

Report of Survey

2020 Lidar and Derivative Products for Cherokee, Chester,
Fairfield, Lancaster, and Union Counties

*Report of Survey for 2020 Lidar: Flood Map Modernization Initiative
Contract*

December 1, 2020

Prepared for:

South Carolina Floodplain Mitigation Program
South Carolina Department of Natural Resources

Prepared by:



ESP Associates, Inc.

South Carolina Flood Mitigation Program

Report of Survey for 2020 Lidar

Overview

This Report of Survey outlines the scope and procedures used to establish calibration and independent checkpoint survey control for the 2020 aerial lidar project commissioned by the South Carolina Department of Natural Resources (SCDNR). The ground survey for the project was performed under the “Flood Map Modernization Initiative” contract between ESP Associates, Inc. (formerly ESP Associates, P.A.) and the SCDNR Flood Mitigation Program, dated December 2015. All survey control for the project was established by ESP Associates, Inc. (ESP).

ESP surveyed 70 calibration points and 164 ground control check points throughout Cherokee, Chester, Fairfield, Lancaster, and Union Counties, SC, in support of this project (Figure 1). All field surveys were conducted between January and February 2020 under the direct supervision of a South Carolina Professional Land Surveyor.

This report contains data sheets for all surveyed lidar calibration and ground check points to include coordinates, elevations, datum, photos, descriptions, etc. Team member, Quantum Spatial, used the calibration points to calibrate the lidar data set. The ground control check points were distributed throughout the project area within the following land categories: bare earth (67), forested (53), low vegetation (2), medium-height vegetation (16), and urban (26), and were used to quality-control the accuracy of the final lidar data set, independent of Quantum Spatial’s calibration efforts.

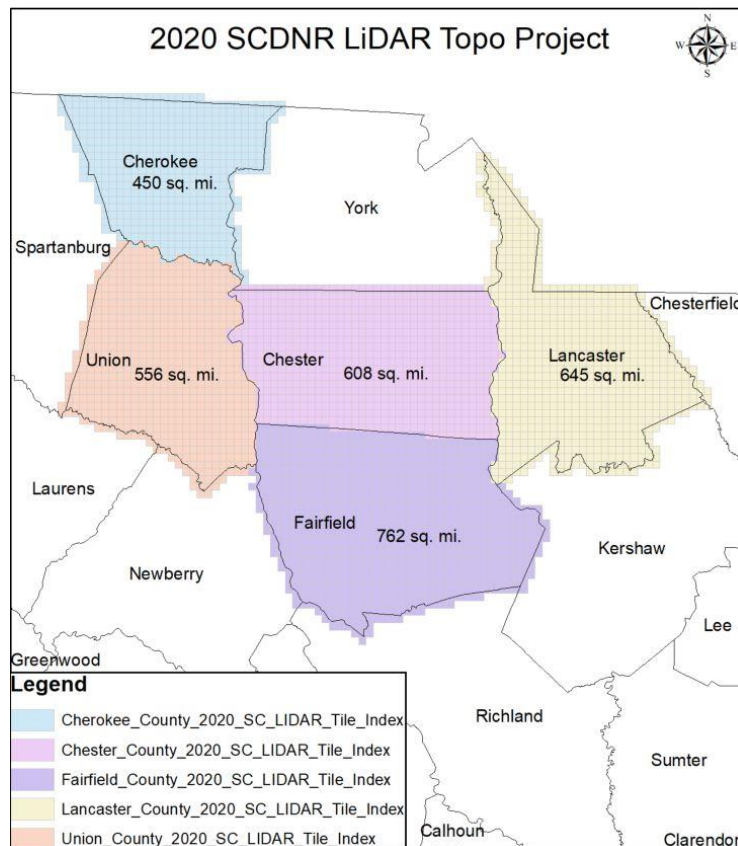


Figure 1. Project AOI

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Survey Procedures

Both real-time network (RTN) Global Navigation Satellite System (GNSS) and static GPS survey procedures were used to obtain 5 cm (H & V) accuracy standards on all 234 points. The real-time GNSS surveys were performed in accordance with survey procedures outlined in the National Geodetic Survey (NGS) Guidelines for Real Time GNSS Networks March 2011 v. 2.0.

Horizontal and Vertical Datum

The horizontal and vertical reference datum for these surveys are the NAD 83 (2011) Epoch 2010.0 and NAVD 88 (Geoid 18) respectively. The horizontal coordinates are referenced to the South Carolina State Plane Coordinate System (Zone 3900). The Orthometric heights (elevations) are derived from the GNSS observed ellipsoid and geoid heights within the South Carolina RTN. All coordinates and elevations are provided in International Survey Feet and Feet (US Survey) respectively, unless otherwise specified.

Verification of GNSS Observations

In order to verify the accuracy of our GNSS observations, ESP checked into eight NGS horizontal/vertical monuments within the project area. Seven (7) monuments were Height Modernization points and one was a First Order Class II monument. H & V observation residuals on these monuments are shown in the table below.

Bench Mark Name	PID	Vertical Order	Published (International Feet)			ESP Observed (International Feet)			Delta (ESP VS. Published)	
			Northing	Easting	Elevation	Northing	Easting	Elevation	Horizontal	Vertical
Diamonds	AJ4338	Height MOD	1178976.57	2019303.69	650.13	1178976.53	2019303.59	650.05	0.11	0.08
EA 10	AJ5353	Height MOD	986928.89	2123169.62	514.83	986928.93	2123169.71	514.79	0.10	0.04
EA 51	AJ4342	Height MOD	1133728.88	2046091.46	634.94	1133728.79	2046091.54	634.83	0.12	0.11
EA 63	AJ5390	Height MOD	1063770.22	2111402.68	689.96	1063770.19	2111402.73	689.90	0.06	0.06
Jenkinsville	AA9492	Height MOD	885613.71	1912878.02	465.88	885613.71	1912878.02	465.91	0.00	-0.03
Lions Club	AI6665	Height MOD	1045333.37	1806033.03	529.00	1045333.29	1806033.15	529.08	0.14	-0.08
Tanyard Branch	AI6716	Height MOD	1044421.70	1932067.57	500.52	1044421.69	1932067.65	500.61	0.08	-0.09
TT 22 P	EC0935	First Order Class II	1049138.12	1812138.61	645.03	1049138.05	1812138.72	645.12	0.13	-0.09

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Below are the CORS within the SC RTN that were used as primary control for this Project.

Designation	PID/NGS Data Sheet	County	USGS Quad
Cherokee County CORS ARP	DP1943	Cherokee	Gaffney (2017)
Union COPR ARP	DK7758	Union	Jonesville (2017)
Newberry County CORS ARP	DM8061	Newberry	Newberry East (2017)
Fairfield County CORS ARP	DM8062	Fairfield	Winnsboro Mills (2017)
Lancaster County CORS ARP	DM8064	Lancaster	Anticoh (2017)
I-77 Welcome Center CORS ARP	DF6318	Mecklenburg	Fort Mill (2017)
White Rose CORS ARP	DO2638	York	Rirzah (2017)

Ground Control Point Survey Accuracy

The lidar calibration point and ground control check point surveys meet the 5.0 cm (0.17 feet) horizontal and vertical positional accuracy standard, specified within the National Standards for Spatial Data Accuracy, at a 95% confidence level, relative to the SCGS RTN.

Signature:

Daniel B. Hill, SC PLS No. 21236

Date: 12/01/2020

Sealed:



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Appendix A – Digital Attachments

The following digital attachments have been provided as part of this report:

- 2020 Lidar Calibration Point Datasheets – PDF of survey datasheets for the calibration points
- 2020 Lidar Checkpoint Datasheets – PDF of survey datasheets for the independent checkpoints
- 2020 Lidar Survey Excel Sheets – ZIP file of Excel sheets containing survey coordinates
- 2020 Lidar Calibration Point Photos – ZIP file of field photos of the calibration points
- 2020 Lidar Survey Checkpoint Photog – ZIP file of field photos of the independent checkpoints