

FL PANHANDLE QL2 LIDAR PROJECT INDEPENDENT CHECK POINTS

CONTRACT NO. G16PC00020

Reference:

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Prepared For:

Dewberry Consultants LLC

Prepared By:



Dewberry[®]

PREBLE-RISH

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	Including: a) Ground Control Point Documentation Report – NVA.pdf and VVA.pdf	
	b) Final Coordinate List in Excel Format – ICP-Control.xls	
	c) NGS Data Sheets for Project Controls – NGS Datasheets.pdf	

1. INTRODUCTION

1.1 *Project Summary*

Dewberry|Preble-Rish is under subcontract to Dewberry Consultants, LLC, to provide 154 Non-vegetated Vertical Accuracy (NVA), and 109 Vegetated Vertical Accuracy (VVA) check points that will be used to evaluate vertical accuracy on the bare-earth terrain derived from the LiDAR. A total of 79 of the NVA points shall also be horizontal accuracy check points.

Existing NGS Control Points were recovered and surveyed to verify the accuracy of the RTK/GPS survey equipment with the results shown in Section 2.4 and Appendix 1 of this report.

As an internal QA/QC procedure, and to verify that the LiDAR check points meet the 95% confidence level, 83 of the NVA check points, and 62 of the VVA check points were re-surveyed and are shown in Section 5 of this report. For check points that were surveyed twice, an average of the two observations was computed to generate final coordinates and elevations.

Final horizontal coordinates are referenced to NAD 83 (2011), Universal Transverse Mercator (UTM) Zone 16, meters. Final vertical elevations are referenced to NAVD88 in Meters using Geoid model 2012B (Geoid12B).

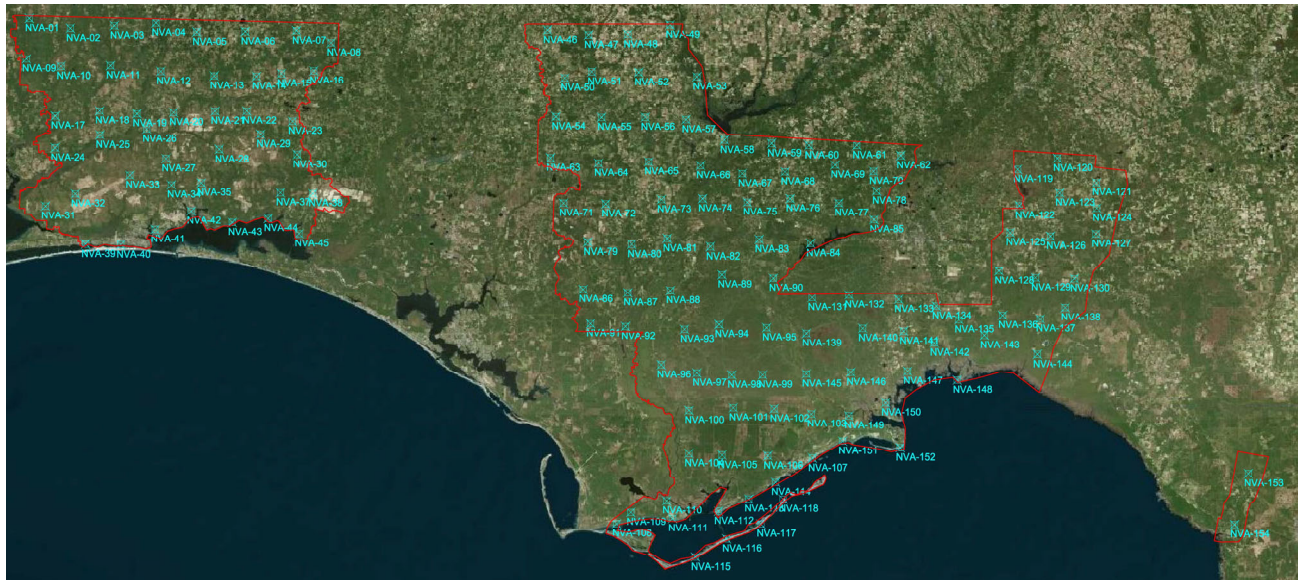
1.2 *Points of Contact*

Questions regarding the technical aspects of this report should be addressed to:

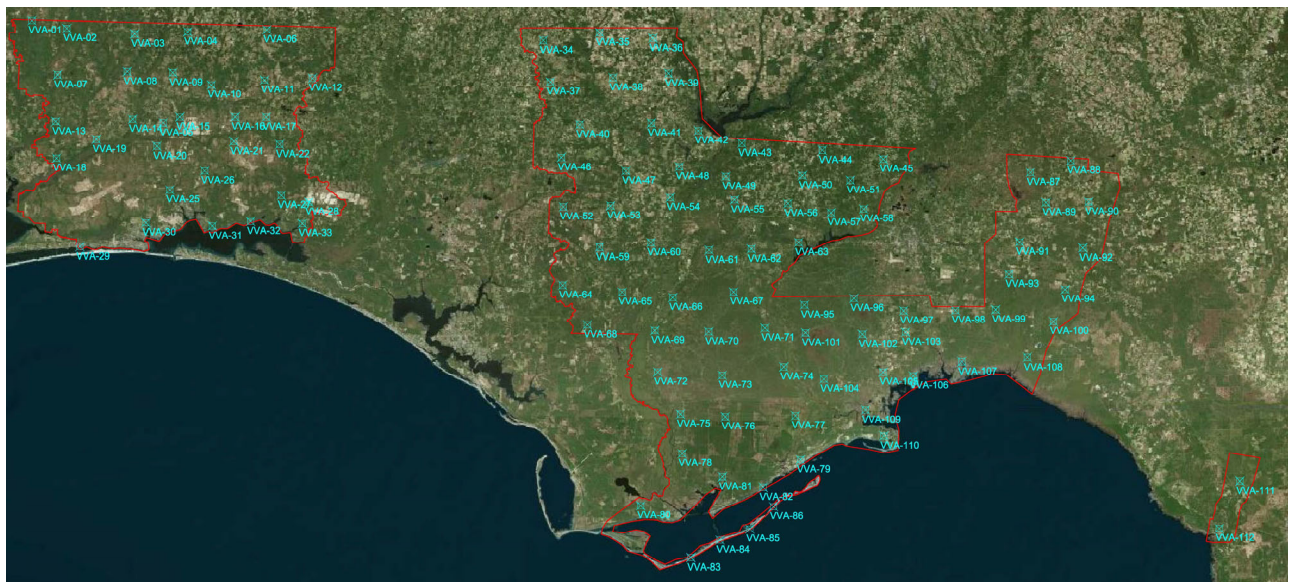
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1.3 Project Area



FL PANHANDLE QL2 LIDAR PROJECT – NVA LOCATIONS



FL PANHANDLE QL2 LIDAR PROJECT – VVA LOCATIONS

2. PROJECT DETAILS

2.1 *Survey Equipment*

In performing the GPS observations, Spectra Precision Epoch 80 GNSS RTK GPS receiver/antenna attached to a 6.56 foot (2 meter) fixed height pole was used, together with a Spectra Precision Ranger Data Collector equipped with SurveyPro Software (version 5.5.2), to collect GPS raw data for the field surveys.

2.2 *Survey Point Detail*

154 Non-vegetated Check Points, and 109 Vegetated Check Points were distributed throughout the project area. Approximate locations were provided to Dewberry|Preble-Rish prior to field survey.

A sketch was made for each location and a nail was set at the point where possible, unless said point was already located at a photo identifiable point. The LiDAR calibration point locations are detailed on the “Ground Control Point Documentation Report”, which is delivered via electronic transfer, see appendix 5a on sheet 2.

2.3 *Network Design*

The GPS survey performed by Dewberry|Preble-Rish was tied to the Trimble VRS Now Permanent Reference Network, a Real Time Network (RTN) managed by the Trimble Company. The Trimble VRS Now Network provides instant access to real-time kinematic (RTK) corrections utilizing a network of continuously operating permanent reference stations located throughout the United States, Europe, and Australia. Each site provides Global Positioning System (GPS) carrier phase and code range measurements in support of 3-dimensional positioning activities through Florida and surrounding states. All of the reference stations have been linked together, creating a Virtual Reference Station System (VRS).

2.4 *Field Survey Procedures and Analysis*

Dewberry|Preble-Rish field surveyors used Spectra Precision Epoch 80 GNSS RTK GPS systems, which is a geodetic quality dual frequency GPS receiver, to collect data at each check point location.

A total of twelve (28) existing NGS monuments were located as an additional QA/QC procedure, for the purpose of verifying the accuracy of the VRS network. All NGS monuments used are published in the NSRS database, and represent the primary project control for this survey. Field GPS observations are detailed in the “Project Network Control Monument Report”, see appendix 1 on sheets 8-11.

A total of 83 of the NVA check point locations, and 62 of the VVA check point locations were occupied twice. If re-observations matched the initially derived station positions within the allowable tolerance of $\pm 5\text{cm}$ or within the 95% confidence level, then no further occupations were performed. If re-observations did not match the initially derived positions, a static GPS session was collected and processed through NOAA’s Online Positioning User Service (OPUS). Each VRS occupation utilized the Trimble VRS Now Network, was occupied for approximately 3 to 6 minutes in duration, and measured to 180 - 360 epochs. All static sessions were occupied for a minimum of 45 minutes, and up to 100 minutes. Field GPS observations are detailed in the “Ground Control Point Documentation Report”, and delivered via electronic transfer, see appendix 5a on sheet 2.

2.5 *Adjustment*

Most survey data was collected using Virtual Reference Stations (VRS) methodology within a Virtual Reference System (VRS). The system is designed to provide a true Network RTK performance. The RTK software enables high-accuracy positioning in real time across a geographic region. The RTK software package uses real-time data streams from the GPS system user and generates correction models for high-accuracy RTK GPS corrections throughout the network. Therefore, corrections were applied to the points as they were being collected, thus negating the need for a post process adjustment.

Some survey data was collected using Rapid Static GPS Surveying methodology. Rapid Static methodology is similar to conventional static GPS, except for the benefit of needing shorter occupation times due to shorter baselines, favorable satellite geometry, and minimal signal disturbances. Once data was collected, static sessions were processed through NOAA’s Online Positioning User Service (OPUS). This service provides simplified access to high-accuracy National Spatial Reference System (NSRS) coordinates and elevations. OPUS uses software which computes coordinates and elevations for NGS’ Continuously Operating Reference Station (CORS) network. The resulting positions are accurate and consistent with other National Spatial Reference System users.

2.6 *Data Processing Procedures*

After field data is collected (and processed through OPUS for static observations) the information is downloaded into the office software. Text files are created that show the point number, northing, easting, elevation, and description (PNEZD format) for each point surveyed. Points are then entered into a Microsoft Excell spreadsheet, which contains formulas for calculating differences between published and field survey data, as well as, comparing differences between points surveyed multiple times. This data is used to confirm point accuracy and precision.

After review of the point data, an “ASCII” or “txt” file (PNEZD format) is created, which is the industry standard. Point files are loaded into our CADD program (AutoCAD Civil 3D) to make a visual check of the point data (Pt. #, Coordinates, Elev. and Description). For check points that were surveyed twice, an average of the two observations was computed to generate final northings, eastings, and elevations. The data can now be imported into the final product.

Appendix 1:
Project Network Control Monument Report

872 9154 C TIDAL - UTM 16										
Date	Field Survey Data (M)			Published Data (M)			Differences (M)			RMSE
	Northing	Easting	Elevation	Northing	Easting	Elevation	Delta N	Delta E	Delta Z	
4/26/2018	3355844.184	618998.121	4.381	3355844.169	618998.115	4.367	-0.015	-0.006	-0.014	rmse _N 0.021
4/26/2018	3355844.187	618998.120	4.358	3355844.169	618998.115	4.367	-0.018	-0.005	0.009	rmse _E 0.008
4/27/2018	3355844.193	618998.107	4.349	3355844.169	618998.115	4.367	-0.024	0.008	0.018	Hrmse, 0.022
4/27/2018	3355844.173	618998.125	4.321	3355844.169	618998.115	4.367	-0.004	-0.010	0.046	Vrmse 0.026
4/30/2018	3355844.160	618998.113	4.321	3355844.169	618998.115	4.367	0.009	0.002	0.046	
4/30/2018	3355844.181	618998.120	4.378	3355844.169	618998.115	4.367	-0.012	-0.005	-0.011	
5/2/2018	3355844.164	618998.116	4.346	3355844.169	618998.115	4.367	0.005	-0.001	0.021	
5/2/2018	3355844.175	618998.110	4.392	3355844.169	618998.115	4.367	-0.006	0.005	-0.025	
5/3/2018	3355844.180	618998.111	4.347	3355844.169	618998.115	4.367	-0.011	0.004	0.020	
5/3/2018	3355844.187	618998.117	4.347	3355844.169	618998.115	4.367	-0.018	-0.002	0.020	
5/7/2018	3355844.201	618998.121	4.356	3355844.169	618998.115	4.367	-0.032	-0.006	0.011	
6/8/2018	3355844.152	618998.131	4.331	3355844.169	618998.115	4.367	0.017	-0.016	0.036	
6/8/2018	3355844.136	618998.107	4.390	3355844.169	618998.115	4.367	0.033	0.008	-0.023	
6/16/2018	3355844.193	618998.097	4.357	3355844.169	618998.115	4.367	-0.024	0.018	0.010	
8/14/2018	3355844.165	618998.125	4.335	3355844.169	618998.115	4.367	0.004	-0.010	0.032	
8/14/2018	3355844.213	618998.109	4.397	3355844.169	618998.115	4.367	-0.044	0.006	-0.030	

BAY 1054 - HORIZONTAL ONLY - UTM 16										
Date	Field Survey Data (M)			Published Data (M)			Differences (M)			RMSE
	Northing	Easting	Elevation	Northing	Easting	Elevation	Delta N	Delta E	Delta Z	
4/24/2018	3368101.320	654086.618	41.014	3368101.284	654086.624	N.A.	-0.036	0.006	N.A.	rmse _N 0.024
4/25/2018	3368101.307	654086.634	41.011	3368101.284	654086.624	N.A.	-0.023	-0.010	N.A.	rmse _E 0.014
4/26/2018	3368101.320	654086.619	41.003	3368101.284	654086.624	N.A.	-0.036	0.005	N.A.	Hrmse, 0.028
4/26/2018	3368101.316	654086.635	41.006	3368101.284	654086.624	N.A.	-0.032	-0.011	N.A.	Vrmse N.A.
4/27/2018	3368101.306	654086.614	41.037	3368101.284	654086.624	N.A.	-0.022	0.010	N.A.	
4/27/2018	3368101.306	654086.620	41.014	3368101.284	654086.624	N.A.	-0.022	0.004	N.A.	
4/30/2018	3368101.308	654086.609	41.011	3368101.284	654086.624	N.A.	-0.024	0.015	N.A.	
5/1/2018	3368101.312	654086.625	40.996	3368101.284	654086.624	N.A.	-0.028	-0.001	N.A.	
5/1/2018	3368101.304	654086.630	41.043	3368101.284	654086.624	N.A.	-0.020	-0.006	N.A.	
5/8/2018	3368101.293	654086.610	41.018	3368101.284	654086.624	N.A.	-0.009	0.014	N.A.	
5/8/2018	3368101.302	654086.626	41.007	3368101.284	654086.624	N.A.	-0.018	-0.002	N.A.	
5/9/2018	3368101.309	654086.629	41.005	3368101.284	654086.624	N.A.	-0.025	-0.005	N.A.	
5/10/2018	3368101.281	654086.638	41.040	3368101.284	654086.624	N.A.	0.003	-0.014	N.A.	
5/10/2018	3368101.314	654086.594	40.922	3368101.284	654086.624	N.A.	-0.030	0.030	N.A.	
5/11/2018	3368101.308	654086.633	41.085	3368101.284	654086.624	N.A.	-0.024	-0.009	N.A.	
5/14/2018	3368101.292	654086.625	41.008	3368101.284	654086.624	N.A.	-0.008	-0.001	N.A.	
5/14/2018	3368101.305	654086.618	40.999	3368101.284	654086.624	N.A.	-0.021	0.006	N.A.	
5/15/2018	3368101.302	654086.617	41.024	3368101.284	654086.624	N.A.	-0.018	0.007	N.A.	
5/17/2018	3368101.303	654086.624	41.025	3368101.284	654086.624	N.A.	-0.019	0.000	N.A.	
5/17/2018	3368101.323	654086.619	41.034	3368101.284	654086.624	N.A.	-0.039	0.005	N.A.	
5/18/2018	3368101.296	654086.642	40.965	3368101.284	654086.624	N.A.	-0.012	-0.018	N.A.	
5/18/2018	3368101.316	654086.649	40.995	3368101.284	654086.624	N.A.	-0.032	-0.025	N.A.	
7/20/2018	3368101.303	654086.619	41.011	3368101.284	654086.624	N.A.	-0.019	0.005	N.A.	
7/21/2018	3368101.280	654086.633	41.025	3368101.284	654086.624	N.A.	0.004	-0.009	N.A.	
7/21/2018	3368101.298	654086.638	41.090	3368101.284	654086.624	N.A.	-0.014	-0.014	N.A.	
7/23/2018	3368101.295	654086.628	41.013	3368101.284	654086.624	N.A.	-0.011	-0.004	N.A.	
7/23/2018	3368101.288	654086.640	41.085	3368101.284	654086.624	N.A.	-0.004	-0.016	N.A.	
7/24/2018	3368101.293	654086.617	41.021	3368101.284	654086.624	N.A.	-0.009	0.007	N.A.	
7/25/2018	3368101.308	654086.639	41.033	3368101.284	654086.624	N.A.	-0.024	-0.015	N.A.	
7/25/2018	3368101.301	654086.631	41.023	3368101.284	654086.624	N.A.	-0.017	-0.007	N.A.	
7/25/2018	3368101.330	654086.641	41.050	3368101.284	654086.624	N.A.	-0.046	-0.017	N.A.	
7/25/2018	3368101.334	654086.645	41.036	3368101.284	654086.624	N.A.	-0.050	-0.021	N.A.	
7/25/2018	3368101.324	654086.648	41.023	3368101.284	654086.624	N.A.	-0.040	-0.024	N.A.	
7/26/2018	3368101.307	654086.609	40.994	3368101.284	654086.624	N.A.	-0.023	0.015	N.A.	
7/31/2018	3368101.294	654086.615	40.991	3368101.284	654086.624	N.A.	-0.010	0.009	N.A.	
7/31/2018	3368101.310	654086.640	40.996	3368101.284	654086.624	N.A.	-0.026	-0.016	N.A.	
8/3/2018	3368101.310	654086.658	41.005	3368101.284	654086.624	N.A.	-0.026	-0.034	N.A.	
8/13/2018	3368101.294	654086.602	41.019	3368101.284	654086.624	N.A.	-0.010	0.022	N.A.	
8/17/2018	3368101.314	654086.607	41.031	3368101.284	654086.624	N.A.	-0.030	0.017	N.A.	
8/21/2018	3368101.305	654086.631	40.979	3368101.284	654086.624	N.A.	-0.021	-0.007	N.A.	
8/21/2018	3368101.300	654086.600	41.008	3368101.284	654086.624	N.A.	-0.016	0.024	N.A.	
8/22/2018	3368101.305	654086.617	40.955	3368101.284	654086.624	N.A.	-0.021	0.007	N.A.	
8/30/2018	3368101.290	654086.620	40.964	3368101.284	654086.624	N.A.	-0.006	0.004	N.A.	

BAY 2 FLDNR - VERTICAL ONLY										
Date	Field Survey Data (M)			Published Data (M)			Differences (M)			RMSE
	Northing	Easting	Elevation	Northing	Easting	Elevation	Delta N	Delta E	Delta Z	
4/24/2018	N.A.	N.A.	39.942	N.A.	N.A.	39.969	N.A.	N.A.	0.027	rmse _N N.A.
4/25/2018	N.A.	N.A.	39.923	N.A.	N.A.	39.969	N.A.	N.A.	0.046	rmse _E N.A.
4/26/2018	N.A.	N.A.	39.920	N.A.	N.A.	39.969	N.A.	N.A.	0.049	Hrmse, N.A.
4/26/2018	N.A.	N.A.	39.931	N.A.	N.A.	39.969	N.A.	N.A.	0.038	Vrmse 7.554
4/27/2018	N.A.	N.A.	39.928	N.A.	N.A.	39.969	N.A.	N.A.	0.041	
4/27/2018	N.A.	N.A.	39.941	N.A.	N.A.	39.969	N.A.	N.A.	0.028	
4/30/2018	N.A.	N.A.	39.923	N.A.	N.A.	39.969	N.A.	N.A.	0.046	
5/8/2018	N.A.	N.A.	39.935	N.A.	N.A.	39.969	N.A.	N.A.	0.034	
5/9/2018	N.A.	N.A.	39.928	N.A.	N.A.	39.969	N.A.	N.A.	0.041	
5/14/2018	N.A.	N.A.	39.931	N.A.	N.A.	39.969	N.A.	N.A.	0.038	
5/14/2018	N.A.	N.A.	39.929	N.A.	N.A.	39.969	N.A.	N.A.	0.040	
5/15/2018	N.A.	N.A.	39.943	N.A.	N.A.	39.969	N.A.	N.A.	0.026	
5/17/2018	N.A.	N.A.	39.923	N.A.	N.A.	39.969	N.A.	N.A.	0.046	
5/17/2018	N.A.	N.A.	39.969	N.A.	N.A.	39.969	N.A.	N.A.	0.000	
5/18/2018	N.A.	N.A.	39.932	N.A.	N.A.	39.969	N.A.	N.A.	0.037	
6/7/2018	N.A.	N.A.	39.881	N.A.	N.A.	39.969	N.A.	N.A.	0.088	
7/20/2018	N.A.	N.A.	39.939	N.A.	N.A.	39.969	N.A.	N.A.	0.030	
7/21/2018	N.A.	N.A.	39.962	N.A.	N.A.	39.969	N.A.	N.A.	0.007	
7/21/2018	N.A.	N.A.	39.935	N.A.	N.A.	39.969	N.A.	N.A.	0.034	
7/23/2018	N.A.	N.A.	39.920	N.A.	N.A.	39.969	N.A.	N.A.	0.049	
7/23/2018	N.A.	N.A.	39.967	N.A.	N.A.	39.969	N.A.	N.A.	0.002	
7/24/2018	N.A.	N.A.	39.954	N.A.	N.A.	39.969	N.A.	N.A.	0.015	
7/25/2018	N.A.	N.A.	39.976	N.A.	N.A.	39.969	N.A.	N.A.	-0.007	
7/26/2018	N.A.	N.A.	39.943	N.A.	N.A.	39.969	N.A.	N.A.	0.026	
8/13/2018	N.A.	N.A.	39.954	N.A.	N.A.	39.969	N.A.	N.A.	0.015	
8/17/2018	N.A.	N.A.	39.932	N.A.	N.A.	39.969	N.A.	N.A.	0.037	
8/21/2018	N.A.	N.A.	39.933	N.A.	N.A.	39.969	N.A.	N.A.	0.036	

Appendix 1:
Project Network Control Monument Report (Cont.)

G 177 - UTM 16										
Date	Field Survey Data (M)			Published Data (M)			Differences (M)			RMSE
	Northing	Easting	Elevation	Northing	Easting	Elevation	Delta N	Delta E	Delta Z	
5/11/2018	3321970.279	642162.834	5.906	3321970.297	642162.818	5.887	0.018	-0.016	-0.019	rmse _N 0.018 rmse _E 0.016 Hrmse, 0.024 Vrmse 0.019

Q 125 - UTM 16										
Date	Field Survey Data (M)			Published Data (M)			Differences (M)			RMSE
	Northing	Easting	Elevation	Northing	Easting	Elevation	Delta N	Delta E	Delta Z	
5/2/2018	3400938.683	563870.514	76.033	3400938.663	563870.498	76.053	-0.020	-0.016	0.020	rmse _N 0.015
5/3/2018	3400938.647	563870.505	76.031	3400938.663	563870.498	76.053	0.016	-0.007	0.022	rmse _E 0.015
5/7/2018	3400938.651	563870.482	76.042	3400938.663	563870.498	76.053	0.012	0.016	0.011	Hrmse, 0.022
5/10/2018	3400938.661	563870.516	76.044	3400938.663	563870.498	76.053	0.002	-0.018	0.009	Vrmse 0.030
5/10/2018	3400938.641	563870.491	76.036	3400938.663	563870.498	76.053	0.022	0.007	0.017	
5/11/2018	3400938.655	563870.483	76.059	3400938.663	563870.498	76.053	0.008	0.015	-0.006	
5/11/2018	3400938.660	563870.497	76.004	3400938.663	563870.498	76.053	0.003	0.001	0.049	
5/15/2018	3400938.666	563870.511	76.024	3400938.663	563870.498	76.053	-0.003	-0.013	0.029	
5/16/2018	3400938.648	563870.466	76.033	3400938.663	563870.498	76.053	0.015	0.032	0.020	
5/16/2018	3400938.672	563870.497	76.018	3400938.663	563870.498	76.053	-0.009	0.001	0.035	
5/18/2018	3400938.643	563870.508	76.017	3400938.663	563870.498	76.053	0.020	-0.010	0.036	
5/25/2018	3400938.669	563870.518	76.044	3400938.663	563870.498	76.053	-0.006	-0.020	0.009	
5/25/2018	3400938.676	563870.475	76.090	3400938.663	563870.498	76.053	-0.013	0.023	-0.037	
5/31/2018	3400938.666	563870.474	76.014	3400938.663	563870.498	76.053	-0.003	0.024	0.039	
5/31/2018	3400938.695	563870.494	76.007	3400938.663	563870.498	76.053	-0.032	0.004	0.046	
6/1/2018	3400938.650	563870.493	76.030	3400938.663	563870.498	76.053	0.013	0.005	0.023	
5/1/2018	3400938.655	563870.483	76.092	3400938.663	563870.498	76.053	0.008	0.015	-0.039	
6/4/2018	3400938.673	563870.488	76.009	3400938.663	563870.498	76.053	-0.010	0.010	0.044	
6/4/2018	3400938.661	563870.509	76.015	3400938.663	563870.498	76.053	0.002	-0.011	0.038	
6/5/2018	3400938.668	563870.475	76.073	3400938.663	563870.498	76.053	-0.005	0.023	-0.020	
6/5/2018	3400938.627	563870.502	76.093	3400938.663	563870.498	76.053	0.036	-0.004	-0.040	
6/6/2018	3400938.652	563870.506	76.061	3400938.663	563870.498	76.053	0.011	-0.008	-0.008	
6/6/2018	3400938.640	563870.515	76.018	3400938.663	563870.498	76.053	0.023	-0.017	0.035	
6/7/2018	3400938.673	563870.507	76.067	3400938.663	563870.498	76.053	-0.010	-0.009	-0.014	

APALACHICOLA - UTM 16										
Date	Field Survey Data (M)			Published Data (M)			Differences (M)			RMSE
	Northing	Easting	Elevation	Northing	Easting	Elevation	Delta N	Delta E	Delta Z	
5/2/2018	3290067.132	694818.896	4.612	3290067.129	694818.911	4.635	-0.003	0.015	0.023	rmse _N 0.018
5/4/2018	3290067.116	694818.912	4.677	3290067.129	694818.911	4.635	0.013	-0.001	-0.042	rmse _E 0.019
7/26/2018	3290067.101	694818.941	4.613	3290067.129	694818.911	4.635	0.028	-0.030	0.022	Hrmse, 0.026 Vrmse 0.030

J 45 - UTM 16										
Date	Field Survey Data (M)			Published Data (M)			Differences (M)			RMSE
	Northing	Easting	Elevation	Northing	Easting	Elevation	Delta N	Delta E	Delta Z	
5/2/2018	3290092.831	695063.624	4.500	3290092.833	695063.631	4.537	0.002	0.007	0.037	rmse _N 0.012
5/3/2018	3290092.818	695063.644	4.506	3290092.833	695063.631	4.537	0.015	-0.013	0.031	rmse _E 0.013
5/3/2018	3290092.839	695063.627	4.501	3290092.833	695063.631	4.537	-0.006	0.004	0.036	Hrmse, 0.017
5/7/2018	3290092.852	695063.628	4.505	3290092.833	695063.631	4.537	-0.019	0.003	0.032	Vrmse 0.029
5/15/2018	3290092.828	695063.618	4.520	3290092.833	695063.631	4.537	0.005	0.013	0.017	
7/31/2018	3290092.826	695063.653	4.525	3290092.833	695063.631	4.537	0.007	-0.022	0.012	
8/3/2018	3290092.853	695063.647	4.520	3290092.833	695063.631	4.537	-0.020	-0.016	0.017	
8/9/2018	3290092.834	695063.638	4.495	3290092.833	695063.631	4.537	-0.001	-0.007	0.042	
9/10/2018	3290092.843	695063.617	4.518	3290092.833	695063.631	4.537	-0.010	0.014	0.019	
8/13/2018	3290092.846	695063.618	4.510	3290092.833	695063.631	4.537	-0.013	0.013	0.027	

Y 295 - UTM 16										
Date	Field Survey Data (M)			Published Data (M)			Differences (M)			RMSE
	Northing	Easting	Elevation	Northing	Easting	Elevation	Delta N	Delta E	Delta Z	
5/4/2018	3289295.096	683028.191	4.143	3289295.102	683028.206	4.156	0.006	0.015	0.013	rmse _N 0.009
5/7/2018	3289295.106	683028.216	4.125	3289295.102	683028.206	4.156	-0.004	-0.010	0.031	rmse _E 0.014
7/26/2018	3289295.108	683028.208	4.183	3289295.102	683028.206	4.156	-0.006	-0.002	-0.027	Hrmse, 0.017
8/9/2018	3289295.096	683028.181	4.132	3289295.102	683028.206	4.156	0.006	0.025	0.024	Vrmse 0.026
8/10/2018	3289295.116	683028.185	4.175	3289295.102	683028.206	4.156	-0.014	0.021	-0.019	
8/15/2018	3289295.093	683028.222	4.161	3289295.102	683028.206	4.156	0.009	-0.016	-0.005	
8/15/2018	3289295.096	683028.204	4.129	3289295.102	683028.206	4.156	0.006	0.002	0.027	
8/17/2018	3289295.117	683028.216	4.174	3289295.102	683028.206	4.156	-0.015	-0.010	-0.018	
8/22/2018	3289295.106	683028.199	4.111	3289295.102	683028.206	4.156	-0.004	0.007	0.045	

60-03-B02G - UTM 16										
Date	Field Survey Data (M)			Published Data (M)			Differences (M)			RMSE
	Northing	Easting	Elevation	Northing	Easting	Elevation	Delta N	Delta E	Delta Z	
5/15/2018	3365853.408	580810.504	0.633	3365853.424	580810.471	0.629	0.016	-0.033	-0.004	rmse _N 0.020
5/17/2018	3365853.394	580810.501	0.592	3365853.424	580810.471	0.629	0.030	-0.030	0.037	rmse _E 0.046
5/17/2018	3365853.415	580810.537	0.632	3365853.424	580810.471	0.629	0.009	-0.066	-0.003	Hrmse, 0.050 Vrmse 0.022

FLGPS 16 - UTM 16										
Date	Field Survey Data (M)			Published Data (M)			Differences (M)			RMSE
	Northing	Easting	Elevation	Northing	Easting	Elevation	Delta N	Delta E	Delta Z	
5/24/2018	3346567.755	783999.809	5.991	3346567.755	783999.819	6.022	0.000	0.010	0.031	rmse _N 0.018
5/25/2018	3346567.780	783999.805	6.031	3346567.755	783999.819	6.022	-0.025	0.014	-0.009	rmse _E 0.012 Hrmse, 0.021 Vrmse 0.023

TLC 1023 - UTM 16										
Date	Field Survey Data (M)			Published Data (M)			Differences (M)			RMSE
	Northing	Easting	Elevation	Northing	Easting	Elevation	Delta N	Delta E	Delta Z	
4/24/2018	3378002.125	780330.546	26.381	3378002.146	780330.529	26.408	0.021	-0.017	0.027	rmse _N 0.015
4/25/2018	3378002.143	780330.519	26.362	3378002.146	780330.529	26.408	0.003	0.010	0.046	rmse _E 0.014 Hrmse, 0.020 Vrmse 0.038

Appendix 1:
Project Network Control Monument Report (Cont.)

GC060 - HORIZONTAL ONLY-UTM 16										
Date	Field Survey Data (M)			Published Data (M)			Differences (M)			RMSE
	Northing	Easting	Elevation	Northing	Easting	Elevation	Delta N	Delta E	Delta Z	
4/30/2018	3347177.331	674180.731	8.431	3347177.341	674180.717	N.A.	0.010	-0.014	N.A.	rmse _N 0.010 rmse _E 0.014 Hrmse 0.017 Vrmse N.A.

L 44 - VERTICAL ONLY										
Date	Field Survey Data (M)			Published Data (M)			Differences (M)			RMSE
	Northing	Easting	Elevation	Northing	Easting	Elevation	Delta N	Delta E	Delta Z	
4/30/2018	N.A.	N.A.	13.910	N.A.	N.A.	13.911	N.A.	N.A.	0.001	rmse _N N.A. rmse _E N.A. Hrmse N.A. Vrmse 0.001

S 43 - VERTICAL ONLY										
Date	Field Survey Data (M)			Published Data (M)			Differences (M)			RMSE
	Northing	Easting	Elevation	Northing	Easting	Elevation	Delta N	Delta E	Delta Z	
5/1/2018	N.A.	N.A.	19.266	N.A.	N.A.	19.310	N.A.	N.A.	0.044	rmse _N N.A. rmse _E N.A. Hrmse N.A. Vrmse 0.044

CAL 14 FLDNR - VERTICAL ONLY										
Date	Field Survey Data (M)			Published Data (M)			Differences (M)			RMSE
	Northing	Easting	Elevation	Northing	Easting	Elevation	Delta N	Delta E	Delta Z	
5/1/2018	N.A.	N.A.	32.371	N.A.	N.A.	32.372	N.A.	N.A.	0.001	rmse _N N.A. rmse _E N.A. Hrmse N.A. Vrmse 0.028
5/8/2018	N.A.	N.A.	32.333	N.A.	N.A.	32.372	N.A.	N.A.	0.039	
5/11/2018	N.A.	N.A.	32.360	N.A.	N.A.	32.372	N.A.	N.A.	0.012	
7/24/2018	N.A.	N.A.	32.359	N.A.	N.A.	32.372	N.A.	N.A.	0.013	
8/30/2018	N.A.	N.A.	32.416	N.A.	N.A.	32.372	N.A.	N.A.	-0.044	

872 9108 L TIDAL - UTM 16										
Date	Field Survey Data (M)			Published Data (M)			Differences (M)			RMSE
	Northing	Easting	Elevation	Northing	Easting	Elevation	Delta N	Delta E	Delta Z	
5/9/2018	3336440.985	628700.308	2.774	3336440.986	628700.308	2.773	0.001	0.000	-0.001	rmse _N 0.012 rmse _E 0.011 Hrmse 0.016 Vrmse 0.012
5/9/2018	3336440.969	628700.323	2.790	3336440.986	628700.308	2.773	0.017	-0.015	-0.017	

CAL 19 H FLDNR - VERTICAL ONLY										
Date	Field Survey Data (M)			Published Data (M)			Differences (M)			RMSE
	Northing	Easting	Elevation	Northing	Easting	Elevation	Delta N	Delta E	Delta Z	
5/10/2018	N.A.	N.A.	35.374	N.A.	N.A.	35.409	N.A.	N.A.	0.035	rmse _N N.A. rmse _E N.A. Hrmse N.A. Vrmse 0.039
5/18/2018	N.A.	N.A.	35.364	N.A.	N.A.	35.409	N.A.	N.A.	0.045	
7/25/2018	N.A.	N.A.	35.397	N.A.	N.A.	35.409	N.A.	N.A.	0.012	
7/25/2018	N.A.	N.A.	35.362	N.A.	N.A.	35.409	N.A.	N.A.	0.046	
7/31/2018	N.A.	N.A.	35.377	N.A.	N.A.	35.409	N.A.	N.A.	0.032	
8/3/2018	N.A.	N.A.	35.361	N.A.	N.A.	35.409	N.A.	N.A.	0.048	
8/9/2018	N.A.	N.A.	35.362	N.A.	N.A.	35.409	N.A.	N.A.	0.047	
8/22/2018	N.A.	N.A.	35.421	N.A.	N.A.	35.409	N.A.	N.A.	-0.013	
8/30/2018	N.A.	N.A.	35.361	N.A.	N.A.	35.409	N.A.	N.A.	0.048	

TLC 1 14 2S2W - HORIZONTAL ONLY - UTM 16										
Date	Field Survey Data (M)			Published Data (M)			Differences (M)			RMSE
	Northing	Easting	Elevation	Northing	Easting	Elevation	Delta N	Delta E	Delta Z	
5/22/2018	3355506.952	749951.229	22.099	3355506.945	749951.258	N.A.	-0.007	0.029	N.A.	rmse _N 0.014 rmse _E 0.018 Hrmse 0.022 Vrmse N.A.
5/22/2018	3355506.971	749951.232	22.106	3355506.945	749951.258	N.A.	-0.026	0.026	N.A.	
5/23/2018	3355506.946	749951.260	22.112	3355506.945	749951.258	N.A.	-0.001	-0.002	N.A.	
5/23/2018	3355506.960	749951.256	22.172	3355506.945	749951.258	N.A.	-0.015	0.002	N.A.	
5/24/2018	3355506.953	749951.260	22.117	3355506.945	749951.258	N.A.	-0.008	-0.002	N.A.	
6/28/2018	3355506.954	749951.278	22.090	3355506.945	749951.258	N.A.	-0.009	-0.020	N.A.	

S 288 - VERTICAL ONLY										
Date	Field Survey Data (M)			Published Data (M)			Differences (M)			RMSE
	Northing	Easting	Elevation	Northing	Easting	Elevation	Delta N	Delta E	Delta Z	
5/22/2018	N.A.	N.A.	21.373	N.A.	N.A.	21.418	N.A.	N.A.	0.045	rmse _N N.A. rmse _E N.A. Hrmse N.A. Vrmse 0.022
5/22/2018	N.A.	N.A.	21.424	N.A.	N.A.	21.418	N.A.	N.A.	-0.006	
5/23/2018	N.A.	N.A.	21.402	N.A.	N.A.	21.418	N.A.	N.A.	0.016	
5/23/2018	N.A.	N.A.	21.441	N.A.	N.A.	21.418	N.A.	N.A.	-0.023	
5/24/2018	N.A.	N.A.	21.419	N.A.	N.A.	21.418	N.A.	N.A.	-0.001	
6/28/2018	N.A.	N.A.	21.409	N.A.	N.A.	21.418	N.A.	N.A.	0.009	

WACISSA RESET - UTM 16										
Date	Field Survey Data (M)			Published Data (M)			Differences (M)			RMSE
	Northing	Easting	Elevation	Northing	Easting	Elevation	Delta N	Delta E	Delta Z	
5/25/2018	3366702.980	786593.484	65.567	3366702.969	786593.479	65.562	-0.011	-0.005	-0.005	rmse _N 0.011 rmse _E 0.005 Hrmse 0.012 Vrmse 0.005

Appendix 2:
Final Check Point Coordinates

FL Panhandle QL2 LiDAR Project 2018			
POINT #	NORTHING (M)	EASTING (M)	ELEV. (M)
NVA-01	3428743.615	503275.235	83.929
NVA-02	3426200.551	515134.486	80.971
NVA-03	3427208.429	527717.132	62.926
NVA-04	3428283.283	539648.563	73.740
NVA-05	3425948.831	551422.098	88.364
NVA-06	3426385.284	565328.644	97.973
NVA-07	3426948.271	580019.540	68.855
NVA-08	3423757.839	590024.215	59.603
NVA-09	3417212.574	502689.143	43.327
NVA-10	3415299.893	512644.246	64.659
NVA-11	3415788.567	526872.013	64.097
NVA-12	3414431.798	541341.765	37.706
NVA-13	3413476.648	556699.740	57.934
NVA-14	3413593.734	568833.658	79.480
NVA-15	3414573.041	575988.256	69.331
NVA-16	3415554.021	585244.533	87.928
NVA-17	3400887.447	511345.872	31.556
NVA-18	3402643.952	524018.751	44.500
NVA-19	3402051.441	534765.575	22.414
NVA-20	3402623.458	545258.026	45.390
NVA-21	3403269.899	557160.235	65.419
NVA-22	3403524.396	566284.433	82.019
NVA-23	3400845.787	579467.009	87.455
NVA-24	3391825.267	511486.435	44.911
NVA-25	3395696.833	524295.695	52.741
NVA-26	3397667.517	537673.817	36.954
NVA-27	3389474.186	543371.609	66.149
NVA-28	3392388.388	558595.004	63.788
NVA-29	3396916.689	570408.108	69.247
NVA-30	3391423.851	580993.907	52.135
NVA-31	3374974.524	509098.524	32.099
NVA-32	3378689.432	517575.662	32.316
NVA-33	3384443.193	533133.559	62.425
NVA-34	3381907.921	545112.606	37.302
NVA-35	3382694.131	553679.254	50.811
NVA-36	0.000	0.000	0.000
NVA-37	3380331.983	576443.042	30.083
NVA-38	3380281.028	585742.365	33.789
NVA-39	3364279.504	520870.267	3.937
NVA-40	3364311.543	530960.394	5.947
NVA-41	3368896.251	540698.649	9.239
NVA-42	3374436.054	550950.147	6.298
NVA-43	3371434.354	562814.162	6.232
NVA-44	3372773.175	573098.459	3.969
NVA-45	3368563.249	582037.729	3.504
NVA-46	3428708.335	652076.150	44.347
NVA-47	3427592.922	663899.142	45.391
NVA-48	3428019.462	675179.340	43.429
NVA-49	3430954.804	687231.950	39.944
NVA-50	3415142.340	657359.321	36.601

Appendix 2:
Final Check Point Coordinates (Cont.)

FL Panhandle QL2 LiDAR Project 2018			
POINT #	NORTHING (F)	EASTING (F)	ELEV. (F)
NVA-51	3417064.731	665059.944	29.772
NVA-52	3417164.328	678555.371	42.011
NVA-53	3416327.772	695273.809	26.873
NVA-54	3403828.957	655061.572	44.489
NVA-55	3403952.286	668167.003	44.420
NVA-56	3404242.570	680690.584	38.837
NVA-57	3403814.755	692435.353	35.347
NVA-58	3398226.258	703581.657	26.564
NVA-59	3397604.959	717148.140	87.078
NVA-60	3397254.143	727910.596	87.627
NVA-61	3397595.175	741651.120	78.314
NVA-62	3394997.545	754336.859	65.999
NVA-63	3392096.086	653760.760	83.396
NVA-64	3390902.508	667586.192	92.282
NVA-65	3391649.466	681982.985	36.116
NVA-66	3390869.838	696898.957	44.524
NVA-67	3388805.981	708928.282	83.222
NVA-68	3389594.354	721196.219	84.822
NVA-69	3391899.351	735492.747	85.230
NVA-70	3390305.886	746611.481	74.635
NVA-71	3379077.685	657788.835	61.685
NVA-72	3379114.012	669922.481	26.633
NVA-73	3380754.648	685874.413	41.081
NVA-74	3381242.560	697673.742	80.265
NVA-75	3380501.740	710550.128	82.160
NVA-76	3381822.505	722842.733	74.841
NVA-77	3380841.633	736832.297	55.456
NVA-78	3384589.448	747589.175	59.858
NVA-79	3368017.009	665013.747	46.326
NVA-80	3367657.922	677629.338	32.044
NVA-81	3369544.469	687766.114	20.455
NVA-82	3367502.081	700233.678	50.725
NVA-83	3369853.913	714197.771	59.909
NVA-84	3369063.885	728974.983	33.025
NVA-85	3376304.508	747035.624	36.926
NVA-86	3354480.727	663945.629	22.884
NVA-87	3353784.598	676801.796	24.832
NVA-88	3354686.991	688987.354	18.177
NVA-89	3359608.760	703738.455	39.729
NVA-90	3358905.284	718487.844	22.914
NVA-91	3344580.578	666310.802	21.719
NVA-92	3343996.165	676368.346	8.764
NVA-93	3343524.206	693314.547	20.069
NVA-94	3345170.225	703213.237	23.592
NVA-95	3344495.392	716874.771	20.241
NVA-96	3333312.847	686856.875	10.736
NVA-97	3331239.037	697126.021	12.967
NVA-98	3330892.875	707163.998	11.653
NVA-99	3331105.953	716030.245	12.867
NVA-100	3320303.735	695122.485	9.623

Appendix 2:
Final Check Point Coordinates (Cont.)

FL Panhandle QL2 LiDAR Project 2018			
POINT #	NORTHING (M)	EASTING (M)	ELEV. (M)
NVA-101	3321350.931	707791.173	8.853
NVA-102	3321309.529	719556.944	7.713
NVA-103	3320008.907	730268.207	5.191
NVA-104	3307871.458	695361.431	4.307
NVA-105	3307616.464	704884.675	4.205
NVA-106	3307715.735	718061.248	1.233
NVA-107	3307362.151	730856.394	7.072
NVA-108	3287273.227	675033.314	1.761
NVA-109	3290675.625	679038.068	3.122
NVA-110	3294227.717	689287.329	1.719
NVA-111	3289130.872	691080.074	4.243
NVA-112	3291519.577	704245.413	5.397
NVA-113	3295251.356	712845.480	2.366
NVA-114	3300265.840	720450.786	3.024
NVA-115	3278124.568	697870.264	1.423
NVA-116	3283577.477	706708.389	2.110
NVA-117	3288087.677	716490.112	1.627
NVA-118	3295436.939	722709.131	1.096
NVA-119	3391792.889	788003.287	32.785
NVA-120	3395221.001	799336.272	31.289
NVA-121	3388464.699	810689.544	51.470
NVA-122	3381248.679	788743.983	40.749
NVA-123	3385201.388	800214.748	49.823
NVA-124	3381014.732	810963.500	26.502
NVA-125	3373404.747	786246.717	45.021
NVA-126	3372624.221	797873.700	67.973
NVA-127	3373550.246	810900.970	28.935
NVA-128	3362489.368	783270.558	12.824
NVA-129	3360747.433	793806.188	12.736
NVA-130	3360733.723	804998.855	25.389
NVA-131	3353577.332	729762.266	27.429
NVA-132	3354560.597	740354.172	20.994
NVA-133	3353580.734	754649.579	5.931
NVA-134	3351864.568	765510.295	8.065
NVA-135	3348028.651	772050.839	5.030
NVA-136	3349598.523	784597.394	7.212
NVA-137	3348802.459	795426.191	6.648
NVA-138	3352220.463	802549.493	11.000
NVA-139	3343110.547	728338.445	25.319
NVA-140	3344933.490	744484.157	17.124
NVA-141	3344345.562	756285.734	4.935
NVA-142	3341223.451	765139.889	2.603
NVA-143	3343672.592	779490.152	4.487
NVA-144	3338614.665	794835.781	3.208
NVA-145	3331658.768	728583.605	11.701
NVA-146	3332398.168	741340.437	13.912
NVA-147	3333061.100	757628.334	3.989
NVA-148	3330815.337	771949.764	1.740
NVA-149	3319739.262	741060.527	4.333
NVA-150	3323740.878	751572.201	2.362

Appendix 2:*Final Check Point Coordinates (Cont.)*

FL Panhandle QL2 LIDAR Project 2018			
POINT #	NORTHING (M)	EASTING (M)	ELEV. (M)
NVA-151	3312351.972	739447.162	8.723
NVA-152	3310846.889	756016.172	3.109
NVA-153	3305727.290	856225.488	9.078
NVA-154	3290865.802	852545.537	3.618
NVA-155	3348799.697	801319.351	10.515

Appendix 2:
Final Check Point Coordinates

FL Panhandle QL2 LiDAR Project 2018			
POINT #	NORTHING (M)	EASTING (M)	ELEV. (M)
VVA-01	3429296.813	504481.027	86.060
VVA-02	3427231.295	514585.779	77.867
VVA-03	3426079.313	534237.782	68.377
VVA-04	3427033.758	549495.444	79.525
VVA-05	3400549.166	543025.129	59.130
VVA-06	3428150.200	572356.536	71.349
VVA-07	3413927.314	512224.917	64.305
VVA-08	3415286.691	532304.293	63.012
VVA-09	3415260.209	545454.874	76.230
VVA-10	3411974.296	556647.123	60.192
VVA-11	3413740.224	571983.503	66.959
VVA-12	3414574.793	585772.057	80.508
VVA-13	3400264.058	512001.661	31.200
VVA-14	3401433.218	534167.215	21.389
VVA-15	3402383.802	547771.378	52.595
VVA-16	3402744.610	563732.026	77.301
VVA-17	3402897.894	572715.136	78.728
VVA-18	3389847.533	512432.497	41.356
VVA-19	3395395.170	523817.246	51.754
VVA-20	3393833.169	541330.273	37.462
VVA-21	3395681.129	563510.726	60.832
VVA-22	3395131.941	576739.246	54.722
VVA-23	0.000	0.000	0.000
VVA-24	0.000	0.000	0.000
VVA-25	3381360.574	545343.418	35.824
VVA-26	3387128.131	555281.932	56.747
VVA-27	3380458.759	577564.670	26.341
VVA-28	3378700.885	585559.928	27.361
VVA-29	3364263.696	519749.057	4.999
VVA-30	3371590.608	538675.555	12.716
VVA-31	3371060.098	557841.847	8.097
VVA-32	3372645.415	568866.458	4.576
VVA-33	3372370.738	583785.703	6.554
VVA-34	3426843.383	652214.616	42.443
VVA-35	3429443.763	668378.160	36.846
VVA-36	3428179.855	683813.166	42.488
VVA-37	3415019.162	654497.323	40.945
VVA-38	3416631.883	672541.244	31.687
VVA-39	3418228.267	688571.356	35.036
VVA-40	3402738.966	663267.233	44.315
VVA-41	3403602.258	683921.606	43.832
VVA-42	3401722.746	697547.775	50.757
VVA-43	3398440.868	710173.766	83.857
VVA-44	3396966.521	733472.941	78.418
VVA-45	3394838.551	751111.427	59.339
VVA-46	3393260.695	658143.688	76.600
VVA-47	3389757.722	676865.161	23.139
VVA-48	3391348.361	692259.360	57.522
VVA-49	3388836.172	705792.793	85.692
VVA-50	3389574.809	727869.527	81.872

Appendix 2:*Final Check Point Coordinates (Cont.)*

FL Panhandle QL2 LiDAR Project 2018			
POINT #	NORTHING (F)	EASTING (F)	ELEV. (F)
VVA-51	3388478.247	741758.195	59.674
VVA-52	3378900.947	659044.335	59.143
VVA-53	3379505.326	672689.613	40.739
VVA-54	3382305.210	689829.007	38.756
VVA-55	3382008.185	708400.942	87.421
VVA-56	3381307.888	723848.482	74.398
VVA-57	3378900.176	736406.441	61.313
VVA-58	3380206.019	745765.832	72.726
VVA-59	3367401.482	669752.165	42.161
VVA-60	3369056.507	684573.988	25.990
VVA-61	3367287.865	701369.993	51.690
VVA-62	3367865.927	713588.117	48.517
VVA-63	3370032.659	727216.240	48.727
VVA-64	3356268.152	659349.216	28.070
VVA-65	3354658.712	676558.447	21.626
VVA-66	3353394.682	691204.644	16.020
VVA-67	3355431.740	708726.530	33.223
VVA-68	3344859.186	666719.113	20.915
VVA-69	3343617.618	686230.179	14.888
VVA-70	3343632.302	701819.076	21.930
VVA-71	3345066.078	718023.562	19.084
VVA-72	3331777.330	687325.947	10.568
VVA-73	3331253.344	705978.091	14.346
VVA-74	3334051.117	723705.342	12.666
VVA-75	3319629.811	694173.852	9.392
VVA-76	3319161.870	707122.723	9.800
VVA-77	3319923.568	727371.682	6.348
VVA-78	3308162.979	694905.346	4.316
VVA-79	3307091.165	729144.493	6.458
VVA-80	3292918.726	683284.681	2.426
VVA-81	3301735.014	706685.846	2.326
VVA-82	3299047.392	718514.474	2.785
VVA-83	3278162.008	698065.099	1.155
VVA-84	3283409.463	706388.825	1.535
VVA-85	3286831.637	714938.303	1.621
VVA-86	3293487.123	721623.605	1.284
VVA-87	3391949.364	793681.407	46.081
VVA-88	3395600.486	805280.550	37.960
VVA-89	3383230.202	798392.774	45.726
VVA-90	3383737.856	810751.195	33.939
VVA-91	3371581.511	791021.567	59.251
VVA-92	3370273.975	809338.514	24.854
VVA-93	3362307.948	788174.280	11.780
VVA-94	3358230.195	804476.755	15.282
VVA-95	3352047.757	729279.465	27.422
VVA-96	3354308.489	743546.211	24.676
VVA-97	3350972.200	757962.186	9.452
VVA-98	3351449.290	772937.051	5.777
VVA-99	3351892.782	784548.648	7.960
VVA-100	0.000	0.000	0.000

Appendix 2:

Final Check Point Coordinates (Cont.)

FL Panhandle QL2 LIDAR Project 2018			
POINT #	NORTHING (M)	EASTING (M)	ELEV. (M)
VVA-101	3343912.166	729761.800	25.681
VVA-102	3343842.547	746185.482	14.732
VVA-103	3344733.822	758681.071	6.421
VVA-104	3330789.322	735375.550	14.045
VVA-105	3333171.049	752424.562	12.683
VVA-106	3332269.926	761147.227	2.103
VVA-107	3336635.478	775093.800	3.087
VVA-108	3338231.629	794003.955	2.328
VVA-109	3322004.909	747578.070	4.044
VVA-110	3314545.493	753064.895	2.339
VVA-111	3303741.585	856207.200	7.143
VVA-112	3289913.589	850531.084	6.440

Appendix 3:
GPS Observation & Re-Observation Schedule

FL Panhandle QL2 LiDAR Project 2018					
POINT #	SURVEY DATE	JULIAN DATE	TIME	RE-SURVEY DATE	RE-SURVEY TIME
NVA-01	5/31/2018	151	12:41	N.A.	N.A.
NVA-02	6/1/2018	152	9:35	N.A.	N.A.
NVA-03	6/4/2018	155	11:05	N.A.	N.A.
NVA-04	6/4/2018	155	12:48	N.A.	N.A.
NVA-05	6/4/2018	155	14:07	N.A.	N.A.
NVA-06	6/7/2018	158	8:53	N.A.	N.A.
NVA-07	5/18/2018	138	9:05	5/25/2018	9:05
NVA-08	5/18/2018	138	9:33	5/25/2018	9:25
NVA-09	6/1/2018	152	11:00	N.A.	N.A.
NVA-10	6/1/2018	152	10:14	N.A.	N.A.
NVA-11	5/11/2018	131	11:27	N.A.	N.A.
NVA-12	6/6/2018	157	11:05	N.A.	N.A.
NVA-13	5/2/2018	122	12:30	5/3/2018	10:06
NVA-14	5/2/2018	122	9:55	5/3/2018	8:57
NVA-15	6/7/2018	158	8:15	N.A.	N.A.
NVA-16	6/5/2018	156	10:40	N.A.	N.A.
NVA-17	5/16/2018	136	9:55	N.A.	N.A.
NVA-18	5/15/2018	135	14:10	N.A.	N.A.
NVA-19	5/11/2018	131	12:50	N.A.	N.A.
NVA-20	6/6/2018	157	14:30	N.A.	N.A.
NVA-21	5/2/2018	122	12:00	5/3/2018	10:36
NVA-22	5/2/2018	122	9:30	5/3/2018	8:19
NVA-23	6/5/2018	156	7:52	N.A.	N.A.
NVA-24	5/15/2018	135	14:45	N.A.	N.A.
NVA-25	5/16/2018	136	12:22	N.A.	N.A.
NVA-26	5/11/2018	131	13:45	N.A.	N.A.
NVA-27	5/15/2018	135	11:35	N.A.	N.A.
NVA-28	5/4/2018	124	11:06	5/4/2018	11:40
NVA-29	4/27/2018	117	12:50	4/30/2018	9:43
NVA-30	4/27/2018	117	11:30	4/30/2018	8:57
NVA-31	5/7/2018	127	10:45	N.A.	N.A.
NVA-32	5/17/2018	137	12:50	N.A.	N.A.
NVA-33	5/17/2018	137	12:00	N.A.	N.A.
NVA-34	5/15/2018	135	10:15	N.A.	N.A.
NVA-35	5/3/2018	124	12:15	5/4/2018	12:10
NVA-36					
NVA-37	4/27/2018	117	8:50	4/30/2018	7:35
NVA-38	4/26/2018	116	16:03	4/27/2018	10:35
NVA-39	5/7/2018	127	11:49	N.A.	N.A.
NVA-40	5/7/2018	127	12:24	N.A.	N.A.
NVA-41	5/7/2018	127	14:26	5/11/2018	9:25
NVA-42	4/30/2018	120	14:12	5/3/2018	12:50
NVA-43	4/30/2018	120	13:04	5/3/2018	13:25
NVA-44	4/30/2018	120	11:12	5/3/2018	13:50
NVA-45	4/26/2018	116	14:50	4/27/2018	9:55
NVA-46	6/7/2018	158	13:50	N.A.	N.A.
NVA-47	5/18/2018	138	13:24	N.A.	N.A.
NVA-48	6/16/2018	167	10:26	N.A.	N.A.
NVA-49	6/16/2018	167	9:49	6/19/2018	9:05
NVA-50	5/17/2018	137	14:53	N.A.	N.A.

Appendix 3:

GPS Observation & Re-Observation Schedule (Cont.)

FL Panhandle QL2 LiDAR Project 2018					
POINT #	SURVEY DATE	JULIAN DATE	TIME	RE-SURVEY DATE	RE-SURVEY TIME
NVA-51	5/17/2018	137	14:30	5/18/2018	11:49
NVA-52	6/16/2018	167	11:40	N.A.	N.A.
NVA-53	6/25/2018	176	13:43	7/23/2018	10:22
NVA-54	5/17/2018	137	12:56	5/18/2018	9:07
NVA-55	5/17/2018	137	13:52	5/18/2018	11:25
NVA-56	6/16/2018	167	12:10	N.A.	N.A.
NVA-57	6/19/2018	170	8:23	6/25/2018	15:10
NVA-58	6/16/2018	167	7:40	N.A.	N.A.
NVA-59	6/15/2018	166	10:30	N.A.	N.A.
NVA-60	6/15/2018	166	9:45	6/19/2018	7:02
NVA-61	6/15/2018	166	8:34	N.A.	N.A.
NVA-62	7/25/2018	206	10:45	N.A.	N.A.
NVA-63	5/14/2018	134	14:30	5/17/2018	12:32
NVA-64	5/14/2018	134	13:36	5/17/2018	10:00
NVA-65	7/24/2018	205	8:10	N.A.	N.A.
NVA-66	6/16/2018	167	8:18	6/19/2018	8:01
NVA-67	6/20/2018	171	14:40	6/21/2018	8:09
NVA-68	6/21/2018	172	14:50	6/22/2018	7:30
NVA-69	6/15/2018	166	9:20	6/19/2018	7:20
NVA-70	6/15/2018	166	8:01	N.A.	N.A.
NVA-71	5/17/2018	137	8:20	N.A.	N.A.
NVA-72	5/14/2018	134	12:15	N.A.	N.A.
NVA-73	7/23/2018	204	15:07	N.A.	N.A.
NVA-74	7/24/2018	205	10:26	N.A.	N.A.
NVA-75	6/20/2018	171	12:05	6/21/2018	8:43
NVA-76	6/29/2018	180	14:49	N.A.	N.A.
NVA-77	6/18/2018	169	9:24	6/19/2018	11:30
NVA-78	6/15/2018	166	7:40	6/18/2018	15:20
NVA-79	4/26/2018	116	8:57	4/27/2018	13:04
NVA-80	4/25/2018	115	14:51	4/26/2018	8:18
NVA-81	4/24/2018	114	14:57	4/25/2018	14:08
NVA-82	4/30/2018	120	8:16	5/1/2018	12:34
NVA-83	6/20/2018	171	11:04	6/21/2018	9:07
NVA-84	6/20/2018	171	9:40	6/29/2018	13:58
NVA-85	6/15/2018	166	7:05	N.A.	N.A.
NVA-86	4/26/2018	116	10:42	4/27/2018	11:52
NVA-87	4/26/2018	116	13:50	4/27/2018	9:50
NVA-88	4/30/2018	120	10:01	5/1/2018	16:39
NVA-89	5/14/2018	134	8:39	N.A.	N.A.
NVA-90	5/9/2018	129	9:30	N.A.	N.A.
NVA-91	4/26/2018	116	12:09	4/27/2018	11:28
NVA-92	4/30/2018	120	14:44	N.A.	N.A.
NVA-93	4/30/2018	120	11:03	5/1/2018	13:53
NVA-94	8/22/2018	234	9:20	8/30/2018	9:00
NVA-95	5/9/2018	129	10:35	5/10/2018	11:15
NVA-96	4/30/2018	120	12:22	N.A.	N.A.
NVA-97	7/25/2018	206	14:20	8/10/2018	11:43
NVA-98	5/8/2018	128	10:49	N.A.	N.A.
NVA-99	5/9/2018	129	11:51	N.A.	N.A.
NVA-100	8/15/2018	227	9:13	8/22/2018	8:55

Appendix 3:
GPS Observation & Re-Observation Schedule

FL Panhandle QL2 LiDAR Project 2018					
POINT #	SURVEY DATE	JULIAN DATE	TIME	RE-SURVEY DATE	RE-SURVEY TIME
NVA-101	5/11/2018	131	13:28	N.A.	N.A.
NVA-102	5/9/2018	129	14:00	N.A.	N.A.
NVA-103	5/9/2018	129	12:29	5/10/2018	12:59
NVA-104	5/7/2018	127	10:43	N.A.	N.A.
NVA-105	5/7/2018	127	9:12	5/11/2018	11:46
NVA-106	5/15/2018	135	13:10	7/26/2018	13:15
NVA-107	7/26/2018	207	10:28	N.A.	N.A.
NVA-108	5/11/2018	131	8:20	N.A.	N.A.
NVA-109	5/4/2018	124	12:09	N.A.	N.A.
NVA-110	5/7/2018	127	13:43	5/26/2018	8:35
NVA-111	5/4/2018	124	9:35	5/7/2018	13:26
NVA-112	5/4/2018	124	9:07	5/7/2018	13:04
NVA-113	5/15/2018	135	11:52	N.A.	N.A.
NVA-114	5/15/2018	135	12:42	N.A.	N.A.
NVA-115	5/2/2018	122	15:00	5/3/2018	13:03
NVA-116	8/22/2018	234	12:47	N.A.	N.A.
NVA-117	5/2/2018	122	12:06	5/3/2018	10:49
NVA-118	5/2/2018	122	10:54	5/3/2018	15:13
NVA-119	6/12/2018	163	11:40	N.A.	N.A.
NVA-120	6/12/2018	163	12:40	6/18/2018	10:48
NVA-121	6/12/2018	163	14:00	6/18/2018	11:30
NVA-122	5/25/2018	145	12:54	6/14/2018	7:53
NVA-123	6/18/2018	169	11:10	7/31/2018	10:27
NVA-124	6/12/2018	163	14:45	N.A.	N.A.
NVA-125	5/25/2018	145	13:21	6/26/2018	8:28
NVA-126	5/25/2018	145	11:51	6/26/2018	8:52
NVA-127	6/13/2018	164	7:00	N.A.	N.A.
NVA-128	6/14/2018	165	10:05	6/18/2018	13:43
NVA-129	6/14/2018	165	9:19	N.A.	N.A.
NVA-130	6/13/2018	164	8:05	6/18/2018	12:20
NVA-131	6/28/2018	179	14:29	6/29/2018	11:50
NVA-132	5/23/2018	143	9:42	5/24/2018	8:00
NVA-133	5/23/2018	143	12:22	N.A.	N.A.
NVA-134	5/23/2018	143	13:00	5/24/2018	12:45
NVA-135	5/23/2018	143	13:57	N.A.	N.A.
NVA-136	5/24/2018	144	14:29	5/25/2018	8:19
NVA-137	6/13/2018	164	10:00	N.A.	N.A.
NVA-138	6/13/2018	164	9:07	6/18/2018	12:45
NVA-139	6/28/2018	179	12:23	6/29/2018	10:00
NVA-140	5/23/2018	143	9:01	5/24/2018	9:33
NVA-141	5/22/2018	142	13:19	5/23/2018	7:59
NVA-142	5/23/2018	143	14:23	N.A.	N.A.
NVA-143	6/13/2018	164	12:30	N.A.	N.A.
NVA-144	6/13/2018	164	10:30	6/18/2018	13:08
NVA-145	6/27/2018	178	16:00	6/28/2018	12:00
NVA-146	6/23/2018	174	10:27	6/27/2018	13:57
NVA-147	5/23/2018	143	15:34	5/24/2018	10:08
NVA-148	6/27/2018	178	11:58	N.A.	N.A.
NVA-149	7/31/2018	212	14:05	N.A.	N.A.
NVA-150	6/28/2018	179	9:48	6/29/2018	8:41

Appendix 3:

GPS Observation & Re-Observation Schedule (Cont.)

FL Panhandle QL2 LiDAR Project 2018					
POINT #	SURVEY DATE	JULIAN DATE	TIME	RE-SURVEY DATE	RE-SURVEY TIME
NVA-151	8/3/2018	215	9:57	8/13/2018	9:10
NVA-152	6/28/2018	179	10:46	6/29/2018	9:08
NVA-153	6/26/2018	177	11:33	6/27/2018	9:59
NVA-154	6/26/2018	177	12:30	6/27/2018	9:27
NVA-155	6/13/2018	164	9:30	6/26/2018	10:25

Appendix 3:
GPS Observation & Re-Observation Schedule (Cont.)

FL Panhandle QL2 LiDAR Project 2018					
POINT #	SURVEY DATE	JULIAN DATE	TIME	RE-SURVEY DATE	RE-SURVEY TIME
VVA-01	5/31/2018	151	12:15	N.A.	N.A.
VVA-02	8/21/2018	233	9:37	N.A.	N.A.
VVA-03	5/16/2018	136	13:50	N.A.	N.A.
VVA-04	6/4/2018	155	13:35	N.A.	N.A.
VVA-05	7/19/2018	200	12:28	N.A.	N.A.
VVA-06	5/18/2018	138	8:26	5/25/2018	9:48
VVA-07	6/1/2018	152	10:33	N.A.	N.A.
VVA-08	5/11/2018	131	11:00	N.A.	N.A.
VVA-09	6/6/2018	157	12:55	N.A.	N.A.
VVA-10	5/2/2018	122	12:50	5/3/2018	9:47
VVA-11	5/2/2018	122	10:15	5/3/2018	9:10
VVA-12	7/19/2018	200	13:43	8/14/2018	12:45
VVA-13	5/16/2018	136	10:37	N.A.	N.A.
VVA-14	5/11/2018	131	13:15	N.A.	N.A.
VVA-15	6/6/2018	157	13:55	N.A.	N.A.
VVA-16	5/2/2018	122	8:45	5/3/2018	8:35
VVA-17	7/20/2018	201	9:37	N.A.	N.A.
VVA-18	5/31/2018	151	8:45	7/20/2018	10:54
VVA-19	5/16/2018	136	11:58	N.A.	N.A.
VVA-20	5/15/2018	135	11:55	N.A.	N.A.
VVA-21	6/7/2018	158	7:05	N.A.	N.A.
VVA-22	4/27/2018	117	12:15	4/30/2018	9:20
VVA-23					
VVA-24					
VVA-25	5/15/2018	135	10:40	5/31/2018	10:44
VVA-26	5/3/2018	123	11:50	5/4/2018	12:00
VVA-27	4/27/2018	117	9:14	4/30/2018	7:46
VVA-28	4/27/2018	117	8:20	4/30/2018	10:20
VVA-29	5/7/2018	127	11:25	N.A.	N.A.
VVA-30	5/7/2018	127	13:00	5/11/2018	10:00
VVA-31	4/30/2018	120	13:30	5/3/2018	13:10
VVA-32	4/30/2018	120	12:35	5/3/2018	13:45
VVA-33	4/26/2018	116	15:30	4/27/2018	10:15
VVA-34	6/7/2018	158	13:30	6/25/2018	11:03
VVA-35	6/25/2018	176	11:52	N.A.	N.A.
VVA-36	6/25/2018	176	12:27	N.A.	N.A.
VVA-37	5/17/2018	137	15:12	N.A.	N.A.
VVA-38	6/25/2018	176	16:05	N.A.	N.A.
VVA-39	6/25/2018	176	12:31	7/20/2018	13:55
VVA-40	5/18/2018	138	9:58	N.A.	N.A.
VVA-41	7/21/2018	201	8:05	N.A.	N.A.
VVA-42	6/21/2018	172	11:24	6/23/2018	12:46
VVA-43	6/21/2018	172	12:00	6/22/2018	8:14
VVA-44	6/21/2018	172	12:55	7/21/2018	10:30
VVA-45	7/23/2018	203	8:49	N.A.	N.A.
VVA-46	5/14/2018	134	14:08	N.A.	N.A.
VVA-47	5/14/2018	134	13:06	N.A.	N.A.
VVA-48	7/23/2018	203	14:02	N.A.	N.A.
VVA-49	6/20/2018	171	14:10	6/21/2018	7:45
VVA-50	6/21/2018	172	14:17	7/24/2018	13:05

Appendix 3:

GPS Observation & Re-Observation Schedule (Cont.)

FL Panhandle QL2 LiDAR Project 2018					
POINT #	SURVEY DATE	JULIAN DATE	TIME	RE-SURVEY DATE	RE-SURVEY TIME
VVA-51	7/24/2018	204	14:35	N.A.	N.A.
VVA-52	5/14/2018	134	15:32	N.A.	N.A.
VVA-53	5/14/2018	134	11:55	5/17/2018	7:48
VVA-54	7/25/2018	205	8:18	N.A.	N.A.
VVA-55	6/20/2018	171	12:34	6/21/2018	8:30
VVA-56	6/29/2018	180	14:30	7/25/2018	9:16
VVA-57	6/18/2018	169	9:00	6/19/2018	11:50
VVA-58	7/25/2018	205	10:07	N.A.	N.A.
VVA-59	4/25/2018	115	15:15	4/26/2018	7:54
VVA-60	4/24/2018	114	15:32	4/25/2018	14:23
VVA-61	4/30/2018	120	8:39	5/1/2018	12:43
VVA-62	6/20/2018	171	11:25	6/21/2018	9:20
VVA-63	6/20/2018	171	10:05	6/27/2018	17:08
VVA-64	4/26/2018	116	9:45	4/27/2018	12:15
VVA-65	4/26/2018	116	14:30	4/27/2018	10:03
VVA-66	4/30/2018	120	10:36	5/1/2018	13:33
VVA-67	5/8/2018	128	8:29	5/9/2018	9:11
VVA-68	4/26/2018	116	12:44	4/27/2018	10:59
VVA-69	4/30/2018	120	11:27	N.A.	N.A.
VVA-70	5/8/2018	128	8:59	N.A.	N.A.
VVA-71	5/9/2018	129	10:12	5/10/2018	11:05
VVA-72	4/30/2018	120	13:00	5/1/2018	16:11
VVA-73	5/8/2018	128	11:02	N.A.	N.A.
VVA-74	5/9/2018	129	11:08	N.A.	N.A.
VVA-75	8/10/2018	222	13:15	8/17/2018	8:45
VVA-76	5/11/2018	131	13:20	N.A.	N.A.
VVA-77	5/9/2018	129	13:31	5/10/2018	13:08
VVA-78	5/7/2018	127	10:56	N.A.	N.A.
VVA-79	7/26/2018	206	11:38	N.A.	N.A.
VVA-80	5/7/2018	127	14:12	5/11/2018	10:20
VVA-81	7/26/2018	206	9:20	N.A.	N.A.
VVA-82	8/9/2018	221	14:22	N.A.	N.A.
VVA-83	5/2/2018	122	15:14	8/10/2018	9:08
VVA-84	5/2/2018	122	14:27	5/3/2018	12:33
VVA-85	5/2/2018	122	13:34	5/3/2018	15:47
VVA-86	5/2/2018	122	11:30	5/3/2018	9:23
VVA-87	7/31/2018	211	10:00	N.A.	N.A.
VVA-88	6/12/2018	163	13:18	N.A.	N.A.
VVA-89	6/14/2018	165	7:02	6/20/2018	7:18
VVA-90	6/12/2018	163	14:25	N.A.	N.A.
VVA-91	6/26/2018	177	8:02	6/28/2018	8:33
VVA-92	7/31/2018	212	11:20	8/13/2018	10:57
VVA-93	6/14/2018	165	9:50	N.A.	N.A.
VVA-94	6/13/2018	164	8:28	6/19/2018	14:18
VVA-95	6/28/2018	179	13:57	6/29/2018	11:39
VVA-96	5/24/2018	144	7:51	6/28/2018	15:26
VVA-97	5/22/2018	142	14:06	5/23/2018	7:35
VVA-98	5/23/2018	143	13:33	5/24/2018	12:28
VVA-99	5/25/2018	145	10:09	6/26/2018	9:28
VVA-100					

Appendix 3:*GPS Observation & Re-Observation Schedule (Cont.)*

FL Panhandle QL2 LiDAR Project 2018					
POINT #	SURVEY DATE	JULIAN DATE	TIME	RE-SURVEY DATE	RE-SURVEY TIME
VVA-101	6/29/2018	179	10:07	8/17/2018	9:47
VVA-102	5/23/2018	143	8:31	5/24/2018	9:43
VVA-103	5/22/2018	142	13:47	N.A.	N.A.
VVA-104	6/27/2018	178	15:23	6/28/2018	11:47
VVA-105	5/23/2018	143	15:55	6/27/2018	13:10
VVA-106	5/23/2018	143	15:15	5/24/2018	10:35
VVA-107	5/24/2018	144	13:18	N.A.	N.A.
VVA-108	6/13/2018	164	11:01	N.A.	N.A.
VVA-109	6/28/2018	179	11:12	N.A.	N.A.
VVA-110	6/28/2018	179	10:28	8/3/2018	10:34
VVA-111	6/26/2018	177	11:59	6/27/2018	9:48
VVA-112	6/26/2018	177	12:56	6/27/2018	9:12

Appendix 4:
Point Comparison Report

FL Panhandle QL2 LiDAR Project 2018				
POINT ID	POINT CHK	DELTA N (F)	DELTA E (F)	VERT DIFF (F)
NVA-01	N.A.	N.A.	N.A.	N.A.
NVA-02	N.A.	N.A.	N.A.	N.A.
NVA-03	N.A.	N.A.	N.A.	N.A.
NVA-04	N.A.	N.A.	N.A.	N.A.
NVA-05	N.A.	N.A.	N.A.	N.A.
NVA-06	N.A.	N.A.	N.A.	N.A.
NVA-07	NVA-07CHK	0.000	0.016	0.003
NVA-08	NVA-08CHK	-0.018	-0.010	-0.025
NVA-09	N.A.	N.A.	N.A.	N.A.
NVA-10	N.A.	N.A.	N.A.	N.A.
NVA-11	N.A.	N.A.	N.A.	N.A.
NVA-12	N.A.	N.A.	N.A.	N.A.
NVA-13	NVA-13CHK	-0.015	0.025	-0.015
NVA-14	NVA-14CHK	0.000	-0.010	0.000
NVA-15	N.A.	N.A.	N.A.	N.A.
NVA-16	N.A.	N.A.	N.A.	N.A.
NVA-17	N.A.	N.A.	N.A.	N.A.
NVA-18	N.A.	N.A.	N.A.	N.A.
NVA-19	N.A.	N.A.	N.A.	N.A.
NVA-20	N.A.	N.A.	N.A.	N.A.
NVA-21	NVA-21CHK	0.011	0.025	0.039
NVA-22	NVA-22CHK	-0.005	-0.001	-0.008
NVA-23	N.A.	N.A.	N.A.	N.A.
NVA-24	N.A.	N.A.	N.A.	N.A.
NVA-25	N.A.	N.A.	N.A.	N.A.
NVA-26	N.A.	N.A.	N.A.	N.A.
NVA-27	N.A.	N.A.	N.A.	N.A.
NVA-28	NVA-28CHK	0.003	-0.017	-0.030
NVA-29	NVA-29CHK	-0.008	-0.008	-0.003
NVA-30	NVA-30CHK	-0.011	0.014	0.033
NVA-31	N.A.	N.A.	N.A.	N.A.
NVA-32	N.A.	N.A.	N.A.	N.A.
NVA-33	N.A.	N.A.	N.A.	N.A.
NVA-34	N.A.	N.A.	N.A.	N.A.
NVA-35	NVA-35CHK	0.016	-0.002	-0.044
NVA-36				
NVA-37	NVA-37CHK	-0.003	0.002	0.009
NVA-38	NVA-38CHK	-0.022	0.017	-0.042
NVA-39	N.A.	N.A.	N.A.	N.A.
NVA-40	N.A.	N.A.	N.A.	N.A.
NVA-41	NVA-41CHK	0.009	-0.003	-0.016
NVA-42	NVA-42CHK	-0.004	0.000	0.009
NVA-43	NVA-43CHK	-0.012	-0.008	0.023
NVA-44	NVA-44CHK	-0.005	0.010	0.039
NVA-45	NVA-45CHK	0.001	-0.030	-0.019
NVA-46	N.A.	N.A.	N.A.	N.A.
NVA-47	N.A.	N.A.	N.A.	N.A.
NVA-48	N.A.	N.A.	N.A.	N.A.
NVA-49	NVA-49CHK	0.005	0.009	-0.034
NVA-50	N.A.	N.A.	N.A.	N.A.

Appendix 4:*Point Comparison Report (Cont.)*

FL Panhandle QL2 LiDAR Project 2018				
POINT ID	POINT CHK	DELTA N (F)	DELTA E (F)	VERT DIFF (F)
NVA-51	NVA-51CHK	-0.015	0.015	-0.015
NVA-52	N.A.	N.A.	N.A.	N.A.
NVA-53	NVA-53CHK	-0.011	0.019	0.016
NVA-54	NVA-54CHK	-0.012	0.004	0.016
NVA-55	NVA-55CHK	0.061	-0.021	0.027
NVA-56	N.A.	N.A.	N.A.	N.A.
NVA-57	NVA-57CHK	0.021	0.001	-0.041
NVA-58	N.A.	N.A.	N.A.	N.A.
NVA-59	N.A.	N.A.	N.A.	N.A.
NVA-60	NVA-60CHK	0.017	-0.006	-0.013
NVA-61	N.A.	N.A.	N.A.	N.A.
NVA-62	N.A.	N.A.	N.A.	N.A.
NVA-63	NVA-63CHK	-0.017	0.020	-0.048
NVA-64	NVA-64CHK	0.004	0.013	-0.004
NVA-65	N.A.	N.A.	N.A.	N.A.
NVA-66	NVA-66CHK	-0.026	0.002	0.022
NVA-67	NVA-67CHK	0.012	-0.002	-0.013
NVA-68	NVA-68CHK	-0.035	0.036	-0.037
NVA-69	NVA-69CHK	0.014	0.009	0.028
NVA-70	N.A.	N.A.	N.A.	N.A.
NVA-71	N.A.	N.A.	N.A.	N.A.
NVA-72	N.A.	N.A.	N.A.	N.A.
NVA-73	N.A.	N.A.	N.A.	N.A.
NVA-74	N.A.	N.A.	N.A.	N.A.
NVA-75	NVA-75CHK	0.008	0.012	0.006
NVA-76	N.A.	N.A.	N.A.	N.A.
NVA-77	NVA-77CHK	-0.004	-0.016	0.023
NVA-78	NVA-78CHK	-0.019	0.009	-0.012
NVA-79	NVA-79CHK	-0.001	0.007	-0.004
NVA-80	NVA-80CHK	0.023	0.004	-0.047
NVA-81	NVA-81CHK	0.008	0.006	0.004
NVA-82	NVA-82CHK	0.013	0.020	-0.023
NVA-83	NVA-83CHK	-0.011	-0.001	0.032
NVA-84	NVA-84CHK	-0.045	0.028	0.048
NVA-85	N.A.	N.A.	N.A.	N.A.
NVA-86	NVA-86CHK	0.015	0.016	-0.002
NVA-87	NVA-87CHK	0.018	-0.008	-0.016
NVA-88	NVA-88CHK	0.012	-0.003	0.023
NVA-89	N.A.	N.A.	N.A.	N.A.
NVA-90	N.A.	N.A.	N.A.	N.A.
NVA-91	NVA-91CHK	-0.009	-0.014	-0.045
NVA-92	N.A.	N.A.	N.A.	N.A.
NVA-93	NVA-93CHK	0.005	-0.004	0.014
NVA-94	NVA-94CHK	-0.027	-0.034	-0.049
NVA-95	NVA-95CHK	-0.001	0.000	0.026
NVA-96	N.A.	N.A.	N.A.	N.A.
NVA-97	NVA-97CHK	-0.017	0.025	-0.019
NVA-98	N.A.	N.A.	N.A.	N.A.
NVA-99	N.A.	N.A.	N.A.	N.A.
NVA-100	NVA-100CHK	-0.015	-0.009	-0.011

Appendix 4:
Point Comparison Report

FL Panhandle QL2 LiDAR Project 2018				
POINT ID	POINT CHK	DELTA N (F)	DELTA E (F)	VERT DIFF (F)
NVA-101	N.A.	N.A.	N.A.	N.A.
NVA-102	N.A.	N.A.	N.A.	N.A.
NVA-103	NVA-103CHK	0.004	-0.011	0.036
NVA-104	N.A.	N.A.	N.A.	N.A.
NVA-105	NVA-105CHK	0.007	0.005	-0.044
NVA-106	NVA-106CHK	0.029	-0.009	-0.041
NVA-107	N.A.	N.A.	N.A.	N.A.
NVA-108	N.A.	N.A.	N.A.	N.A.
NVA-109	N.A.	N.A.	N.A.	N.A.
NVA-110	NVA-110CHK	-0.013	0.021	-0.023
NVA-111	NVA-111CHK	0.003	-0.010	-0.025
NVA-112	NVA-112CHK	-0.033	-0.013	0.024
NVA-113	N.A.	N.A.	N.A.	N.A.
NVA-114	N.A.	N.A.	N.A.	N.A.
NVA-115	NVA-115CHK	-0.003	-0.021	-0.002
NVA-116	N.A.	N.A.	N.A.	N.A.
NVA-117	NVA-117CHK	0.002	-0.013	0.041
NVA-118	NVA-118CHK	-0.008	-0.003	0.026
NVA-119	N.A.	N.A.	N.A.	N.A.
NVA-120	NVA-120CHK	0.002	-0.005	-0.033
NVA-121	NVA-121CHK	0.012	-0.002	0.043
NVA-122	NVA-122CHK	-0.021	-0.009	0.026
NVA-123	NVA-123CHK	-0.002	-0.028	-0.035
NVA-124	N.A.	N.A.	N.A.	N.A.
NVA-125	NVA-125CHK	-0.009	0.024	0.023
NVA-126	NVA-126CHK	0.028	0.006	-0.002
NVA-127	N.A.	N.A.	N.A.	N.A.
NVA-128	NVA-128CHK	-0.027	0.000	0.002
NVA-129	N.A.	N.A.	N.A.	N.A.
NVA-130	NVA-130CHK	0.004	-0.004	0.007
NVA-131	NVA-131CHK	0.012	0.029	0.001
NVA-132	NVA-132CHK	0.031	0.013	-0.026
NVA-133	N.A.	N.A.	N.A.	N.A.
NVA-134	NVA-134CHK	0.018	-0.008	-0.007
NVA-135	N.A.	N.A.	N.A.	N.A.
NVA-136	NVA-136CHK	0.001	-0.031	0.036
NVA-137	N.A.	N.A.	N.A.	N.A.
NVA-138	NVA-138CHK	-0.003	-0.017	0.023
NVA-139	NVA-139CHK	0.016	0.001	0.028
NVA-140	NVA-140CHK	0.013	-0.009	-0.008
NVA-141	NVA-141CHK	0.008	0.013	-0.019
NVA-142	N.A.	N.A.	N.A.	N.A.
NVA-143	N.A.	N.A.	N.A.	N.A.
NVA-144	NVA-144CHK	0.004	-0.006	-0.042
NVA-145	NVA-145CHK	-0.033	0.003	-0.003
NVA-146	NVA-146CHK	0.048	0.027	0.020
NVA-147	NVA-147CHK	0.035	-0.007	0.025
NVA-148	N.A.	N.A.	N.A.	N.A.
NVA-149	N.A.	N.A.	N.A.	N.A.
NVA-150	NVA-150CHK	0.005	0.013	0.019

Appendix 4:*Point Comparison Report (Cont.)*

FL Panhandle QL2 LiDAR Project 2018				
POINT ID	POINT CHK	DELTA N (F)	DELTA E (F)	VERT DIFF (F)
NVA-151	NVA-151CHK	0.033	-0.016	0.034
NVA-152	NVA-152CHK	0.020	-0.027	0.029
NVA-153	NVA-153CHK	-0.029	-0.032	-0.044
NVA-154	NVA-154CHK	-0.037	0.011	0.026
NVA-155	NVA-155CHK	0.005	0.004	0.011

Appendix 4:
Point Comparison Report (Cont.)

FL Panhandle QL2 LiDAR Project 2018				
POINT ID	POINT CHK	DELTA N (F)	DELTA E (F)	VERT DIFF (F)
VVA-01	N.A.	N.A.	N.A.	N.A.
VVA-02	N.A.	N.A.	N.A.	N.A.
VVA-03	N.A.	N.A.	N.A.	N.A.
VVA-04	N.A.	N.A.	N.A.	N.A.
VVA-05	N.A.	N.A.	N.A.	N.A.
VVA-06	VVA-06CHK	-0.008	-0.017	0.002
VVA-07	N.A.	N.A.	N.A.	N.A.
VVA-08	N.A.	N.A.	N.A.	N.A.
VVA-09	N.A.	N.A.	N.A.	N.A.
VVA-10	VVA-10CHK	0.001	0.003	0.017
VVA-11	VVA-11CHK	0.005	-0.009	0.016
VVA-12	VVA-12CHK	-0.011	-0.002	-0.008
VVA-13	N.A.	N.A.	N.A.	N.A.
VVA-14	N.A.	N.A.	N.A.	N.A.
VVA-15	N.A.	N.A.	N.A.	N.A.
VVA-16	VVA-16CHK	0.016	-0.005	-0.011
VVA-17	N.A.	N.A.	N.A.	N.A.
VVA-18	VVA-18CHK	0.003	0.014	0.006
VVA-19	N.A.	N.A.	N.A.	N.A.
VVA-20	N.A.	N.A.	N.A.	N.A.
VVA-21	N.A.	N.A.	N.A.	N.A.
VVA-22				
VVA-23				
VVA-24	VVA-24CHK	0.000	0.000	0.000
VVA-25	VVA-25CHK	0.013	-0.016	0.000
VVA-26	VVA-26CHK	0.010	-0.028	-0.026
VVA-27	VVA-27CHK	-0.002	-0.005	-0.001
VVA-28	VVA-28CHK	0.005	-0.013	-0.020
VVA-29	N.A.	N.A.	N.A.	N.A.
VVA-30	VVA-30CHK	0.031	0.027	0.046
VVA-31	VVA-31CHK	-0.003	-0.005	0.009
VVA-32	VVA-32CHK	-0.021	-0.002	0.032
VVA-33	VVA-33CHK	-0.001	0.010	-0.041
VVA-34	VVA-34CHK	0.002	0.012	-0.009
VVA-35	N.A.	N.A.	N.A.	N.A.
VVA-36	N.A.	N.A.	N.A.	N.A.
VVA-37	N.A.	N.A.	N.A.	N.A.
VVA-38	N.A.	N.A.	N.A.	N.A.
VVA-39	VVA-39CHK	-0.022	-0.050	-0.001
VVA-40	N.A.	N.A.	N.A.	N.A.
VVA-41	N.A.	N.A.	N.A.	N.A.
VVA-42	VVA-42CHK	0.018	-0.023	0.010
VVA-43	VVA-43CHK	0.020	-0.027	-0.037
VVA-44	VVA-44CHK	-0.021	-0.011	0.027
VVA-45	N.A.	N.A.	N.A.	N.A.
VVA-46	N.A.	N.A.	N.A.	N.A.
VVA-47	N.A.	N.A.	N.A.	N.A.
VVA-48	N.A.	N.A.	N.A.	N.A.
VVA-49	VVA-49CHK	0.000	0.026	-0.010
VVA-50	VVA-50CHK	-0.028	0.002	0.002

Appendix 4:

Point Comparison Report (Cont.)

FL Panhandle QL2 LiDAR Project 2018				
POINT ID	POINT CHK	DELTA N (F)	DELTA E (F)	VERT DIFF (F)
VVA-51	N.A.	N.A.	N.A.	N.A.
VVA-52	N.A.	N.A.	N.A.	N.A.
VVA-53	VVA-53CHK	0.003	0.018	0.025
VVA-54	N.A.	N.A.	N.A.	N.A.
VVA-55	VVA-55CHK	0.026	-0.003	0.038
VVA-56	VVA-56CHK	0.030	0.002	-0.041
VVA-57	VVA-57CHK	0.000	0.014	-0.026
VVA-58	N.A.	N.A.	N.A.	N.A.
VVA-59	VVA-59CHK	0.000	-0.003	0.028
VVA-60	VVA-60CHK	-0.008	-0.016	0.021
VVA-61	VVA-61CHK	0.023	-0.034	0.002
VVA-62	VVA-62CHK	0.016	-0.023	0.027
VVA-63	VVA-63CHK	-0.004	-0.009	0.015
VVA-64	VVA-64CHK	0.005	0.009	-0.007
VVA-65	VVA-65CHK	-0.021	0.012	0.011
VVA-66	VVA-66CHK	0.037	0.002	-0.017
VVA-67	VVA-67CHK	0.009	-0.009	0.020
VVA-68	VVA-68CHK	0.003	-0.016	0.015
VVA-69	VVA-69CHK	N.A.	N.A.	N.A.
VVA-70	N.A.	N.A.	N.A.	N.A.
VVA-71	VVA-71CHK	0.008	0.006	-0.025
VVA-72	VVA-72CHK	0.021	0.014	0.003
VVA-73	N.A.	N.A.	N.A.	N.A.
VVA-74	N.A.	N.A.	N.A.	N.A.
VVA-75	VVA-75CHK	-0.021	0.004	0.012
VVA-76	N.A.	N.A.	N.A.	N.A.
VVA-77	VVA-77CHK	0.006	-0.008	0.000
VVA-78	N.A.	N.A.	N.A.	N.A.
VVA-79	N.A.	N.A.	N.A.	N.A.
VVA-80	VVA-80CHK	-0.004	0.012	-0.006
VVA-81	N.A.	N.A.	N.A.	N.A.
VVA-82	N.A.	N.A.	N.A.	N.A.
VVA-83	VVA-83CHK	-0.023	-0.020	0.001
VVA-84	VVA-84CHK	-0.029	-0.006	0.048
VVA-85	VVA-85CHK	-0.006	0.016	0.041
VVA-86	VVA-86CHK	0.015	-0.013	-0.032
VVA-87	N.A.	N.A.	N.A.	N.A.
VVA-88	N.A.	N.A.	N.A.	N.A.
VVA-89	VVA-89CHK	0.021	-0.029	-0.035
VVA-90	N.A.	N.A.	N.A.	N.A.
VVA-91	VVA-91CHK	0.012	-0.003	0.004
VVA-92	VVA-92CHK	0.007	0.002	-0.006
VVA-93	N.A.	N.A.	N.A.	N.A.
VVA-94	VVA-94CHK	-0.012	0.009	-0.024
VVA-95	VVA-95CHK	0.016	-0.003	-0.015
VVA-96	VVA-96CHK	0.045	0.005	-0.017
VVA-97	VVA-97CHK	-0.015	-0.014	-0.009
VVA-98	VVA-98CHK	-0.009	0.004	0.023
VVA-99	VVA-99CHK	0.020	-0.023	-0.012
VVA-100				

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POINT ID	POINT CHK	DELTA N (F)	DELTA E (F)	VERT DIFF (F)
VVA-101	VVA-101CHK	0.004	-0.003	0.005
VVA-102	VVA-102CHK	0.045	0.003	-0.036
VVA-103	N.A.	N.A.	N.A.	N.A.
VVA-104	VVA-104CHK	-0.020	-0.016	0.036
VVA-105	VVA-105CHK	-0.033	0.001	0.014
VVA-106	VVA-106CHK	0.022	-0.006	0.003
VVA-107	N.A.	N.A.	N.A.	N.A.
VVA-108	N.A.	N.A.	N.A.	N.A.
VVA-109	N.A.	N.A.	N.A.	N.A.
VVA-110	VVA-110CHK	-0.031	-0.014	0.026
VVA-111	VVA-111CHK	-0.015	-0.029	0.037
VVA-112	VVA-112CHK	0.009	-0.021	-0.031