980 -0 26 41.7
AD8700
AD8700! - Elev Factor x Scale Factor = Combined Factor
AD8700!SPC FL W - 1.00000313 x 0.99994119 = 0.99994432
AD8700!UTM 17 - 1.00000313 x 0.99971980 = 0.99972293
```

AD8700
AD8700 SUPERSEDED SURVEY CONTROL
AD8700
AD8700 NAD 83(1999)- 26 41 50.77927(N) 081 59 24.69582(W) AD() 1
AD8700 ELLIP H (07/06/01) -19.924 (m) GP() 4 2
AD8700 NAD 83(1990)- 26 41 50.77761(N) 081 59 24.69500(W) AD() 1
AD8700 ELLIP H (11/12/93) -19.866 (m) GP() 4 1
AD8700
AD8700.Superseded values are not recommended for survey control.
AD8700.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
AD8700.[See file dsdata.txt](#) to determine how the superseded data were derived.
AD8700
AD8700_U.S. NATIONAL GRID SPATIAL ADDRESS: 17RMK0149353307(NAD 83)
AD8700_MARKER: DO = NOT SPECIFIED OR SEE DESCRIPTION
AD8700_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
AD8700_SP_SET: CONCRETE POST
AD8700_STAMPING: GPS HOLT 9033 1990
AD8700_MARK LOGO: DENI
AD8700_MAGNETIC: R = STEEL ROD IMBEDDED IN MONUMENT
AD8700_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
AD8700+STABILITY: SURFACE MOTION
AD8700_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
AD8700+SATELLITE: SATELLITE OBSERVATIONS - May 25, 2006
AD8700
AD8700 HISTORY - Date Condition Report By
AD8700 HISTORY - 1990 MONUMENTED DENI
AD8700 HISTORY - 19971009 GOOD USPSQD
AD8700 HISTORY - 20060525 GOOD HOLE
AD8700
AD8700 STATION DESCRIPTION
AD8700
AD8700'DESCRIBED BY DENI ASSOCIATES INCORPORATED 1990
AD8700'STATION IS LOCATED NEAR THE SOUTHEAST CORNER OF SEC.27, TWP 43S, RGE
AD8700'23E, IN CAPE CORAL, 8.4 MI (13.5 KM) NORTHWEST OF FORT MYERS, 5.1 MI
AD8700'(8.2 KM) SOUTH OF THE LEE/CHARLOTTE COUNTY LINE, 3.0 MI (4.8 KM) EAST
AD8700'OF BURNT STORE ROAD/COUNTY ROAD 765.
AD8700'TO REACH STATION FROM THE JUNCTION OF U.S.HIGHWAY 41 AND PINE ISLAND
AD8700'ROAD/STATE ROUTE 78, GO WEST AND SOUTHWEST ON PINE ISLAND ROAD FOR
AD8700'6.1 MI (9.8 KM) TO NELSON ROAD, THEN NORTH ON NELSON ROAD 3.6 MI
AD8700'(5.8 KM) TO KISMET PARKWAY AND THE STATION IN THE MEDIAN NORTH OF THE
AD8700'INTERSECTION OF NELSON ROAD AND KISMET PARKWAY.
AD8700'STATION IS 19.2 FT (5.9 M) EAST OF THE CENTERLINE OF THE SOUTHBOUND
AD8700'THRU LANES OF NELSON ROAD, 21.1 FT (6.4 M) WEST OF THE CENTERLINE OF
AD8700'THE NORTHBOUND LANES OF NELSON ROAD, 172 FT (52.4 M) NORTH OF THE
AD8700'CENTERLINE OF THE WESTBOUND THRU LANES OF KISMET PARKWAY, 150.0 FT
AD8700'(45.7 M) NORTH OF THE SOUTH MOST END OF THE MEDIAN STRIP OF NELSON
AD8700'ROAD, 2.0 FT (0.6 M) SOUTH OF A WITNESS POST.
AD8700'STATION MARK IS A LEE CO/DENI ASSOC 3.25 INCH ALUMINUM SURVEY MARK
AD8700'DISK SET IN THE TOP OF AN 11 INCH ROUND CONCRETE MONUMENT, 1 INCH
AD8700'BELOW GROUND LEVEL.
AD8700
AD8700 STATION RECOVERY (1997)
AD8700
AD8700'RECOVERY NOTE BY US POWER SQUADRON 1997
AD8700'RECOVERED IN GOOD CONDITION.
AD8700
AD8700 STATION RECOVERY (2006)
AD8700
AD8700'RECOVERY NOTE BY HOLE MONTES AND ASSOCIATES INC 2006 (BRH)
AD8700'WITNESS POST MISSING.

*** 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 = AUGUST 15, 2008
AD8292 *****
AD8292 DESIGNATION -   H 415
AD8292 PID          -   AD8292
AD8292 STATE/COUNTY-   FL/LEE
AD8292 USGS QUAD    -   OLGA (1987)
AD8292
AD8292                      *CURRENT SURVEY CONTROL
AD8292
AD8292* NAD 83(2007)-   26 42 33.09534(N)      081 37 32.61733(W)      ADJUSTED
AD8292* NAVD 88        -           4.106 (meters)      13.47 (feet)      ADJUSTED
AD8292
AD8292 EPOCH DATE    -           2002.00
AD8292 X              -           830,348.540 (meters)                      COMP
AD8292 Y              -          -5,640,634.011 (meters)                      COMP
AD8292 Z              -           2,849,459.629 (meters)                      COMP
AD8292 LAPLACE CORR-           -0.50 (seconds)                      DEFLEC99
AD8292 ELLIP HEIGHT-           -20.358 (meters)                      (02/10/07) ADJUSTED
AD8292 GEOID HEIGHT-           -24.46 (meters)                      GEOID03
AD8292 DYNAMIC HT    -           4.100 (meters)      13.45 (feet)      COMP
AD8292
AD8292 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----
AD8292 Type      PID      Designation                      North      East      Ellip
AD8292 -----
AD8292 NETWORK AD8292 H 415                      1.88      2.23      4.17
AD8292 -----
AD8292 MODELED GRAV-           979,076.3 (mgal)                      NAVD 88
AD8292
AD8292 VERT ORDER -   FIRST      CLASS II
AD8292
AD8292.The horizontal coordinates were established by GPS observations
AD8292.and adjusted by the National Geodetic Survey in February 2007.
AD8292
AD8292.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).
AD8292.See National Readjustment for more information.
AD8292.The horizontal coordinates are valid at the epoch date displayed above.
AD8292.The epoch date for horizontal control is a decimal equivalence
AD8292.of Year/Month/Day.
AD8292
AD8292.The orthometric height was determined by differential leveling
AD8292.and adjusted in September 1992.
AD8292
AD8292.The X, Y, and Z were computed from the position and the ellipsoidal ht.
AD8292
AD8292.The Laplace correction was computed from DEFLEC99 derived deflections.
AD8292
AD8292.The ellipsoidal height was determined by GPS observations
AD8292.and is referenced to NAD 83.
AD8292
AD8292.The geoid height was determined by GEOID03.
AD8292
AD8292.The dynamic height is computed by dividing the NAVD 88
AD8292.geopotential number by the normal gravity value computed on the
AD8292.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
AD8292.degrees latitude (g = 980.6199 gals.).
AD8292
AD8292.The modeled gravity was interpolated from observed gravity values.
AD8292

```

AD8292;

	North	East	Units	Scale Factor	Converg.
AD8292;SPC FL W	- 263,238.859	237,241.471	MT	0.99995829	+0 10 05.6
AD8292;SPC FL W	- 863,642.82	778,349.73	sFT	0.99995829	+0 10 05.6
AD8292;UTM 17	- 2,954,379.134	437,758.735	MT	0.99964783	-0 16 52.5

AD8292

AD8292! Elev Factor x Scale Factor = Combined Factor

AD8292!SPC FL W - 1.00000320 x 0.99995829 = 0.99996149

AD8292!UTM 17 - 1.00000320 x 0.99964783 = 0.99965103

AD8292

AD8292 SUPERSEDED SURVEY CONTROL

AD8292

AD8292 NAD 83(1999)- 26 42 33.09553(N) 081 37 32.61770(W) AD() 1

AD8292 ELLIP H (12/12/02) -20.372 (m) GP() 4 1

AD8292 NAVD 88 (12/12/02) 4.11 (m) 13.5 (f) LEVELING 3

AD8292 NGVD 29 (09/01/92) 4.480 (m) 14.70 (f) ADJUSTED 1 2

AD8292

AD8292.Superseded values are not recommended for survey control.

AD8292.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

AD8292.[See file dsdata.txt](#) to determine how the superseded data were derived.

AD8292

AD8292_U.S. NATIONAL GRID SPATIAL ADDRESS: 17RMK3775954379(NAD 83)

AD8292_MARKER: I = METAL ROD

AD8292_SETTING: 49 = STAINLESS STEEL ROD W/O SLEEVE (10 FT.+)

AD8292_SP_SET: STAINLESS STEEL ROD

AD8292_STAMPING: H 415 1992

AD8292_MARK LOGO: NGS

AD8292_PROJECTION: FLUSH

AD8292_MAGNETIC: I = MARKER IS A STEEL ROD

AD8292_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL

AD8292_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

AD8292+SATELLITE: SATELLITE OBSERVATIONS - July 06, 2007

AD8292_ROD/PIPE-DEPTH: 14.7 meters

AD8292

	Date	Condition	Report By
AD8292 HISTORY	- 1992	MONUMENTED	NGS
AD8292 HISTORY	- 19971106	GOOD	USPSQD
AD8292 HISTORY	- 20020714	GOOD	MAPTEC
AD8292 HISTORY	- 20031031	GOOD	USPSQD
AD8292 HISTORY	- 20070706	GOOD	HOLE

AD8292

AD8292 STATION DESCRIPTION

AD8292

AD8292'DESCRIBED BY NATIONAL GEODETIC SURVEY 1992

AD8292'21.0 KM (13.05 MI) WESTERLY ALONG STATE HIGHWAY 80 FROM THE COUNTY

AD8292'COURTHOUSE IN LA BELLE, 22.0 M (72.2 FT) EAST OF THE CENTER OF THE

AD8292'MOST EASTERLY DRIVEWAY LEADING TO YODER ALVA FARM, 20.6 M (67.6 FT)

AD8292'NORTH OF THE CENTERLINE OF THE HIGHWAY, 2.2 M (7.2 FT) SOUTH OF A

AD8292'CHAIN-LINK FENCE, 1.2 M (3.9 FT) WEST OF A UTILITY POLE, 0.6 M (2.0

AD8292'FT) EAST OF A WITNESS POST, AND 0.3 M (1.0 FT) BELOW THE LEVEL OF THE

AD8292'HIGHWAY. NOTE--ACCESS TO THE DATUM POINT IS THROUGH A 5-INCH LOGO

AD8292'CAP.

AD8292

AD8292 STATION RECOVERY (1997)

AD8292

AD8292'RECOVERY NOTE BY US POWER SQUADRON 1997

AD8292'RECOVERED IN GOOD CONDITION.

AD8292

AD8292 STATION RECOVERY (2002)

AD8292

AD8292'RECOVERY NOTE BY MAPTECH INCORPORATED 2002 (CDP)

AD8292'STATION RECOVERY (2002)

AD8292'RECOVERY NOTE BY MAPTECH, INCORPORATED (CDP) RECOVERED GOOD.

AD8292'

AD8292'
AD8292
AD8292 STATION RECOVERY (2003)
AD8292
AD8292'RECOVERY NOTE BY US POWER SQUADRON 2003
AD8292'RECOVERED IN GOOD CONDITION.
AD8292
AD8292 STATION RECOVERY (2007)
AD8292
AD8292'RECOVERY NOTE BY HOLE MONTES AND ASSOCIATES INC 2007 (BRH)
AD8292'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 = AUGUST 15, 2008
AD5969 *****
AD5969 DESIGNATION - I75 81 A13
AD5969 PID - AD5969
AD5969 STATE/COUNTY- FL/LEE
AD5969 USGS QUAD - BONITA SPRINGS (1987)
AD5969
AD5969 *CURRENT SURVEY CONTROL
AD5969
AD5969* NAD 83(1990)- 26 21 49.83433(N) 081 45 49.69415(W) ADJUSTED
AD5969* NAVD 88 - 4.723 (meters) 15.50 (feet) ADJUSTED
AD5969
AD5969 LAPLACE CORR- -1.52 (seconds) DEFLEC99
AD5969 GEOID HEIGHT- -23.98 (meters) GEOID03
AD5969 DYNAMIC HT - 4.715 (meters) 15.47 (feet) COMP
AD5969 MODELED GRAV- 979,051.4 (mgal) NAVD 88
AD5969
AD5969 HORZ ORDER - SECOND
AD5969 VERT ORDER - SECOND CLASS II
AD5969
AD5969.The horizontal coordinates were established by classical geodetic methods
AD5969.and adjusted by the National Geodetic Survey in May 1991.
AD5969
AD5969.The orthometric height was determined by differential leveling
AD5969.and adjusted in June 1991.
AD5969
AD5969.The Laplace correction was computed from DEFLEC99 derived deflections.
AD5969
AD5969.The geoid height was determined by GEOID03.
AD5969
AD5969.The dynamic height is computed by dividing the NAVD 88
AD5969.geopotential number by the normal gravity value computed on the
AD5969.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
AD5969.degrees latitude (g = 980.6199 gals.).
AD5969
AD5969.The modeled gravity was interpolated from observed gravity values.
AD5969
AD5969; North East Units Scale Factor Converg.
AD5969;SPC FL W - 224,944.491 223,572.744 MT 0.99994803 +0 06 17.6
AD5969;SPC FL W - 738,005.38 733,504.91 sFT 0.99994803 +0 06 17.6
AD5969;SPC FL E - 225,148.558 123,769.904 MT 1.00001290 -0 20 21.1
AD5969;SPC FL E - 738,674.89 406,068.43 sFT 1.00001290 -0 20 21.1
AD5969;UTM 17 - 2,916,203.720 423,795.914 MT 0.99967169 -0 20 21.1
AD5969
AD5969! - Elev Factor x Scale Factor = Combined Factor
AD5969!SPC FL W - 1.00000303 x 0.99994803 = 0.99995106
AD5969!SPC FL E - 1.00000303 x 1.00001290 = 1.00001593
AD5969!UTM 17 - 1.00000303 x 0.99967169 = 0.99967471
AD5969
AD5969|-----|
AD5969| PID Reference Object Distance Geod. Az |
AD5969| | | | dddmmss.s |
AD5969| AD5970 I75 81 A13 RM 1 23.744 METERS 03056 |
AD5969| AD5968 I75 81 A13 RM 2 23.269 METERS 06903 |
AD5969|-----|
AD5969
AD5969 SUPERSEDED SURVEY CONTROL
```

AD5969
AD5969 NAD 83(1986)- 26 21 49.83257(N) 081 45 49.70672(W) AD() 2
AD5969 NGVD 29 (09/01/92) 5.088 (m) 16.69 (f) ADJUSTED 2 2
AD5969
AD5969.Superseded values are not recommended for survey control.
AD5969.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
AD5969.[See file dsdata.txt](#) to determine how the superseded data were derived.
AD5969
AD5969_U.S. NATIONAL GRID SPATIAL ADDRESS: 17RMK2379616204(NAD 83)
AD5969_MARKER: DD = SURVEY DISK
AD5969_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
AD5969_SP_SET: CONCRETE POST
AD5969_STAMPING: I75 81 A13
AD5969_MARK LOGO: FLDT
AD5969_PROJECTION: RECESSED 13 CENTIMETERS
AD5969_MAGNETIC: N = NO MAGNETIC MATERIAL
AD5969_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
AD5969+STABILITY: SURFACE MOTION
AD5969
AD5969 HISTORY - Date Condition Report By
AD5969 HISTORY - 1981 MONUMENTED FLDT
AD5969 HISTORY - 1981 GOOD FLDT
AD5969 HISTORY - 1990 GOOD USPSQD
AD5969 HISTORY - 19971225 MARK NOT FOUND USPSQD
AD5969
AD5969 STATION DESCRIPTION
AD5969
AD5969'DESCRIBED BY FLORIDA DEPARTMENT OF TRANSPORTATION 1981 (CBM)
AD5969'STATION IS LOCATED ABOUT 1-3/4 MILES NORTHEAST OF BONITA SPRINGS AND
AD5969'3 MILES NORTH OF THE LEE-COLLIER COUNTY LINE, ON INTERSTATE ROUTE 75
AD5969'HIGHWAY RIGHT-OF-WAY.
AD5969'
AD5969'TO REACH STATION FROM THE INTERSECTION OF COUNTY ROAD 887 AND STATE
AD5969'ROAD 865 IN BONITA SPRINGS, GO EAST ON STATE ROAD 865 FOR 1.8 MILES
AD5969'TO INTERSECTION OF INTERSTATE ROUTE 75. GO NORTH ON INTERSTATE ROUTE
AD5969'75 FOR 2.6 MILES TO STATION ON RIGHT, EAST SHOULDER OF NORTHBOUND LANE
AD5969'IT IS ABOUT 400 FEET NORTHWEST OF AN OLD CANAL THAT CAN BE SEEN
AD5969'RUNNING NORTH.
AD5969'
AD5969'STATION MARK IS A STANDARD FLORIDA, DEPARTMENT OF TRANSPORTATION BRASS
AD5969'DISK, STAMPED---I75 81 A13---, SET IN THE TOP OF A ROUND CONCRETE
AD5969'MONUMENT THAT IS 5 INCHES BELOW THE GROUND. IT IS 29.0 FEET NORTHEAST
AD5969'OF THE CENTER OF THE NORTH BOUND LANE OF INTERSTATE ROUTE 75,
AD5969'74.5 FEET SOUTHWEST OF A METAL WITNESS POST AND 76.5 FEET SOUTHWEST
AD5969'OF A DOUBLE BRACE POST.
AD5969'
AD5969'REFERENCE MARK NUMBER 1 IS A STANDARD FLORIDA DEPARTMENT OF
AD5969'TRANSPORTATION BRASS DISK, STAMPED---I75 A13 RM 1---, SET IN THE TOP
AD5969'OF A ROUND CONCRETE MONUMENT THAT IS FLUSH WITH THE GROUND. IT IS
AD5969'2.0 FEET SOUTHWEST OF A METAL WITNESS POST, 4.3 FEET SOUTHWEST OF
AD5969'THE RIGHT-OF-WAY FENCE, 100.7 FEET NORTHEAST OF THE CENTER OF THE
AD5969'NORTHBOUND LANE AND 20.6 FEET NORTHWEST OF THE NORTHERN MOST POST OF
AD5969'DOUBLE BRACED FENCEPOSTS.
AD5969'
AD5969'REFERENCE MARK NUMBER 2 IS A STANDARD FLORIDA DEPARTMENT OF
AD5969'TRANSPORTATION BRASS DISK, STAMPED---I75 A13 RM 2---, SET IN THE TOP
AD5969'OF A ROUND CONCRETE MONUMENT THAT IS FLUSH WITH THE GROUND. IT IS
AD5969'1.3 FEET SOUTHWEST OF A METAL WITNESS POST, 2.7 FEET SOUTHWEST OF THE
AD5969'RIGHT-OF-WAY FENCE, 14.2 FEET SOUTH OF THE SOUTHERN MOST ONE OF DOUBLE
AD5969'FENCE BRACE POSTS AND 102.0 FEET NORTHEAST OF THE CENTER OF THE
AD5969'NORTHBOUND LANE.
AD5969
AD5969 STATION RECOVERY (1981)

AD5969
AD5969'RECOVERY NOTE BY FLORIDA DEPARTMENT OF TRANSPORTATION 1981
AD5969'4.35 MI NE FROM BONITA SPRINGS.
AD5969'FROM THE INTERSECTION OF INTERSTATE ROUTE 75 AND STATE ROAD 865, ABOUT
AD5969'1.8 MILES SOUTHEAST OF BONITA SPRINGS, GO NORTHERLY ON INTERSTATE
AD5969'ROUTE 75 FOR ABOUT 1.0 MILE TO THE E TERRY ROAD OVERPASS, CONTINUE
AD5969'NORTHERLY FOR ABOUT 1.55 MILES TO THE MARK. IT IS 76.5 FEET SOUTHWEST
AD5969'OF THE SOUTH POST OF A DOUBLE POST BRACE IN THE EAST RIGHT OF WAY
AD5969'FENCE AND 29.0 FEET NORTHEAST OF THE CENTER OF THE NORTHBOUND LANES.
AD5969'THE MARK IS 74.5 FT SW FROM A WITNESS POST.
AD5969
AD5969 STATION RECOVERY (1990)
AD5969
AD5969'RECOVERY NOTE BY US POWER SQUADRON 1990 (HEA)
AD5969'RECOVERED IN GOOD CONDITION.
AD5969
AD5969 STATION RECOVERY (1997)
AD5969
AD5969'RECOVERY NOTE BY US POWER SQUADRON 1997
AD5969'MARK NOT FOUND.

*** 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 = AUGUST 15, 2008
AD1509 *****
AD1509 SACS - This is a Secondary Airport Control Station.
AD1509 DESIGNATION - W 247
AD1509 PID - AD1509
AD1509 STATE/COUNTY- FL/LEE
AD1509 USGS QUAD - FORT MYERS SE (1987)
AD1509
AD1509 *CURRENT SURVEY CONTROL
AD1509
AD1509* NAD 83(2007)- 26 35 09.63330(N) 081 51 22.32828(W) ADJUSTED
AD1509* NAVD 88 - 4.846 (meters) 15.90 (feet) ADJUSTED
AD1509
AD1509 EPOCH DATE - 2002.00
AD1509 X - 808,519.411 (meters) COMP
AD1509 Y - -5,649,989.043 (meters) COMP
AD1509 Z - 2,837,261.325 (meters) COMP
AD1509 LAPLACE CORR- -2.07 (seconds) DEFLEC99
AD1509 ELLIP HEIGHT- -19.322 (meters) (02/10/07) ADJUSTED
AD1509 GEOID HEIGHT- -24.15 (meters) GEOID03
AD1509 DYNAMIC HT - 4.838 (meters) 15.87 (feet) COMP
AD1509
AD1509 ----- Accuracy Estimates (at 95% Confidence Level in cm) -----
AD1509 Type PID Designation North East Ellip
AD1509 -----
AD1509 NETWORK AD1509 W 247 0.92 0.88 3.25
AD1509 -----
AD1509 MODELED GRAV- 979,067.5 (mgal) NAVD 88
AD1509
AD1509 VERT ORDER - FIRST CLASS I
AD1509
AD1509.This mark is at Page Field Airport (FMY)
AD1509
AD1509.The horizontal coordinates were established by GPS observations
AD1509.and adjusted by the National Geodetic Survey in February 2007.
AD1509
AD1509.The datum tag of NAD 83(2007) is equivalent to NAD 83(NSRS2007).
AD1509.See National Readjustment for more information.
AD1509.The horizontal coordinates are valid at the epoch date displayed above.
AD1509.The epoch date for horizontal control is a decimal equivalence
AD1509.of Year/Month/Day.
AD1509
AD1509.The orthometric height was determined by differential leveling
AD1509.and adjusted in September 1992.
AD1509
AD1509.The X, Y, and Z were computed from the position and the ellipsoidal ht.
AD1509
AD1509.The Laplace correction was computed from DEFLEC99 derived deflections.
AD1509
AD1509.The ellipsoidal height was determined by GPS observations
AD1509.and is referenced to NAD 83.
AD1509
AD1509.The geoid height was determined by GEOID03.
AD1509
AD1509.The dynamic height is computed by dividing the NAVD 88
AD1509.geopotential number by the normal gravity value computed on the
AD1509.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
```


AD1509'ABOUT 2 FEET ABOVE THE LEVEL OF THE ROAD.
AD1509
AD1509 STATION RECOVERY (1976)
AD1509
AD1509'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1976
AD1509'RECOVERED IN GOOD CONDITION.
AD1509
AD1509 STATION RECOVERY (1981)
AD1509
AD1509'RECOVERY NOTE BY US GEOLOGICAL SURVEY 1981
AD1509'RECOVERED IN GOOD CONDITION.
AD1509
AD1509 STATION RECOVERY (1992)
AD1509
AD1509'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1992
AD1509'IN FORT MYERS, AT THE INTERSECTION OF IDLEWILD ROAD AND SIXTH STREET,
AD1509'IN TOP OF AND 0.2 M (0.7 FT) EAST OF THE WEST EDGE OF THE MOST
AD1509'NORTHWESTERLY OF 4 CONCRETE FOOTINGS FOR AN AIRPORT BEACON (BEACON
AD1509'REMOVED), IN THE SOUTHWEST CORNER OF THE LAWN OF THE LEE COUNTY
AD1509'DEPARTMENT OF TRANSPORTATION, 34.5 M (113.2 FT) WEST OF THE EXTENDED
AD1509'CENTERLINE OF THE STREET, 19.1 M (62.7 FT) EAST OF THE CENTER OF A
AD1509'PAVED ROAD, 12.9 M (42.3 FT) NORTH OF THE CENTERLINE OF THE ROAD, 6.3
AD1509'M (20.7 FT) SOUTH OF THE SOUTH CURB OF A PARKING LOT, 0.3 M (1.0 FT)
AD1509'ABOVE THE LEVEL OF THE ROAD, 0.3 M (1.0 FT) SOUTH OF A WITNESS POST,
AD1509'0.2 M (0.7 FT) SOUTH OF THE NORTH EDGE OF THE CONCRETE BASE, AND THE
AD1509'FOOTING IS 0.06 M (0.20 FT) BELOW THE GROUND SURFACE.
AD1509
AD1509 STATION RECOVERY (1996)
AD1509
AD1509'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1996 (CFS)
AD1509'THE STATION IS LOCATED OUTSIDE THE EASTERN BOUNDARY OF PAGE FIELD ON
AD1509'THE SOUTH SIDE OF FORT MYERS. IT IS SET ON THE NORTH SIDE OF IDLEWILD
AD1509'ROAD IN FRONT OF THE LEETRAN (LEE COUNTY TRANSIT) FACILITY BETWEEN 6TH
AD1509'STREET AND EAST AIRPORT ROAD. OWNERSHIP -- LEETRAN, 10715 EAST
AD1509'AIRPORT ROAD, FORT MYERS, FL 33907. TRANSIT MANAGER MR. LARRY
AD1509'RALSTON, TELEPHONE (941) 275-8726 TO REACH THE STATION FROM THE
AD1509'JUNCTION OF INTERSTATE HIGHWAY 75 AND STATE HIGHWAY 884 AT INTERSTATE
AD1509'HIGHWAY 75 EXIT 22 EAST OF FORT MYERS, GO WEST ON STATE HIGHWAY 884
AD1509'(COLONIAL BLVD) FOR 3.25 MI (5.23 KM) TO STATE HIGHWAY 739 (METO
AD1509'PARKWAY) ON THE LEFT, TURN LEFT AND GO SOUTHERLY ON THE METOR PARKWAY
AD1509'FOR 0.85 MI (1.37 KM) TO IDLEWILD ROAD ON THE RIGHT. TURN RIGHT ON
AD1509'IDLEWILD ROAD AND GO WEST FOR 0.1 MI (0.2 KM) CROSSING A RAILROAD
AD1509'TRACK AND TEN MILE CANAL TO A FOUR WAY STOP WITH 6TH STREET ON THE
AD1509'LEFT. CONTINUE STRAIGHT AHEAD FOR 0.05 MI (0.08 KM) TO THE STATION ON
AD1509'THE RIGHT NEAR THE CORNER OF IDLEWILD ROAD AND EAST AIRPORT ROAD. THE
AD1509'STATION IS A STANDARD U.S.C. AND G.S. BENCH MARK DISK SET IN THE
AD1509'NORTHWEST CORNER OF AN OLD 3-FT SQUARE CONCRETE FOOTING FOR A BEACON
AD1509'TOWER WHICH IS 4-INCHED BELOW THE SURFACE. THERE IS A SCRATCH THRU
AD1509'THE 24 IN 247. THE STATION IS WITHIN 0.2 MI (0.3 KM) OF PAGE FIELD
AD1509'GATES 4, 5, AND 6B. IT IS 20.0 M (65.6 FT) EAST OF THE PROJECTED
AD1509'CENTERLINE OF EAST AIRPORT ROAD, 13.55 M (44.46 FT) EAST OF THE CENTER
AD1509'OF DRAIN GRATE IN EAST AIRPORT ROAD, 12.8 M (42.0 FT) NORTH OF THE
AD1509'CENTERLINE OF IDLEWILD ROAD, 9.59 M (31.46 FT) SOUTHEAST OF THE
AD1509'SOUTHWEST CORNER OF PARKING LOT, 8.88 M (29.13 FT) EAST-SOUTHEAST OF
AD1509'IDLEWILD ROAD AND EAST AIRPORT ROAD STREET SIGN, 6.41 M (21.03 FT)
AD1509'SOUTH OF SOUTH CURB OF PARKING LOT, 2.87 M (9.42 FT) NORTH OF THE
AD1509'NORTHWEST CORNER OF OLD 3-FT SQUARE CONCRETE FOOTING, AND 0.27 M (0.89
AD1509'FT) SOUTH OF A WITNESS POST. THIS IS A SECONDARY AIRPORT CONTROL
AD1509'STATION. WJR
AD1509
AD1509 STATION RECOVERY (2003)
AD1509
AD1509'RECOVERY NOTE BY US POWER SQUADRON 2003

AD1509'RECOVERED IN GOOD CONDITION.
AD1509
AD1509 STATION RECOVERY (2003)
AD1509
AD1509'RECOVERY NOTE BY US POWER SQUADRON 2003
AD1509'RECOVERED IN GOOD CONDITION.
AD1509
AD1509 STATION RECOVERY (2005)
AD1509
AD1509'RECOVERY NOTE BY MCKIM AND CREED 2005 (BRH)
AD1509'RECOVERED IN GOOD CONDITION.

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

APPENDIX B: NEW GROUND CONTROL STATION INFORMATION

This appendix contains the station recovery information sheets for the newly established Woolpert GPS control stations set for Area F of the FY2007 State of Florida Division of Emergency Management Ground Control QA/QC Survey Mapping Project.



GPS Station Recovery - GPS Log Sheet



Project Name: Florida Coastal Mapping Project

Operator Name S. LAMB Job No. 66517

Station Name: 022Y

Date of Survey: 13 DEC 07 Julian Day 347

WGS84 Coordinates

File Name: 022Y Session # 4

Latitude N 26° 44' 26.07"

Type of Receiver: Trimble

Longitude W 081° 51' 01.38"

Type of Antenna: R8-2 / 5800

Ellip. Height -57.300'

Antenna Height: 2.0m

☒ USFT ☒ ARB

☒ Meters ☒ Phase Center

Type of Mark: BRASS DISK IN CONE

Start Time (local): 1:10 PM

Stamping on Mark: FLA D.O.T. S 1/4 COR. SECT 7

Weather Condition: +/- 80° / m. cloudy

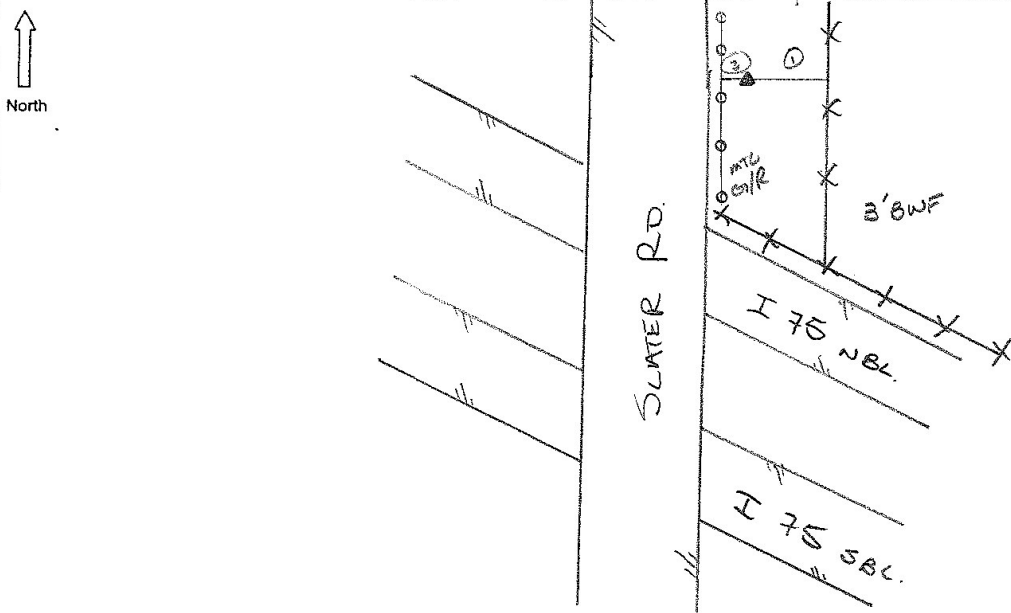
Top Reach Description

STATION 022Y IS ON E SIDE OF SLATER RD JUST NORTH OF A BRIDGE IS I-75.

Witness Notes

Reference Object	Distance	Azimuth
1) TO 3' BWP	47'	
2) TO MTL GUARDRAIL	11'	
3)		
4)		

Sketch





GPS Station Recovery - GPS Log Sheet



Project Name: Florida Coastal Mapping Project

Operator Name: S LAMB

Job No. 66517

Station Name: QUARRY

Date of Survey: 13 Dec 07 Julian Day 347

WGS84 Coordinates

Latitude N 26° 28' 37.90"

Longitude W 081° 42' 43.33"

Ellip. Height -59.732'

File Name: QUARRY Session # 1

Type of Receiver: Trimble

Type of Antenna: RB-2/5800

Antenna Height: 2.0m

☒ Choke ☒ GPS Core

USFT ☒ ARP
Meters ☒ Phase Center

Type of Mark: D.W. w/ CAD

Start Time (local): 9:00am

Stamping on Mark: WOOLPERT

Weather Condition: 7-80°/CLEAR

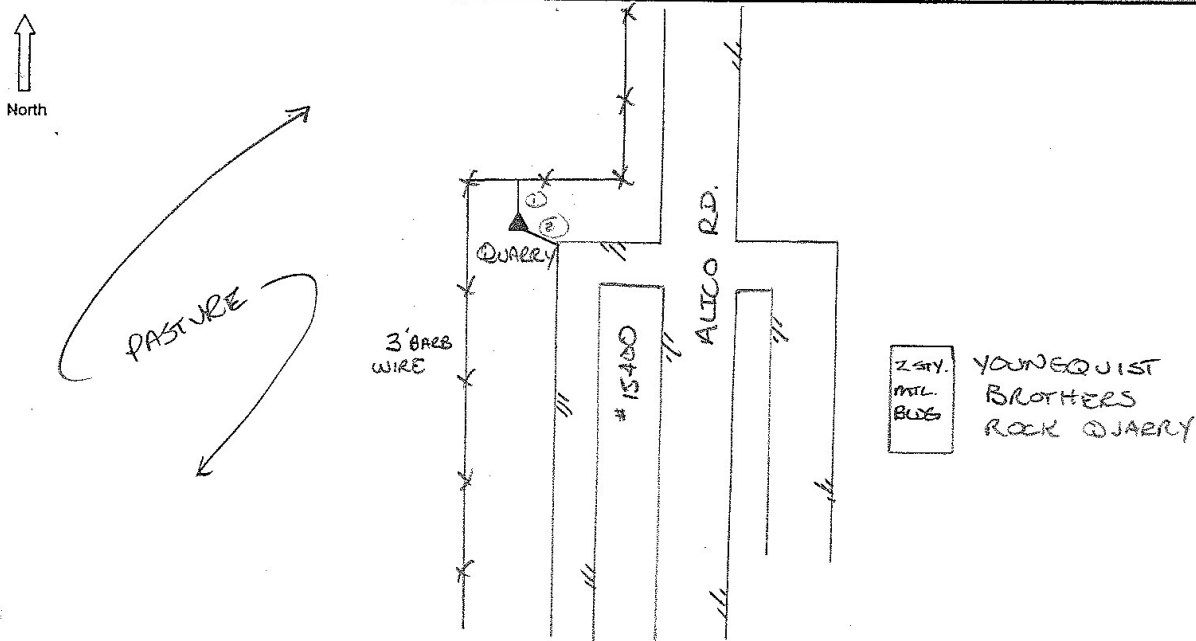
Location Description

STATION QUARRY IS LOCATED SEST
WEST OF ALICO RD AT ENTRANCE TO
YOUNGQUIST BROTHERS ROCK QUARRY.

Witness Sites

Reference Object	Distance	Azimuth
1) TO 3' BARB WIRE FENCE	49'	
2) TO NW CORNER OF PAT.	50'	
3)		
4)		

Sketch



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 Project Area F 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 MODEL: GEOID 03
COORDINATE SYSTEM: GRID
DATE: 1-14-08

STATIONS IN RED USED RAPID STATIC
STATIONS IN BLUE USED CONVENTIONAL METHODS

LiDAR QA/QC POINTS AND LiDAR CONTROL POINTS:

STATION NAME	GRID NORTHING (US FT)	GRID EASTING (US FT)	STATION ELEVATION (US FT)	STATION DESCRIPTION
6000	899442.79	691871.69	27.03	URBAN
6001	899296.44	691869.27	26.90	LOW GRASS OR BARE EARTH
6002	899435.76	691930.82	25.32	BRUSH
6005	870594.99	703852.07	16.84	URBAN
6006	870677.20	703780.49	16.40	LOW GRASS OR BARE EARTH
6008	869914.83	702804.81	17.13	BRUSH
6009	869818.90	702813.90	17.45	LIDAR CONTROL POINT
6010	855465.28	699176.36	8.68	URBAN
6011	855479.06	699450.75	10.39	LOW GRASS OR BARE EARTH
6013	855363.42	699277.04	9.72	BRUSH
6014	855655.16	699010.90	9.03	LIDAR CONTROL POINT
6015	834189.23	695419.00	10.35	URBAN
6016	834239.98	695683.08	9.79	LOW GRASS OR BARE EARTH
6017	834337.66	695642.71	13.44	BRUSH
6018	834406.93	695804.54	13.57	LIDAR CONTROL POINT
6020	826970.61	715104.57	21.52	URBAN
6021	826959.54	714926.70	20.69	LOW GRASS OR BARE EARTH
6022	826760.69	714981.56	18.05	BRUSH
6023	826883.80	714991.61	20.68	LIDAR CONTROL POINT
6025	804331.16	701802.67	13.29	URBAN
6026	804420.92	701539.39	10.66	LOW GRASS OR BARE EARTH
6027	804376.95	701933.29	9.92	BRUSH
6030	802816.34	714435.54	17.13	URBAN
6031	802376.08	714926.50	20.83	LOW GRASS OR BARE EARTH
6032	802223.90	714912.78	16.55	BRUSH
6035	778151.42	704225.92	2.57	URBAN

STATION NAME	GRID NORTHING (US FT)	GRID EASTING (US FT)	STATION ELEVATION (US FT)	STATION DESCRIPTION
6036	778117.04	704094.16	1.75	LOW GRASS OR BARE EARTH
6037	778056.81	704293.83	2.50	BRUSH
6038	777964.32	704229.88	2.48	LIDAR CONTROL POINT
6040	778223.81	713854.32	13.30	URBAN
6041	778344.02	713812.22	14.00	LOW GRASS OR BARE EARTH
6043	778237.34	714114.62	13.65	LIDAR CONTROL POINT
6045	746299.40	717627.92	15.63	URBAN
6046	746266.19	717626.65	14.70	LOW GRASS OR BARE EARTH
6047	746631.47	717727.54	13.77	BRUSH
6048	746300.71	718061.32	15.47	LIDAR CONTROL POINT
6050	752659.88	696792.34	4.16	URBAN
6051	752749.77	696736.53	4.49	LOW GRASS OR BARE EARTH
6052	752274.64	696989.27	1.94	BRUSH
6053	752751.46	696660.74	4.68	LIDAR CONTROL POINT
6061	726005.66	718083.06	10.85	LOW GRASS OR BARE EARTH
6063	725720.81	728428.05	9.56	BRUSH
6065	741751.87	735908.48	15.65	URBAN
6066	741756.42	735976.98	13.38	BRUSH
6067	736936.58	737684.24	13.41	LOW GRASS OR BARE EARTH
6068	741041.50	735900.03	15.01	LIDAR CONTROL POINT
6070	765069.73	734037.58	19.18	URBAN
6071	765292.70	734310.81	18.20	LOW GRASS OR BARE EARTH
6072	765419.74	734242.93	16.39	BRUSH
6073	765303.39	733883.83	19.56	LIDAR CONTROL POINT
6075	784426.97	734739.34	23.96	URBAN
6076	784487.99	734640.26	21.45	LOW GRASS OR BARE EARTH
6077	784411.01	734484.66	22.08	BRUSH
6078	784553.80	734633.49	23.26	LIDAR CONTROL POINT
6080	804833.15	733566.77	26.30	URBAN
6081	804881.04	733709.96	25.55	LOW GRASS OR BARE EARTH
6082	804774.66	733469.44	21.73	BRUSH
6084	805025.42	733529.17	25.62	LIDAR CONTROL POINT
6085	831354.84	731312.27	22.42	URBAN
6086	831281.79	731389.34	19.94	LOW GRASS OR BARE EARTH
6087	831313.33	732298.38	21.70	BRUSH
6088	831375.67	732291.31	22.14	LIDAR CONTROL POINT
6090	849751.73	731803.85	17.22	URBAN
6091	849859.11	731766.96	16.41	LOW GRASS OR BARE EARTH
6092	849671.27	731440.78	16.21	BRUSH
6095	872847.96	743975.37	9.83	URBAN

STATION NAME	GRID NORTHING (US FT)	GRID EASTING (US FT)	STATION ELEVATION (US FT)	STATION DESCRIPTION
6096	874362.78	743970.86	11.24	LOW GRASS OR BARE EARTH
6097	883694.82	720922.57	25.65	URBAN
6098	883658.69	720999.24	23.70	LOW GRASS OR BARE EARTH
6099	883794.96	720946.22	24.87	BRUSH
6100	883609.89	720929.44	25.34	LIDAR CONTROL POINT
6102	892827.83	721993.00	26.50	URBAN
6103	904661.73	734331.71	30.37	URBAN
6104	892836.33	721280.46	26.79	BRUSH
6105	892827.82	722257.93	27.86	LIDAR CONTROL POINT
6106	874717.64	743989.86	12.19	LIDAR CONTROL POINT
6107	892808.06	721409.72	26.99	LOW GRASS OR BARE EARTH
6108	907250.93	734479.91	29.43	LOW GRASS OR BARE EARTH
6109	904644.08	734593.59	28.85	BRUSH
6110	907458.71	734466.89	30.19	LIDAR CONTROL POINT
6112	885677.35	734259.83	26.01	URBAN
6113	885492.16	734269.10	24.45	LOW GRASS OR BARE EARTH
6114	885734.53	734404.81	24.97	BRUSH
6117	874166.48	759810.70	15.02	URBAN
6118	874034.43	759868.83	14.88	LOW GRASS OR BARE EARTH
6119	874237.77	759841.51	15.06	BRUSH
6120	873870.16	759870.68	15.30	LIDAR CONTROL POINT
6122	852480.57	760179.30	18.15	URBAN
6123	852588.15	760194.19	17.47	LOW GRASS OR BARE EARTH
6124	852539.32	760112.16	18.08	BRUSH
6127	835243.43	758175.92	21.59	URBAN
6128	835114.62	758533.24	21.27	LOW GRASS OR BARE EARTH
6129	835140.04	758457.59	20.60	BRUSH
6130	835226.87	758323.62	20.76	LIDAR CONTROL POINT
6132	828594.46	777311.77	23.01	URBAN
6133	828892.25	777167.06	22.74	LOW GRASS OR BARE EARTH
6134	828937.17	777158.38	23.09	BRUSH
6135	828856.98	777295.10	22.89	LIDAR CONTROL POINT
6137	802717.48	752385.35	27.74	URBAN
6138	802753.55	752560.48	27.96	LOW GRASS OR BARE EARTH
6139	802900.72	752829.65	23.97	BRUSH
6143	783993.81	751016.14	24.94	URBAN
6144	783967.49	753269.17	24.62	LOW GRASS OR BARE EARTH
6145	784022.31	751121.98	22.17	BRUSH
6146	783952.06	753009.02	25.10	LIDAR CONTROL POINT
6147	758928.01	759980.71	17.92	URBAN
6148	758867.45	759951.02	17.88	LOW GRASS OR BARE EARTH

STATION NAME	GRID NORTHING (US FT)	GRID EASTING (US FT)	STATION ELEVATION (US FT)	STATION DESCRIPTION
6149	758840.12	759848.89	17.49	BRUSH
6153	725754.43	755926.11	17.08	URBAN
6154	726336.02	755019.54	17.40	LOW GRASS OR BARE EARTH
6155	726249.12	754887.32	13.08	BRUSH
6300	746340.64	717987.67	13.45	FORESTED
6301	746395.22	718045.64	13.01	FORESTED
6302	746352.12	718169.39	13.46	FORESTED
6303	778194.58	704321.77	1.28	FORESTED
6304	778177.82	704283.93	1.35	FORESTED
6305	778223.43	704255.49	1.58	FORESTED
6306	765457.95	734537.26	15.61	FORESTED
6307	765295.49	734563.42	15.62	FORESTED
6308	765211.12	734358.57	16.37	FORESTED
6309	804959.70	734059.48	23.35	FORESTED
6310	804799.20	733895.95	24.06	FORESTED
6311	804709.71	733659.91	21.50	FORESTED
6312	802343.09	714841.54	16.47	FORESTED
6313	802261.06	715170.59	15.55	FORESTED
6314	802453.10	715150.62	16.26	FORESTED
6315	869888.12	702730.07	15.45	FORESTED
6316	870045.53	702794.33	15.79	FORESTED
6317	869932.66	702878.60	15.35	FORESTED
6318	874639.26	743645.28	9.63	FORESTED
6319	874622.73	743762.58	10.11	FORESTED
6320	874674.82	743910.65	10.16	FORESTED
6321	874604.21	743928.17	10.85	FORESTED
6322	849329.80	731374.22	16.29	FORESTED
6323	849419.36	731252.27	16.26	FORESTED
6324	849510.37	731242.99	16.30	FORESTED
6325	828666.71	777361.62	23.54	FORESTED
6326	828763.28	777400.76	22.58	FORESTED
6327	828848.95	777387.03	22.60	FORESTED
6328	783944.41	751013.59	23.70	FORESTED
6329	784155.53	751050.45	23.04	FORESTED
6330	784164.10	750846.40	22.63	FORESTED
I75 81 A13	738005.56	733505.31	15.65	LOW GRASS OR BARE EARTH
QUARRY	778732.83	750368.10	26.23	LOW GRASS OR BARE EARTH
W 247	818713.94	703160.22	15.90	BRUSH

EXISTING NGS CONTROL USED:

STATION NAME	GRID NORTHING (US FT)	GRID EASTING (US FT)	STATION ELEVATION (US FT)	STATION DESCRIPTION
GPSHOLT	859190.94	659368.44	13.11	NGS CONTROL STATION
H 415	863642.82	778349.72	13.61	NGS CONTROL STATION
I75 81 A13	738005.56	733505.31	15.65	NGS CONTROL STATION
W 247	818713.94	703160.22	15.90	NGS CONTROL STATION

NEW CONTROL STATIONS:

STATION NAME	GRID NORTHING (US FT)	GRID EASTING (US FT)	STATION ELEVATION (US FT)	STATION DESCRIPTION
OZZY	874898.47	704997.54	31.64	WOOLPERT BASE STATION
QUARRY	778732.83	750368.10	26.23	WOOLPERT BASE STATION

APPENDIX D: POSITIONAL ACCURACIES

This appendix contains the final positional accuracies for the LiDAR QA/QC Checkpoints (except the forest points) and the LiDAR Control Points for Project Area F of the FY2007 State of Florida Division of Emergency Management Ground Control QA/QC Survey Mapping Project.

LIDAR QA/QC POINTS (NO FOREST POINTS)

CALCULATED ACCURACY:

0.01	Meters RMSE _x
0.01	Meters RMSE _y
0.01	Meters RMSE _{xy}
0.01	Meters at 95% C.I.
0.02	RMSE _z
0.03	Meters at 95% C.I.

CALCULATED ACCURACY:

0.02	Feet RMSE _x
0.02	Feet RMSE _y
0.03	Feet RMSE _{xy}
0.04	Feet at 95% C.I.
0.05	RMSE _z
0.10	Feet at 95% C.I.

METERS

STATION	V _x	V _y	V _{xy}	V _z
6000	0.01	0.005	0.01	0.01
6001	0.01	0.005	0.01	0.01
6002	0.01	0.005	0.01	0.01
6005	0.00	0.006	0.01	0.02
6006	0.00	0.006	0.01	0.02
6008	0.01	0.011	0.01	0.03
6009	0.01	0.011	0.01	0.03
6010	0.01	0.006	0.01	0.02
6011	0.01	0.006	0.01	0.02
6013	0.01	0.006	0.01	0.02
6015	0.01	0.004	0.01	0.02
6016	0.01	0.004	0.01	0.02
6017	0.01	0.004	0.01	0.02
6020	0.01	0.004	0.01	0.01
6021	0.00	0.004	0.01	0.01
6022	0.01	0.004	0.01	0.01
6025	0.01	0.004	0.01	0.01
6026	0.01	0.004	0.01	0.01
6027	0.01	0.004	0.01	0.02
6030	0.01	0.004	0.01	0.02
6031	0.01	0.004	0.01	0.02
6032	0.01	0.006	0.01	0.02
6035	0.00	0.004	0.01	0.02
6036	0.00	0.004	0.01	0.01
6037	0.00	0.004	0.01	0.01
6038	0.00	0.004	0.01	0.01
6040	0.01	0.005	0.01	0.02
6041	0.01	0.005	0.01	0.02
6045	0.01	0.005	0.01	0.01
6046	0.01	0.005	0.01	0.01
6047	0.01	0.005	0.01	0.01

US FEET

STATION	V _x	V _y	V _{xy}	V _z
6000	0.02	0.02	0.03	0.04
6001	0.02	0.02	0.03	0.04
6002	0.02	0.02	0.03	0.04
6005	0.01	0.02	0.02	0.05
6006	0.01	0.02	0.02	0.05
6008	0.03	0.03	0.05	0.10
6009	0.03	0.04	0.05	0.09
6010	0.02	0.02	0.03	0.05
6011	0.02	0.02	0.03	0.05
6013	0.02	0.02	0.03	0.05
6015	0.02	0.01	0.02	0.05
6016	0.02	0.01	0.02	0.05
6017	0.02	0.01	0.02	0.06
6020	0.02	0.01	0.02	0.04
6021	0.02	0.01	0.02	0.04
6022	0.02	0.01	0.02	0.04
6025	0.02	0.01	0.02	0.04
6026	0.02	0.01	0.02	0.05
6027	0.02	0.01	0.03	0.05
6030	0.02	0.01	0.02	0.06
6031	0.02	0.01	0.02	0.06
6032	0.03	0.02	0.03	0.08
6035	0.01	0.01	0.02	0.05
6036	0.01	0.01	0.02	0.05
6037	0.01	0.01	0.02	0.05
6038	0.01	0.01	0.02	0.05
6040	0.02	0.01	0.03	0.05
6041	0.02	0.02	0.03	0.06
6045	0.02	0.02	0.03	0.04
6046	0.02	0.02	0.03	0.04
6047	0.02	0.02	0.03	0.05

STATION	Vx	Vy	Vxy	Vz
6050	0.00	0.005	0.01	0.01
6051	0.00	0.005	0.01	0.01
6052	0.00	0.005	0.01	0.01
6061	0.01	0.005	0.01	0.02
6063	0.00	0.004	0.01	0.01
6065	0.01	0.004	0.01	0.02
6066	0.01	0.006	0.01	0.01
6067	0.01	0.007	0.01	0.02
6070	0.00	0.004	0.01	0.01
6071	0.00	0.004	0.01	0.01
6072	0.00	0.004	0.01	0.01
6075	0.00	0.003	0.01	0.01
6076	0.00	0.004	0.01	0.01
6077	0.00	0.003	0.01	0.01
6080	0.00	0.005	0.01	0.01
6081	0.00	0.005	0.01	0.01
6082	0.00	0.005	0.01	0.01
6085	0.00	0.004	0.01	0.02
6086	0.00	0.004	0.01	0.02
6087	0.01	0.004	0.01	0.02
6090	0.01	0.006	0.01	0.01
6091	0.01	0.006	0.01	0.01
6092	0.01	0.006	0.01	0.01
6095	0.01	0.006	0.01	0.02
6096	0.01	0.005	0.01	0.02
6097	0.01	0.004	0.01	0.01
6098	0.01	0.004	0.01	0.01
6099	0.01	0.004	0.01	0.01
6102	0.00	0.004	0.01	0.01
6103	0.01	0.005	0.01	0.01
6104	0.01	0.004	0.01	0.01
6107	0.01	0.004	0.01	0.01
6108	0.01	0.005	0.01	0.01
6109	0.01	0.005	0.01	0.01
6112	0.01	0.005	0.01	0.02
6113	0.01	0.005	0.01	0.02
6114	0.01	0.005	0.01	0.02
6117	0.01	0.010	0.01	0.02
6118	0.01	0.010	0.01	0.02
6119	0.01	0.011	0.01	0.02
6122	0.01	0.005	0.01	0.02
6123	0.01	0.005	0.01	0.02
6124	0.01	0.005	0.01	0.02
6127	0.00	0.006	0.01	0.02
6128	0.00	0.006	0.01	0.01
6129	0.00	0.006	0.01	0.02
6132	0.01	0.004	0.01	0.01
6133	0.01	0.004	0.01	0.01

STATION	Vx	Vy	Vxy	Vz
6050	0.02	0.02	0.02	0.04
6051	0.01	0.02	0.02	0.04
6052	0.01	0.02	0.02	0.04
6061	0.02	0.02	0.02	0.06
6063	0.01	0.01	0.02	0.04
6065	0.02	0.01	0.02	0.05
6066	0.02	0.02	0.03	0.05
6067	0.02	0.02	0.03	0.07
6070	0.01	0.01	0.02	0.04
6071	0.01	0.01	0.02	0.04
6072	0.01	0.01	0.02	0.04
6075	0.01	0.01	0.02	0.03
6076	0.02	0.01	0.02	0.03
6077	0.01	0.01	0.02	0.03
6080	0.02	0.02	0.02	0.04
6081	0.02	0.02	0.02	0.04
6082	0.02	0.02	0.02	0.04
6085	0.02	0.01	0.02	0.05
6086	0.02	0.01	0.02	0.05
6087	0.02	0.01	0.02	0.06
6090	0.02	0.02	0.03	0.04
6091	0.02	0.02	0.03	0.04
6092	0.02	0.02	0.03	0.04
6095	0.02	0.02	0.03	0.06
6096	0.02	0.02	0.03	0.06
6097	0.02	0.01	0.02	0.03
6098	0.02	0.01	0.02	0.03
6099	0.02	0.01	0.02	0.03
6102	0.02	0.01	0.02	0.04
6103	0.02	0.02	0.02	0.03
6104	0.02	0.01	0.02	0.04
6107	0.02	0.01	0.02	0.04
6108	0.02	0.02	0.02	0.03
6109	0.02	0.02	0.02	0.03
6112	0.02	0.01	0.02	0.06
6113	0.02	0.02	0.03	0.06
6114	0.02	0.02	0.03	0.06
6117	0.02	0.03	0.04	0.07
6118	0.02	0.03	0.04	0.07
6119	0.02	0.04	0.04	0.08
6122	0.02	0.02	0.03	0.07
6123	0.02	0.02	0.03	0.07
6124	0.02	0.02	0.03	0.06
6127	0.01	0.02	0.02	0.05
6128	0.01	0.02	0.02	0.05
6129	0.01	0.02	0.02	0.05
6132	0.02	0.01	0.02	0.05
6133	0.02	0.01	0.02	0.04

STATION	Vx	Vy	Vxy	Vz
6134	0.01	0.004	0.01	0.01
6137	0.01	0.007	0.01	0.02
6138	0.01	0.007	0.01	0.02
6139	0.01	0.008	0.01	0.03
6143	0.00	0.004	0.01	0.01
6144	0.01	0.004	0.01	0.02
6145	0.00	0.004	0.01	0.01
6147	0.01	0.004	0.01	0.01
6148	0.01	0.004	0.01	0.01
6149	0.01	0.004	0.01	0.01
6153	0.01	0.006	0.01	0.01
6154	0.01	0.004	0.01	0.02
6155	0.01	0.005	0.01	0.02
SUMSQ	0.00	0.00	0.01	0.02
COUNT	93.00	93.00	93.00	93.00
AVG ERROR	0.01	0.01	0.01	0.02
MAX ERROR	0.01	0.01	0.01	0.03
MIN ERROR	0.00	0.00	0.01	0.01
RMSE	0.01	0.01	0.01	0.02

STATION	Vx	Vy	Vxy	Vz
6134	0.02	0.01	0.02	0.04
6137	0.02	0.02	0.03	0.07
6138	0.02	0.02	0.03	0.06
6139	0.03	0.03	0.04	0.09
6143	0.02	0.01	0.02	0.04
6144	0.02	0.01	0.02	0.06
6145	0.02	0.01	0.02	0.04
6147	0.02	0.01	0.02	0.03
6148	0.02	0.01	0.02	0.03
6149	0.02	0.01	0.02	0.03
6153	0.02	0.02	0.03	0.04
6154	0.02	0.01	0.02	0.05
6155	0.02	0.02	0.03	0.05
SUMSQ	0.03	0.03	0.06	0.25
COUNT	93.00	93.00	93.00	93.00
AVG ERROR	0.02	0.02	0.02	0.05
MAX ERROR	0.04	0.03	0.05	0.10
MIN ERROR	0.01	0.01	0.02	0.03
RMSE	0.02	0.02	0.03	0.05

LiDAR CONTROL POINTS ONLY

CALCULATED ACCURACY:

0.01	Meters RMSE _x
0.01	Meters RMSE _y
0.01	Meters RMSE _{xy}
0.01	Meters at 95% C.I.
0.02	RMSE _z
0.03	Meters at 95% C.I.

CALCULATED ACCURACY:

0.02	Feet RMSE _x
0.02	Feet RMSE _y
0.02	Feet RMSE _{xy}
0.04	Feet at 95% C.I.
0.05	RMSE _z
0.10	Feet at 95% C.I.

METERS

<u>STATION</u>	<u>V_x</u>	<u>V_y</u>	<u>V_{xy}</u>	<u>V_z</u>
6014	0.01	0.01	0.01	0.02
6018	0.00	0.00	0.01	0.02
6023	0.00	0.00	0.01	0.01
6043	0.01	0.00	0.01	0.02
6048	0.01	0.01	0.01	0.01
6053	0.00	0.01	0.01	0.01
6068	0.01	0.01	0.01	0.03
6073	0.00	0.00	0.01	0.01
6078	0.00	0.00	0.01	0.01
6084	0.01	0.01	0.01	0.01
6088	0.01	0.00	0.01	0.02
6100	0.01	0.00	0.01	0.01
6105	0.00	0.00	0.01	0.01
6106	0.01	0.01	0.01	0.02
6110	0.01	0.00	0.01	0.01
6120	0.01	0.01	0.01	0.02
6130	0.00	0.01	0.01	0.02
6135	0.01	0.00	0.01	0.01
6146	0.01	0.00	0.01	0.02
SUMSQ	0.00	0.00	0.00	0.00
COUNT	19.00	19.00	19.00	19.00
AVG ERROR	0.01	0.01	0.01	0.01
MAX ERROR	0.01	0.01	0.01	0.03
MIN ERROR	0.00	0.00	0.01	0.01
RMSE	0.01	0.01	0.01	0.02

US FEET

<u>STATION</u>	<u>V_x</u>	<u>V_y</u>	<u>V_{xy}</u>	<u>V_z</u>
6014	0.02	0.02	0.03	0.05
6018	0.02	0.02	0.02	0.05
6023	0.02	0.02	0.02	0.04
6043	0.02	0.02	0.02	0.05
6048	0.02	0.02	0.02	0.04
6053	0.01	0.01	0.02	0.05
6068	0.02	0.02	0.03	0.08
6073	0.01	0.01	0.02	0.04
6078	0.02	0.02	0.02	0.03
6084	0.02	0.02	0.02	0.04
6088	0.02	0.02	0.02	0.05
6100	0.02	0.02	0.02	0.03
6105	0.02	0.02	0.02	0.04
6106	0.02	0.02	0.03	0.06
6110	0.02	0.02	0.02	0.03
6120	0.02	0.02	0.04	0.07
6130	0.01	0.01	0.02	0.05
6135	0.02	0.02	0.02	0.05
6146	0.02	0.02	0.02	0.06
SUMSQ	0.01	0.01	0.01	0.05
COUNT	19.00	19.00	19.00	19.00
AVG ERROR	0.02	0.02	0.02	0.05
MAX ERROR	0.03	0.02	0.04	0.08
MIN ERROR	0.01	0.01	0.02	0.03
RMSE	0.02	0.02	0.02	0.05

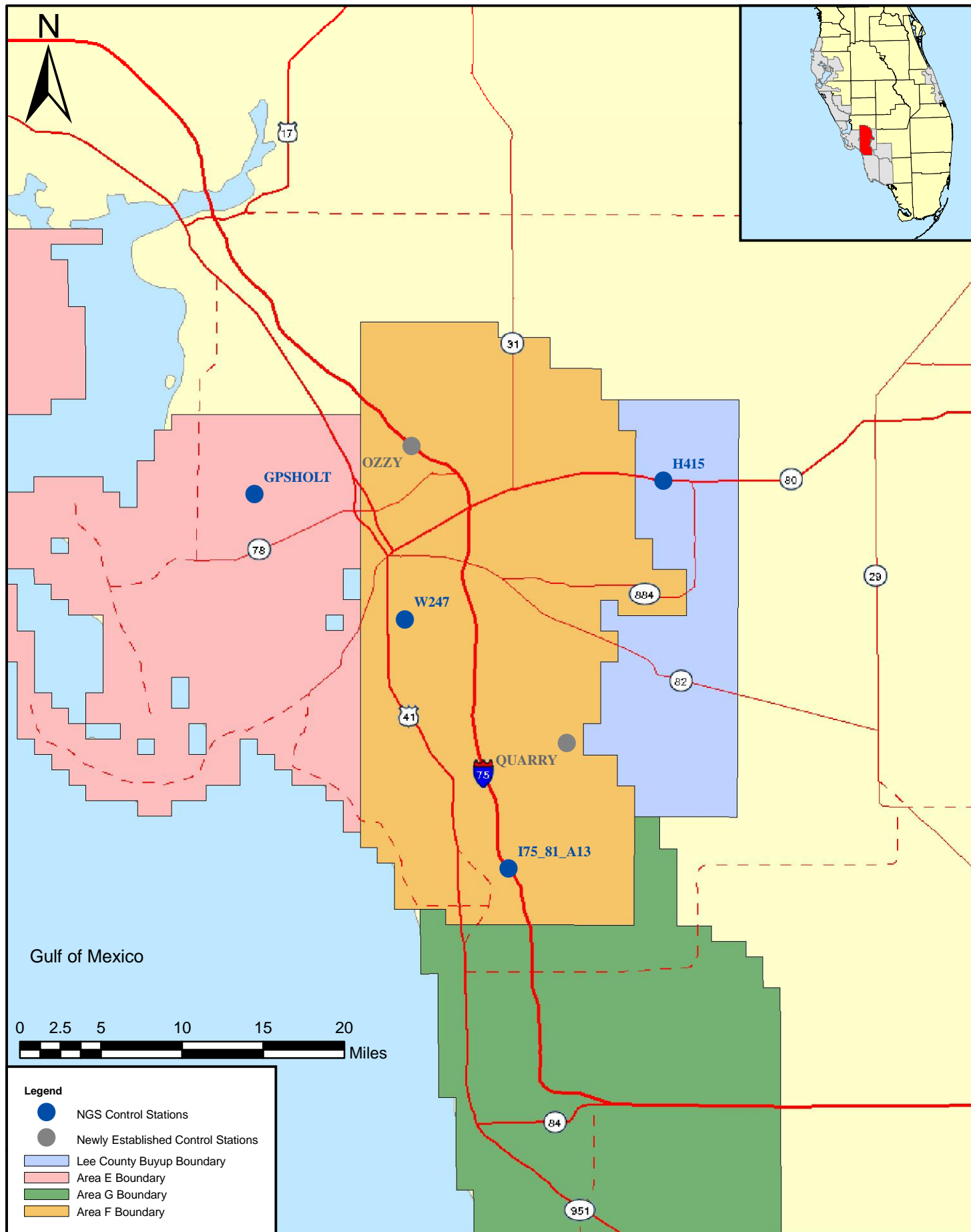
APPENDIX E: LAYOUT MAPS

This appendix contains layout maps of the GPS ground control stations, LiDAR Control Points and LiDAR QA/QC Checkpoints (see below) for the Project Area F 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 Baseline Network

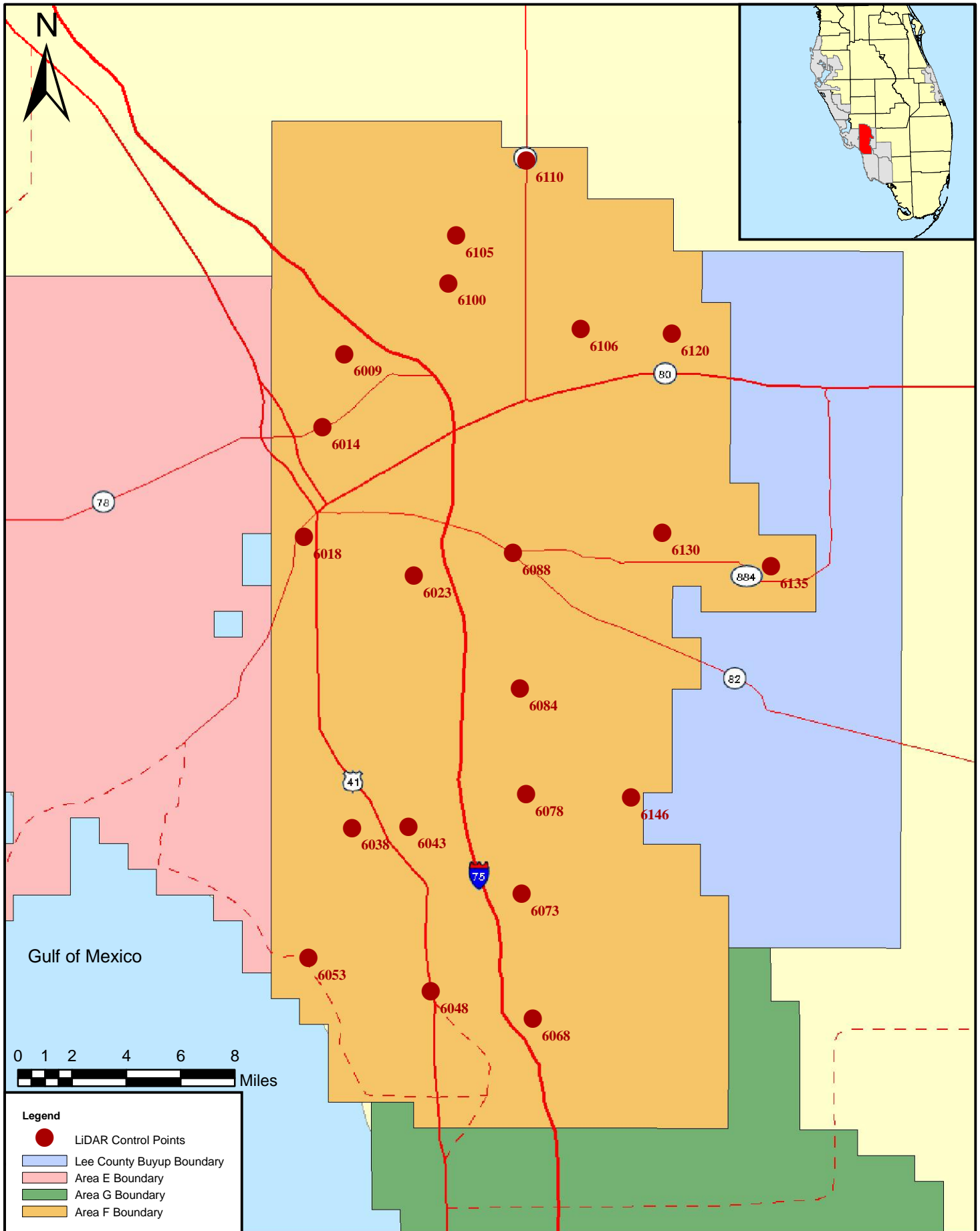


AREA F - GPS CONTROL STATIONS



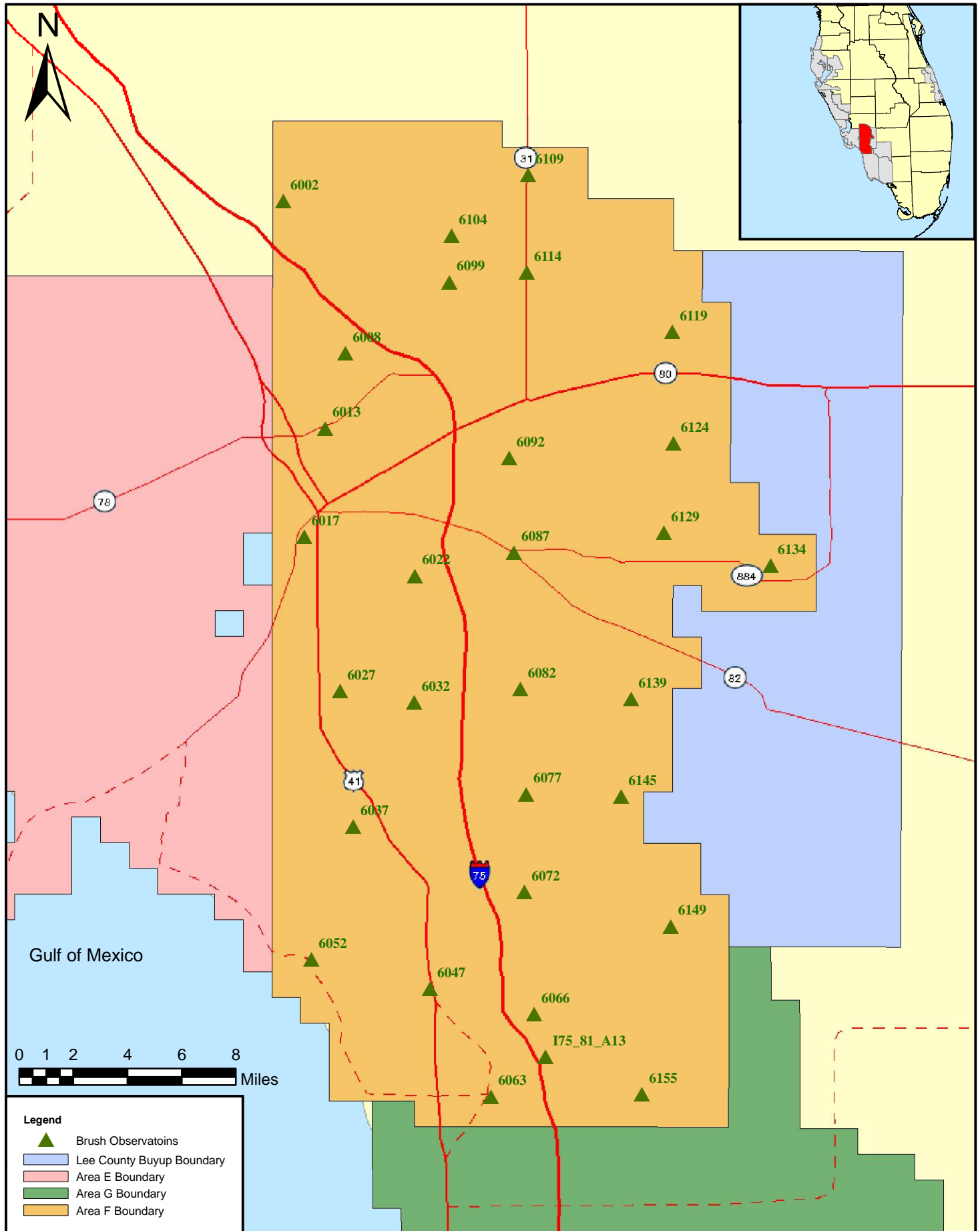


AREA F - LiDAR CONTROL POINTS



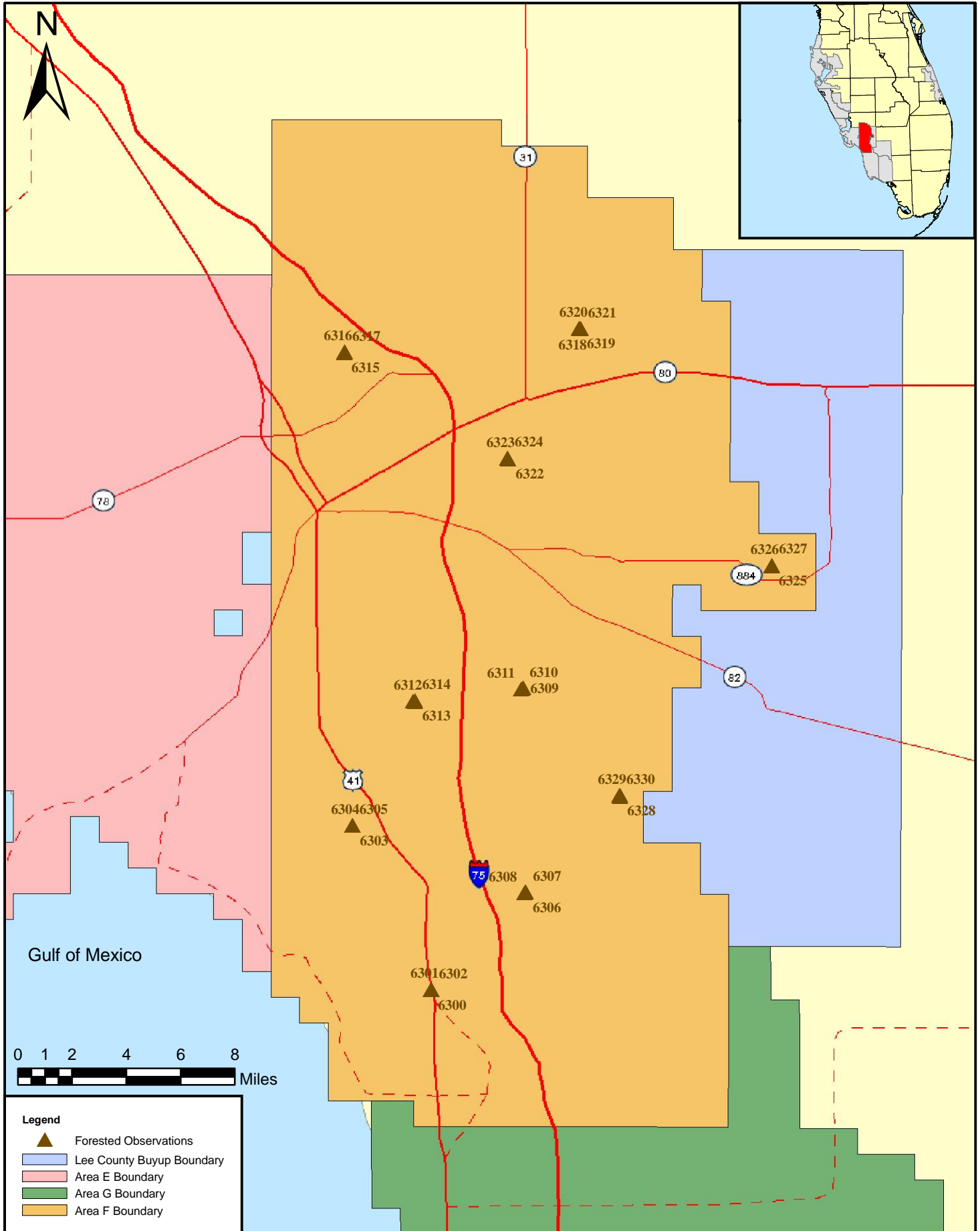


AREA F - BRUSH



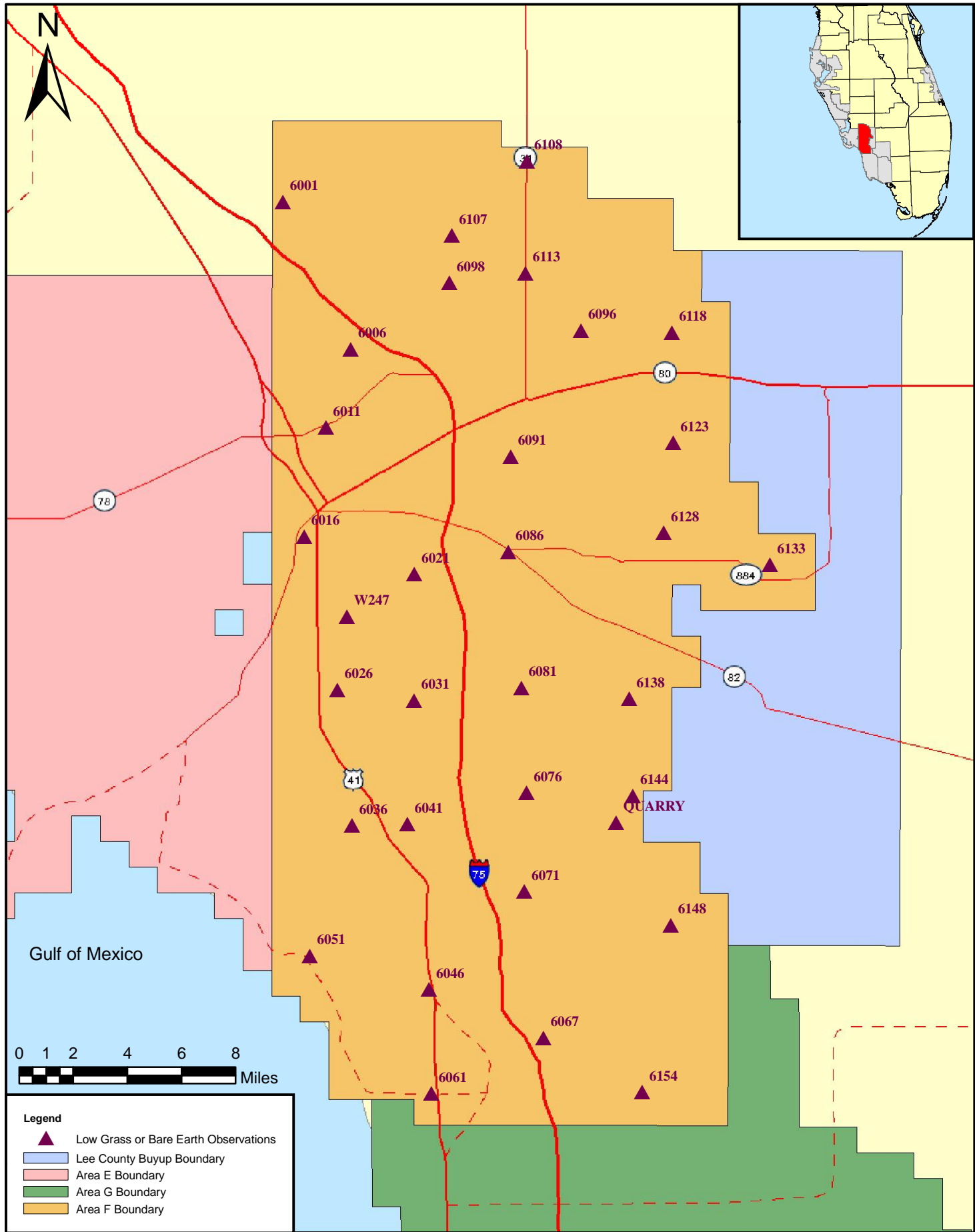


AREA F - FORESTED



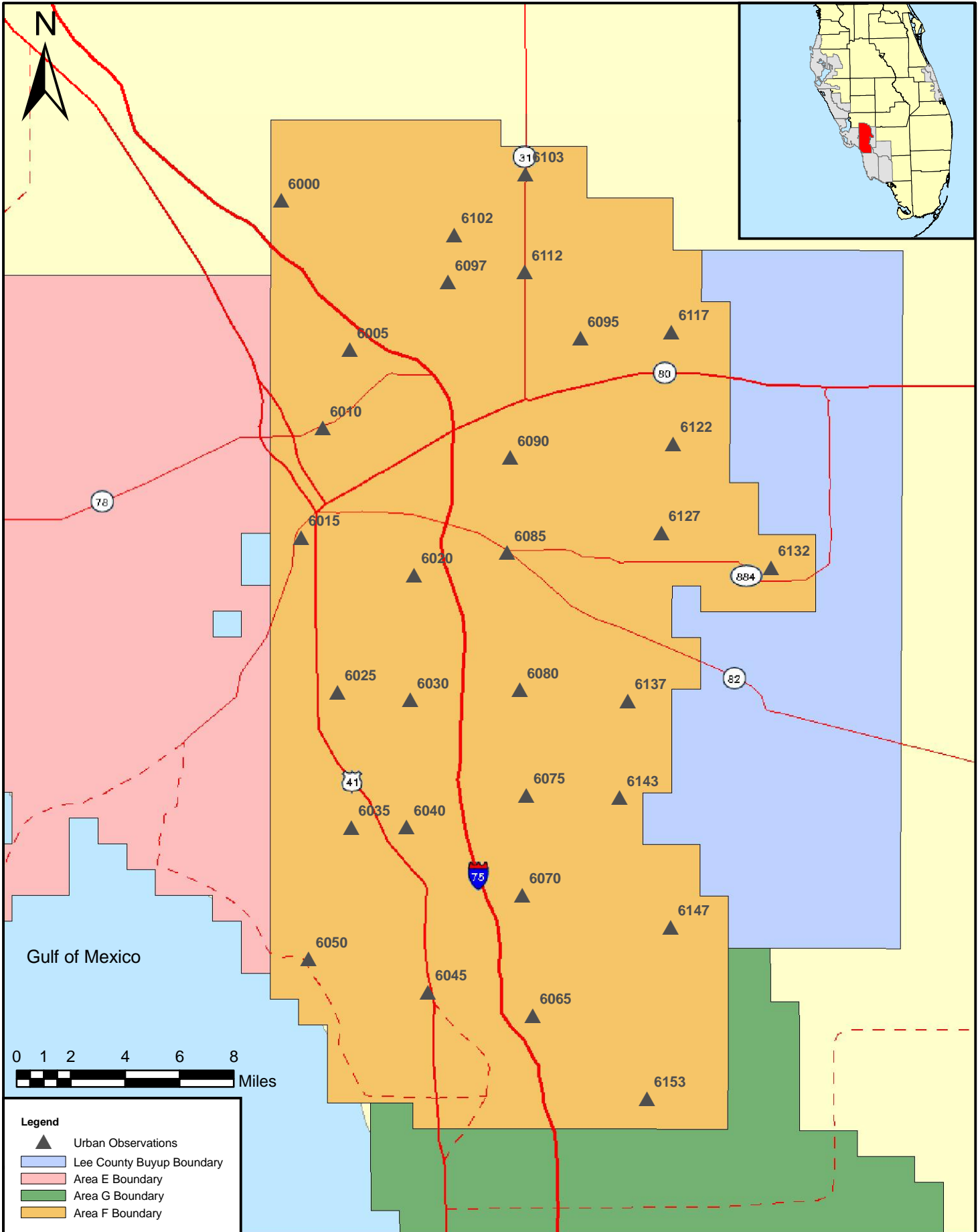


AREA F - LOW GRASS OR BARE EARTH

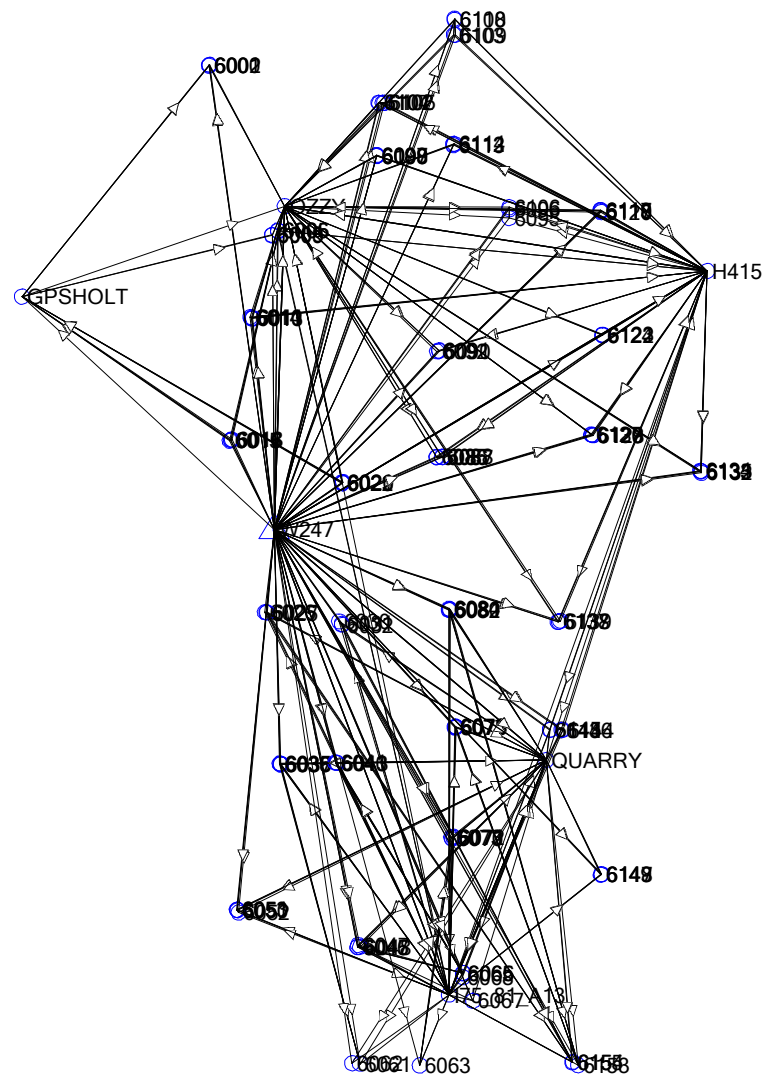




AREA F - URBAN



FDEM



A horizontal scale bar with a black and white checkerboard pattern. The left end is labeled '0' and the right end is labeled '62500 sft'.

US survey feet



USFeet Template