



VIRGINIA – SANDY QL2 LiDAR VALIDATION POINT SURVEYS

Prepared For:

Digital Aerial Solutions, LLC
8409 Laurel Fair Circle, Suite 100
Tampa, FL 33610

Prepared By:

ESP Associates, P.A.
P.O. Box 7030
Charlotte, NC 28241



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1.0 – PLS Certification

The following page contains the project narrative certified by the PLS in responsible charge of this project.



LiDAR VALIDATION POINT SURVEYS CERTIFICATION

PRIME CONTRACT NO: G10PC00093
SUBCONTRACTOR TASK ORDER NO: ESP0001-2014
USGS TASK ORDER NO: G14PD00222
VIRGINIA – SANDY QL2 LiDAR

Introduction

ESP Associates, P.A. (ESP), performed a total of 100 Light Detection and Ranging (LiDAR) validation point surveys within 12 counties in southeastern Virginia. These counties included: Amelia, Chesterfield, Colonial Heights, Dinwiddie, Hanover, Henrico, Hopewell, Nottoway, Petersburg, Prince Edward, Richmond, and Sussex. The validation points were located in a 3 Block acquisition area totaling 3,254 square miles and surveyed from April 10 – 25, 2014 under the supervision of a Virginia Professional Land Surveyor.

Survey Procedures

The goal for the LiDAR validation point surveys was to provide horizontal and vertical positions in varying land cover classes approximately 5 meters away from any breaklines. The following table summarizes the land cover types used for this project, the quantity of survey points for each type, and the nominal vegetation heights per cover type:

Land Cover Type	Quantity	Height Range
(A) Bare Earth/Open Terrain	32	0 ft. – 0.5 ft. (flush to ankle high)
(B) Tall Weeds/Crops	21	0.5 ft – 5 ft. (between ankle and chest high)
(C) Brush lands and Trees	7	5 ft.– 6.5 ft. (between chest and head high)
(D) Forested and Fully Grown	20	> 6.5 ft. (greater than head high)
(E) Urban	20	0 ft. (flush)

These validation point surveys will be used to test the vertical accuracies of the raw and classified point clouds as well as the bare earth surface derived from the final LiDAR dataset. Specifically, points located within the bare earth and urban categories will be used to test the Fundamental Vertical Accuracy (FVA) of the raw, classified, and bare earth surface products while points located in the remaining categories will be used to calculate Supplemental and Consolidated Vertical Accuracies (SVA and CVA) for the classified point cloud only.

Real-Time & Static Global Navigation Satellite System (GNSS) procedures were used for this project. ESP used the KeyNet GPS Real-Time Network (RTN) as the primary GNSS control for the real-time procedures. For the static GPS post-processing, ESP used National Geodetic Survey (NGS) Continuously Operating Reference Station (CORS) data. The real-time GNSS surveys were performed in accordance with survey procedures outlined in the NGS *Guidelines for Real Time GNSS Networks March 2011 v. 2.0*, and the static GNSS surveys were performed in accordance with *NOAA Technical Memorandum NOS NGS-58 – Guidelines for Establishing GPS-Derived Ellipsoid Heights (Standards: 2 CM and 5 CM)*. A datasheet for each calibration point is included in this report which contains Northing, Easting, Elevation, Latitude, Longitude, and Ellipsoid Height information along with accompanying photographs.

Project Anomalies

Existing conditions on the ground throughout the project area posed challenges for finding ideal vegetation areas for tall weeds/crops and brush land cover types. The majority of the project area was rural meadowland which limited options for finding brush areas, and the tall weeds/crops areas found fit the height range on the lower end in many cases. Per the client's direction, deficiencies in brush points were replaced with additional bare earth points or points from other categories. ESP made the best available use of the existing conditions to meet the goals of this project.

ESP Associates, P.A.
PO Box 7030
Charlotte, NC 28241
803-802-2440
www.espassociates.com

GNSS Horizontal Survey Control

The GNSS derived horizontal coordinates referred to in this report are based on the Universal Transverse Mercator Coordinate System (Zone 18). The project horizontal datum is NAD83(2011) Epoch 2010.00. All coordinates are provided in meters unless otherwise specified.

GNSS Derived Orthometric Heights

Project elevations are based on the NAVD 88 vertical datum and were calculated using the GNSS derived ellipsoid heights from the NCGS RTN and applying geoid heights that were interpolated from the GEOID12A model. All NAVD 88 elevations are provided in meters unless otherwise specified.

Verification of GNSS Derived Horizontal & Vertical Positions

In order to verify the GNSS derived ellipsoid heights and interpolated geoid model heights against the local NAVD 88 datum as well as the GNSS derived horizontal positions against the NAD83 (2011) Epoch 2010.00 datum, ESP checked into published NGS horizontal/vertical bench marks throughout the project area. The following table shows the results of the benchmark checks:

Benchmark Name	PID	Published (M)			ESP Measured (M)			Deltas (ESP Minus NGS)	
		Northing	Easting	Elev.	Northing	Easting	Elev.	Hor. (M)	Ver. (M)
BAILEY RM 1	FX1096	N/A	N/A	46.299	4079065.945	281626.022	46.281	N/A	-0.018
BURK	GW0280	N/A	N/A	183.694	4120388.638	212518.770	183.685	N/A	-0.009
G 247	GV1642	N/A	N/A	16.715	4129546.731	296095.069	16.755	N/A	0.040
N 474	GV3456	N/A	N/A	106.391	4154133.403	272010.919	106.366	N/A	-0.025
SCOTT	GV2204	4134169.060	243940.620	96.725	4134169.088	243940.622	96.744	0.028	0.019
STUART	GV1256	N/A	N/A	60.713	4171245.253	282963.741	60.692	N/A	-0.021
T 343	GV1263	N/A	N/A	63.810	4175668.456	281242.861	63.789	N/A	-0.021
V 13	GV1207	4156626.750	284991.770	9.232	4156626.754	284991.771	9.242	0.004	0.010
VA 20	GV6211	4156429.140	283869.430	26.164	4156429.144	283869.416	26.155	0.015	-0.009

Survey Accuracy

The LiDAR validation point surveys meet a 5 cm (0.16 feet) or better horizontal and vertical positional accuracy relative to the KeyNet GPS RTN and NGS CORS used for static post-processing. In order to test the accuracy of the real-time LiDAR validation points multiple observations were taken at different times utilizing different satellite configurations and averaged to establish final coordinates and elevations. Positional accuracy was tested using National Standards for Spatial Data Accuracy guidance and reported at the 95% confidence level. The positional accuracy of the static validation points was tested by evaluating the results of a minimally-constrained least square adjustment at the 95% confidence level.

Signature:

Date: 05/14/2014

Sealed:

Augustin D. Keane, PLS #0403002876



ESP Associates, P.A.
PO Box 7030
Charlotte, NC 28241
803-802-2440
www.espassociates.com

5/14/14

2.0 – LiDAR Validation Point Spreadsheet

The following pages contain the final validation point information in spreadsheet format. The spreadsheet contains Point ID, Latitude, Longitude, Ellipsoid Height, Northing, Easting, Elevation, and a Description code for each validation point.

Project: Virginia - Sandy QL2 LiDAR Calibration Point Surveys**ESP Job#: CP10.200.000****Survey Date: April 2014****Coordinate System: UTM****Zone: 18****Horizontal Datum: NAD83 (2011)****Vertical Datum: NAVD88 using Geoid12A****Units: Meters****LIPT = LiDAR Calibration Point**

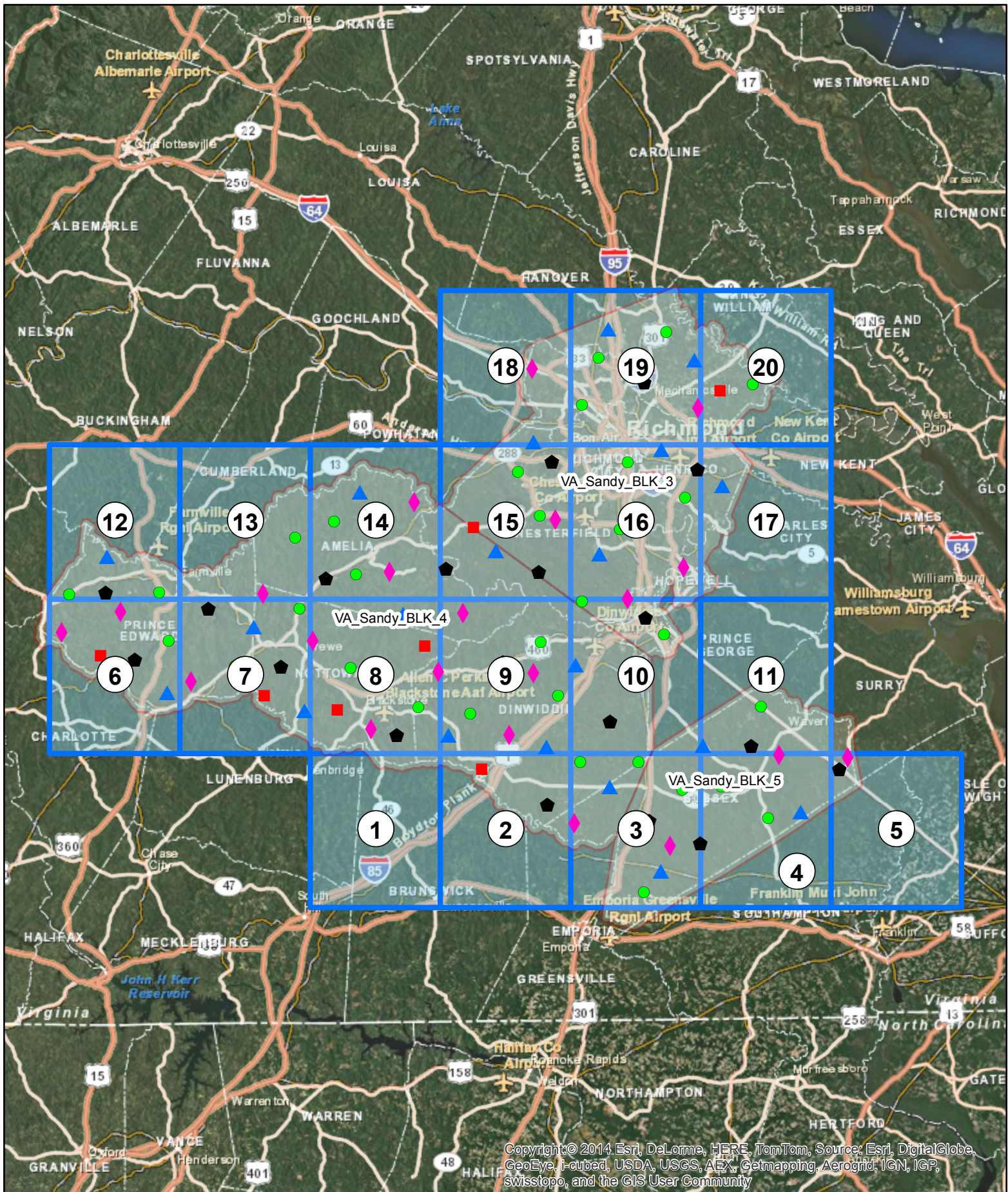
Pt#	Geodetic NAD83(2011)		Ellipsoid	NAD83 (2011) UTM (Zone 18)		NAVD88	Combined	Description
Name	Latitude	Longitude	Height	Northing	Easting	Elevation	Grid	Code
	North	West		Y	X	Z	Factor	
	Deg Min Sec	Deg Min Sec	Meters	Meters	Meters	Meters		
ESP_A_02	37 16 51.26179	-078 26 17.16886	111.094	4131578.566	195171.069	142.409	1.00072735	Bare Earth
ESP_A_03	37 12 13.86127	-077 21 34.94151	7.148	4120094.811	290588.408	40.904	1.00013911	Bare Earth
ESP_A_04	37 24 05.38164	-078 03 49.08395	67.748	4143819.148	228815.621	99.539	1.00049533	Bare Earth
ESP_A_06	37 29 01.84122	-077 40 06.78393	49.512	4151894.094	264053.433	82.156	1.00027801	Bare Earth
ESP_A_07	37 15 43.16117	-077 32 03.03241	42.721	4126946.442	275275.255	76.042	1.00021542	Bare Earth
ESP_A_08	37 26 10.95096	-077 18 39.05893	4.346	4145789.633	295556.039	37.710	1.00011419	Bare Earth
ESP_A_10	37 06 03.90716	-077 35 12.82243	60.799	4109217.959	270111.845	94.150	1.00024153	Bare Earth
ESP_A_11	36 59 12.27084	-077 25 02.75310	9.321	4096133.212	284851.335	43.227	1.00016881	Bare Earth
ESP_A_12	36 45 50.31565	-077 24 31.41088	7.541	4071395.837	285002.370	41.633	1.00016832	Bare Earth
ESP_A_13	36 56 15.52198	-077 19 28.29043	-3.115	4090479.508	292988.211	31.026	1.00012845	Bare Earth
ESP_A_14	36 53 14.63527	-077 08 35.92936	-3.426	4084526.145	309002.972	31.138	1.00004996	Bare Earth
ESP_A_15	37 04 42.41912	-077 09 15.86035	2.399	4105746.442	308494.137	36.533	1.00005143	Bare Earth
ESP_A_16	37 35 49.01573	-077 31 46.83493	57.546	4164106.161	276672.410	90.376	1.00020533	Bare Earth
ESP_A_17	37 29 53.35622	-077 25 56.36067	-17.371	4152915.770	284984.673	15.773	1.00017222	Bare Earth
ESP_A_18	37 43 10.81917	-077 20 47.78455	22.174	4177304.766	293177.728	55.209	1.00012341	Bare Earth
ESP_A_20	37 37 43.50157	-077 09 44.63864	14.064	4166824.461	309182.358	47.528	1.0000463	Bare Earth
ESP_A_21	37 16 40.52397	-078 37 48.11173	189.674	4131884.300	178135.639	220.877	1.00084656	Bare Earth
ESP_A_22	37 11 51.99920	-078 25 03.44311	124.063	4122286.153	196653.949	155.357	1.00071422	Bare Earth
ESP_A_23	37 09 19.23647	-078 16 33.22335	140.169	4117131.686	209074.512	171.624	1.00062075	Bare Earth
ESP_A_24	37 15 09.70340	-078 08 18.26698	118.878	4127522.669	221646.130	150.575	1.00053588	Bare Earth
ESP_A_25	37 22 26.88384	-078 08 45.70655	103.998	4141022.907	221418.974	135.661	1.00053975	Bare Earth
ESP_A_26	37 18 40.29625	-078 01 01.34902	79.611	4133664.325	232620.420	111.484	1.00046824	Bare Earth
ESP_A_28	37 09 04.89144	-078 01 46.64290	77.916	4115961.663	230937.094	109.881	1.00047967	Bare Earth
ESP_A_29	37 05 00.52547	-077 53 07.47537	74.838	4108029.098	243518.678	107.262	1.00039869	Bare Earth
ESP_A_30	37 04 14.53835	-077 46 29.58329	60.180	4106318.617	253303.922	92.894	1.00034033	Bare Earth
ESP_A_31	36 59 11.81315	-077 32 27.44012	23.966	4096405.525	273855.489	57.589	1.0002263	Bare Earth
ESP_A_32	36 52 18.44592	-077 25 57.61475	-6.258	4083412.775	283169.246	27.780	1.00018023	Bare Earth

Pt#	Geodetic NAD83(2011)		Ellipsoid	NAD83 (2011) UTM (Zone 18)		NAVD88	Combined	Description
Name	Latitude	Longitude	Height	Northing	Easting	Elevation	Grid	Code
	North	West		Y	X	Z	Factor	
	Deg Min Sec	Deg Min Sec	Meters	Meters	Meters	Meters		
ESP_A_33	36 56 33.95111	-077 14 27.18709	-16.456	4090869.058	300451.240	17.797	1.00009316	Bare Earth
ESP_A_35	37 24 29.75969	-077 37 21.18417	37.384	4143392.631	267887.803	70.244	1.00025781	Bare Earth
ESP_A_36	37 23 00.48091	-077 27 03.12672	-0.829	4140231.651	283013.788	32.483	1.00018013	Bare Earth
ESP_A_38	37 40 39.63411	-077 29 34.60699	33.656	4172977.865	280153.755	66.453	1.00019007	Bare Earth
ESP_A_39	37 11 34.00514	-077 37 23.06801	54.474	4119481.279	267177.598	87.563	1.00025923	Bare Earth
ESP_B_01	37 12 42.07361	-078 38 49.53518	146.996	4124590.477	176338.624	178.174	1.00086758	Tall Weeds/Crops
ESP_B_02	37 14 51.33431	-078 31 14.85429	120.204	4128151.093	187699.379	151.440	1.00078274	Tall Weeds/Crops
ESP_B_03	37 07 43.94940	-078 22 12.63625	129.647	4114487.700	200594.530	160.965	1.00068409	Tall Weeds/Crops
ESP_B_04	37 16 43.94487	-078 13 00.46968	116.723	4130661.777	214790.474	148.276	1.00058382	Tall Weeds/Crops
ESP_B_05	37 11 53.93417	-078 06 37.53023	93.866	4121405.420	223930.227	125.651	1.00052422	Tall Weeds/Crops
ESP_B_06	37 18 54.38811	-077 56 43.98824	74.615	4133898.687	238971.066	106.641	1.00042768	Tall Weeds/Crops
ESP_B_07	37 08 39.46284	-077 50 34.29171	80.281	4114663.885	247504.081	112.724	1.00037283	Tall Weeds/Crops
ESP_B_08	37 14 36.11084	-077 47 20.10177	48.588	4125515.490	252619.848	81.077	1.00034628	Tall Weeds/Crops
ESP_B_09	37 08 23.70922	-077 38 21.21278	57.083	4113655.322	265580.392	90.184	1.00026803	Tall Weeds/Crops
ESP_B_10	37 15 53.83027	-077 26 12.62901	15.216	4127048.418	283916.533	48.768	1.00017281	Tall Weeds/Crops
ESP_B_11	37 24 07.25606	-077 35 22.66441	10.418	4142618.368	270783.089	43.373	1.00024559	Tall Weeds/Crops
ESP_B_12	37 19 05.04783	-077 18 59.55432	-11.631	4132674.205	294729.896	21.955	1.00012088	Tall Weeds/Crops
ESP_B_13	37 35 22.85372	-077 16 51.57102	22.488	4162737.005	298610.591	55.760	1.00009606	Tall Weeds/Crops
ESP_B_14	37 02 04.31837	-077 41 33.81643	56.876	4102094.372	260495.735	89.886	1.00029777	Tall Weeds/Crops
ESP_B_15	36 52 57.03347	-077 33 19.58439	33.266	4084888.198	272256.327	66.867	1.0002338	Tall Weeds/Crops
ESP_B_16	36 50 32.33825	-077 21 09.89136	4.292	4079963.750	290213.574	38.548	1.00014155	Tall Weeds/Crops
ESP_B_17	36 59 40.07667	-077 07 06.48433	-0.226	4096356.142	311481.442	34.189	1.00003786	Tall Weeds/Crops
ESP_B_18	37 39 34.48954	-077 38 10.39196	32.382	4171315.643	267460.125	64.862	1.00026101	Tall Weeds/Crops
ESP_B_19	37 02 48.76409	-077 59 14.39379	88.721	4104247.613	234328.970	120.963	1.00045565	Tall Weeds/Crops
ESP_B_20	37 25 59.70215	-077 53 29.27759	66.910	4146861.745	244167.168	98.990	1.00039577	Tall Weeds/Crops
ESP_B_34	36 59 20.87280	-076 58 15.97125	-1.829	4095482.512	324584.397	33.059	0.99997936	Tall Weeds/Crops
ESP_C_01	37 10 23.69175	-078 33 48.04458	125.575	4120040.598	183612.800	156.765	1.00081358	Brush
ESP_C_05	37 11 15.84131	-077 52 12.87890	81.845	4119557.738	245217.240	114.163	1.00038687	Brush
ESP_C_09	36 58 33.99122	-077 45 04.92508	45.126	4095760.495	255091.264	78.072	1.00033189	Brush
ESP_C_19	37 04 46.72274	-078 03 29.59297	82.979	4108084.571	228140.117	114.995	1.00049753	Brush
ESP_C_27	37 06 17.15616	-078 12 48.82653	124.929	4111328.783	214421.481	156.539	1.00058517	Brush
ESP_C_37	37 37 08.43124	-077 13 56.95419	13.207	4165888.364	302971.062	46.540	1.00007611	Brush
ESP_C_40	37 23 24.09445	-077 45 52.27063	71.128	4141727.593	255260.829	103.596	1.0003267	Brush
ESP_D_01	37 06 35.96318	-078 25 16.09097	125.027	4112553.852	195990.213	156.302	1.00071906	Forested & Fully Grown
ESP_D_02	37 13 18.72352	-078 14 09.45882	121.041	4124392.969	212874.369	152.571	1.00059667	Forested & Fully Grown
ESP_D_03	37 04 41.54318	-078 07 43.77580	119.078	4108129.474	221856.621	150.934	1.00053445	Forested & Fully Grown
ESP_D_04	37 14 33.99738	-077 54 59.47603	44.909	4125791.761	241296.643	77.057	1.00041746	Forested & Fully Grown
ESP_D_05	37 00 49.08056	-077 16 45.31388	-8.517	4098813.579	297222.316	25.521	1.00010791	Forested & Fully Grown
ESP_D_06	36 53 48.37697	-077 04 23.66364	-4.310	4085428.061	315270.837	30.410	1.00002108	Forested & Fully Grown
ESP_D_07	36 47 55.48130	-077 22 19.61208	5.382	4075171.931	288366.394	39.609	1.00015097	Forested & Fully Grown
ESP_D_08	37 20 33.42204	-077 29 45.44431	25.824	4135803.351	278901.352	59.116	1.00019814	Forested & Fully Grown
ESP_D_09	37 27 23.57818	-077 13 51.09550	8.711	4147857.628	302686.829	42.114	1.00007821	Forested & Fully Grown

Pt#	Geodetic NAD83(2011)		Ellipsoid	NAD83 (2011) UTM (Zone 18)		NAVD88	Combined	Description
Name	Latitude	Longitude	Height	Northing	Easting	Elevation	Grid	Code
	North	West		Y	X	Z	Factor	
	Deg Min Sec	Deg Min Sec	Meters	Meters	Meters	Meters		
ESP_D_10	37 27 01.93585	-078 00 30.31224	79.696	4149104.508	233878.084	111.569	1.00045993	Forested & Fully Grown
ESP_D_11	37 31 07.23008	-077 21 39.75823	15.467	4155032.315	291343.743	48.686	1.00013388	Forested & Fully Grown
ESP_D_12	37 40 19.91885	-077 17 15.84771	19.721	4171908.348	298238.479	52.919	1.00009833	Forested & Fully Grown
ESP_D_13	37 00 51.47476	-077 36 49.93209	61.277	4099653.246	267449.284	94.610	1.00025664	Forested & Fully Grown
ESP_D_14	37 02 03.82615	-077 49 17.75449	61.750	4102411.753	249030.303	94.415	1.0003663	Forested & Fully Grown
ESP_D_15	37 20 57.77634	-077 43 03.98349	29.627	4137096.859	259270.101	62.252	1.00030924	Forested & Fully Grown
ESP_D_16	37 32 05.15156	-077 38 07.03737	78.831	4157461.898	267153.368	111.493	1.0002555	Forested & Fully Grown
ESP_D_17	37 20 33.76963	-078 32 59.32336	122.939	4138805.403	185521.307	154.220	1.00079911	Forested & Fully Grown
ESP_D_18	37 09 08.28953	-077 32 56.54002	43.177	4114810.293	273629.322	76.596	1.00022451	Forested & Fully Grown
ESP_D_19	37 43 34.67896	-077 28 19.14285	31.183	4178324.760	282145.114	63.950	1.00017971	Forested & Fully Grown
ESP_D_20	36 56 38.43580	-077 28 44.49621	5.591	4091532.643	279245.037	39.435	1.00019952	Forested & Fully Grown
ESP_E_01	37 16 50.53623	-078 33 08.50597	133.932	4131931.126	185036.260	165.168	1.00080116	Urban
ESP_E_02	37 09 59.89381	-078 29 24.96486	134.240	4119065.161	190076.488	165.467	1.00076234	Urban
ESP_E_03	37 15 11.39770	-078 20 00.25620	112.255	4128166.980	204348.060	143.668	1.00065927	Urban
ESP_E_04	37 09 11.06912	-078 10 41.68850	111.530	4116584.498	217740.496	143.204	1.00056404	Urban
ESP_E_05	37 18 13.85945	-078 04 54.31319	98.445	4133034.559	226857.360	130.205	1.00050367	Urban
ESP_E_06	37 08 28.84765	-077 57 46.74874	91.983	4114663.422	236821.921	124.112	1.00043887	Urban
ESP_E_07	37 19 09.00540	-077 49 29.28239	56.196	4134022.287	249687.677	88.545	1.00036305	Urban
ESP_E_08	37 09 33.25466	-077 42 15.37036	69.949	4115961.861	259863.106	102.773	1.00029943	Urban
ESP_E_09	37 18 46.05503	-077 37 32.92534	60.668	4132805.879	267304.239	93.623	1.00025751	Urban
ESP_E_10	37 13 58.10914	-077 23 55.38865	-25.558	4123395.063	287207.071	8.117	1.00016183	Urban
ESP_E_11	36 53 07.41611	-077 23 46.11177	2.810	4084839.735	286463.586	36.924	1.00016133	Urban
ESP_E_12	36 50 43.12156	-077 17 15.54170	-1.024	4080155.062	296026.909	33.351	1.00011274	Urban
ESP_E_13	37 00 40.84446	-077 10 34.75406	2.371	4098345.241	306375.394	36.579	1.00006149	Urban
ESP_E_14	36 58 07.91277	-076 59 22.22679	-5.691	4093267.971	322899.362	29.169	0.99998728	Urban
ESP_E_15	37 02 08.32917	-077 55 52.77232	77.825	4102845.995	239272.487	110.231	1.0004253	Urban
ESP_E_16	36 54 55.96274	-077 36 43.34916	59.314	4088690.633	267311.388	92.708	1.00025776	Urban
ESP_E_17	37 03 21.71849	-077 28 36.09373	7.687	4103957.536	279776.485	41.401	1.00019628	Urban
ESP_E_18	37 38 03.95118	-077 23 44.75599	23.211	4167955.278	288602.510	56.254	1.00014683	Urban
ESP_E_19	37 30 02.44250	-077 35 42.70340	67.516	4153580.703	270592.072	100.313	1.00023769	Urban
ESP_E_20	37 29 07.01821	-077 16 58.81849	10.040	4151156.589	298151.425	43.373	1.0001003	Urban

3.0 – Map Book

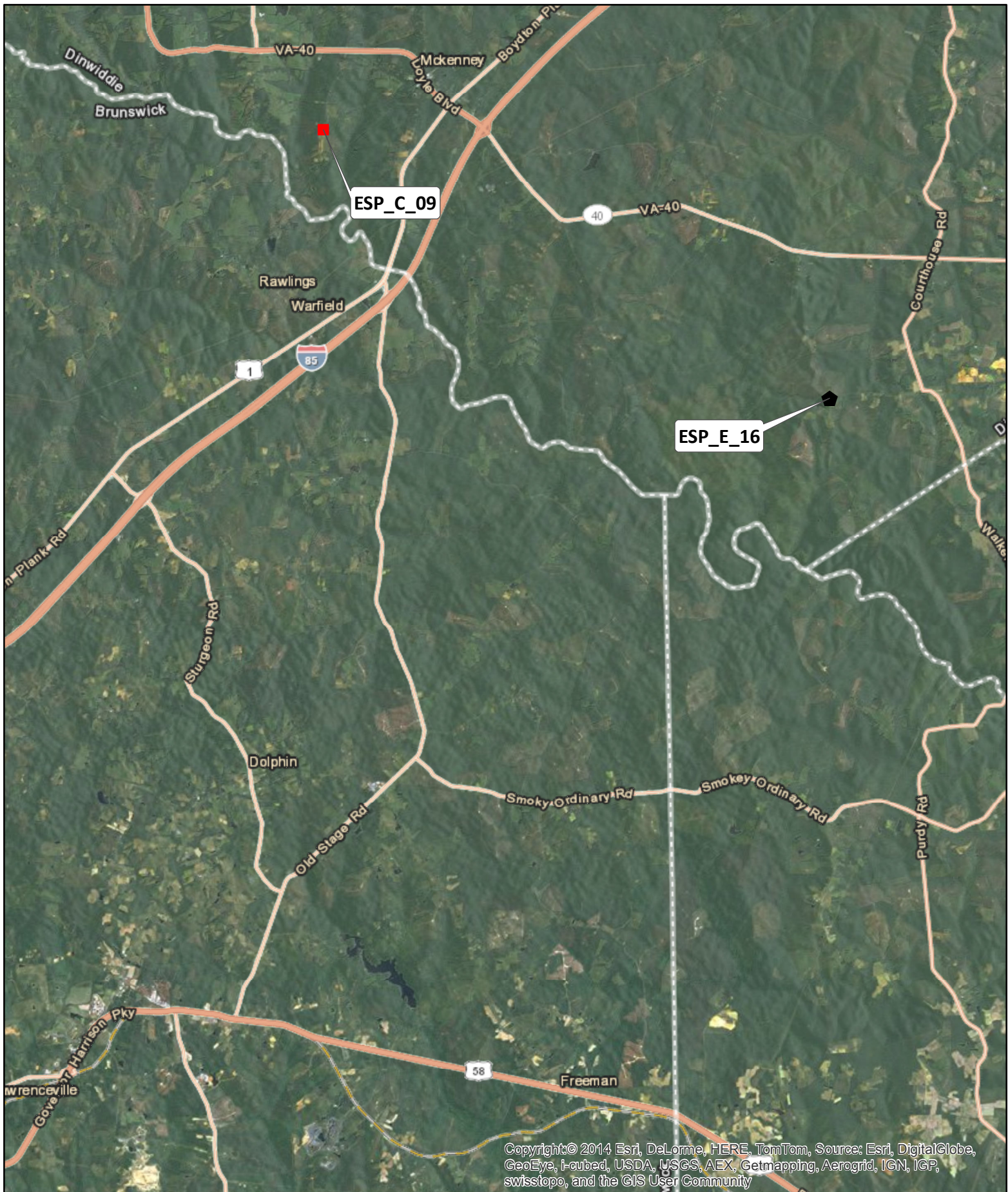
The following pages contain a map book that illustrates the vicinity for each LiDAR calibration point. An index sheet is provided to serve as a guide for the individual map book pages.



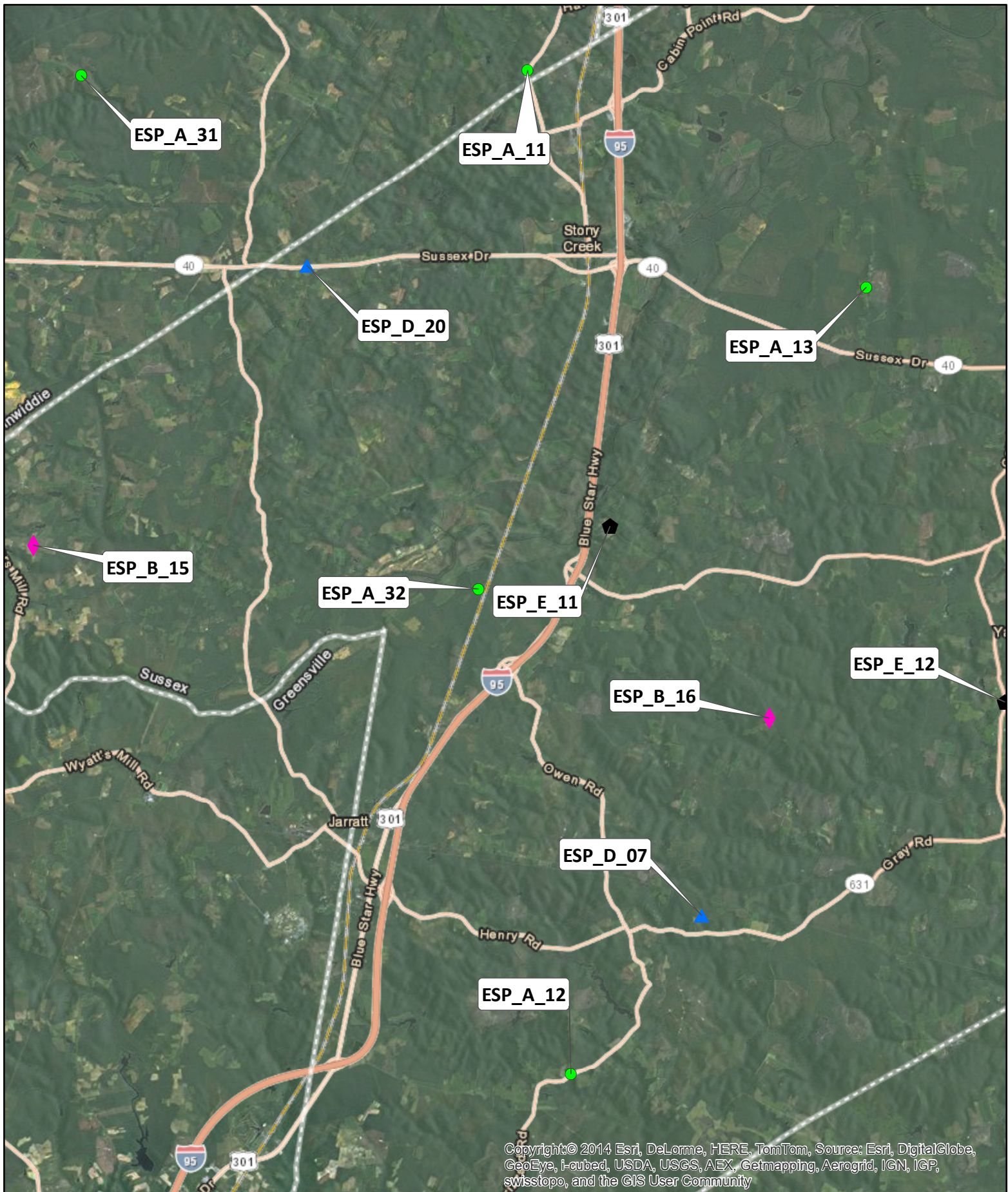
		Date	Project	 PO Box 7030 Charlotte, NC 28241
● Bare Earth ■ Brush ▲ Forested & Fully Grown ◆ Tall Weeds/Crops ■ Urban VA_Sandy_AOI		05/13/2014	Virginia - Sandy QL2 LiDAR	
		Scale	Sheet	
		Not to Scale	Index Map	



Bare Earth Brush Forested & Fully Grown Tall Weeds/Crops Urban <td> N W E S </td> <td> Date 05/13/2014 Scale 1 in = 10,000 ft </td> <td> Project Virginia - Sandy QL2 LiDAR Sheet Sheet #: 1 of 20 </td> <td> ESP ESP Associates, P.A. PO Box 7030 Charlotte, NC 28241 </td>	N W E S	Date 05/13/2014 Scale 1 in = 10,000 ft	Project Virginia - Sandy QL2 LiDAR Sheet Sheet #: 1 of 20	ESP ESP Associates, P.A. PO Box 7030 Charlotte, NC 28241
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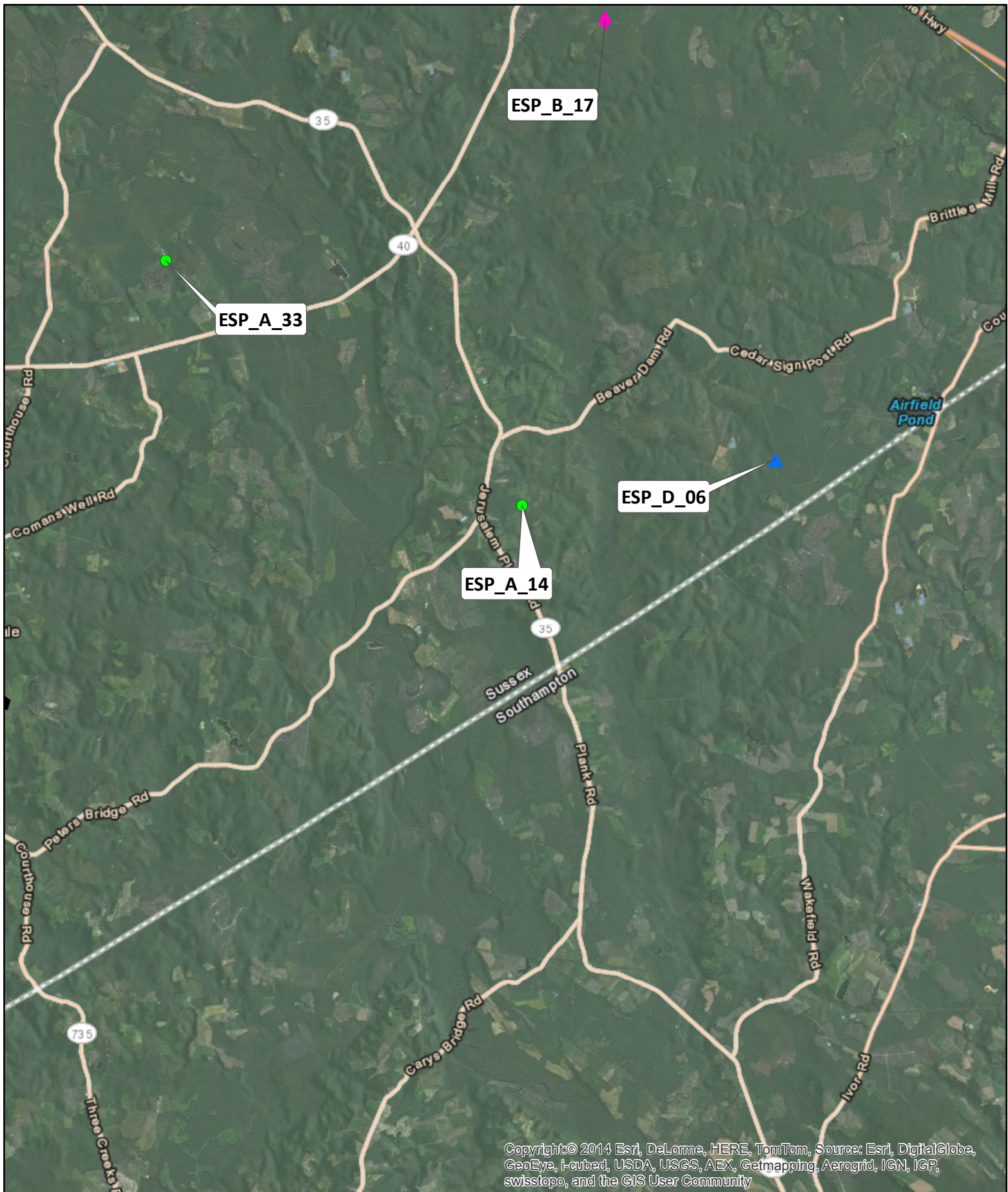
Bare Earth Brush Forested & Fully Grown Tall Weeds/Crops Urban	Date 05/13/2014 Project Virginia - Sandy QL2 LiDAR
	Scale 1 in = 10,000 ft Sheet Sheet #: 2 of 20
	PO Box 7030 Charlotte, NC 28241



● Bare Earth ■ Brush ▲ Forested & Fully Grown ◆ Tall Weeds/Crops ■ Urban		Date	05/13/2014	Project	Virginia - Sandy QL2 LiDAR
		Scale	1 in = 10,000 ft	Sheet	Sheet #: 3 of 20



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- Bare Earth
- Brush
- ▲ Forested & Fully Grown
- ◆ Tall Weeds/Crops
- Urban



Date 05/13/2014	Project Virginia - Sandy QL2 LiDAR
Scale 1 in = 10,000 ft	Sheet Sheet #: 4 of 20



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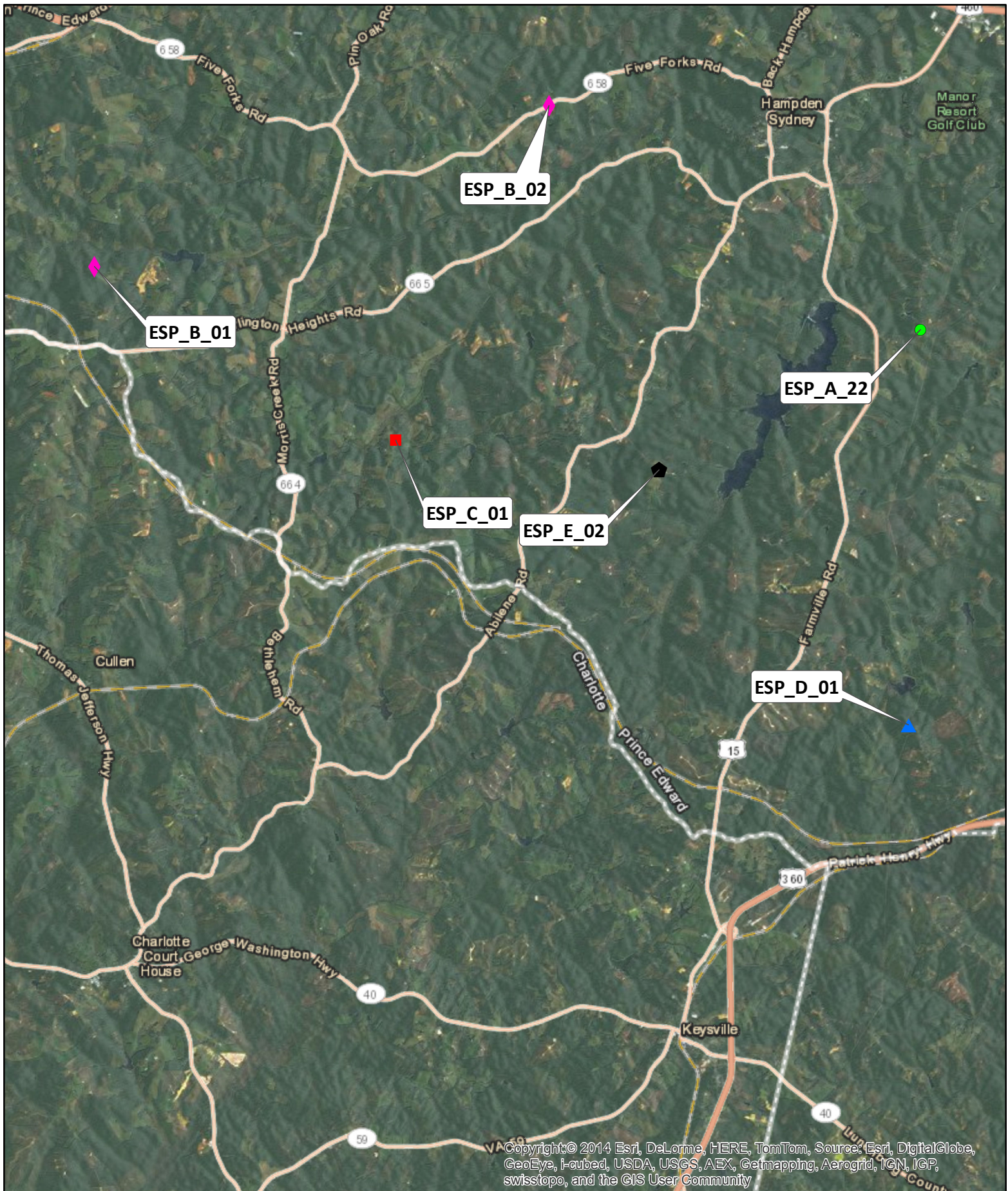


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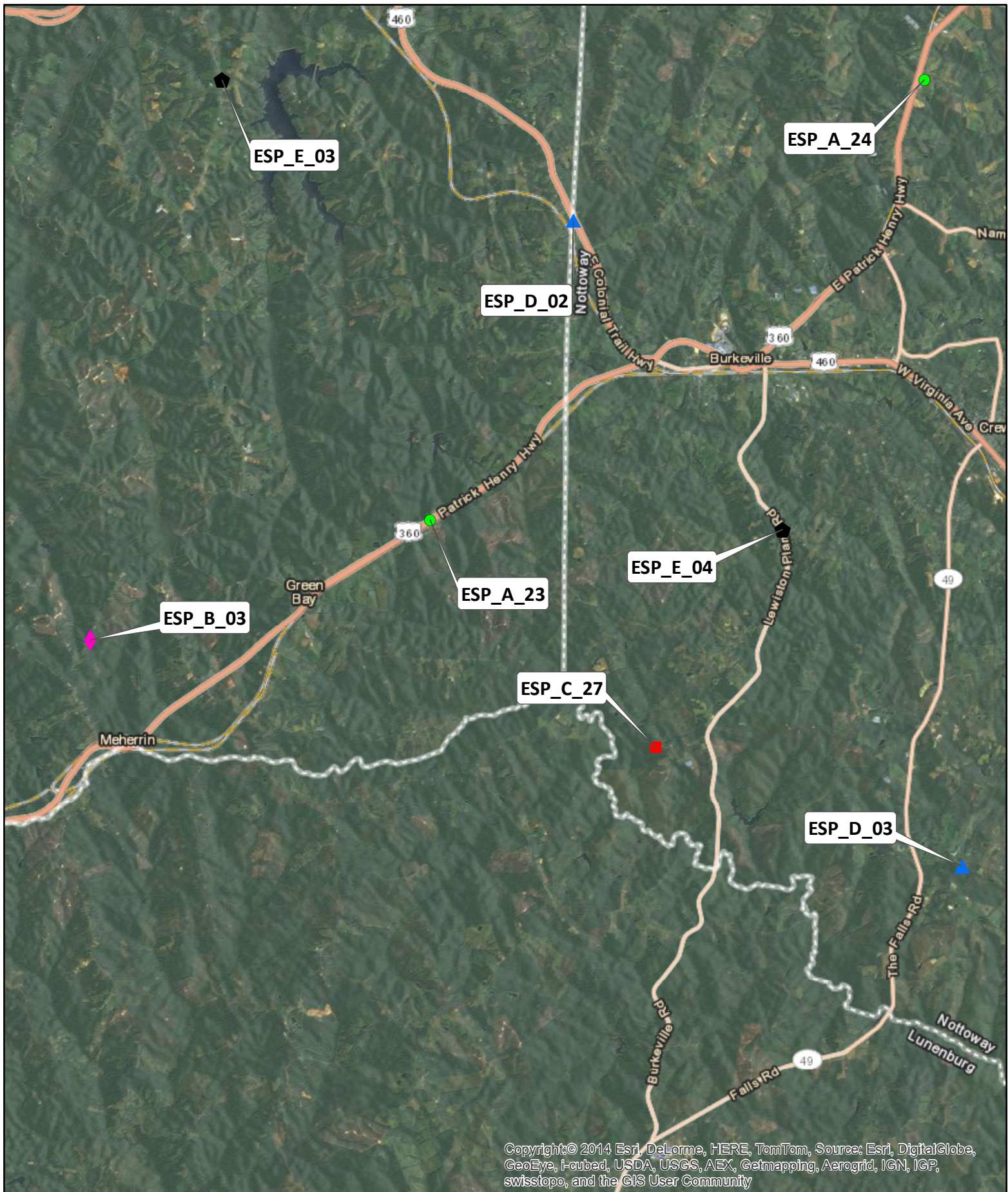
Bare Earth Brush Forested & Fully Grown Tall Weeds/Crops Urban	<table><tr><td>Date</td><td>Project</td></tr><tr><td>05/13/2014</td><td>Virginia - Sandy QL2 LiDAR</td></tr><tr><td>Scale</td><td>Sheet</td></tr><tr><td>1 in = 10,000 ft</td><td>Sheet #: 5 of 20</td></tr></table>	Date	Project	05/13/2014	Virginia - Sandy QL2 LiDAR	Scale	Sheet	1 in = 10,000 ft	Sheet #: 5 of 20	ESP Associates, P.A. PO Box 7030 Charlotte, NC 28241
Date	Project									
05/13/2014	Virginia - Sandy QL2 LiDAR									
Scale	Sheet									
1 in = 10,000 ft	Sheet #: 5 of 20									



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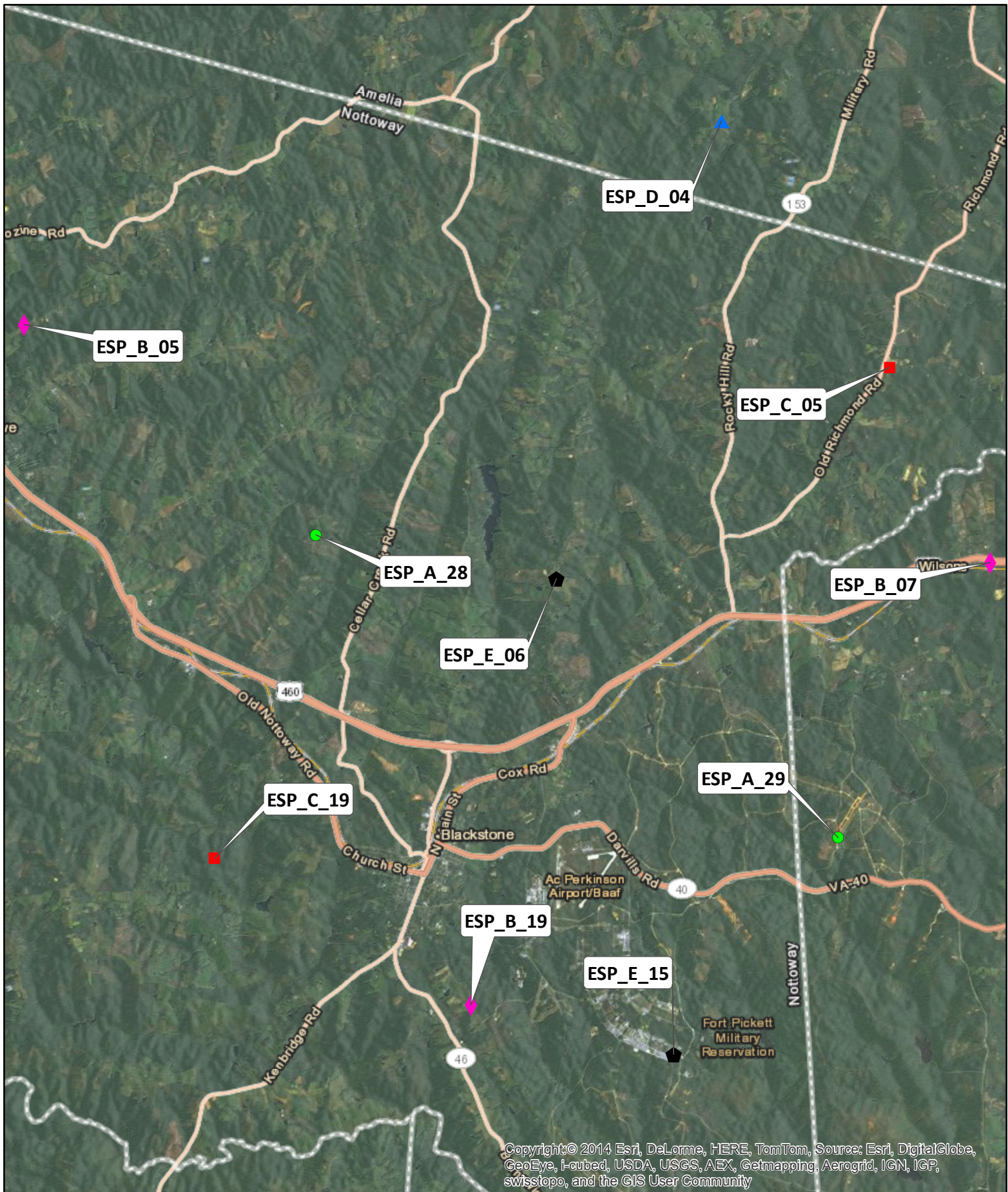


● Bare Earth ■ Brush ▲ Forested & Fully Grown ◆ Tall Weeds/Crops ⬠ Urban		Date 05/13/2014	Project Virginia - Sandy QL2 LiDAR	PO Box 7030 Charlotte, NC 28241
		Scale 1 in = 10,000 ft	Sheet Sheet #: 6 of 20	



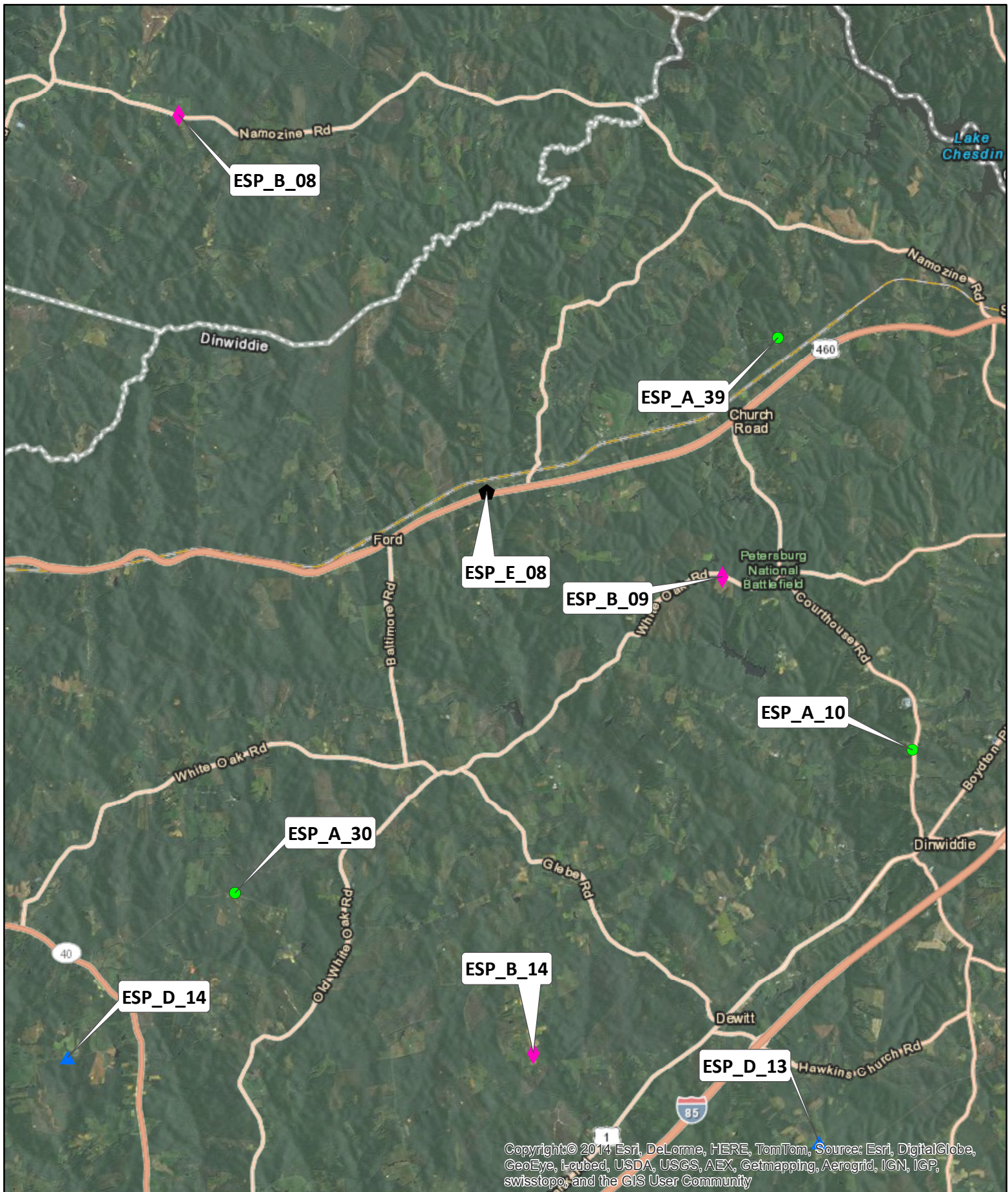
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Bare Earth Brush Forested & Fully Grown Tall Weeds/Crops Urban Date 05/13/2014 Project Virginia - Sandy QL2 LiDAR Scale 1 in = 10,000 ft Sheet Sheet #: 7 of 20 PO Box 7030 Charlotte, NC 28241



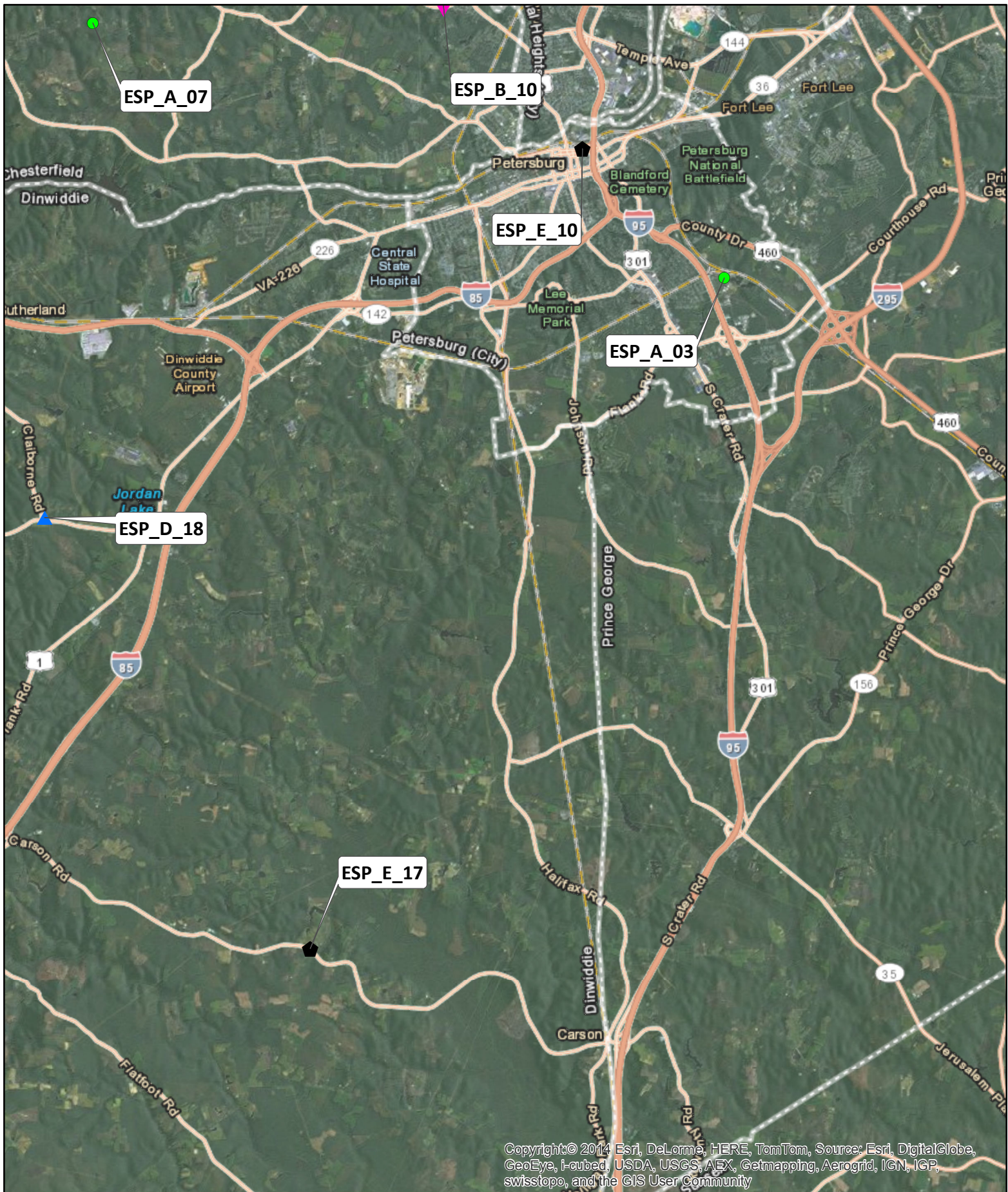
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Bare Earth Brush Forested & Fully Grown Tall Weeds/Crops Urban	<table><tr><td>Date</td><td>Project</td></tr><tr><td>05/13/2014</td><td>Virginia - Sandy QL2 LiDAR</td></tr><tr><td>Scale</td><td>Sheet</td></tr><tr><td>1 in = 10,000 ft</td><td>Sheet #: 8 of 20</td></tr></table>	Date	Project	05/13/2014	Virginia - Sandy QL2 LiDAR	Scale	Sheet	1 in = 10,000 ft	Sheet #: 8 of 20	ESP Associates, P.A. PO Box 7030 Charlotte, NC 28241
Date	Project									
05/13/2014	Virginia - Sandy QL2 LiDAR									
Scale	Sheet									
1 in = 10,000 ft	Sheet #: 8 of 20									

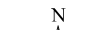


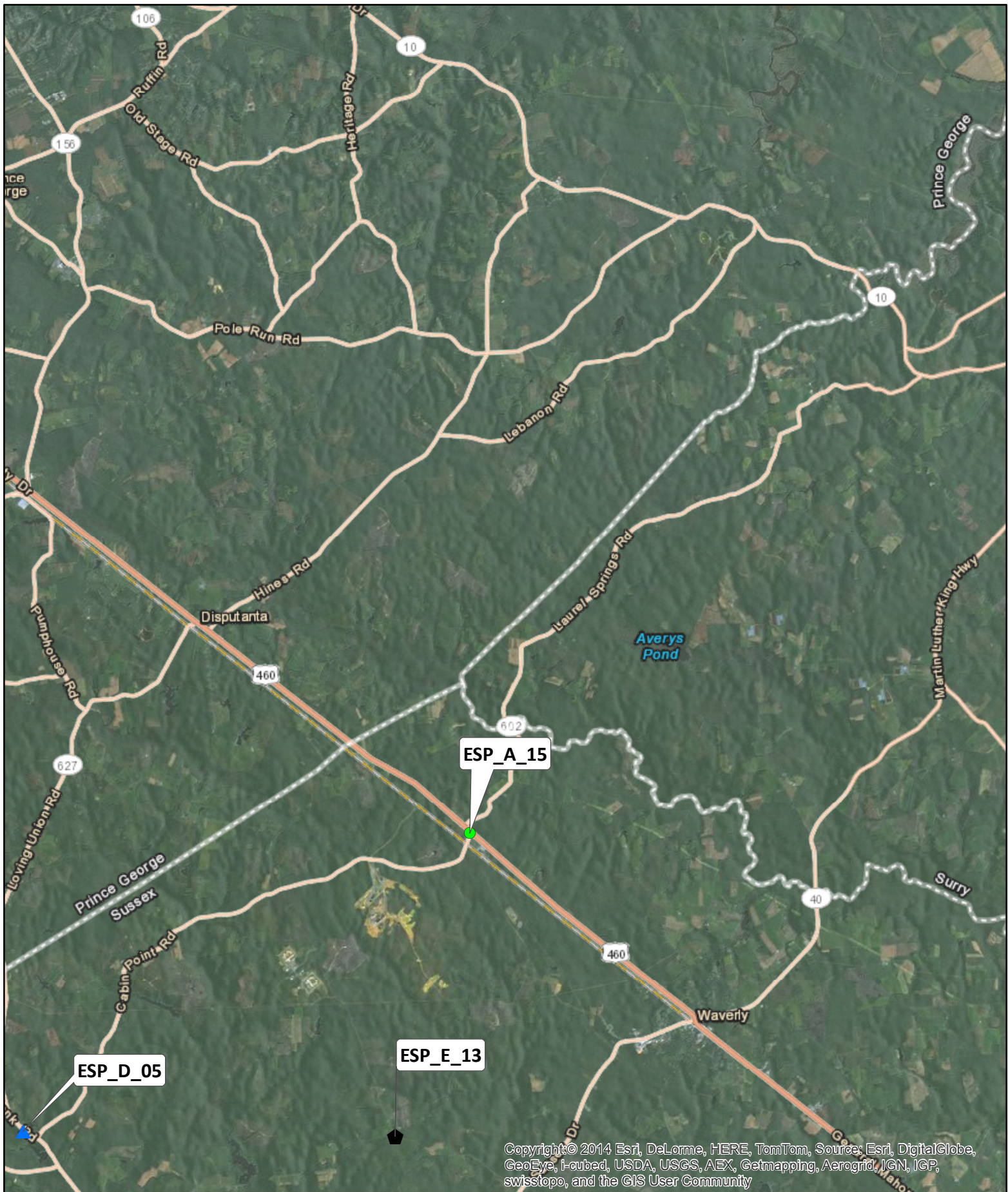
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● Bare Earth ■ Brush ▲ Forested & Fully Grown ◆ Tall Weeds/Crops ◆ Urban		Date 05/13/2014	Project Virginia - Sandy QL2 LiDAR	PO Box 7030 Charlotte, NC 28241
		Scale 1 in = 10,000 ft	Sheet Sheet #: 9 of 20	



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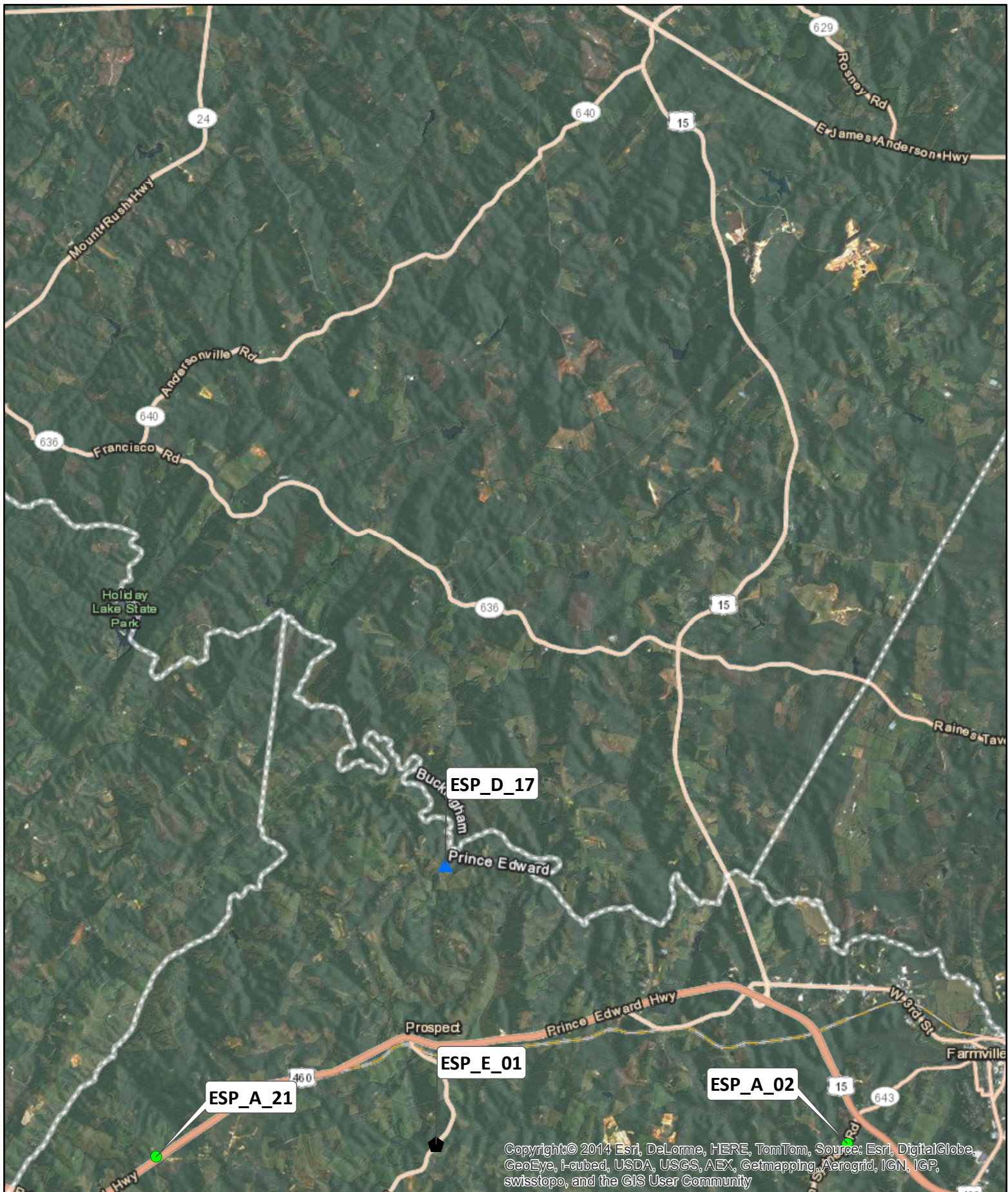
Bare Earth Brush Forested & Fully Grown Tall Weeds/Crops Urban  Date 05/13/2014 Project Virginia - Sandy QL2 LiDAR Scale 1 in = 10,000 ft Sheet Sheet #: 10 of 20  ESP Associates, P.A. PO Box 7030 Charlotte, NC 28241
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● Bare Earth ■ Brush ▲ Forested & Fully Grown ◆ Tall Weeds/Crops ▣ Urban		Date 05/13/2014	Project Virginia - Sandy QL2 LiDAR
		Scale 1 in = 10,000 ft	Sheet Sheet #: 11 of 20



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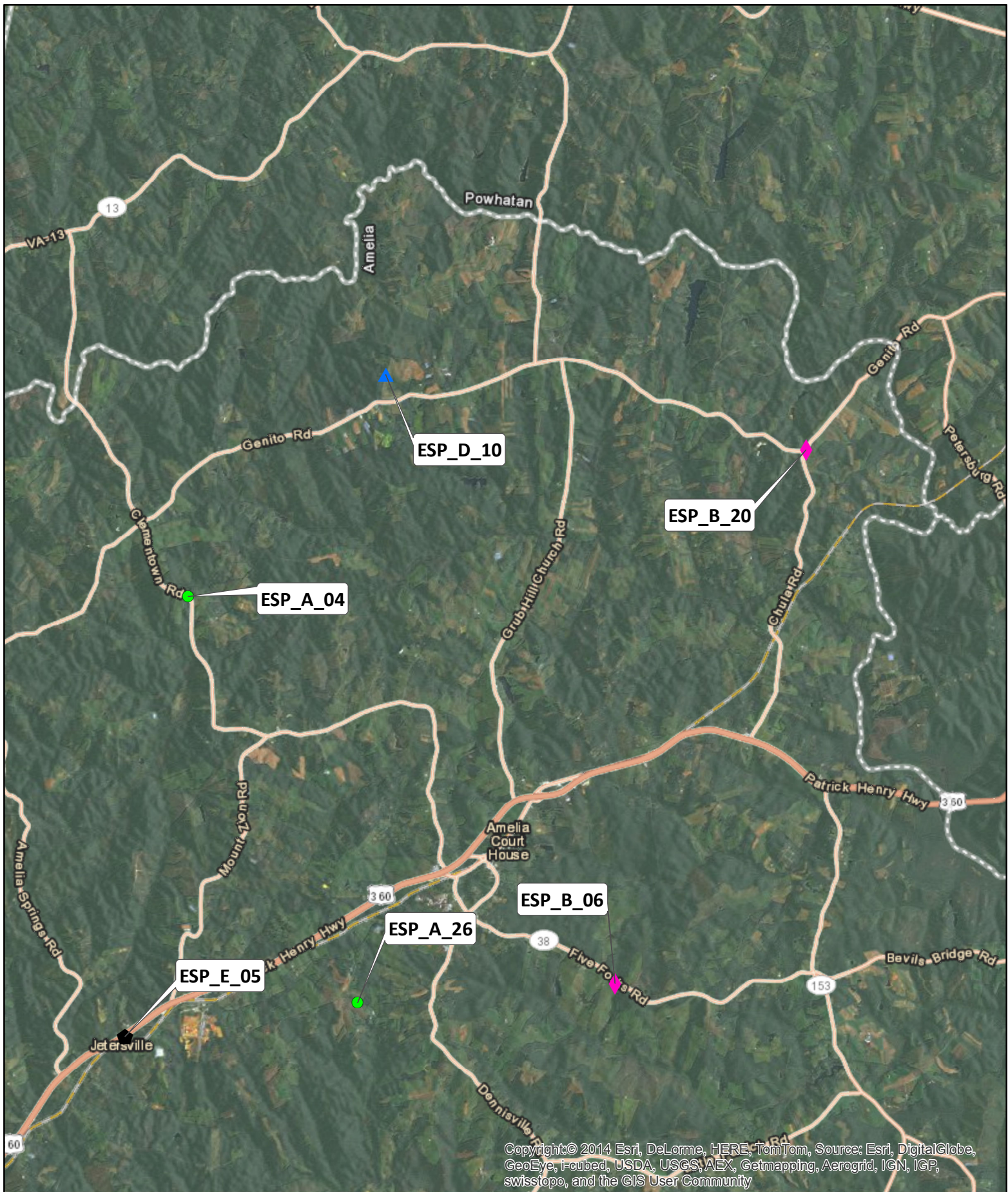


Bare Earth Brush Forested & Fully Grown Tall Weeds/Crops Urban Date 05/13/2014 Project Virginia - Sandy QL2 LiDAR Scale 1 in = 10,000 ft Sheet Sheet #: 12 of 20 ESP Associates, P.A. PO Box 7030 Charlotte, NC 28241



Bare Earth Brush Forested & Fully Grown Tall Weeds/Crops Urban <td> N W E S </td> <td> Date 05/13/2014 Project Virginia - Sandy QL2 LiDAR </td> <td rowspan="2"> ESP ESP Associates, P.A. PO Box 7030 Charlotte, NC 28241 </td>	N W E S	Date 05/13/2014 Project Virginia - Sandy QL2 LiDAR	ESP ESP Associates, P.A. PO Box 7030 Charlotte, NC 28241
	Scale 1 in = 10,000 ft Sheet Sheet #: 13 of 20		

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● Bare Earth ■ Brush ▲ Forested & Fully Grown ◆ Tall Weeds/Crops ⬛ Urban		Date	05/13/2014	Project	Virginia - Sandy QL2 LiDAR
		Scale	1 in = 10,000 ft	Sheet	Sheet #: 14 of 20

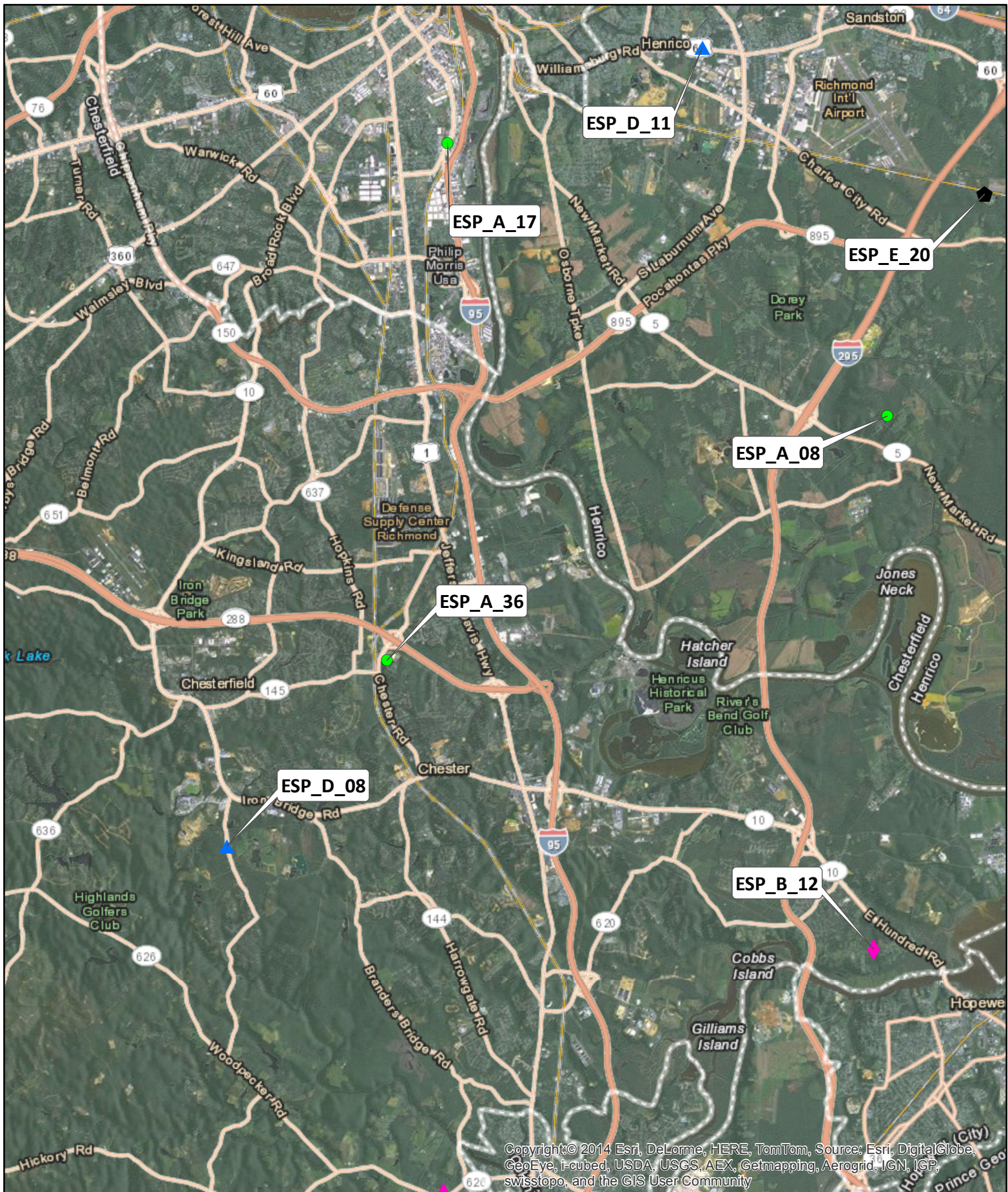


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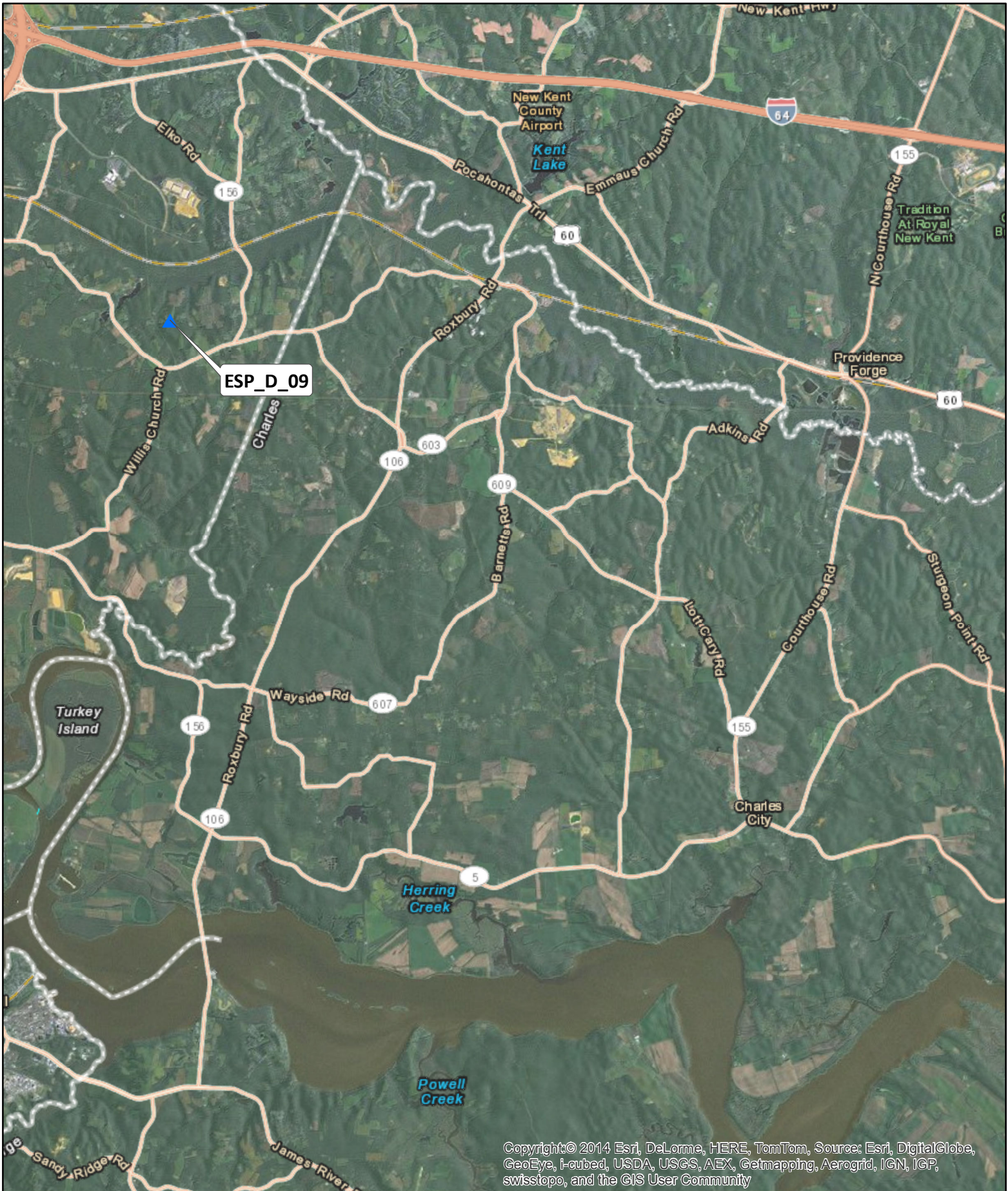
● Bare Earth ■ Brush ▲ Forested & Fully Grown ◆ Tall Weeds/Crops ⬠ Urban		Date 05/13/2014	Project Virginia - Sandy QL2 LiDAR
		Scale 1 in = 10,000 ft	Sheet Sheet #: 15 of 20


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Bare Earth Brush Forested & Fully Grown Tall Weeds/Crops Urban <td> N W E S </td> <td> Date 05/13/2014 Scale 1 in = 10,000 ft </td> <td> Project Virginia - Sandy QL2 LiDAR Sheet Sheet #: 16 of 20 </td> <td> ESP ESP Associates, P.A. PO Box 7030 Charlotte, NC 28241 </td>	N W E S	Date 05/13/2014 Scale 1 in = 10,000 ft	Project Virginia - Sandy QL2 LiDAR Sheet Sheet #: 16 of 20	ESP ESP Associates, P.A. PO Box 7030 Charlotte, NC 28241
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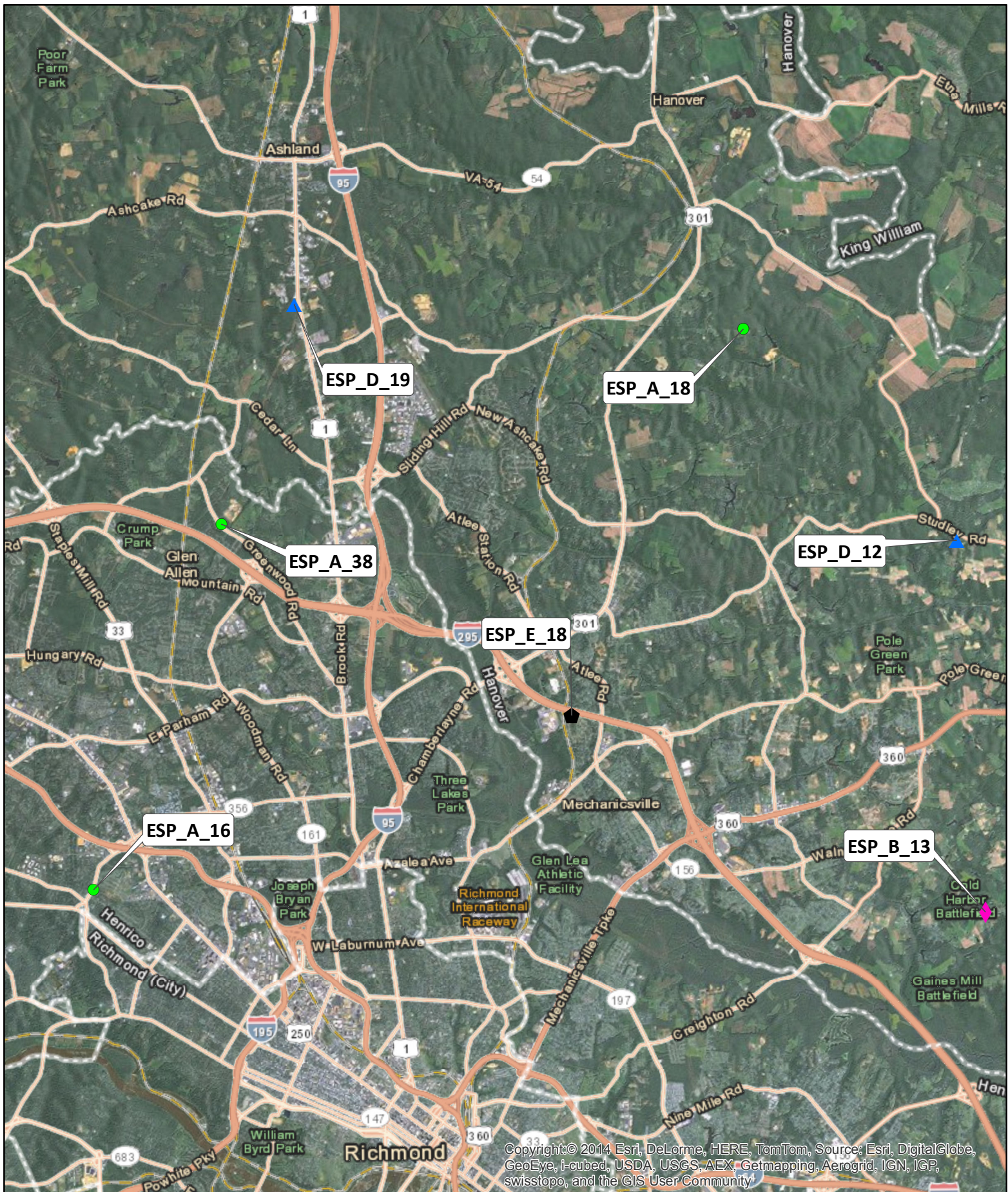
● Bare Earth ■ Brush ▲ Forested & Fully Grown ◆ Tall Weeds/Crops ■ Urban		Date 05/13/2014	Project Virginia - Sandy QL2 LiDAR
		Scale 1 in = 10,000 ft	Sheet Sheet #: 17 of 20


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● Bare Earth ■ Brush ▲ Forested & Fully Grown ◆ Tall Weeds/Crops ▣ Urban		Date 05/13/2014	Project Virginia - Sandy QL2 LiDAR
		Scale 1 in = 10,000 ft	Sheet Sheet #: 18 of 20

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● Bare Earth ■ Brush ▲ Forested & Fully Grown ◆ Tall Weeds/Crops ■ Urban	Date 05/13/2014 Scale 1 in = 10,000 ft	Project Virginia - Sandy QL2 LiDAR Sheet Sheet #: 19 of 20	 ESP Associates, P.A. PO Box 7030 Charlotte, NC 28241
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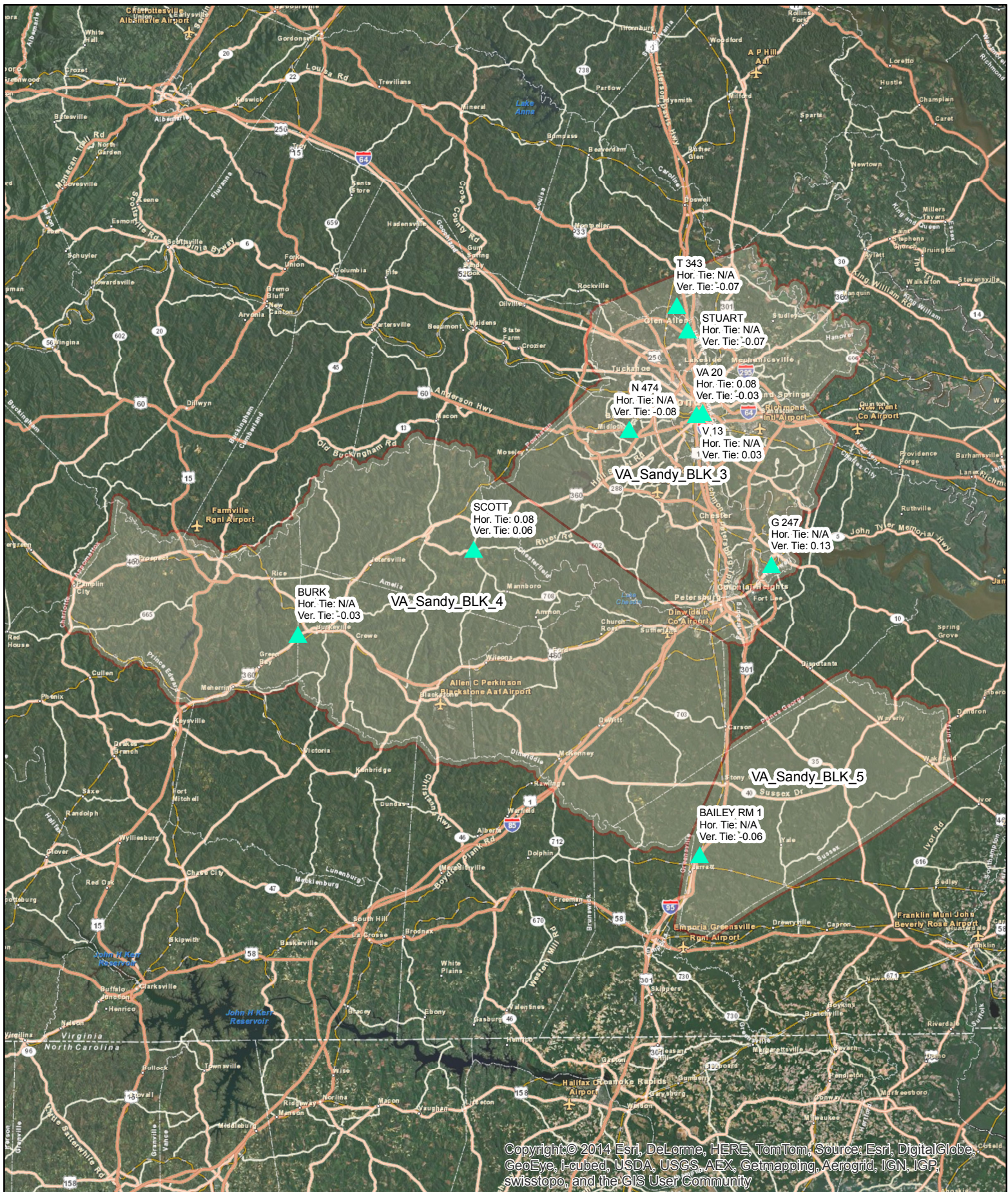


● Bare Earth ■ Brush ▲ Forested & Fully Grown ◆ Tall Weeds/Crops ■ Urban		Date 05/13/2014	Project Virginia - Sandy QL2 LiDAR
		Scale 1 in = 10,000 ft	Sheet Sheet #: 20 of 20


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4.0 – NGS Bench Mark Tie Map

The following page contains a map that illustrates the NGS bench mark ties that were made throughout the project area in order to verify the horizontal and vertical GNSS positions derived from the NGS RTN. Bench mark names and delta values from ESP's ties are shown.



- ▲ NGS_Ties (USFT)
- VA_Sandy_AOI



Date	05/01/2014	Project	Virginia - Sandy QL2 LiDAR
Scale	Not to Scale	Sheet	NGS Bench Mark Ties
		 PO Box 7030 Charlotte, NC 28241	

5.0 – Validation Point Datasheets

The following pages contain datasheets for each LiDAR calibration point surveyed. Each datasheet contains Northing, Easting, Elevation, Latitude, Longitude, and Ellipsoid Height information along with accompanying photographs.

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/11/2014

County: Prince Edward

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEoid12A)	Geographic (GRS 80)
Northing: 4131578.566 Meters	Latitude: 37 16 51.26179
Easting: 195171.069 Meters	Longitude: -078 26 17.16886
Elevation: 142.409 Meters	Ellipsoid Height: 111.094 Meters
Combined Grid Factor: 1.00072735	

Station Name

ESP A 02

Station Type:

Bare Earth

Photos:



ESP_A_02_North.jpg



ESP_A_02_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/13/2014

County: Petersburg

Acquisition Block: VA_Sandy_BLK_3



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4120094.811 Meters	Latitude: 37 12 13.86127
Easting: 290588.408 Meters	Longitude: -077 21 34.94151
Elevation: 40.904 Meters	Ellipsoid Height: 7.148 Meters
Combined Grid Factor: 1.00013911	

Station Name

ESP A 03

Station Type:

Bare Earth

Photos:



ESP_A_03_North.jpg



ESP_A_03_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/21/2014

County: Amelia

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4143819.148 Meters	Latitude: 37 24 05.38164
Easting: 228815.621 Meters	Longitude: -078 03 49.08395
Elevation: 99.539 Meters	Ellipsoid Height: 67.748 Meters
Combined Grid Factor: 1.00049533	

Station Name

ESP A 04

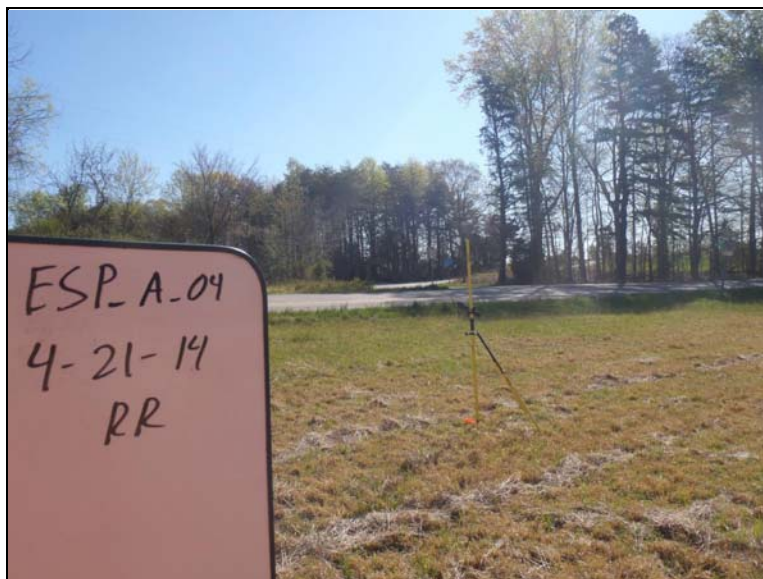
Station Type:

Bare Earth

Photos:



ESP_A_04_North.jpg



ESP_A_04_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/16/2014

County: Chesterfield

Acquisition Block: VA_Sandy_BLK_3



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4151894.094 Meters	Latitude: 37 29 01.84122
Easting: 264053.433 Meters	Longitude: -077 40 06.78393
Elevation: 82.156 Meters	Ellipsoid Height: 49.512 Meters
Combined Grid Factor: 1.00027801	

Station Name

ESP A 06

Station Type:

Bare Earth

Photos:



ESP_A_06_North.jpg



ESP_A_06_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/19/2014

County: Chesterfield

Acquisition Block: VA_Sandy_BLK_3



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4126946.442 Meters	Latitude: 37 15 43.16117
Easting: 275275.255 Meters	Longitude: -077 32 03.03241
Elevation: 76.042 Meters	Ellipsoid Height: 42.721 Meters
Combined Grid Factor: 1.00021542	

Station Name

ESP A 07

Station Type:

Bare Earth

Photos:



ESP_A_07_North.jpg



ESP_A_07_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/16/2014

County: Henrico

Acquisition Block: VA_Sandy_BLK_3



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOD12A)	Geographic (GRS 80)
Northing: 4145789.633 Meters	Latitude: 37 26 10.95096
Easting: 295556.039 Meters	Longitude: -077 18 39.05893
Elevation: 37.71 Meters	Ellipsoid Height: 4.346 Meters
Combined Grid Factor: 1.00011419	

Station Name

ESP A 08

Station Type:

Bare Earth

Photos:



ESP_A_08_North.jpg



ESP_A_08_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/21/2014

County: Dinwiddie

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEoid12A)	Geographic (GRS 80)
Northing: 4109217.959 Meters	Latitude: 37 06 03.90716
Easting: 270111.845 Meters	Longitude: -077 35 12.82243
Elevation: 94.15 Meters	Ellipsoid Height: 60.799 Meters
Combined Grid Factor: 1.00024153	

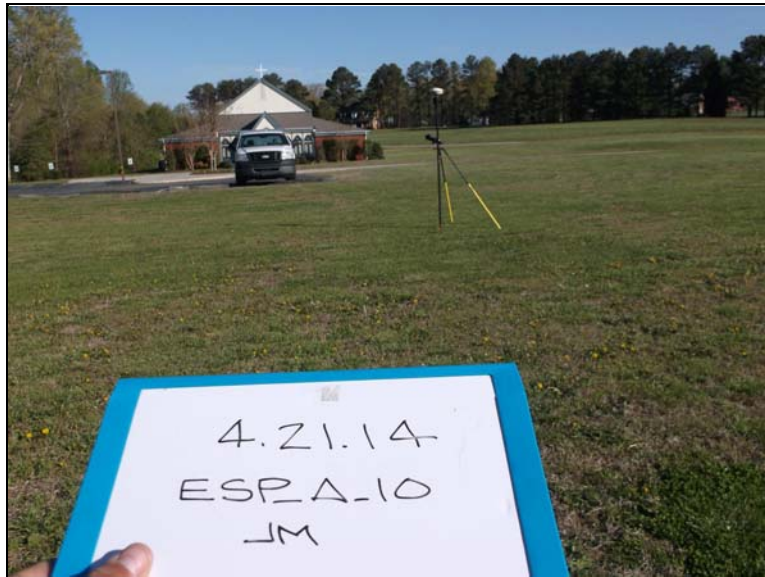
Station Name

ESP A 10

Station Type:

Bare Earth

Photos:



ESP_A_10_North.jpg



ESP_A_10_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/14/2014

County: Dinwiddie

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4096133.212 Meters	Latitude: 36 59 12.27084
Easting: 284851.335 Meters	Longitude: -077 25 02.75310
Elevation: 43.227 Meters	Ellipsoid Height: 9.321 Meters
Combined Grid Factor: 1.00016881	

Station Name

ESP A 11

Station Type:

Bare Earth

Photos:



ESP_A_11_North.jpg



ESP_A_11_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/24/2014

County: Sussex

Acquisition Block: VA_Sandy_BLK_5



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4071395.837 Meters	Latitude: 36 45 50.31565
Easting: 285002.37 Meters	Longitude: -077 24 31.41088
Elevation: 41.633 Meters	Ellipsoid Height: 7.541 Meters
Combined Grid Factor: 1.00016832	

Station Name

ESP A 12

Station Type:

Bare Earth

Photos:



ESP_A_12_North.jpg



ESP_A_12_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/13/2014

County: Sussex

Acquisition Block: VA_Sandy_BLK_5



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4090479.508 Meters	Latitude: 36 56 15.52198
Easting: 292988.211 Meters	Longitude: -077 19 28.29043
Elevation: 31.026 Meters	Ellipsoid Height: -3.115 Meters
Combined Grid Factor: 1.00012845	

Station Name

ESP A 13

Station Type:

Bare Earth

Photos:



ESP_A_13_North.jpg



ESP_A_13_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/14/2014

County: Sussex

Acquisition Block: VA_Sandy_BLK_5



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEoid12A)	Geographic (GRS 80)
Northing: 4084526.145 Meters	Latitude: 36 53 14.63527
Easting: 309002.972 Meters	Longitude: -077 08 35.92936
Elevation: 31.138 Meters	Ellipsoid Height: -3.426 Meters
Combined Grid Factor: 1.00004996	

Station Name

ESP A 14

Station Type:

Bare Earth

Photos:



ESP_A_14_North.jpg



ESP_A_14_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/14/2014

County: Sussex

Acquisition Block: VA_Sandy_BLK_5



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEoid12A)	Geographic (GRS 80)
Northing: 4105746.442 Meters	Latitude: 37 04 42.41912
Easting: 308494.137 Meters	Longitude: -077 09 15.86035
Elevation: 36.533 Meters	Ellipsoid Height: 2.399 Meters
Combined Grid Factor: 1.00005143	

Station Name

ESP A 15

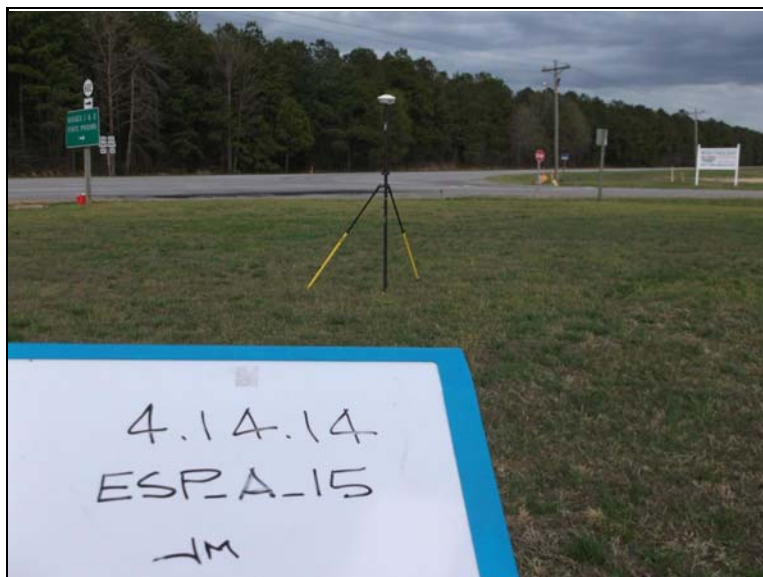
Station Type:

Bare Earth

Photos:



ESP_A_15_North.jpg



ESP_A_15_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/18/2014

County: Henrico

Acquisition Block: VA_Sandy_BLK_3



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4164106.161 Meters	Latitude: 37 35 49.01573
Easting: 276672.41 Meters	Longitude: -077 31 46.83493
Elevation: 90.376 Meters	Ellipsoid Height: 57.546 Meters
Combined Grid Factor: 1.00020533	

Station Name

ESP A 16

Station Type:

Bare Earth

Photos:



ESP_A_16_North.jpg



ESP_A_16_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/17/2014

County: Richmond

Acquisition Block: VA_Sandy_BLK_3



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4152915.77 Meters	Latitude: 37 29 53.35622
Easting: 284984.673 Meters	Longitude: -077 25 56.36067
Elevation: 15.773 Meters	Ellipsoid Height: -17.371 Meters
Combined Grid Factor: 1.00017222	

Station Name

ESP A 17

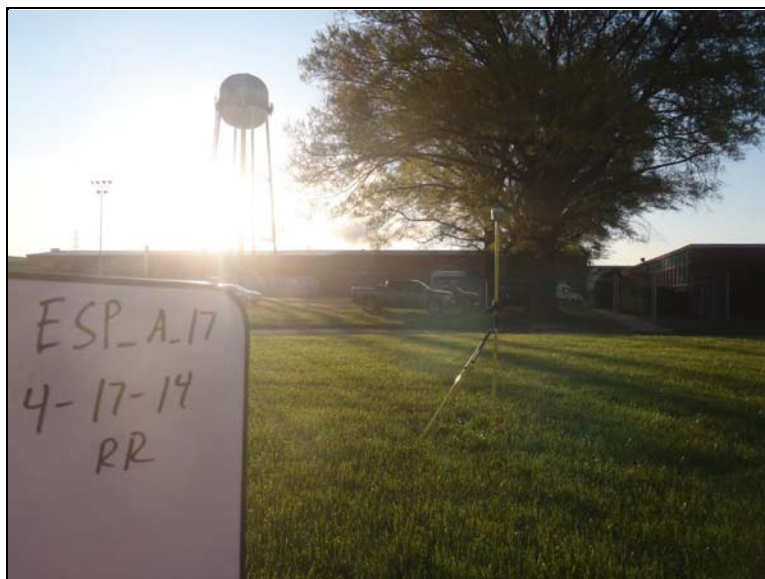
Station Type:

Bare Earth

Photos:



ESP_A_17_North.jpg



ESP_A_17_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/19/2014

County: Hanover

Acquisition Block: VA_Sandy_BLK_3



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4177304.766 Meters	Latitude: 37 43 10.81917
Easting: 293177.728 Meters	Longitude: -077 20 47.78455
Elevation: 55.209 Meters	Ellipsoid Height: 22.174 Meters
Combined Grid Factor: 1.00012341	

Station Name

ESP A 18

Station Type:

Bare Earth

Photos:



ESP_A_18_North.jpg



ESP_A_18_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/19/2014

County: Hanover

Acquisition Block: VA_Sandy_BLK_3



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4166824.461 Meters	Latitude: 37 37 43.50157
Easting: 309182.358 Meters	Longitude: -077 09 44.63864
Elevation: 47.528 Meters	Ellipsoid Height: 14.064 Meters
Combined Grid Factor: 1.0000463	

Station Name

ESP A 20

Station Type:

Bare Earth

Photos:



ESP_A_20_North.jpg



ESP_A_20_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/10/2014

County: Prince Edward

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4131884.3 Meters	Latitude: 37 16 40.52397
Easting: 178135.639 Meters	Longitude: -078 37 48.11173
Elevation: 220.877 Meters	Ellipsoid Height: 189.674 Meters
Combined Grid Factor: 1.00084656	

Station Name

ESP A 21

Station Type:

Bare Earth

Photos:



ESP_A_21_North.jpg



ESP_A_21_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/10/2014

County: Prince Edward

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4122286.153 Meters	Latitude: 37 11 51.99920
Easting: 196653.949 Meters	Longitude: -078 25 03.44311
Elevation: 155.357 Meters	Ellipsoid Height: 124.063 Meters
Combined Grid Factor: 1.00071422	

Station Name

ESP A 22

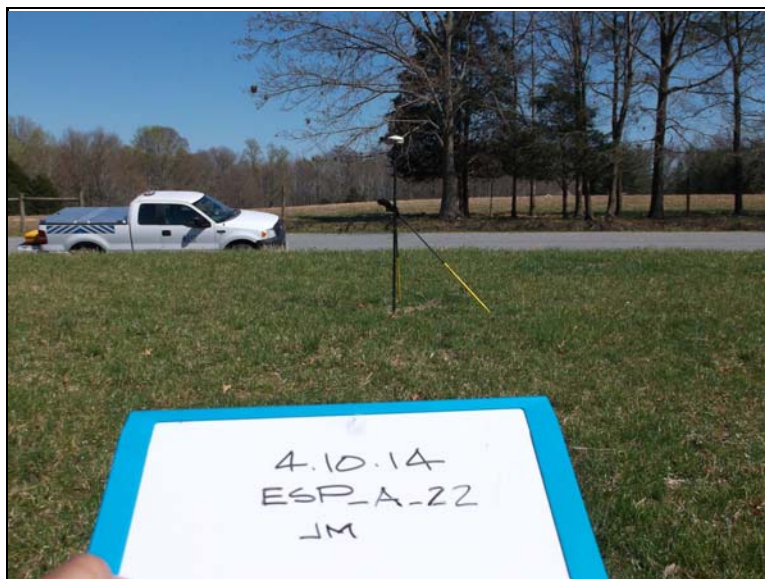
Station Type:

Bare Earth

Photos:



ESP_A_22_North.jpg



ESP_A_22_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/10/2014

County: Prince Edward

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4117131.686 Meters	Latitude: 37 09 19.23647
Easting: 209074.512 Meters	Longitude: -078 16 33.22335
Elevation: 171.624 Meters	Ellipsoid Height: 140.169 Meters
Combined Grid Factor: 1.00062075	

Station Name

ESP A 23

Station Type:

Bare Earth

Photos:



ESP_A_23_North.jpg



ESP_A_23_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/12/2014

County: Nottoway

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4127522.669 Meters	Latitude: 37 15 09.70340
Easting: 221646.13 Meters	Longitude: -078 08 18.26698
Elevation: 150.575 Meters	Ellipsoid Height: 118.878 Meters
Combined Grid Factor: 1.00053588	

Station Name

ESP A 24

Station Type:

Bare Earth

Photos:



ESP_A_24_North.jpg



ESP_A_24_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/12/2014

County: Amelia

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4141022.907 Meters	Latitude: 37 22 26.88384
Easting: 221418.974 Meters	Longitude: -078 08 45.70655
Elevation: 135.661 Meters	Ellipsoid Height: 103.998 Meters
Combined Grid Factor: 1.00053975	

Station Name

ESP A 25

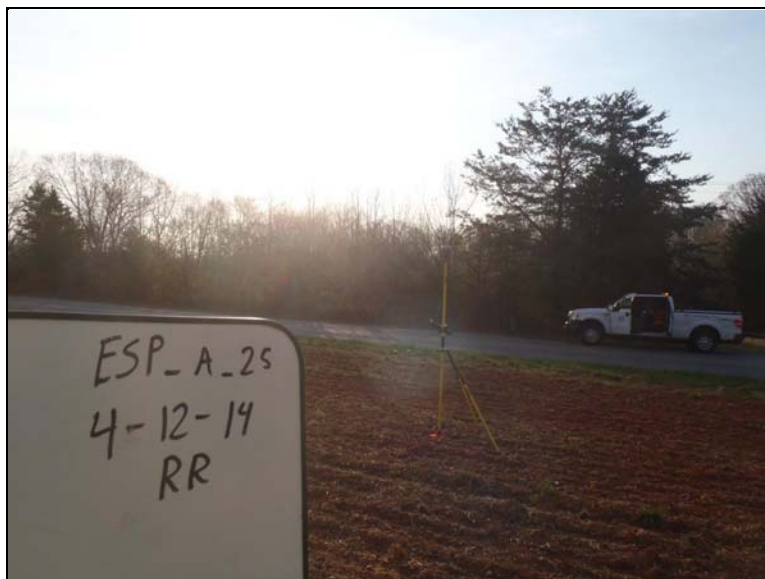
Station Type:

Bare Earth

Photos:



ESP_A_25_North.jpg



ESP_A_25_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/22/2014

County: Amelia

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4133664.325 Meters	Latitude: 37 18 40.29625
Easting: 232620.42 Meters	Longitude: -078 01 01.34902
Elevation: 111.484 Meters	Ellipsoid Height: 79.611 Meters
Combined Grid Factor: 1.00046824	

Station Name

ESP A 26

Station Type:

Bare Earth

Photos:



ESP_A_26_North.jpg



ESP_A_26_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/20/2014

County: Nottoway

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4115961.663 Meters	Latitude: 37 09 04.89144
Easting: 230937.094 Meters	Longitude: -078 01 46.64290
Elevation: 109.881 Meters	Ellipsoid Height: 77.916 Meters
Combined Grid Factor: 1.00047967	

Station Name

ESP A 28

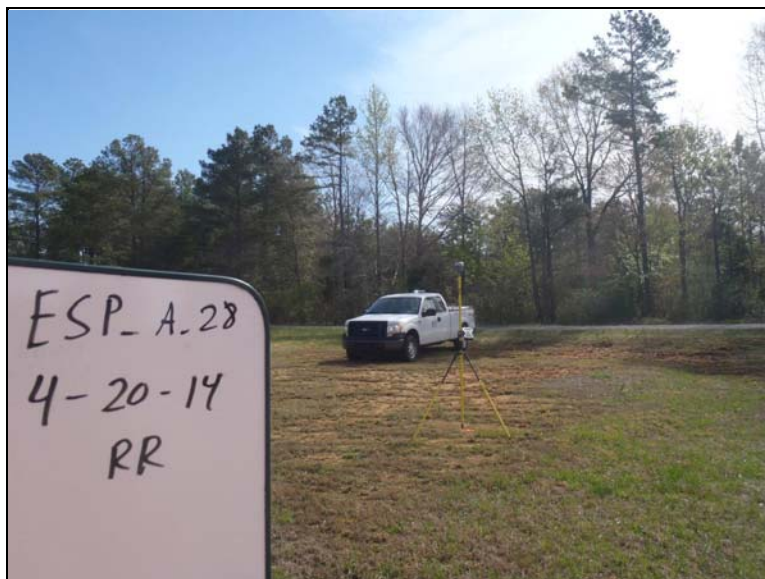
Station Type:

Bare Earth

Photos:



ESP_A_28_North.jpg



ESP_A_28_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/14/2014

County: Dinwiddie

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4108029.098 Meters	Latitude: 37 05 00.52547
Easting: 243518.678 Meters	Longitude: -077 53 07.47537
Elevation: 107.262 Meters	Ellipsoid Height: 74.838 Meters
Combined Grid Factor: 1.00039869	

Station Name

ESP A 29

Station Type:

Bare Earth

Photos:



ESP_A_29_North.jpg



ESP_A_29_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/24/2014

County: Dinwiddie

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4106318.617 Meters	Latitude: 37 04 14.53835
Easting: 253303.922 Meters	Longitude: -077 46 29.58329
Elevation: 92.894 Meters	Ellipsoid Height: 60.18 Meters
Combined Grid Factor: 1.00034033	

Station Name

ESP A 30

Station Type:

Bare Earth

Photos:



ESP_A_30_North.jpg



ESP_A_30_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/14/2014

County: Dinwiddie

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEoid12A)	Geographic (GRS 80)
Northing: 4096405.525 Meters	Latitude: 36 59 11.81315
Easting: 273855.489 Meters	Longitude: -077 32 27.44012
Elevation: 57.589 Meters	Ellipsoid Height: 23.966 Meters
Combined Grid Factor: 1.0002263	

Station Name

ESP A 31

Station Type:

Bare Earth

Photos:



ESP_A_31_North.jpg



ESP_A_31_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/12/2014

County: Sussex

Acquisition Block: VA_Sandy_BLK_5



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4083412.775 Meters	Latitude: 36 52 18.44592
Easting: 283169.246 Meters	Longitude: -077 25 57.61475
Elevation: 27.78 Meters	Ellipsoid Height: -6.258 Meters
Combined Grid Factor: 1.00018023	

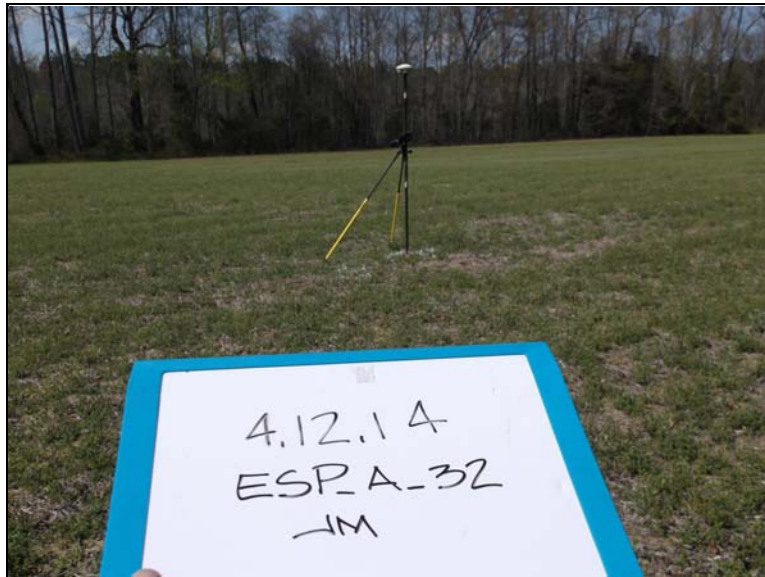
Station Name

ESP A 32

Station Type:

Bare Earth

Photos:



ESP_A_32_North.jpg



ESP_A_32_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/13/2014

County: Sussex

Acquisition Block: VA_Sandy_BLK_5



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4090869.058 Meters	Latitude: 36 56 33.95111
Easting: 300451.24 Meters	Longitude: -077 14 27.18709
Elevation: 17.797 Meters	Ellipsoid Height: -16.456 Meters
Combined Grid Factor: 1.00009316	

Station Name

ESP A 33

Station Type:

Bare Earth

Photos:



ESP_A_33_North.jpg



ESP_A_33_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/16/2014

County: Chesterfield

Acquisition Block: VA_Sandy_BLK_3



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEoid12A)	Geographic (GRS 80)
Northing: 4143392.631 Meters	Latitude: 37 24 29.75969
Easting: 267887.803 Meters	Longitude: -077 37 21.18417
Elevation: 70.244 Meters	Ellipsoid Height: 37.384 Meters
Combined Grid Factor: 1.00025781	

Station Name

ESP A 35

Station Type:

Bare Earth

Photos:



ESP_A_35_North.jpg



ESP_A_35_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/19/2014

County: Chesterfield

Acquisition Block: VA_Sandy_BLK_3



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEoid12A)	Geographic (GRS 80)
Northing: 4140231.651 Meters	Latitude: 37 23 00.48091
Easting: 283013.788 Meters	Longitude: -077 27 03.12672
Elevation: 32.483 Meters	Ellipsoid Height: -0.829 Meters
Combined Grid Factor: 1.00018013	

Station Name

ESP A 36

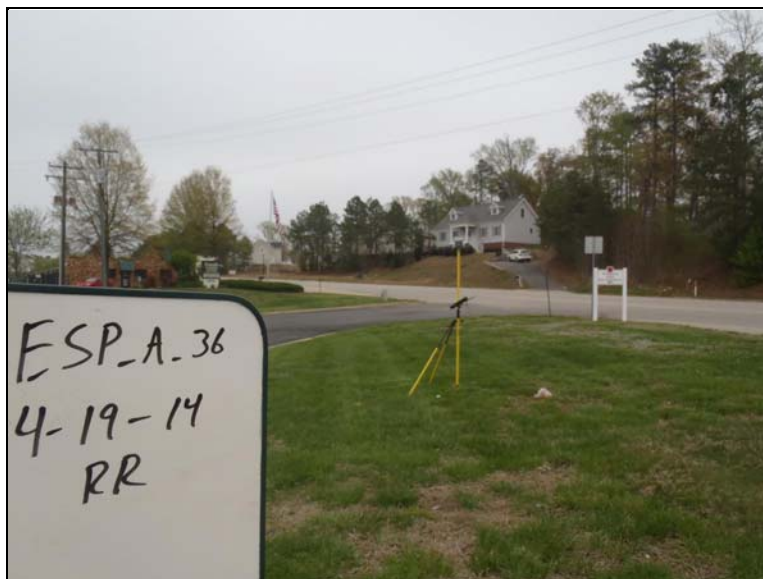
Station Type:

Bare Earth

Photos:



ESP_A_36_North.jpg



ESP_A_36_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/18/2014

County: Henrico

Acquisition Block: VA_Sandy_BLK_3



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEoid12A)	Geographic (GRS 80)
Northing: 4172977.865 Meters	Latitude: 37 40 39.63411
Easting: 280153.755 Meters	Longitude: -077 29 34.60699
Elevation: 66.453 Meters	Ellipsoid Height: 33.656 Meters
Combined Grid Factor: 1.00019007	

Station Name

ESP A 38

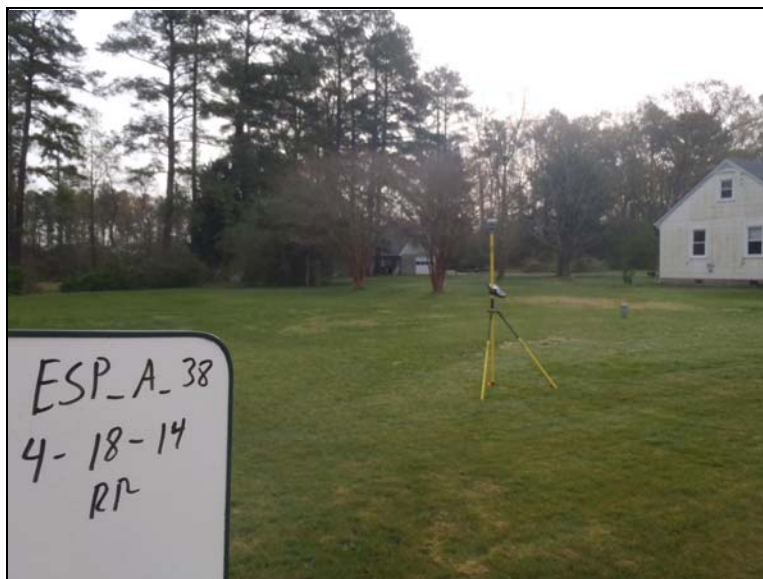
Station Type:

Bare Earth

Photos:



ESP_A_38_North.jpg



ESP_A_38_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/20/2014

County: Dinwiddie

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4119481.279 Meters	Latitude: 37 11 34.00514
Easting: 267177.598 Meters	Longitude: -077 37 23.06801
Elevation: 87.563 Meters	Ellipsoid Height: 54.474 Meters
Combined Grid Factor: 1.00025923	

Station Name

ESP A 39

Station Type:

Bare Earth

Photos:



ESP_A_39_North.jpg



ESP_A_39_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/10/2014

County: Prince Edward

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4124590.477 Meters	Latitude: 37 12 42.07361
Easting: 176338.624 Meters	Longitude: -078 38 49.53518
Elevation: 178.174 Meters	Ellipsoid Height: 146.996 Meters
Combined Grid Factor: 1.00086758	

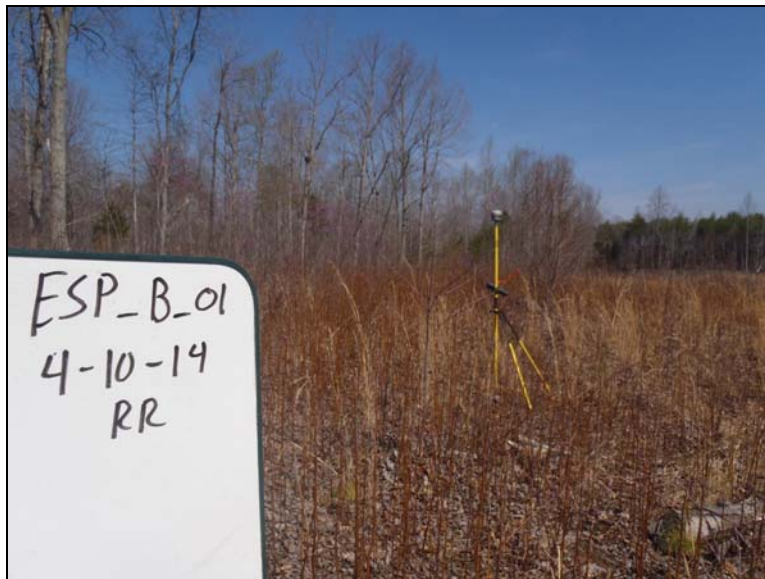
Station Name

ESP B 01

Station Type:

Tall Weeds/Crops

Photos:



ESP_B_01_North.jpg



ESP_B_01_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/11/2014

County: Prince Edward

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEoid12A)	Geographic (GRS 80)
Northing: 4128151.093 Meters	Latitude: 37 14 51.33431
Easting: 187699.379 Meters	Longitude: -078 31 14.85429
Elevation: 151.44 Meters	Ellipsoid Height: 120.204 Meters
Combined Grid Factor: 1.00078274	

Station Name

ESP B 02

Station Type:

Tall Weeds/Crops

Photos:



ESP_B_02_North.jpg



ESP_B_02_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/10/2014

County: Prince Edward

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4114487.7 Meters	Latitude: 37 07 43.94940
Easting: 200594.53 Meters	Longitude: -078 22 12.63625
Elevation: 160.965 Meters	Ellipsoid Height: 129.647 Meters
Combined Grid Factor: 1.00068409	

Station Name

ESP B 03

Station Type:

Tall Weeds/Crops

Photos:



ESP_B_03_North.jpg



ESP_B_03_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/11/2014

County: Nottoway

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEoid12A)	Geographic (GRS 80)
Northing: 4130661.777 Meters	Latitude: 37 16 43.94487
Easting: 214790.474 Meters	Longitude: -078 13 00.46968
Elevation: 148.276 Meters	Ellipsoid Height: 116.723 Meters
Combined Grid Factor: 1.00058382	

Station Name

ESP B 04

Station Type:

Tall Weeds/Crops

Photos:



ESP_B_04_North.jpg



ESP_B_04_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/13/2014

County: Nottoway

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEoid12A)	Geographic (GRS 80)
Northing: 4121405.42 Meters	Latitude: 37 11 53.93417
Easting: 223930.227 Meters	Longitude: -078 06 37.53023
Elevation: 125.651 Meters	Ellipsoid Height: 93.866 Meters
Combined Grid Factor: 1.00052422	

Station Name

ESP B 05

Station Type:

Tall Weeds/Crops

Photos:



ESP_B_05_North.jpg



ESP_B_05_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/22/2014

County: Amelia

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4133898.687 Meters	Latitude: 37 18 54.38811
Easting: 238971.066 Meters	Longitude: -077 56 43.98824
Elevation: 106.641 Meters	Ellipsoid Height: 74.615 Meters
Combined Grid Factor: 1.00042768	

Station Name

ESP B 06

Station Type:

Tall Weeds/Crops

Photos:



ESP_B_06_North.jpg



ESP_B_06_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/20/2014

County: Dinwiddie

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEoid12A)	Geographic (GRS 80)
Northing: 4114663.885 Meters	Latitude: 37 08 39.46284
Easting: 247504.081 Meters	Longitude: -077 50 34.29171
Elevation: 112.724 Meters	Ellipsoid Height: 80.281 Meters
Combined Grid Factor: 1.00037283	

Station Name

ESP B 07

Station Type:

Tall Weeds/Crops

Photos:



ESP_B_07_North.jpg



ESP_B_07_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/22/2014

County: Amelia

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4125515.49 Meters	Latitude: 37 14 36.11084
Easting: 252619.848 Meters	Longitude: -077 47 20.10177
Elevation: 81.077 Meters	Ellipsoid Height: 48.588 Meters
Combined Grid Factor: 1.00034628	

Station Name

ESP B 08

Station Type:

Tall Weeds/Crops

Photos:



ESP_B_08_North.jpg



ESP_B_08_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/24/2014

County: Dinwiddie

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4113655.322 Meters	Latitude: 37 08 23.70922
Easting: 265580.392 Meters	Longitude: -077 38 21.21278
Elevation: 90.184 Meters	Ellipsoid Height: 57.083 Meters
Combined Grid Factor: 1.00026803	

Station Name

ESP B 09

Station Type:

Tall Weeds/Crops

Photos:



ESP_B_09_North.jpg



ESP_B_09_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/19/2014

County: Chesterfield

Acquisition Block: VA_Sandy_BLK_3



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4127048.418 Meters	Latitude: 37 15 53.83027
Easting: 283916.533 Meters	Longitude: -077 26 12.62901
Elevation: 48.768 Meters	Ellipsoid Height: 15.216 Meters
Combined Grid Factor: 1.00017281	

Station Name

ESP B 10

Station Type:

Tall Weeds/Crops

Photos:



ESP_B_10_North.jpg



ESP_B_10_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/16/2014

County: Chesterfield

Acquisition Block: VA_Sandy_BLK_3



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4142618.368 Meters	Latitude: 37 24 07.25606
Easting: 270783.089 Meters	Longitude: -077 35 22.66441
Elevation: 43.373 Meters	Ellipsoid Height: 10.418 Meters
Combined Grid Factor: 1.00024559	

Station Name

ESP B 11

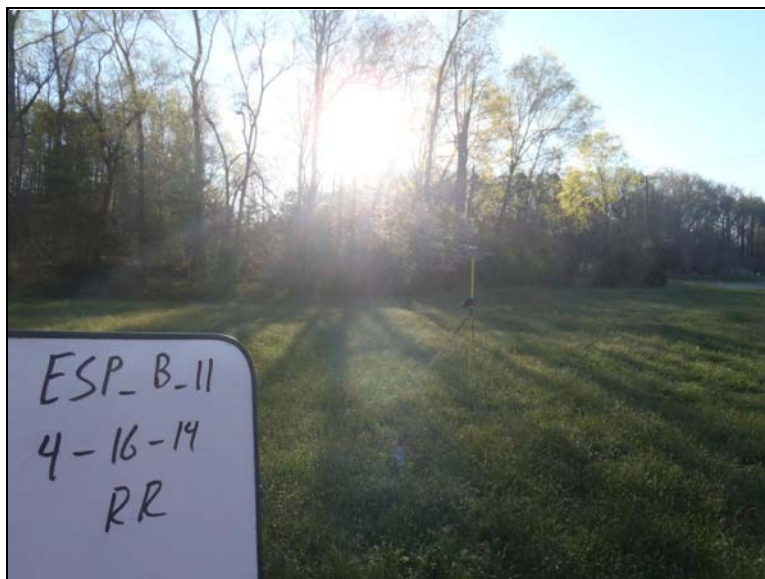
Station Type:

Tall Weeds/Crops

Photos:



ESP_B_11_North.jpg



ESP_B_11_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/19/2014

County: Chesterfield

Acquisition Block: VA_Sandy_BLK_3



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEoid12A)	Geographic (GRS 80)
Northing: 4132674.205 Meters	Latitude: 37 19 05.04783
Easting: 294729.896 Meters	Longitude: -077 18 59.55432
Elevation: 21.955 Meters	Ellipsoid Height: -11.631 Meters
Combined Grid Factor: 1.00012088	

Station Name

ESP B 12

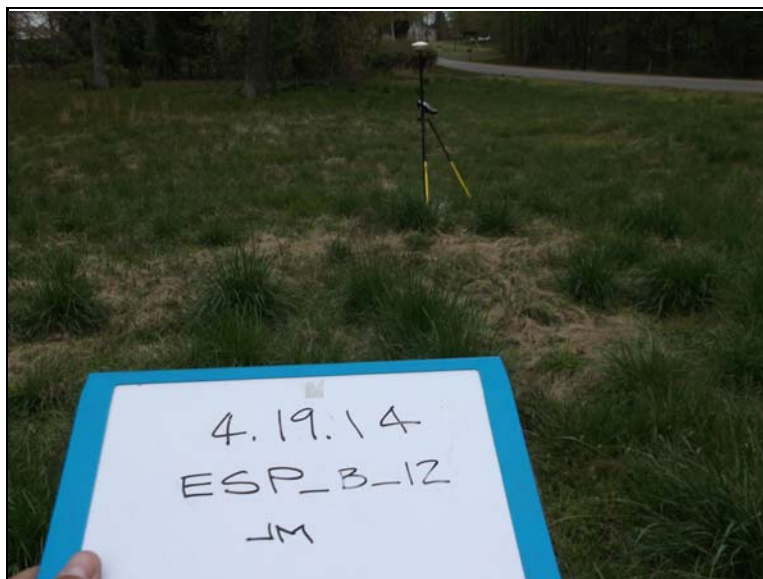
Station Type:

Tall Weeds/Crops

Photos:



ESP_B_12_North.jpg



ESP_B_12_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/17/2014

County: Hanover

Acquisition Block: VA_Sandy_BLK_3



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4162737.005 Meters	Latitude: 37 35 22.85372
Easting: 298610.591 Meters	Longitude: -077 16 51.57102
Elevation: 55.76 Meters	Ellipsoid Height: 22.488 Meters
Combined Grid Factor: 1.00009606	

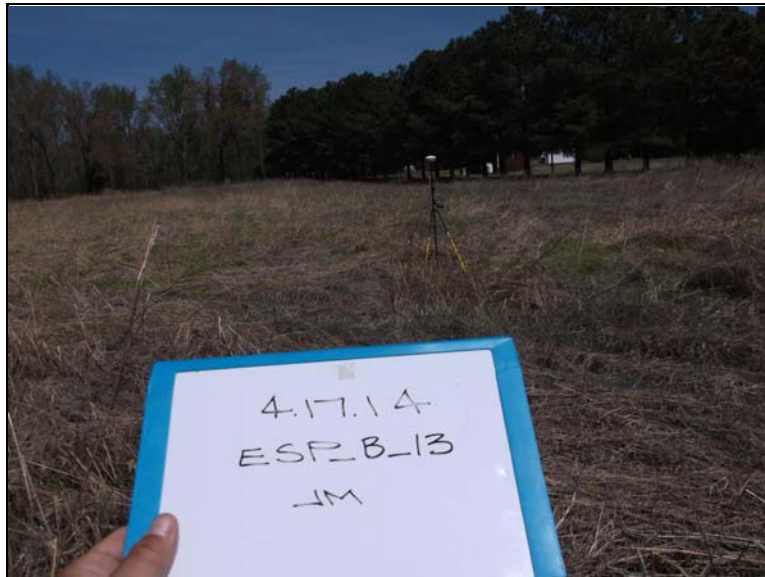
Station Name

ESP B 13

Station Type:

Tall Weeds/Crops

Photos:



ESP_B_13_North.jpg



ESP_B_13_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/21/2014

County: Dinwiddie

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4102094.372 Meters	Latitude: 37 02 04.31837
Easting: 260495.735 Meters	Longitude: -077 41 33.81643
Elevation: 89.886 Meters	Ellipsoid Height: 56.876 Meters
Combined Grid Factor: 1.00029777	

Station Name

ESP B 14

Station Type:

Tall Weeds/Crops

Photos:



ESP_B_14_North.jpg



ESP_B_14_West.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/14/2014

County: Sussex

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4084888.198 Meters	Latitude: 36 52 57.03347
Easting: 272256.327 Meters	Longitude: -077 33 19.58439
Elevation: 66.867 Meters	Ellipsoid Height: 33.266 Meters
Combined Grid Factor: 1.0002338	

Station Name

ESP B 15

Station Type:

Tall Weeds/Crops

Photos:



ESP_B_15_North.jpg



ESP_B_15_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/24/2014

County: Sussex

Acquisition Block: VA_Sandy_BLK_5



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4079963.75 Meters	Latitude: 36 50 32.33825
Easting: 290213.574 Meters	Longitude: -077 21 09.89136
Elevation: 38.548 Meters	Ellipsoid Height: 4.292 Meters
Combined Grid Factor: 1.00014155	

Station Name

ESP B 16

Station Type:

Tall Weeds/Crops

Photos:



ESP_B_16_North.jpg



ESP_B_16_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/23/2014

County: Sussex

Acquisition Block: VA_Sandy_BLK_5



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEoid12A)	Geographic (GRS 80)
Northing: 4096356.142 Meters	Latitude: 36 59 40.07667
Easting: 311481.442 Meters	Longitude: -077 07 06.48433
Elevation: 34.189 Meters	Ellipsoid Height: -0.226 Meters
Combined Grid Factor: 1.00003786	

Station Name

ESP B 17

Station Type:

Tall Weeds/Crops

Photos:



ESP_B_17_North.jpg



ESP_B_17_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/17/2014

County: Henrico

Acquisition Block: VA_Sandy_BLK_3



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4171315.643 Meters	Latitude: 37 39 34.48954
Easting: 267460.125 Meters	Longitude: -077 38 10.39196
Elevation: 64.862 Meters	Ellipsoid Height: 32.382 Meters
Combined Grid Factor: 1.00026101	

Station Name

ESP B 18

Station Type:

Tall Weeds/Crops

Photos:



ESP_B_18_North.jpg



ESP_B_18_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/14/2014

County: Nottoway

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4104247.613 Meters	Latitude: 37 02 48.76409
Easting: 234328.97 Meters	Longitude: -077 59 14.39379
Elevation: 120.963 Meters	Ellipsoid Height: 88.721 Meters
Combined Grid Factor: 1.00045565	

Station Name

ESP B 19

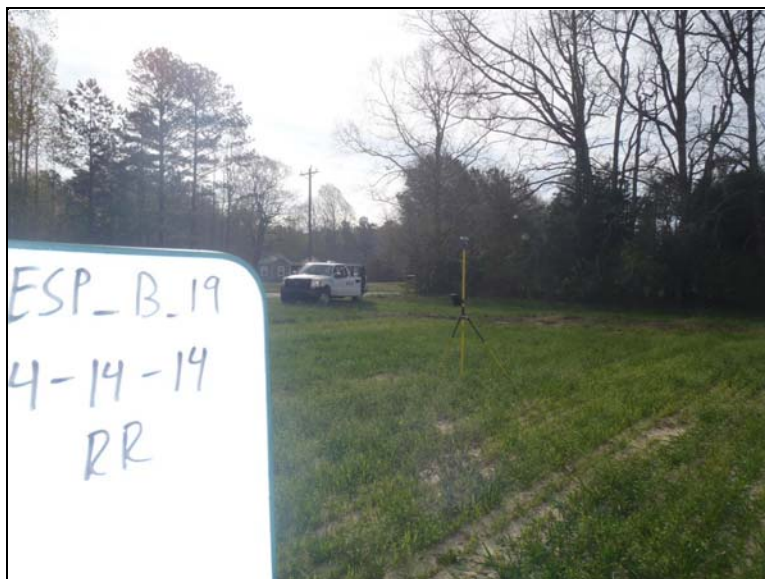
Station Type:

Tall Weeds/Crops

Photos:



ESP_B_19_North.jpg



ESP_B_19_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/21/2014

County: Amelia

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4146861.745 Meters	Latitude: 37 25 59.70215
Easting: 244167.168 Meters	Longitude: -077 53 29.27759
Elevation: 98.99 Meters	Ellipsoid Height: 66.91 Meters
Combined Grid Factor: 1.00039577	

Station Name

ESP B 20

Station Type:

Tall Weeds/Crops

Photos:



ESP_B_20_North.jpg



ESP_B_20_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/11/2014

County: Prince Edward

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4120040.598 Meters	Latitude: 37 10 23.69175
Easting: 183612.8 Meters	Longitude: -078 33 48.04458
Elevation: 156.765 Meters	Ellipsoid Height: 125.575 Meters
Combined Grid Factor: 1.00081358	

Station Name

ESP C 01

Station Type:

Brush

Photos:



ESP_C_01_North.jpg



ESP_C_01_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/22/2014

County: Nottoway

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4119557.738 Meters	Latitude: 37 11 15.84131
Easting: 245217.24 Meters	Longitude: -077 52 12.87890
Elevation: 114.163 Meters	Ellipsoid Height: 81.845 Meters
Combined Grid Factor: 1.00038687	

Station Name

ESP C 05

Station Type:

Brush

Photos:



ESP_C_05_North.jpg



ESP_C_05_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/21/2014

County: Dinwiddie

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEoid12A)	Geographic (GRS 80)
Northing: 4095760.495 Meters	Latitude: 36 58 33.99122
Easting: 255091.264 Meters	Longitude: -077 45 04.92508
Elevation: 78.072 Meters	Ellipsoid Height: 45.126 Meters
Combined Grid Factor: 1.00033189	

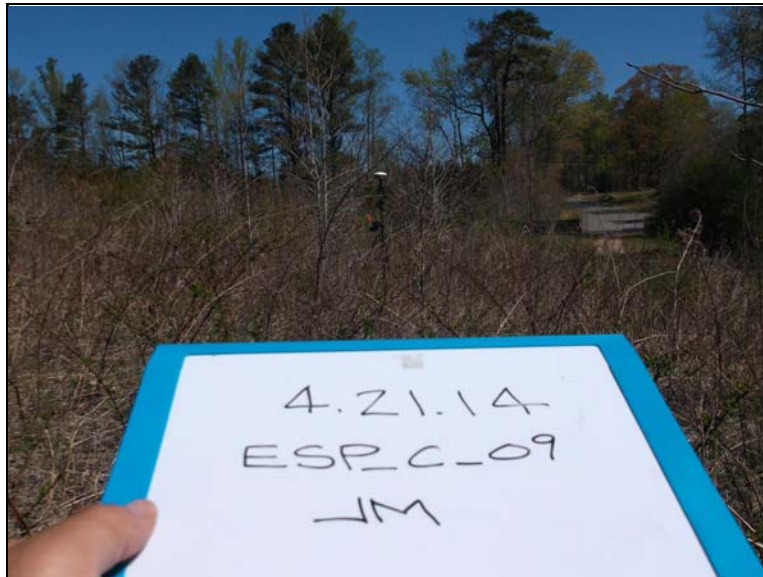
Station Name

ESP C 09

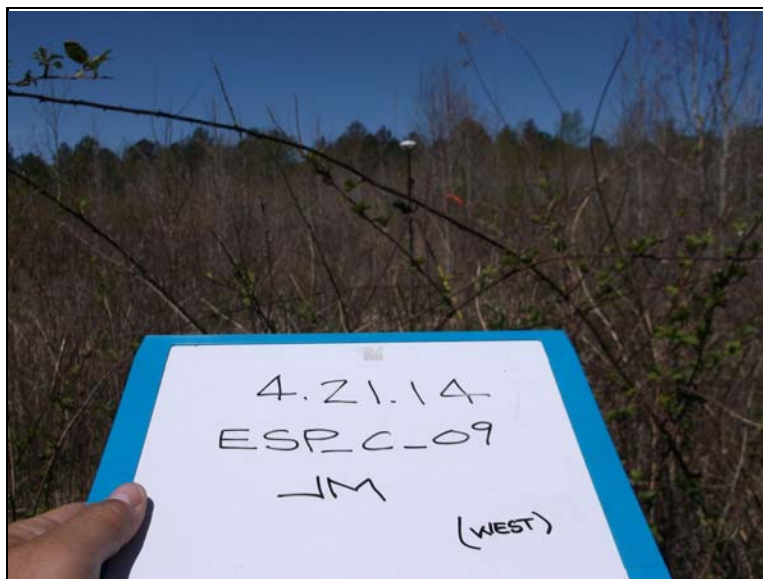
Station Type:

Brush

Photos:



ESP_C_09_North.jpg



ESP_C_09_West.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/20/2014

County: Nottoway

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4108084.571 Meters	Latitude: 37 04 46.72274
Easting: 228140.117 Meters	Longitude: -078 03 29.59297
Elevation: 114.995 Meters	Ellipsoid Height: 82.979 Meters
Combined Grid Factor: 1.00049753	

Station Name

ESP C 19

Station Type:

Brush

Photos:



ESP_C_19_North.jpg



ESP_C_19_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/13/2014

County: Nottoway

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4111328.783 Meters	Latitude: 37 06 17.15616
Easting: 214421.481 Meters	Longitude: -078 12 48.82653
Elevation: 156.539 Meters	Ellipsoid Height: 124.929 Meters
Combined Grid Factor: 1.00058517	

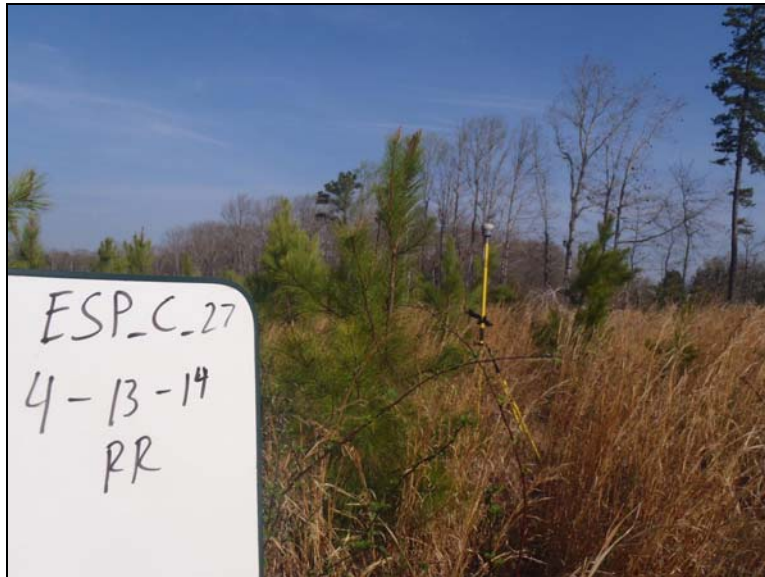
Station Name

ESP C 27

Station Type:

Brush

Photos:



ESP_C_27_North.jpg



ESP_C_27_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/18/2014

County: Hanover

Acquisition Block: VA_Sandy_BLK_3



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEoid12A)	Geographic (GRS 80)
Northing: 4165888.364 Meters	Latitude: 37 37 08.43124
Easting: 302971.062 Meters	Longitude: -077 13 56.95419
Elevation: 46.54 Meters	Ellipsoid Height: 13.207 Meters
Combined Grid Factor: 1.00007611	

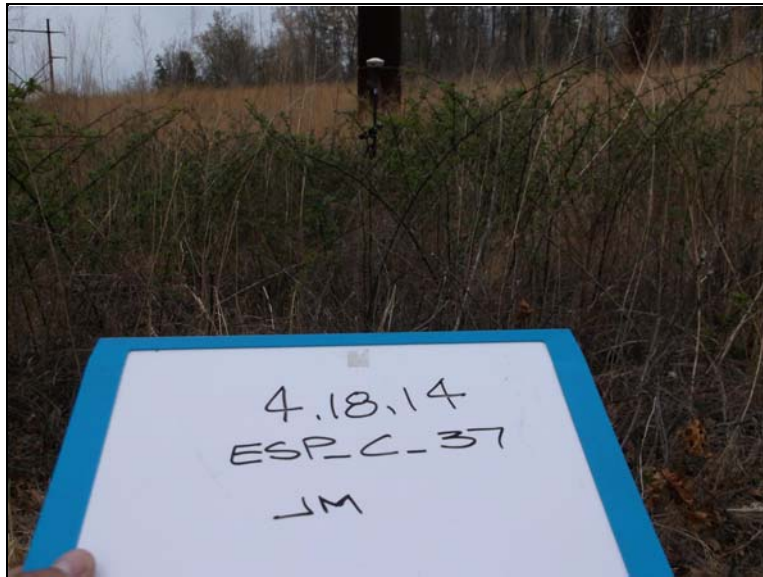
Station Name

ESP C 37

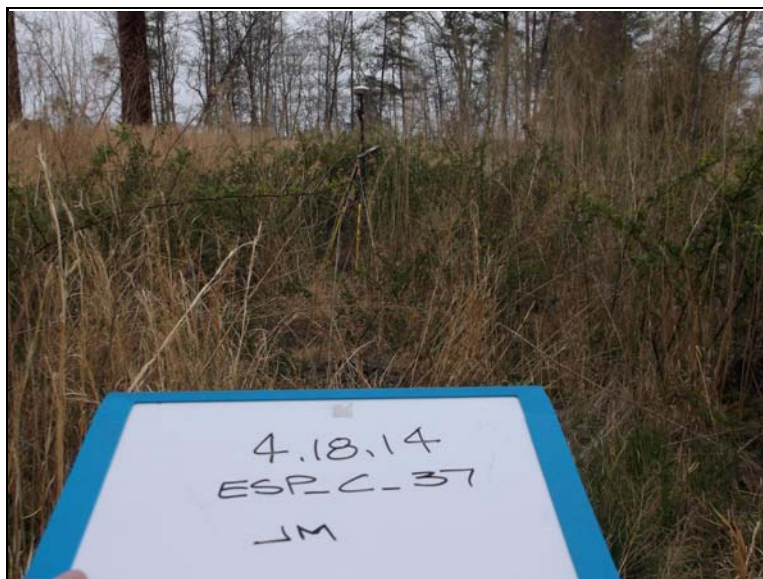
Station Type:

Brush

Photos:



ESP_C_37_North.jpg



ESP_C_37_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/21/2014

County: Chesterfield

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4141727.593 Meters	Latitude: 37 23 24.09445
Easting: 255260.829 Meters	Longitude: -077 45 52.27063
Elevation: 103.596 Meters	Ellipsoid Height: 71.128 Meters
Combined Grid Factor: 1.0003267	

Station Name

ESP C 40

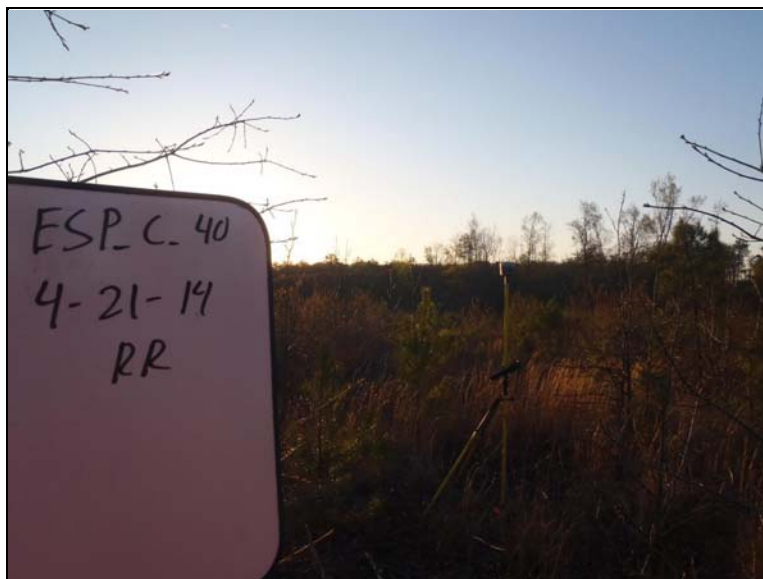
Station Type:

Brush

Photos:



ESP_C_40_North.jpg



ESP_C_40_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/10/2014

County: Prince Edward

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEoid12A)	Geographic (GRS 80)
Northing: 4112553.852 Meters	Latitude: 37 06 35.96318
Easting: 195990.213 Meters	Longitude: -078 25 16.09097
Elevation: 156.302 Meters	Ellipsoid Height: 125.027 Meters
Combined Grid Factor: 1.00071906	

Station Name

ESP D 01

Station Type:

Forested & Fully Grown

Photos:



ESP_D_01_North.jpg



ESP_D_01_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/12/2014

County: Nottoway

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4124392.969 Meters	Latitude: 37 13 18.72352
Easting: 212874.369 Meters	Longitude: -078 14 09.45882
Elevation: 152.571 Meters	Ellipsoid Height: 121.041 Meters
Combined Grid Factor: 1.00059667	

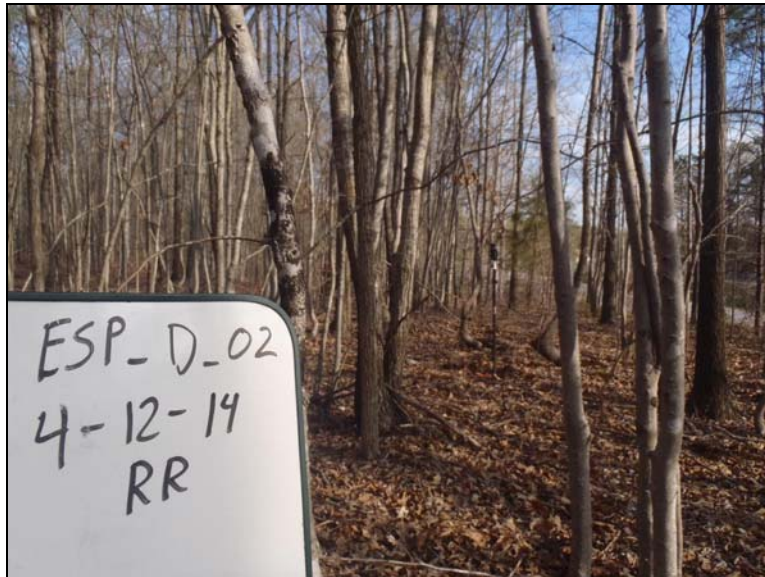
Station Name

ESP D 02

Station Type:

Forested & Fully Grown

Photos:



ESP_D_02_North.jpg



ESP_D_02_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/14/2014

County: Nottoway

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4108129.474 Meters	Latitude: 37 04 41.54318
Easting: 221856.621 Meters	Longitude: -078 07 43.77580
Elevation: 150.934 Meters	Ellipsoid Height: 119.078 Meters
Combined Grid Factor: 1.00053445	

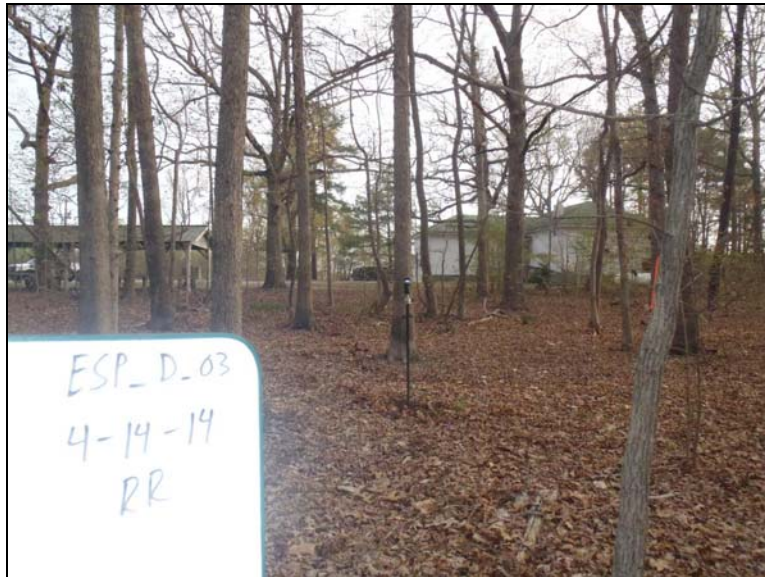
Station Name

ESP D 03

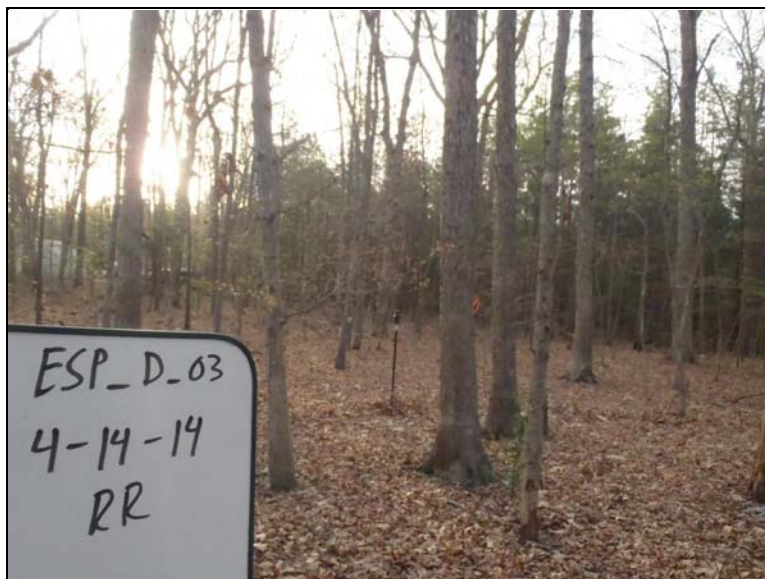
Station Type:

Forested & Fully Grown

Photos:



ESP_D_03_North.jpg



ESP_D_03_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/22/2014

County: Amelia

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4125791.761 Meters	Latitude: 37 14 33.99738
Easting: 241296.643 Meters	Longitude: -077 54 59.47603
Elevation: 77.057 Meters	Ellipsoid Height: 44.909 Meters
Combined Grid Factor: 1.00041746	

Station Name

ESP D 04

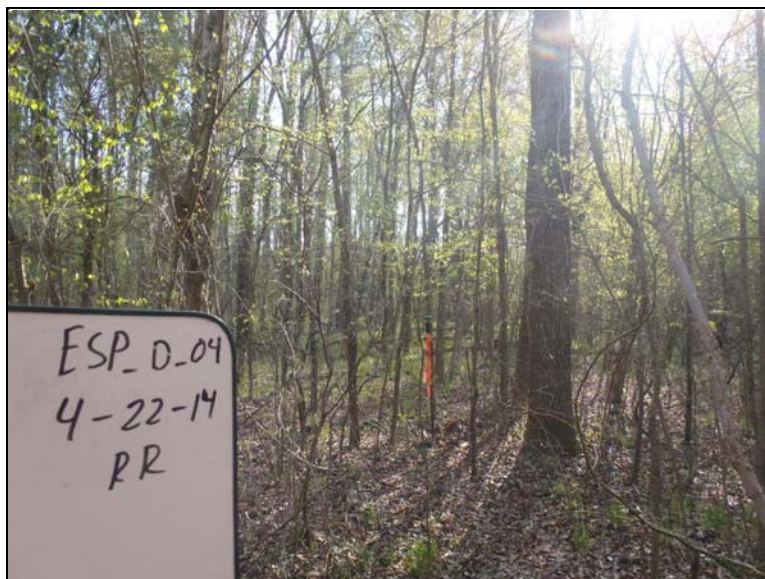
Station Type:

Forested & Fully Grown

Photos:



ESP_D_04_North.jpg



ESP_D_04_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/25/2014

County: Sussex

Acquisition Block: VA_Sandy_BLK_5



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4098813.579 Meters	Latitude: 37 00 49.08056
Easting: 297222.316 Meters	Longitude: -077 16 45.31388
Elevation: 25.521 Meters	Ellipsoid Height: -8.517 Meters
Combined Grid Factor: 1.00010791	

Station Name

ESP D 05

Station Type:

Forested & Fully Grown

Photos:



ESP_D_05_North.jpg



ESP_D_05_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/25/2014

County: Sussex

Acquisition Block: VA_Sandy_BLK_5



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4085428.061 Meters	Latitude: 36 53 48.37697
Easting: 315270.837 Meters	Longitude: -077 04 23.66364
Elevation: 30.41 Meters	Ellipsoid Height: -4.31 Meters
Combined Grid Factor: 1.00002108	

Station Name

ESP D 06

Station Type:

Forested & Fully Grown

Photos:



ESP_D_06_North.jpg



ESP_D_06_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/24/2014

County: Sussex

Acquisition Block: VA_Sandy_BLK_5



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEoid12A)	Geographic (GRS 80)
Northing: 4075171.931 Meters	Latitude: 36 47 55.48130
Easting: 288366.394 Meters	Longitude: -077 22 19.61208
Elevation: 39.609 Meters	Ellipsoid Height: 5.382 Meters
Combined Grid Factor: 1.00015097	

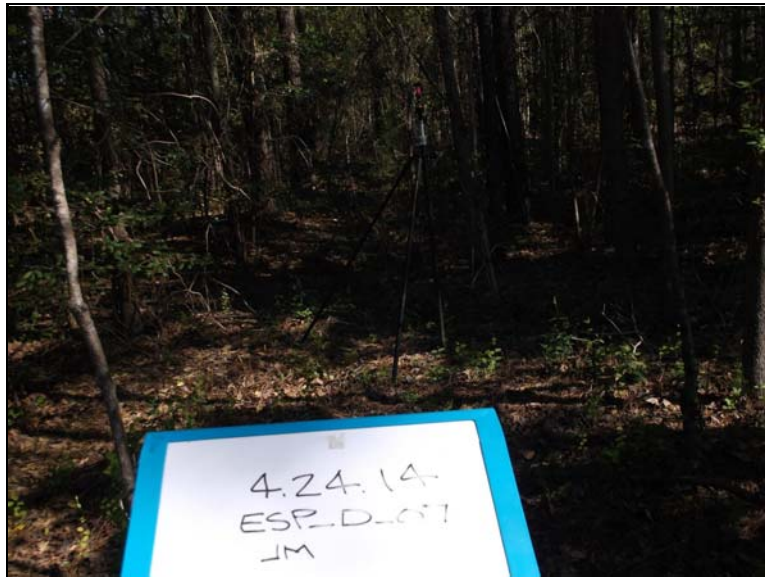
Station Name

ESP D 07

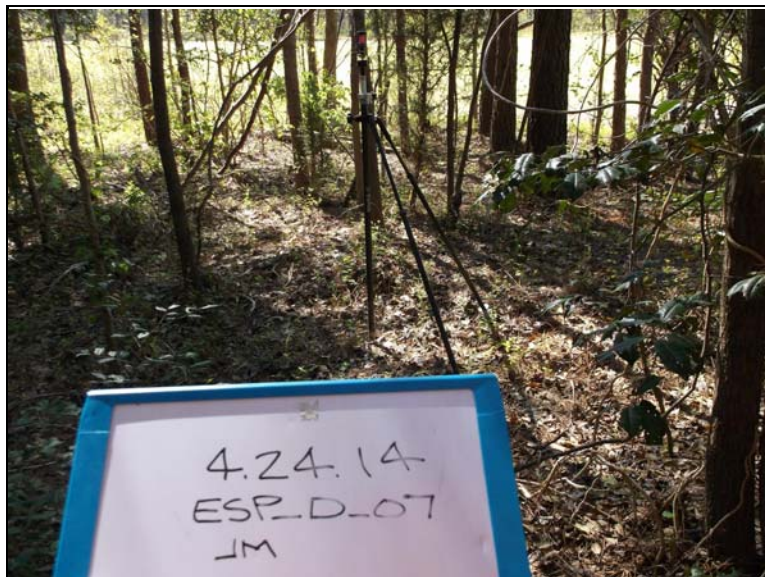
Station Type:

Forested & Fully Grown

Photos:



ESP_D_07_North.jpg



ESP_D_07_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/23/2014

County: Chesterfield

Acquisition Block: VA_Sandy_BLK_3



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4135803.351 Meters	Latitude: 37 20 33.42204
Easting: 278901.352 Meters	Longitude: -077 29 45.44431
Elevation: 59.116 Meters	Ellipsoid Height: 25.824 Meters
Combined Grid Factor: 1.00019814	

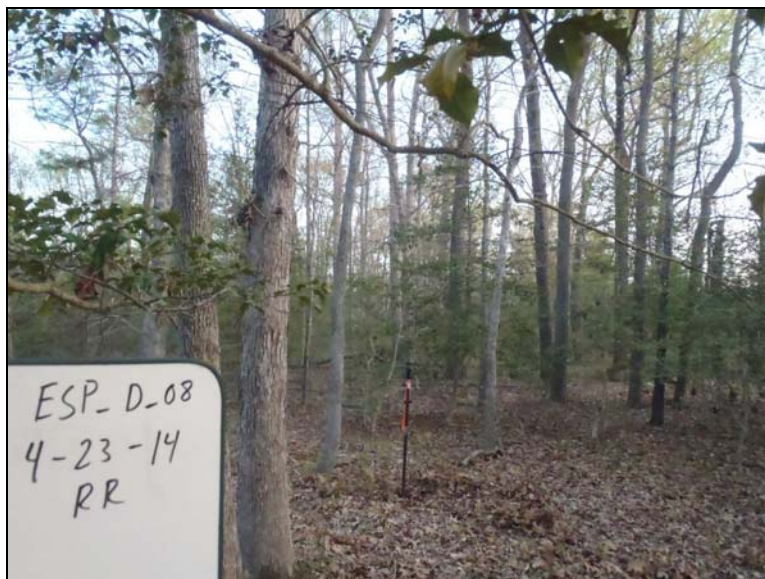
Station Name

ESP D 08

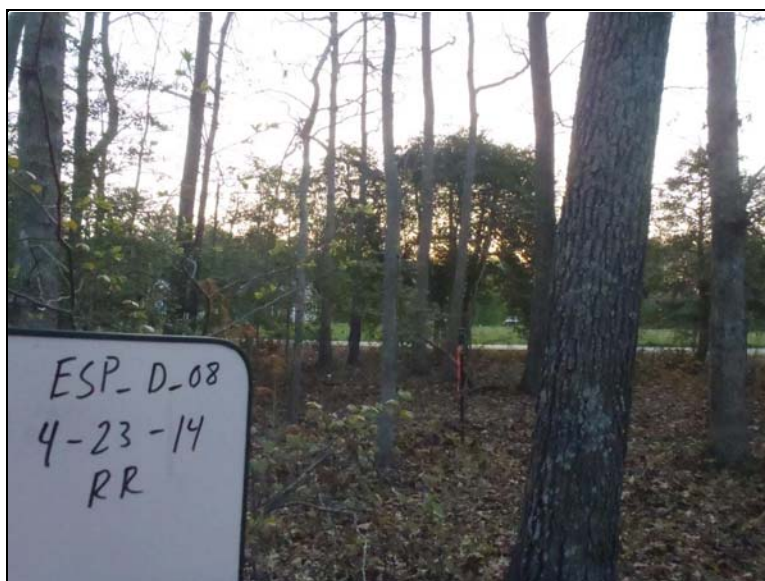
Station Type:

Forested & Fully Grown

Photos:



ESP_D_08_North.jpg



ESP_D_08_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/16/2014

County: Henrico

Acquisition Block: VA_Sandy_BLK_3



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEoid12A)	Geographic (GRS 80)
Northing: 4147857.628 Meters	Latitude: 37 27 23.57818
Easting: 302686.829 Meters	Longitude: -077 13 51.09550
Elevation: 42.114 Meters	Ellipsoid Height: 8.711 Meters
Combined Grid Factor: 1.00007821	

Station Name

ESP D 09

Station Type:

Forested & Fully Grown

Photos:



ESP_D_09_North.jpg



ESP_D_09_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/21/2014

County: Amelia

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4149104.508 Meters	Latitude: 37 27 01.93585
Easting: 233878.084 Meters	Longitude: -078 00 30.31224
Elevation: 111.569 Meters	Ellipsoid Height: 79.696 Meters
Combined Grid Factor: 1.00045993	

Station Name

ESP D 10

Station Type:

Forested & Fully Grown

Photos:



ESP_D_10_North.jpg



ESP_D_10_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/17/2014

County: Henrico

Acquisition Block: VA_Sandy_BLK_3



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4155032.315 Meters	Latitude: 37 31 07.23008
Easting: 291343.743 Meters	Longitude: -077 21 39.75823
Elevation: 48.686 Meters	Ellipsoid Height: 15.467 Meters
Combined Grid Factor: 1.00013388	

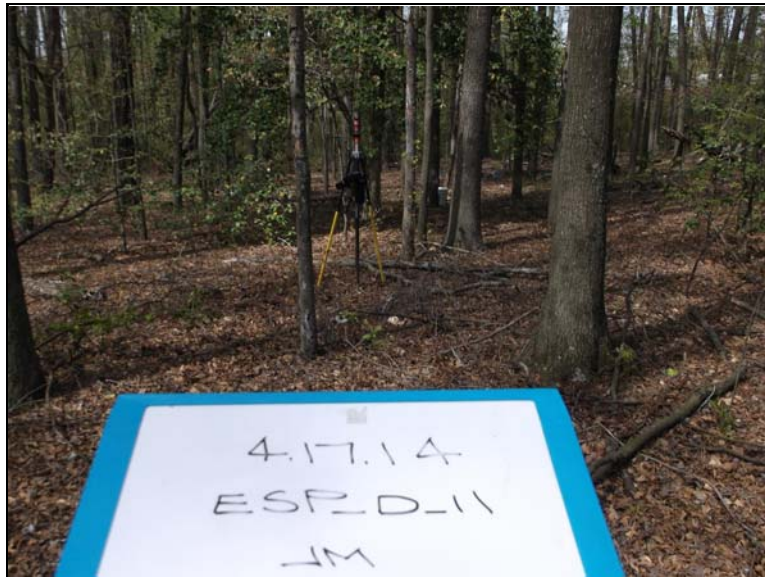
Station Name

ESP D 11

Station Type:

Forested & Fully Grown

Photos:



ESP_D_11_North.jpg



ESP_D_11_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/26/2014

County: Hanover

Acquisition Block: VA_Sandy_BLK_3



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEoid12A)	Geographic (GRS 80)
Northing: 4171908.348 Meters	Latitude: 37 40 19.91885
Easting: 298238.479 Meters	Longitude: -077 17 15.84771
Elevation: 52.919 Meters	Ellipsoid Height: 19.721 Meters
Combined Grid Factor: 1.00009833	

Station Name

ESP D 12

Station Type:

Forested & Fully Grown

Photos:



ESP_D_12_North.jpg



ESP_D_12_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/22/2014

County: Dinwiddie

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEoid12A)	Geographic (GRS 80)
Northing: 4099653.246 Meters	Latitude: 37 00 51.47476
Easting: 267449.284 Meters	Longitude: -077 36 49.93209
Elevation: 94.61 Meters	Ellipsoid Height: 61.277 Meters
Combined Grid Factor: 1.00025664	

Station Name

ESP D 13

Station Type:

Forested & Fully Grown

Photos:



ESP_D_13_North.jpg



ESP_D_13_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/24/2014

County: Dinwiddie

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4102411.753 Meters	Latitude: 37 02 03.82615
Easting: 249030.303 Meters	Longitude: -077 49 17.75449
Elevation: 94.415 Meters	Ellipsoid Height: 61.75 Meters
Combined Grid Factor: 1.0003663	

Station Name

ESP D 14

Station Type:

Forested & Fully Grown

Photos:



ESP_D_14_North.jpg



ESP_D_14_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/23/2014

County: Chesterfield

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4137096.859 Meters	Latitude: 37 20 57.77634
Easting: 259270.101 Meters	Longitude: -077 43 03.98349
Elevation: 62.252 Meters	Ellipsoid Height: 29.627 Meters
Combined Grid Factor: 1.00030924	

Station Name

ESP D 15

Station Type:

Forested & Fully Grown

Photos:



ESP_D_15_North.jpg



ESP_D_15_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/17/2014

County: Chesterfield

Acquisition Block: VA_Sandy_BLK_3



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4157461.898 Meters	Latitude: 37 32 05.15156
Easting: 267153.368 Meters	Longitude: -077 38 07.03737
Elevation: 111.493 Meters	Ellipsoid Height: 78.831 Meters
Combined Grid Factor: 1.0002555	

Station Name

ESP D 16

Station Type:

Forested & Fully Grown

Photos:



ESP_D_16_North.jpg



ESP_D_16_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/10/2014

County: Prince Edward

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEoid12A)	Geographic (GRS 80)
Northing: 4138805.403 Meters	Latitude: 37 20 33.76963
Easting: 185521.307 Meters	Longitude: -078 32 59.32336
Elevation: 154.22 Meters	Ellipsoid Height: 122.939 Meters
Combined Grid Factor: 1.00079911	

Station Name

ESP D 17

Station Type:

Forested & Fully Grown

Photos:



ESP_D_17_North.jpg



ESP_D_17_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/21/2014

County: Dinwiddie

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEoid12A)	Geographic (GRS 80)
Northing: 4114810.293 Meters	Latitude: 37 09 08.28953
Easting: 273629.322 Meters	Longitude: -077 32 56.54002
Elevation: 76.596 Meters	Ellipsoid Height: 43.177 Meters
Combined Grid Factor: 1.00022451	

Station Name

ESP D 18

Station Type:

Forested & Fully Grown

Photos:



ESP_D_18_North.jpg



ESP_D_18_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/18/2014

County: Hanover

Acquisition Block: VA_Sandy_BLK_3



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4178324.76 Meters	Latitude: 37 43 34.67896
Easting: 282145.114 Meters	Longitude: -077 28 19.14285
Elevation: 63.95 Meters	Ellipsoid Height: 31.183 Meters
Combined Grid Factor: 1.00017971	

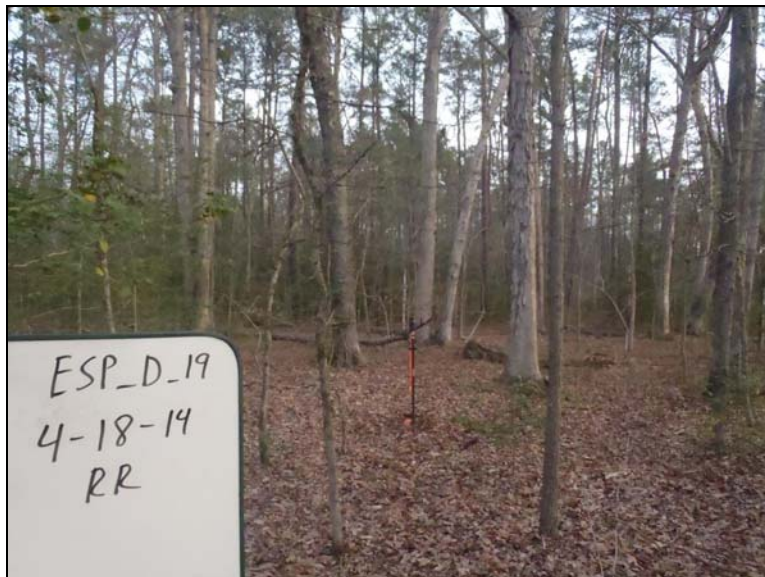
Station Name

ESP D 19

Station Type:

Forested & Fully Grown

Photos:



ESP_D_19_North.jpg



ESP_D_19_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/22/2014

County: Sussex

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEoid12A)	Geographic (GRS 80)
Northing: 4091532.643 Meters	Latitude: 36 56 38.43580
Easting: 279245.037 Meters	Longitude: -077 28 44.49621
Elevation: 39.435 Meters	Ellipsoid Height: 5.591 Meters
Combined Grid Factor: 1.00019952	

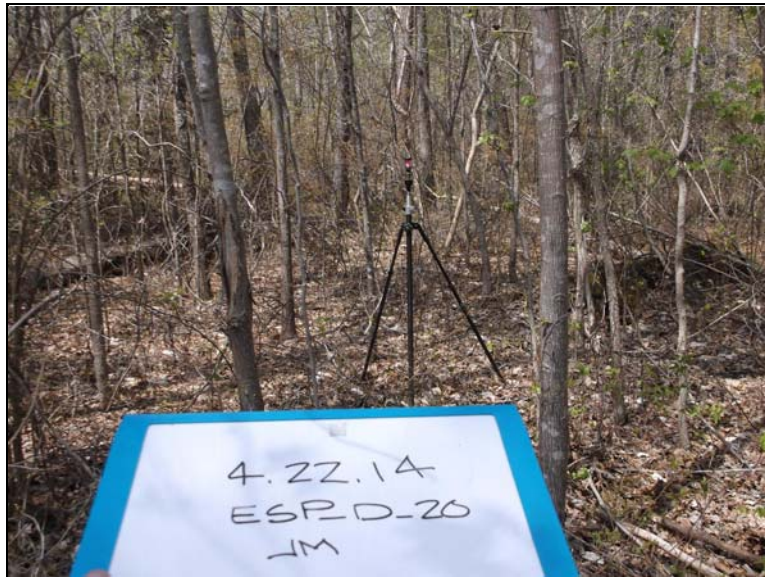
Station Name

ESP D 20

Station Type:

Forested & Fully Grown

Photos:



ESP_D_20_North.jpg



ESP_D_20_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/11/2014

County: Prince Edward

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4131931.126 Meters	Latitude: 37 16 50.53623
Easting: 185036.26 Meters	Longitude: -078 33 08.50597
Elevation: 165.168 Meters	Ellipsoid Height: 133.932 Meters
Combined Grid Factor: 1.00080116	

Station Name

ESP E 01

Station Type:

Urban

Photos:



ESP_E_01_North.jpg



ESP_E_01_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/11/2014

County: Prince Edward

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4119065.161 Meters	Latitude: 37 09 59.89381
Easting: 190076.488 Meters	Longitude: -078 29 24.96486
Elevation: 165.467 Meters	Ellipsoid Height: 134.24 Meters
Combined Grid Factor: 1.00076234	

Station Name

ESP E 02

Station Type:

Urban

Photos:



ESP_E_02_North.jpg



ESP_E_02_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/11/2014

County: Prince Edward

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEoid12A)	Geographic (GRS 80)
Northing: 4128166.98 Meters	Latitude: 37 15 11.39770
Easting: 204348.06 Meters	Longitude: -078 20 00.25620
Elevation: 143.668 Meters	Ellipsoid Height: 112.255 Meters
Combined Grid Factor: 1.00065927	

Station Name

ESP E 03

Station Type:

Urban

Photos:



ESP_E_03_North.jpg



ESP_E_03_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/12/2014

County: Nottoway

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4116584.498 Meters	Latitude: 37 09 11.06912
Easting: 217740.496 Meters	Longitude: -078 10 41.68850
Elevation: 143.204 Meters	Ellipsoid Height: 111.53 Meters
Combined Grid Factor: 1.00056404	

Station Name

ESP E 04

Station Type:

Urban

Photos:



ESP_E_04_North.jpg



ESP_E_04_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/12/2014

County: Amelia

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4133034.559 Meters	Latitude: 37 18 13.85945
Easting: 226857.36 Meters	Longitude: -078 04 54.31319
Elevation: 130.205 Meters	Ellipsoid Height: 98.445 Meters
Combined Grid Factor: 1.00050367	

Station Name

ESP E 05

Station Type:

Urban

Photos:



ESP_E_05_North.jpg



ESP_E_05_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/20/2014

County: Nottoway

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4114663.422 Meters	Latitude: 37 08 28.84765
Easting: 236821.921 Meters	Longitude: -077 57 46.74874
Elevation: 124.112 Meters	Ellipsoid Height: 91.983 Meters
Combined Grid Factor: 1.00043887	

Station Name

ESP E 06

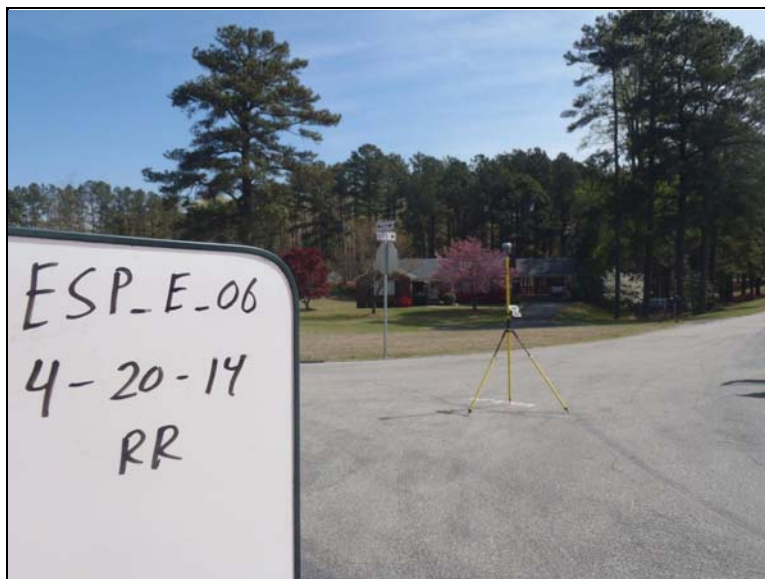
Station Type:

Urban

Photos:



ESP_E_06_North.jpg



ESP_E_06_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/22/2014

County: Amelia

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4134022.287 Meters	Latitude: 37 19 09.00540
Easting: 249687.677 Meters	Longitude: -077 49 29.28239
Elevation: 88.545 Meters	Ellipsoid Height: 56.196 Meters
Combined Grid Factor: 1.00036305	

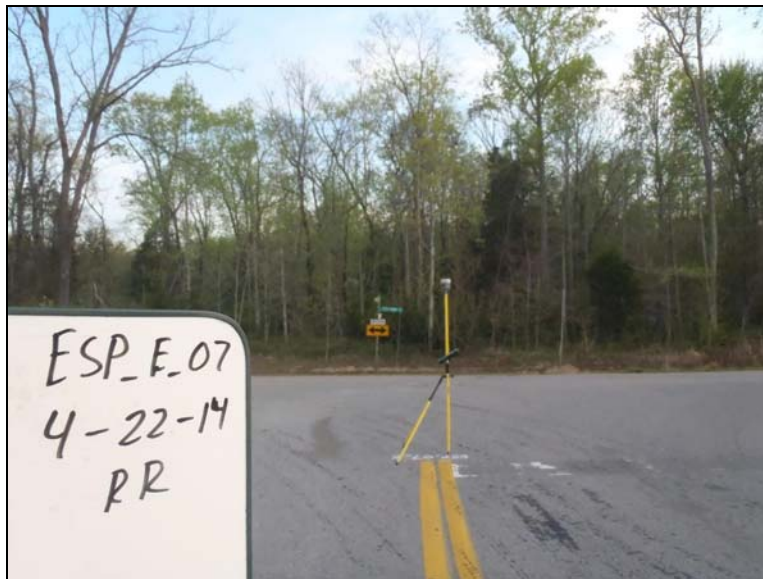
Station Name

ESP E 07

Station Type:

Urban

Photos:



ESP_E_07_North.jpg



ESP_E_07_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/20/2014

County: Dinwiddie

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEoid12A)	Geographic (GRS 80)
Northing: 4115961.861 Meters	Latitude: 37 09 33.25466
Easting: 259863.106 Meters	Longitude: -077 42 15.37036
Elevation: 102.773 Meters	Ellipsoid Height: 69.949 Meters
Combined Grid Factor: 1.00029943	

Station Name

ESP E 08

Station Type:

Urban

Photos:



ESP_E_08_North.jpg



ESP_E_08_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/23/2014

County: Chesterfield

Acquisition Block: VA_Sandy_BLK_3



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4132805.879 Meters	Latitude: 37 18 46.05503
Easting: 267304.239 Meters	Longitude: -077 37 32.92534
Elevation: 93.623 Meters	Ellipsoid Height: 60.668 Meters
Combined Grid Factor: 1.00025751	

Station Name

ESP E 09

Station Type:

Urban

Photos:



ESP_E_09_North.jpg



ESP_E_09_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/19/2014

County: Petersburg

Acquisition Block: VA_Sandy_BLK_3



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4123395.063 Meters	Latitude: 37 13 58.10914
Easting: 287207.071 Meters	Longitude: -077 23 55.38865
Elevation: 8.117 Meters	Ellipsoid Height: -25.558 Meters
Combined Grid Factor: 1.00016183	

Station Name

ESP E 10

Station Type:

Urban

Photos:



ESP_E_10_North.jpg



ESP_E_10_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/12/2014

County: Sussex

Acquisition Block: VA_Sandy_BLK_5



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4084839.735 Meters	Latitude: 36 53 07.41611
Easting: 286463.586 Meters	Longitude: -077 23 46.11177
Elevation: 36.924 Meters	Ellipsoid Height: 2.81 Meters
Combined Grid Factor: 1.00016133	

Station Name

ESP E 11

Station Type:

Urban

Photos:



ESP_E_11_North.jpg



ESP_E_11_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/24/2014

County: Sussex

Acquisition Block: VA_Sandy_BLK_5



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEoid12A)	Geographic (GRS 80)
Northing: 4080155.062 Meters	Latitude: 36 50 43.12156
Easting: 296026.909 Meters	Longitude: -077 17 15.54170
Elevation: 33.351 Meters	Ellipsoid Height: -1.024 Meters
Combined Grid Factor: 1.00011274	

Station Name

ESP E 12

Station Type:

Urban

Photos:



ESP_E_12_North.jpg



ESP_E_12_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/23/2014

County: Sussex

Acquisition Block: VA_Sandy_BLK_5



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEoid12A)	Geographic (GRS 80)
Northing: 4098345.241 Meters	Latitude: 37 00 40.84446
Easting: 306375.394 Meters	Longitude: -077 10 34.75406
Elevation: 36.579 Meters	Ellipsoid Height: 2.371 Meters
Combined Grid Factor: 1.00006149	

Station Name

ESP E 13

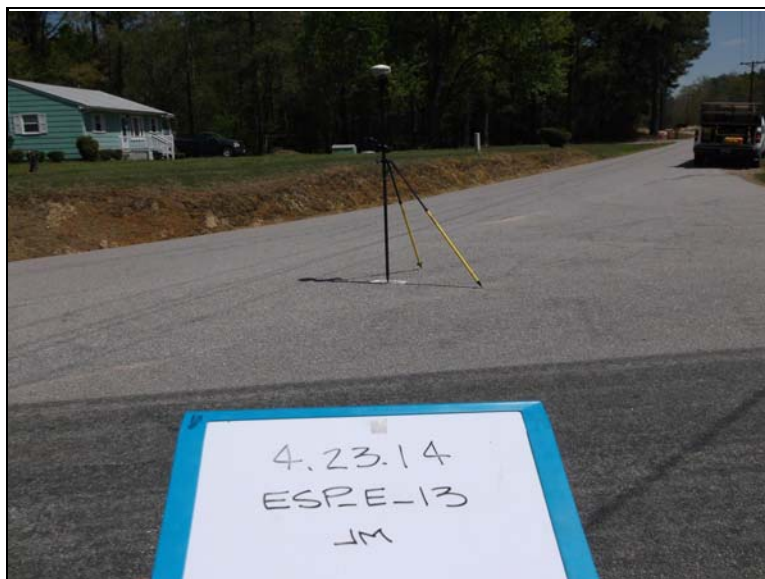
Station Type:

Urban

Photos:



ESP_E_13_North.jpg



ESP_E_13_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/25/2014

County: Sussex

Acquisition Block: VA_Sandy_BLK_5



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEoid12A)	Geographic (GRS 80)
Northing: 4093267.971 Meters	Latitude: 36 58 07.91277
Easting: 322899.362 Meters	Longitude: -076 59 22.22679
Elevation: 29.169 Meters	Ellipsoid Height: -5.691 Meters
Combined Grid Factor: 0.99998728	

Station Name

ESP E 14

Station Type:

Urban

Photos:



ESP_E_14_North.jpg



ESP_E_14_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/14/2014

County: Nottoway

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4102845.995 Meters	Latitude: 37 02 08.32917
Easting: 239272.487 Meters	Longitude: -077 55 52.77232
Elevation: 110.231 Meters	Ellipsoid Height: 77.825 Meters
Combined Grid Factor: 1.0004253	

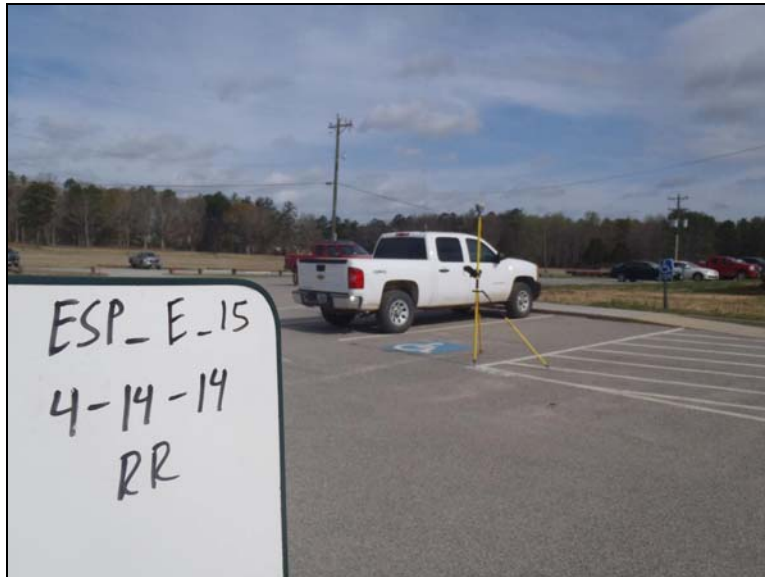
Station Name

ESP E 15

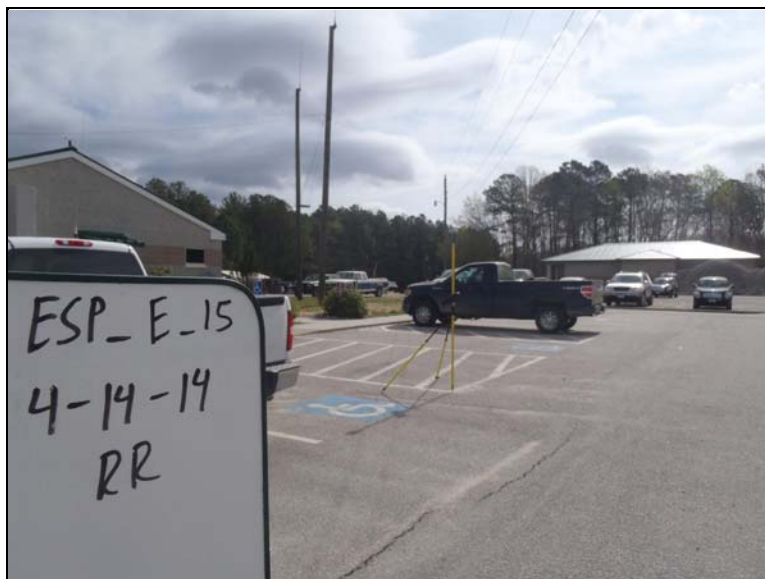
Station Type:

Urban

Photos:



ESP_E_15_North.jpg



ESP_E_15_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/22/2014

County: Dinwiddie

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4088690.633 Meters	Latitude: 36 54 55.96274
Easting: 267311.388 Meters	Longitude: -077 36 43.34916
Elevation: 92.708 Meters	Ellipsoid Height: 59.314 Meters
Combined Grid Factor: 1.00025776	

Station Name

ESP E 16

Station Type:

Urban

Photos:



ESP_E_16_North.jpg



ESP_E_16_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/20/2014

County: Dinwiddie

Acquisition Block: VA_Sandy_BLK_4



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4103957.536 Meters	Latitude: 37 03 21.71849
Easting: 279776.485 Meters	Longitude: -077 28 36.09373
Elevation: 41.401 Meters	Ellipsoid Height: 7.687 Meters
Combined Grid Factor: 1.00019628	

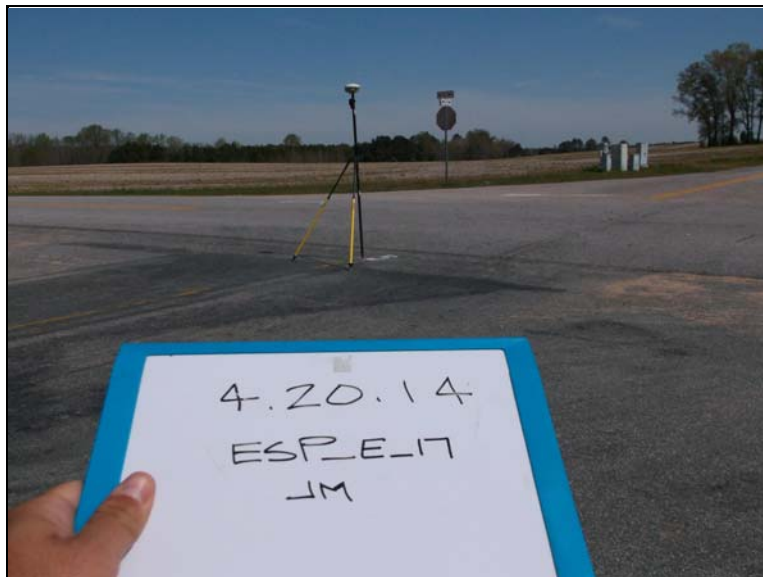
Station Name

ESP E 17

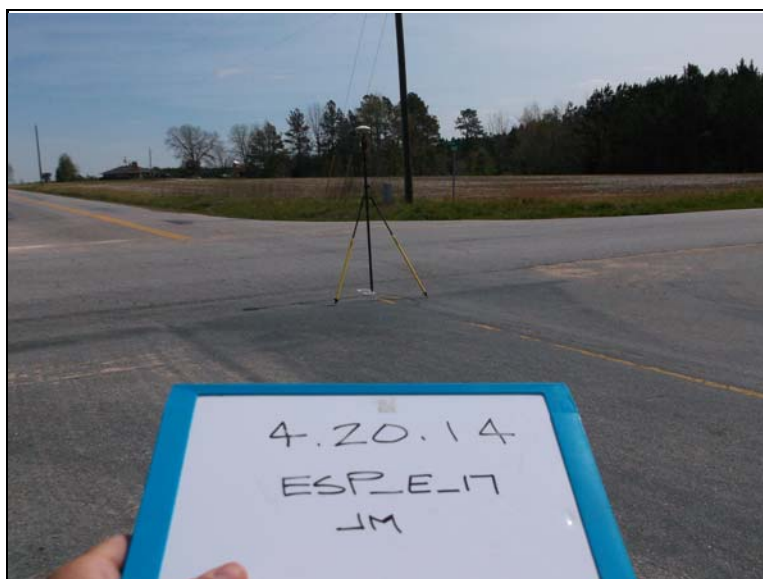
Station Type:

Urban

Photos:



ESP_E_17_North.jpg



ESP_E_17_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/18/2014

County: Hanover

Acquisition Block: VA_Sandy_BLK_3



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4167955.278 Meters	Latitude: 37 38 03.95118
Easting: 288602.51 Meters	Longitude: -077 23 44.75599
Elevation: 56.254 Meters	Ellipsoid Height: 23.211 Meters
Combined Grid Factor: 1.00014683	

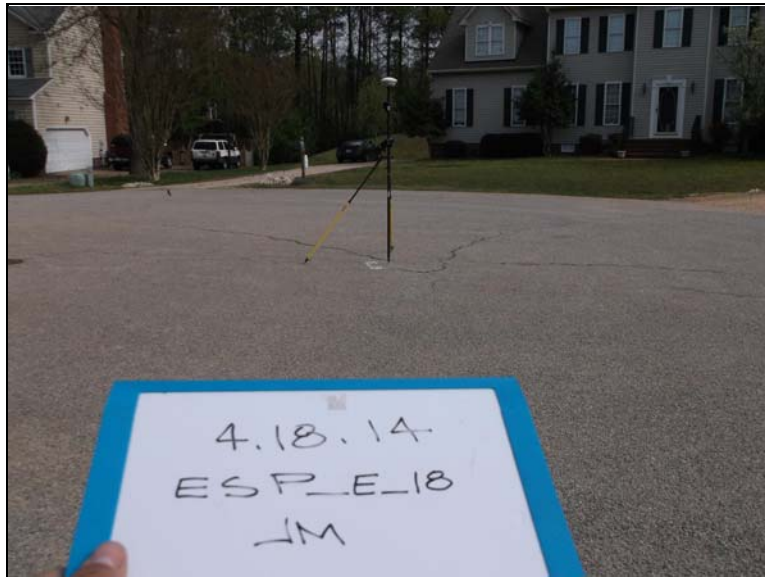
Station Name

ESP E 18

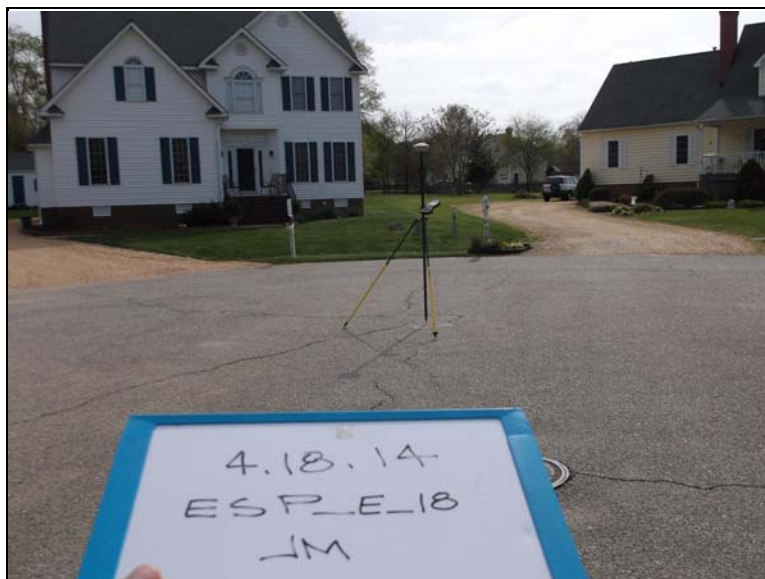
Station Type:

Urban

Photos:



ESP_E_18_North.jpg



ESP_E_18_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/16/2014

County: Chesterfield

Acquisition Block: VA_Sandy_BLK_3



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4153580.703 Meters	Latitude: 37 30 02.44250
Easting: 270592.072 Meters	Longitude: -077 35 42.70340
Elevation: 100.313 Meters	Ellipsoid Height: 67.516 Meters
Combined Grid Factor: 1.00023769	

Station Name

ESP E 19

Station Type:

Urban

Photos:



ESP_E_19_North.jpg



ESP_E_19_East.jpg

Project Name: Virginia - SANDY QL2 LiDAR

ESP Project #: CP10.200.000

Date of Survey: 4/16/2014

County: Henrico

Acquisition Block: VA_Sandy_BLK_3



UTM (Zone 18) NAD 83(2011)//NAVD 88(GEOID12A)	Geographic (GRS 80)
Northing: 4151156.589 Meters	Latitude: 37 29 07.01821
Easting: 298151.425 Meters	Longitude: -077 16 58.81849
Elevation: 43.373 Meters	Ellipsoid Height: 10.04 Meters
Combined Grid Factor: 1.0001003	

Station Name

ESP E 20

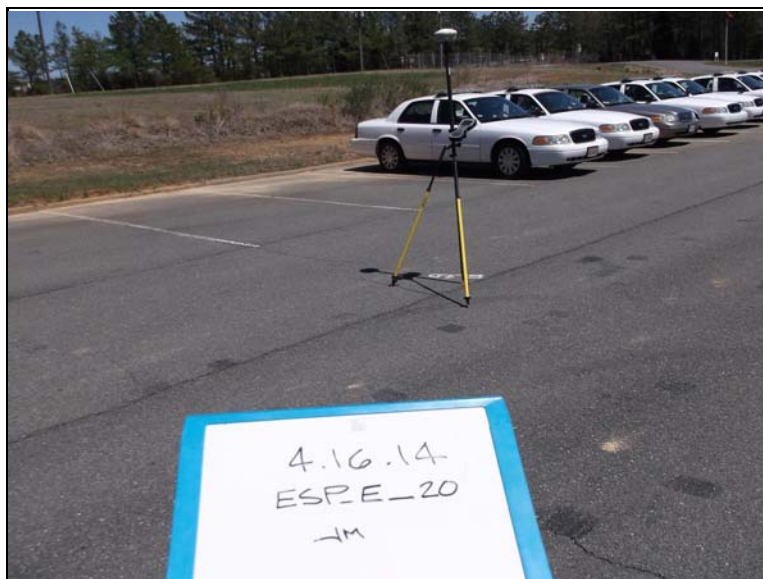
Station Type:

Urban

Photos:



ESP_E_20_North.jpg

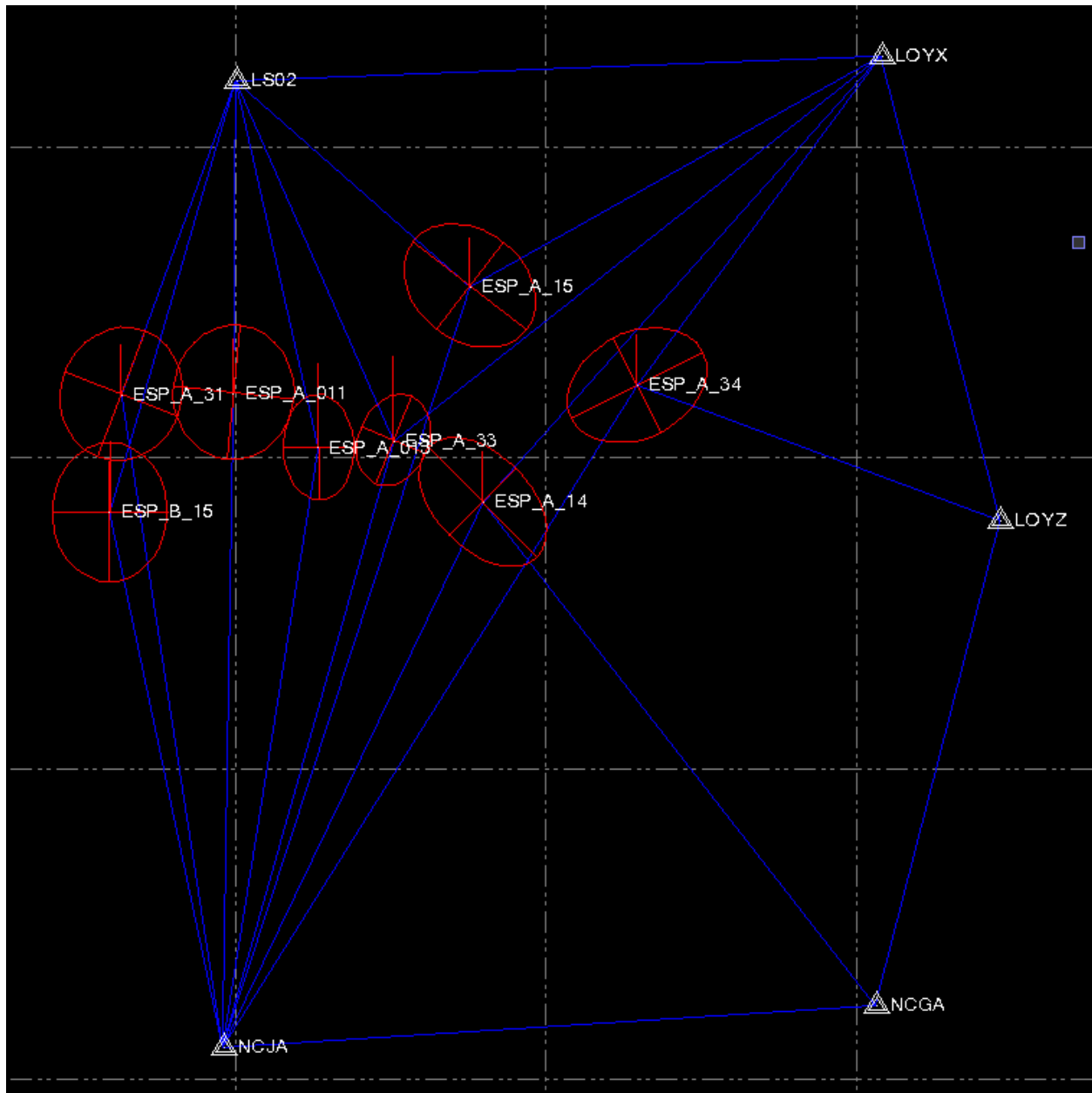


ESP_E_20_East.jpg

6.0 – Static GPS Network Supporting Information

The following pages contain supporting documentation for the static GPS network that was established for this project. The documentation includes baseline processing reports, free adjustment report, and fully constrained network adjustment report.

Network Map



Project file data		Coordinate System	
Name:	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network.vce	Name:	US State Plane 1983
Size:	889 KB	Datum:	NAD 1983 (Conus)
Modified:	4/24/2014 2:23:50 PM (UTC:-4)	Zone:	Virginia South 4502
Time zone:	Eastern Standard Time	Geoid:	GEOID12A (Conus)
Reference number:		Vertical datum:	
Description:			

Baseline Processing Report

Processing Summary

Observation	From	To	Solution Type	H. Prec. (US survey foot)	V. Prec. (US survey foot)	Geodetic Az.	Ellipsoid Dist. (US survey foot)	ΔHeight (US survey foot)
LOYZ --- LOYX (B1)	LOYX	LOYZ	Fixed	0.015	0.050	166°38'43"	154458.83 1	-71.221
LOYX --- LS02 (B2)	LOYX	LS02	Fixed	0.021	0.052	268°54'19"	208286.22 5	-27.990
LOYZ --- LOYX (B13)	LOYX	LOYZ	Fixed	0.013	0.045	166°38'43"	154458.81 5	-71.205
LOYX --- ESP_A_33 (B14)	LOYX	ESP_A_33	Fixed	0.070	0.148	232°47'29"	200125.58 2	-61.282
LOYX --- LS02 (B16)	LOYX	LS02	Fixed	0.026	0.054	268°54'19"	208286.23 5	-28.006
LS02 --- ESP_A_33 (B18)	LS02	ESP_A_33	Fixed	0.017	0.082	156°54'31"	126827.66 9	-33.188
LS02 --- ESP_A_013 (B19)	LS02	ESP_A_013	Fixed	0.018	0.079	167°57'17"	121232.40 9	10.539
NCJA --- NCGA (B31)	NCJA	NCGA	Fixed	0.022	0.054	86°58'59"	211015.10 7	-110.612
LOYZ --- NCGA (B36)	LOYZ	NCGA	Fixed	0.015	0.052	195°37'37"	161295.16 7	-3.232
LOYZ --- NCGA (B39)	LOYZ	NCGA	Fixed	0.015	0.049	195°37'37"	161295.16 6	-3.240
NCGA --- NCJA (B42)	NCJA	NCGA	Fixed	0.028	0.056	86°58'59"	211015.10 3	-110.649
NCJA --- ESP_A_33 (B46)	NCJA	ESP_A_33	Fixed	0.058	0.180	16°27'34"	202891.44 5	-97.458
NCJA --- ESP_A_013 (B47)	NCJA	ESP_A_013	Fixed	0.071	0.165	9°43'55"	195486.93 6	-53.606
NCJA --- ESP_B_15 (B49)	NCJA	ESP_B_15	Fixed	0.043	0.056	348°42'21"	176009.33 1	65.609

NCJA --- ESP_A_34 (B50)	NCJA	ESP_A_34	Fixed	0.069	0.070	32°45'41"	251781.46 7	-49.691
NCJA --- ESP_A_31 (B51)	NCJA	ESP_A_31	Fixed	0.027	0.049	351°50'15"	212654.61 1	35.187
NCJA --- ESP_A_15 (B52)	NCJA	ESP_A_15	Fixed	0.046	0.071	18°42'08"	257647.41 9	-35.706
NCJA --- ESP_A_14 (B53)	NCJA	ESP_A_14	Fixed	0.033	0.063	26°15'14"	194562.10 3	-54.944
NCJA --- ESP_A_011 (B54)	NCJA	ESP_A_011	Fixed	0.124	0.070	1°36'06"	210613.25 2	-12.856
NCJA --- NCGA (B55)	NCJA	NCGA	Fixed	0.016	0.046	86°58'59"	211015.09 7	-110.674
NCGA --- ESP_A_14 (B61)	NCGA	ESP_A_14	Fixed	0.054	0.079	323°05'02"	205507.69 8	56.034
LS02 --- ESP_B_15 (B76)	LS02	ESP_B_15	Fixed	0.025	0.044	196°56'24"	144904.52 5	129.935
LS02 --- ESP_A_31 (B78)	LS02	ESP_A_31	Fixed	0.018	0.032	200°38'14"	107625.29 5	99.377
LS02 --- ESP_A_15 (B79)	LS02	ESP_A_15	Fixed	0.018	0.030	131°54'28"	100618.24 7	28.736
LS02 --- ESP_A_011 (B81)	LS02	ESP_A_011	Fixed	0.022	0.045	181°03'15"	100715.68 9	51.321
LS02 --- LOYX (B82)	LOYX	LS02	Fixed	0.016	0.045	268°54'19"	208286.23 8	-27.973
LOYX --- ESP_A_34 (B88)	LOYX	ESP_A_34	Fixed	0.021	0.036	217°36'44"	131891.08 3	-13.202
LOYX --- ESP_A_15 (B90)	LOYX	ESP_A_15	Fixed	0.018	0.031	241°48'39"	151890.84 5	0.545
LOYX --- ESP_A_14 (B91)	LOYX	ESP_A_14	Fixed	0.323	0.107	222°49'16"	192680.96 2	-18.055
LOYX --- LOYZ (B93)	LOYX	LOYZ	Fixed	0.009	0.035	166°38'43"	154458.82 1	-71.195
NCGA --- LOYZ (B96)	LOYZ	NCGA	Fixed	0.009	0.036	195°37'37"	161295.16 2	-3.236
LOYZ --- ESP_A_34 (B100)	LOYZ	ESP_A_34	Fixed	0.021	0.035	291°35'28"	124874.34 6	58.006

Acceptance Summary

Processed	Passed	Flag		Fail	
32	32	0		0	

LOYZ - LOYX (12:59:44 PM-3:59:44 PM) (S1)

Baseline observation: LOYZ --- LOYX (B1)
Processed: 4/24/2014 4:01:16 PM
Solution type: Fixed
Frequency used: Dual Frequency (L1, L2)
Horizontal precision: 0.015 ft
Vertical precision: 0.050 ft
RMS: 0.000 ft
Maximum PDOP: 2.292
Ephemeris used: Mixed
Antenna model: NGS Absolute
Processing start time: 4/12/2014 12:59:44 PM (Local: UTC-4hr)
Processing stop time: 4/12/2014 3:59:44 PM (Local: UTC-4hr)
Processing duration: 03:00:00
Processing interval: 1 second

Occupations

	From	To
Point ID:	LOYX	LOYZ
Data file:	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static \Static Network\loyx1020.14o	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static \Static Network\loyz1020.14o
Receiver type:	GRX1200GGPRO	GRX1200GGPRO
Receiver serial number:	353214	355208
Antenna type:	AX1202GG	AX1202GG
Antenna serial number:	07020036	07210069
Antenna height (measured):	0.000 ft	0.000 ft
Antenna method:	Bottom of antenna mount	Bottom of antenna mount

Processing style

Elevation mask: 15.0 deg
Auto start processing: Yes
Start automatic ID numbering: AUTO0001
Continuous vectors: No
Generate residuals: Yes
Antenna model: Automatic
Ephemeris type: Automatic
Frequency: Multiple Frequencies

Processing Interval: Use all data

Force float: No

Acceptance Criteria

Vector Component	Flag 	Fail 
Horizontal Precision >	0.164 ft + 1.000 ppm	0.328 ft + 1.000 ppm
Vertical Precision >	0.328 ft + 1.000 ppm	0.656 ft + 1.000 ppm

LOYX - LS02 (12:59:44 PM-3:59:44 PM) (S2)

Baseline observation: [LOYX --- LS02 \(B2\)](#)

Processed: 4/24/2014 4:01:21 PM

Solution type: Fixed

Frequency used: Dual Frequency (L1, L2)

Horizontal precision: 0.021 ft

Vertical precision: 0.052 ft

RMS: 0.000 ft

Maximum PDOP: 2.292

Ephemeris used: Mixed

Antenna model: NGS Absolute

Processing start time: 4/12/2014 12:59:44 PM (Local: UTC-4hr)

Processing stop time: 4/12/2014 3:59:44 PM (Local: UTC-4hr)

Processing duration: 03:00:00

Processing interval: 1 second

Occupations

	From	To
Point ID:	LOYX	LS02
Data file:	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\loyx1020.14o	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ls021020.14o
Receiver type:	GRX1200GGPRO	GRX1200GGPRO
Receiver serial number:	353214	355936
Antenna type:	AX1202GG	AX1202GG
Antenna serial number:	07020036	08090163
Antenna height (measured):	0.000 ft	0.000 ft
Antenna method:	Bottom of antenna mount	Bottom of antenna mount

Processing style

Elevation mask: 15.0 deg
Auto start processing: Yes
Start automatic ID numbering: AUTO0001
Continuous vectors: No
Generate residuals: Yes
Antenna model: Automatic
Ephemeris type: Automatic
Frequency: Multiple Frequencies
Processing Interval: Use all data
Force float: No

Acceptance Criteria

Vector Component	Flag 	Fail 
Horizontal Precision >	0.164 ft + 1.000 ppm	0.328 ft + 1.000 ppm
Vertical Precision >	0.328 ft + 1.000 ppm	0.656 ft + 1.000 ppm

LOYZ - LOYX (12:59:44 PM-4:59:44 PM) (S13)

Baseline observation: LOYZ --- LOYX (B13)
Processed: 4/24/2014 4:00:25 PM
Solution type: Fixed
Frequency used: Dual Frequency (L1, L2)
Horizontal precision: 0.013 ft
Vertical precision: 0.045 ft
RMS: 0.087 ft
Maximum PDOP: 3.433
Ephemeris used: Broadcast
Antenna model: NGS Absolute
Processing start time: 4/13/2014 12:59:44 PM (Local: UTC-4hr)
Processing stop time: 4/13/2014 4:59:44 PM (Local: UTC-4hr)
Processing duration: 04:00:00
Processing interval: 1 second

Occupations

	From	To
Point ID:	LOYX	LOYZ
Data file:	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\loyx1030.14o	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\loyz1030.14o
Receiver type:	GRX1200GGPRO	GRX1200GGPRO
Receiver serial number:	353214	355208
Antenna type:	AX1202GG	AX1202GG
Antenna serial number:	07020036	07210069
Antenna height (measured):	0.000 ft	0.000 ft
Antenna method:	Bottom of antenna mount	Bottom of antenna mount

Processing style

Elevation mask: 15.0 deg
Auto start processing: Yes
Start automatic ID numbering: AUTO0001
Continuous vectors: No
Generate residuals: Yes
Antenna model: Automatic
Ephemeris type: Automatic
Frequency: Multiple Frequencies

Processing Interval: Use all data

Force float: No

Acceptance Criteria

Vector Component	Flag 	Fail 
Horizontal Precision >	0.164 ft + 1.000 ppm	0.328 ft + 1.000 ppm
Vertical Precision >	0.328 ft + 1.000 ppm	0.656 ft + 1.000 ppm

LOYX - ESP_A_33 (3:15:59 PM-4:51:44 PM) (S14)

Baseline observation: [LOYX --- ESP_A_33 \(B14\)](#)

Processed: 4/24/2014 4:11:50 PM

Solution type: Fixed

Frequency used: Dual Frequency (L1, L2)

Horizontal precision: 0.070 ft

Vertical precision: 0.148 ft

RMS: 0.001 ft

Maximum PDOP: 3.915

Ephemeris used: Broadcast

Antenna model: NGS Absolute

Processing start time: 4/13/2014 3:15:59 PM (Local: UTC-4hr)

Processing stop time: 4/13/2014 4:51:44 PM (Local: UTC-4hr)

Processing duration: 01:35:45

Processing interval: 15 seconds

Occupations

	From	To
Point ID:	LOYX	ESP_A_33
Data file:	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\loyx1030.14o	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ESP_A_33_71061035.T01
Receiver type:	GRX1200GGPRO	R8 Model 2
Receiver serial number:	353214	4624117106
Antenna type:	AX1202GG	R8 GNSS/SPS88x Internal
Antenna serial number:	07020036	-----
Antenna height (measured):	0.000 ft	6.562 ft
Antenna method:	Bottom of antenna mount	Bottom of antenna mount

Processing style

Elevation mask: 15.0 deg
 Auto start processing: Yes
 Start automatic ID numbering: AUTO0001
 Continuous vectors: No
 Generate residuals: Yes
 Antenna model: Automatic
 Ephemeris type: Automatic
 Frequency: Multiple Frequencies
 Processing Interval: Use all data
 Force float: No

Acceptance Criteria

Vector Component	Flag 	Fail 
Horizontal Precision >	0.164 ft + 1.000 ppm	0.328 ft + 1.000 ppm
Vertical Precision >	0.328 ft + 1.000 ppm	0.656 ft + 1.000 ppm

LOYX - LS02 (12:59:44 PM-4:59:44 PM) (S16)

Baseline observation: [LOYX --- LS02 \(B16\)](#)

Processed: 4/24/2014 4:00:29 PM

Solution type: Fixed

Frequency used: Dual Frequency (L1, L2)

Horizontal precision: 0.026 ft

Vertical precision: 0.054 ft

RMS: 0.082 ft

Maximum PDOP: 3.460

Ephemeris used: Broadcast

Antenna model: NGS Absolute

Processing start time: 4/13/2014 12:59:44 PM (Local: UTC-4hr)

Processing stop time: 4/13/2014 4:59:44 PM (Local: UTC-4hr)

Processing duration: 04:00:00

Processing interval: 1 second

Occupations

	From	To
Point ID:	LOYX	LS02
Data file:	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\loyx1030.14o	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ls021030.14o
Receiver type:	GRX1200GGPRO	GRX1200GGPRO
Receiver serial number:	353214	355936
Antenna type:	AX1202GG	AX1202GG
Antenna serial number:	07020036	08090163
Antenna height (measured):	0.000 ft	0.000 ft
Antenna method:	Bottom of antenna mount	Bottom of antenna mount

Processing style

Elevation mask: 15.0 deg

Auto start processing: Yes

Start automatic ID numbering: AUTO0001

Continuous vectors: No

Generate residuals: Yes

Antenna model: Automatic

Ephemeris type: Automatic

Frequency: Multiple Frequencies

Processing Interval: Use all data

Force float: No

Acceptance Criteria

Vector Component	Flag 	Fail 
Horizontal Precision >	0.164 ft + 1.000 ppm	0.328 ft + 1.000 ppm
Vertical Precision >	0.328 ft + 1.000 ppm	0.656 ft + 1.000 ppm

LS02 - ESP_A_33 (3:15:59 PM-4:51:44 PM) (S18)

Baseline observation: [LS02 --- ESP_A_33 \(B18\)](#)

Processed: 4/24/2014 4:21:23 PM

Solution type: Fixed

Frequency used: Dual Frequency (L1, L2)

Horizontal precision: 0.017 ft

Vertical precision: 0.082 ft

RMS: 0.002 ft

Maximum PDOP: 2.264

Ephemeris used: Broadcast

Antenna model: NGS Absolute

Processing start time: 4/13/2014 3:15:59 PM (Local: UTC-4hr)

Processing stop time: 4/13/2014 4:51:44 PM (Local: UTC-4hr)

Processing duration: 01:35:45

Processing interval: 15 seconds

Occupations

	From	To
Point ID:	LS02	ESP_A_33
Data file:	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ls021030.14o	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ESP_A_33_71061035.T01
Receiver type:	GRX1200GGPRO	R8 Model 2
Receiver serial number:	355936	4624117106
Antenna type:	AX1202GG	R8 GNSS/SPS88x Internal
Antenna serial number:	08090163	-----
Antenna height (measured):	0.000 ft	6.562 ft
Antenna method:	Bottom of antenna mount	Bottom of antenna mount

Processing style

Elevation mask: 15.0 deg
 Auto start processing: Yes
 Start automatic ID numbering: AUTO0001
 Continuous vectors: No
 Generate residuals: Yes
 Antenna model: Automatic
 Ephemeris type: Automatic
 Frequency: Multiple Frequencies
 Processing Interval: Use all data
 Force float: No

Acceptance Criteria

Vector Component	Flag 	Fail 
Horizontal Precision >	0.164 ft + 1.000 ppm	0.328 ft + 1.000 ppm
Vertical Precision >	0.328 ft + 1.000 ppm	0.656 ft + 1.000 ppm

LS02 - ESP_A_013 (1:03:29 PM-2:32:29 PM) (S19)

Baseline observation: [LS02 --- ESP_A_013 \(B19\)](#)

Processed: 4/24/2014 4:01:25 PM

Solution type: Fixed

Frequency used: Dual Frequency (L1, L2)

Horizontal precision: 0.018 ft

Vertical precision: 0.079 ft

RMS: 0.002 ft

Maximum PDOP: 3.423

Ephemeris used: Broadcast

Antenna model: NGS Absolute

Processing start time: 4/13/2014 1:03:29 PM (Local: UTC-4hr)

Processing stop time: 4/13/2014 2:32:29 PM (Local: UTC-4hr)

Processing duration: 01:29:00

Processing interval: 15 seconds

Occupations

	From	To
Point ID:	LS02	ESP_A_013
Data file:	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ls021030.14o	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ESP_A_13_71061034.T01
Receiver type:	GRX1200GGPRO	R8 Model 2
Receiver serial number:	355936	4624117106
Antenna type:	AX1202GG	R8 GNSS/SPS88x Internal
Antenna serial number:	08090163	-----
Antenna height (measured):	0.000 ft	6.562 ft
Antenna method:	Bottom of antenna mount	Bottom of antenna mount

Processing style

Elevation mask: 15.0 deg

Auto start processing: Yes

Start automatic ID numbering: AUTO0001

Continuous vectors: No

Generate residuals: Yes

Antenna model: Automatic

Ephemeris type: Automatic

Frequency: Multiple Frequencies

Processing Interval: Use all data

Force float: No

Acceptance Criteria

Vector Component	Flag 	Fail 
Horizontal Precision >	0.164 ft + 1.000 ppm	0.328 ft + 1.000 ppm
Vertical Precision >	0.328 ft + 1.000 ppm	0.656 ft + 1.000 ppm

NCJA - NCGA (12:59:44 PM-3:59:44 PM) (S31)

Baseline observation: [NCJA --- NCGA \(B31\)](#)

Processed: 4/24/2014 4:00:41 PM

Solution type: Fixed

Frequency used: Dual Frequency (L1, L2)

Horizontal precision: 0.022 ft

Vertical precision: 0.054 ft

RMS: 0.000 ft

Maximum PDOP: 5.433

Ephemeris used: Precise

Antenna model: NGS Absolute

Processing start time: 4/12/2014 12:59:44 PM (Local: UTC-4hr)

Processing stop time: 4/12/2014 3:59:44 PM (Local: UTC-4hr)

Processing duration: 03:00:00

Processing interval: 1 second

Occupations

	From	To
Point ID:	NCJA	NCGA
Data file:	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ncja1020.14o	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ncga1020.14o
Receiver type:	NetR5	NetR5
Receiver serial number:	4831K57548	4833K57791
Antenna type:	Zephyr Geodetic 2 RoHS	Zephyr Geodetic 2 RoHS
Antenna serial number:	30962892	30975448
Antenna height (measured):	0.000 ft	0.000 ft
Antenna method:	Bottom of antenna mount	Bottom of antenna mount

Processing style

Elevation mask: 15.0 deg
 Auto start processing: Yes
 Start automatic ID numbering: AUTO0001
 Continuous vectors: No
 Generate residuals: Yes
 Antenna model: Automatic
 Ephemeris type: Automatic
 Frequency: Multiple Frequencies
 Processing Interval: Use all data
 Force float: No

Acceptance Criteria

Vector Component	Flag 	Fail 
Horizontal Precision >	0.164 ft + 1.000 ppm	0.328 ft + 1.000 ppm
Vertical Precision >	0.328 ft + 1.000 ppm	0.656 ft + 1.000 ppm

LOYZ - NCGA (12:59:44 PM-3:59:44 PM) (S36)

Baseline observation: LOYZ --- NCGA (B36)
Processed: 4/24/2014 4:04:12 PM
Solution type: Fixed
Frequency used: Dual Frequency (L1, L2)
Horizontal precision: 0.015 ft
Vertical precision: 0.052 ft
RMS: 0.000 ft
Maximum PDOP: 5.433
Ephemeris used: Precise
Antenna model: NGS Absolute
Processing start time: 4/12/2014 12:59:44 PM (Local: UTC-4hr)
Processing stop time: 4/12/2014 3:59:44 PM (Local: UTC-4hr)
Processing duration: 03:00:00
Processing interval: 1 second

Occupations

	From	To
Point ID:	LOYZ	NCGA
Data file:	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\loyz1020.14o	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ncga1020.14o
Receiver type:	GRX1200GGPRO	NetR5
Receiver serial number:	355208	4833K57791
Antenna type:	AX1202GG	Zephyr Geodetic 2 RoHS
Antenna serial number:	07210069	30975448
Antenna height (measured):	0.000 ft	0.000 ft
Antenna method:	Bottom of antenna mount	Bottom of antenna mount

Processing style

Elevation mask: 15.0 deg
Auto start processing: Yes
Start automatic ID numbering: AUTO0001
Continuous vectors: No
Generate residuals: Yes
Antenna model: Automatic
Ephemeris type: Automatic
Frequency: Multiple Frequencies

Processing Interval: Use all data

Force float: No

Acceptance Criteria

Vector Component	Flag 	Fail 
Horizontal Precision >	0.164 ft + 1.000 ppm	0.328 ft + 1.000 ppm
Vertical Precision >	0.328 ft + 1.000 ppm	0.656 ft + 1.000 ppm

LOYZ - NCGA (12:59:44 PM-4:59:44 PM) (S39)

Baseline observation: [LOYZ --- NCGA \(B39\)](#)

Processed: 4/24/2014 4:03:43 PM

Solution type: Fixed

Frequency used: Dual Frequency (L1, L2)

Horizontal precision: 0.015 ft

Vertical precision: 0.049 ft

RMS: 0.000 ft

Maximum PDOP: 5.432

Ephemeris used: Broadcast

Antenna model: NGS Absolute

Processing start time: 4/13/2014 12:59:44 PM (Local: UTC-4hr)

Processing stop time: 4/13/2014 4:59:44 PM (Local: UTC-4hr)

Processing duration: 04:00:00

Processing interval: 1 second

Occupations

	From	To
Point ID:	LOYZ	NCGA
Data file:	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\loyz1030.14o	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ncga1030.14o
Receiver type:	GRX1200GGPRO	NetR5
Receiver serial number:	355208	4833K57791
Antenna type:	AX1202GG	Zephyr Geodetic 2 RoHS
Antenna serial number:	07210069	30975448
Antenna height (measured):	0.000 ft	0.000 ft
Antenna method:	Bottom of antenna mount	Bottom of antenna mount

Processing style

Elevation mask: 15.0 deg
 Auto start processing: Yes
 Start automatic ID numbering: AUTO0001
 Continuous vectors: No
 Generate residuals: Yes
 Antenna model: Automatic
 Ephemeris type: Automatic
 Frequency: Multiple Frequencies
 Processing Interval: Use all data
 Force float: No

Acceptance Criteria

Vector Component	Flag 	Fail 
Horizontal Precision >	0.164 ft + 1.000 ppm	0.328 ft + 1.000 ppm
Vertical Precision >	0.328 ft + 1.000 ppm	0.656 ft + 1.000 ppm

NCGA - NCJA (12:59:44 PM-4:59:44 PM) (S42)

Baseline observation: [NCGA --- NCJA \(B42\)](#)
Processed: 4/24/2014 4:00:07 PM
Solution type: Fixed
Frequency used: Dual Frequency (L1, L2)
Horizontal precision: 0.028 ft
Vertical precision: 0.056 ft
RMS: 0.000 ft
Maximum PDOP: 5.432
Ephemeris used: Broadcast
Antenna model: NGS Absolute
Processing start time: 4/13/2014 12:59:44 PM (Local: UTC-4hr)
Processing stop time: 4/13/2014 4:59:44 PM (Local: UTC-4hr)
Processing duration: 04:00:00
Processing interval: 1 second

Occupations

	From	To
Point ID:	NCJA	NCGA
Data file:	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ncja1030.14o	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ncga1030.14o
Receiver type:	NetR5	NetR5
Receiver serial number:	4831K57548	4833K57791
Antenna type:	Zephyr Geodetic 2 RoHS	Zephyr Geodetic 2 RoHS
Antenna serial number:	30962892	30975448
Antenna height (measured):	0.000 ft	0.000 ft
Antenna method:	Bottom of antenna mount	Bottom of antenna mount

Processing style

Elevation mask: 15.0 deg
Auto start processing: Yes
Start automatic ID numbering: AUTO0001
Continuous vectors: No
Generate residuals: Yes
Antenna model: Automatic
Ephemeris type: Automatic
Frequency: Multiple Frequencies

Processing Interval: Use all data

Force float: No

Acceptance Criteria

Vector Component	Flag 	Fail 
Horizontal Precision >	0.164 ft + 1.000 ppm	0.328 ft + 1.000 ppm
Vertical Precision >	0.328 ft + 1.000 ppm	0.656 ft + 1.000 ppm

NCJA - ESP_A_33 (3:15:59 PM-4:51:44 PM) (S46)

Baseline observation: [NCJA --- ESP_A_33 \(B46\)](#)

Processed: 4/24/2014 4:13:22 PM

Solution type: Fixed

Frequency used: Dual Frequency (L1, L2)

Horizontal precision: 0.058 ft

Vertical precision: 0.180 ft

RMS: 0.001 ft

Maximum PDOP: 3.400

Ephemeris used: Broadcast

Antenna model: NGS Absolute

Processing start time: 4/13/2014 3:15:59 PM (Local: UTC-4hr)

Processing stop time: 4/13/2014 4:51:44 PM (Local: UTC-4hr)

Processing duration: 01:35:45

Processing interval: 15 seconds

Occupations

	From	To
Point ID:	NCJA	ESP_A_33
Data file:	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ncja1030.14o	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ESP_A_33_71061035.T01
Receiver type:	NetR5	R8 Model 2
Receiver serial number:	4831K57548	4624117106
Antenna type:	Zephyr Geodetic 2 RoHS	R8 GNSS/SPS88x Internal
Antenna serial number:	30962892	-----
Antenna height (measured):	0.000 ft	6.562 ft
Antenna method:	Bottom of antenna mount	Bottom of antenna mount

Processing style

Elevation mask: 15.0 deg
Auto start processing: Yes
Start automatic ID numbering: AUTO0001
Continuous vectors: No
Generate residuals: Yes
Antenna model: Automatic
Ephemeris type: Automatic
Frequency: Multiple Frequencies
Processing Interval: Use all data
Force float: No

Acceptance Criteria

Vector Component	Flag 	Fail 
Horizontal Precision >	0.164 ft + 1.000 ppm	0.328 ft + 1.000 ppm
Vertical Precision >	0.328 ft + 1.000 ppm	0.656 ft + 1.000 ppm

NCJA - ESP_A_013 (1:03:29 PM-2:32:29 PM) (S47)

Baseline observation: [NCJA --- ESP_A_013 \(B47\)](#)
Processed: 4/24/2014 3:57:10 PM
Solution type: Fixed
Frequency used: Dual Frequency (L1, L2)
Horizontal precision: 0.071 ft
Vertical precision: 0.165 ft
RMS: 0.002 ft
Maximum PDOP: 6.887
Ephemeris used: Broadcast
Antenna model: NGS Absolute
Processing start time: 4/13/2014 1:03:29 PM (Local: UTC-4hr)
Processing stop time: 4/13/2014 2:32:29 PM (Local: UTC-4hr)
Processing duration: 01:29:00
Processing interval: 15 seconds

Occupations

	From	To
Point ID:	NCJA	ESP_A_013
Data file:	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ncja1030.14o	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ESP_A_13_71061034.T01
Receiver type:	NetR5	R8 Model 2
Receiver serial number:	4831K57548	4624117106
Antenna type:	Zephyr Geodetic 2 RoHS	R8 GNSS/SPS88x Internal
Antenna serial number:	30962892	-----
Antenna height (measured):	0.000 ft	6.562 ft
Antenna method:	Bottom of antenna mount	Bottom of antenna mount

Processing style

Elevation mask: 15.0 deg
Auto start processing: Yes
Start automatic ID numbering: AUTO0001
Continuous vectors: No
Generate residuals: Yes
Antenna model: Automatic
Ephemeris type: Automatic
Frequency: Multiple Frequencies

Processing Interval: Use all data

Force float: No

Acceptance Criteria

Vector Component	Flag 	Fail 
Horizontal Precision >	0.164 ft + 1.000 ppm	0.328 ft + 1.000 ppm
Vertical Precision >	0.328 ft + 1.000 ppm	0.656 ft + 1.000 ppm

NCJA - ESP_B_15 (12:47:59 PM-1:46:14 PM) (S49)

Baseline observation: [NCJA --- ESP_B_15 \(B49\)](#)

Processed: 4/24/2014 3:57:09 PM

Solution type: Fixed

Frequency used: Dual Frequency (L1, L2)

Horizontal precision: 0.043 ft

Vertical precision: 0.056 ft

RMS: 0.001 ft

Maximum PDOP: 5.428

Ephemeris used: Broadcast

Antenna model: NGS Absolute

Processing start time: 4/14/2014 12:47:59 PM (Local: UTC-4hr)

Processing stop time: 4/14/2014 1:46:14 PM (Local: UTC-4hr)

Processing duration: 00:58:15

Processing interval: 15 seconds

Occupations

	From	To
Point ID:	NCJA	ESP_B_15
Data file:	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ncja1040.14o	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ESP_B_15_71061043.T01
Receiver type:	NetR5	R8 Model 2
Receiver serial number:	4831K57548	4624117106
Antenna type:	Zephyr Geodetic 2 RoHS	R8 GNSS/SPS88x Internal
Antenna serial number:	30962892	-----
Antenna height (measured):	0.000 ft	6.562 ft
Antenna method:	Bottom of antenna mount	Bottom of antenna mount

Processing style

Elevation mask: 15.0 deg
 Auto start processing: Yes
 Start automatic ID numbering: AUTO0001
 Continuous vectors: No
 Generate residuals: Yes
 Antenna model: Automatic
 Ephemeris type: Automatic
 Frequency: Multiple Frequencies
 Processing Interval: Use all data
 Force float: No

Acceptance Criteria

Vector Component	Flag 	Fail 
Horizontal Precision >	0.164 ft + 1.000 ppm	0.328 ft + 1.000 ppm
Vertical Precision >	0.328 ft + 1.000 ppm	0.656 ft + 1.000 ppm

NCJA - ESP_A_34 (4:31:59 PM-5:30:29 PM) (S50)

Baseline observation: [NCJA --- ESP_A_34 \(B50\)](#)

Processed: 4/24/2014 3:57:02 PM

Solution type: Fixed

Frequency used: Dual Frequency (L1, L2)

Horizontal precision: 0.069 ft

Vertical precision: 0.070 ft

RMS: 0.001 ft

Maximum PDOP: 3.252

Ephemeris used: Broadcast

Antenna model: NGS Absolute

Processing start time: 4/14/2014 4:31:59 PM (Local: UTC-4hr)

Processing stop time: 4/14/2014 5:30:29 PM (Local: UTC-4hr)

Processing duration: 00:58:30

Processing interval: 15 seconds

Occupations

	From	To
Point ID:	NCJA	ESP_A_34
Data file:	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ncja1040.14o	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ESP_A_34_71061045.T01
Receiver type:	NetR5	R8 Model 2
Receiver serial number:	4831K57548	4624117106
Antenna type:	Zephyr Geodetic 2 RoHS	R8 GNSS/SPS88x Internal
Antenna serial number:	30962892	-----
Antenna height (measured):	0.000 ft	6.562 ft
Antenna method:	Bottom of antenna mount	Bottom of antenna mount

Processing style

Elevation mask: 15.0 deg

Auto start processing: Yes

Start automatic ID numbering: AUTO0001

Continuous vectors: No

Generate residuals: Yes

Antenna model: Automatic

Ephemeris type: Automatic

Frequency: Multiple Frequencies

Processing Interval: Use all data

Force float: No

Acceptance Criteria

Vector Component	Flag 	Fail 
Horizontal Precision >	0.164 ft + 1.000 ppm	0.328 ft + 1.000 ppm
Vertical Precision >	0.328 ft + 1.000 ppm	0.656 ft + 1.000 ppm

NCJA - ESP_A_31 (11:18:29 AM-12:13:59 PM) (S51)

Baseline observation: [NCJA --- ESP_A_31 \(B51\)](#)

Processed: 4/24/2014 3:57:09 PM

Solution type: Fixed

Frequency used: Dual Frequency (L1, L2)

Horizontal precision: 0.027 ft

Vertical precision: 0.049 ft

RMS: 0.001 ft

Maximum PDOP: 3.072

Ephemeris used: Broadcast

Antenna model: NGS Absolute

Processing start time: 4/14/2014 11:18:29 AM (Local: UTC-4hr)

Processing stop time: 4/14/2014 12:13:59 PM (Local: UTC-4hr)

Processing duration: 00:55:30

Processing interval: 15 seconds

Occupations

	From	To
Point ID:	NCJA	ESP_A_31
Data file:	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ncja1040.14o	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ESP_A_31_71061042.T01
Receiver type:	NetR5	R8 Model 2
Receiver serial number:	4831K57548	4624117106
Antenna type:	Zephyr Geodetic 2 RoHS	R8 GNSS/SPS88x Internal
Antenna serial number:	30962892	-----
Antenna height (measured):	0.000 ft	6.562 ft
Antenna method:	Bottom of antenna mount	Bottom of antenna mount

Processing style

Elevation mask: 15.0 deg
 Auto start processing: Yes
 Start automatic ID numbering: AUTO0001
 Continuous vectors: No
 Generate residuals: Yes
 Antenna model: Automatic
 Ephemeris type: Automatic
 Frequency: Multiple Frequencies
 Processing Interval: Use all data
 Force float: No

Acceptance Criteria

Vector Component	Flag 	Fail 
Horizontal Precision >	0.164 ft + 1.000 ppm	0.328 ft + 1.000 ppm
Vertical Precision >	0.328 ft + 1.000 ppm	0.656 ft + 1.000 ppm

NCJA - ESP_A_15 (6:10:59 PM-7:07:44 PM) (S52)

Baseline observation: [NCJA --- ESP_A_15 \(B52\)](#)
Processed: 4/24/2014 3:57:09 PM
Solution type: Fixed
Frequency used: Dual Frequency (L1, L2)
Horizontal precision: 0.046 ft
Vertical precision: 0.071 ft
RMS: 0.002 ft
Maximum PDOP: 3.456
Ephemeris used: Broadcast
Antenna model: NGS Absolute
Processing start time: 4/14/2014 6:10:59 PM (Local: UTC-4hr)
Processing stop time: 4/14/2014 7:07:44 PM (Local: UTC-4hr)
Processing duration: 00:56:45
Processing interval: 15 seconds

Occupations

	From	To
Point ID:	NCJA	ESP_A_15
Data file:	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ncja1040.14o	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ESP_A_15_71061046.T01
Receiver type:	NetR5	R8 Model 2
Receiver serial number:	4831K57548	4624117106
Antenna type:	Zephyr Geodetic 2 RoHS	R8 GNSS/SPS88x Internal
Antenna serial number:	30962892	-----
Antenna height (measured):	0.000 ft	6.562 ft
Antenna method:	Bottom of antenna mount	Bottom of antenna mount

Processing style

Elevation mask: 15.0 deg
Auto start processing: Yes
Start automatic ID numbering: AUTO0001
Continuous vectors: No
Generate residuals: Yes
Antenna model: Automatic
Ephemeris type: Automatic
Frequency: Multiple Frequencies

Processing Interval: Use all data

Force float: No

Acceptance Criteria

Vector Component	Flag 	Fail 
Horizontal Precision >	0.164 ft + 1.000 ppm	0.328 ft + 1.000 ppm
Vertical Precision >	0.328 ft + 1.000 ppm	0.656 ft + 1.000 ppm

NCJA - ESP_A_14 (2:41:29 PM-3:36:59 PM) (S53)

Baseline observation: [NCJA --- ESP_A_14 \(B53\)](#)

Processed: 4/24/2014 3:57:09 PM

Solution type: Fixed

Frequency used: Dual Frequency (L1, L2)

Horizontal precision: 0.033 ft

Vertical precision: 0.063 ft

RMS: 0.002 ft

Maximum PDOP: 4.030

Ephemeris used: Broadcast

Antenna model: NGS Absolute

Processing start time: 4/14/2014 2:41:44 PM (Local: UTC-4hr)

Processing stop time: 4/14/2014 3:36:59 PM (Local: UTC-4hr)

Processing duration: 00:55:15

Processing interval: 15 seconds

Occupations

	From	To
Point ID:	NCJA	ESP_A_14
Data file:	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ncja1040.14o	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ESP_A_14_71061044.T01
Receiver type:	NetR5	R8 Model 2
Receiver serial number:	4831K57548	4624117106
Antenna type:	Zephyr Geodetic 2 RoHS	R8 GNSS/SPS88x Internal
Antenna serial number:	30962892	-----
Antenna height (measured):	0.000 ft	6.562 ft
Antenna method:	Bottom of antenna mount	Bottom of antenna mount

Processing style

Elevation mask: 15.0 deg
 Auto start processing: Yes
 Start automatic ID numbering: AUTO0001
 Continuous vectors: No
 Generate residuals: Yes
 Antenna model: Automatic
 Ephemeris type: Automatic
 Frequency: Multiple Frequencies
 Processing Interval: Use all data
 Force float: No

Acceptance Criteria

Vector Component	Flag 	Fail 
Horizontal Precision >	0.164 ft + 1.000 ppm	0.328 ft + 1.000 ppm
Vertical Precision >	0.328 ft + 1.000 ppm	0.656 ft + 1.000 ppm

NCJA - ESP_A_011 (9:40:59 AM-10:37:14 AM) (S54)

Baseline observation: [NCJA --- ESP_A_011 \(B54\)](#)
Processed: 4/24/2014 3:57:09 PM
Solution type: Fixed
Frequency used: Dual Frequency (L1, L2)
Horizontal precision: 0.124 ft
Vertical precision: 0.070 ft
RMS: 0.002 ft
Maximum PDOP: 3.242
Ephemeris used: Broadcast
Antenna model: NGS Absolute
Processing start time: 4/14/2014 9:40:59 AM (Local: UTC-4hr)
Processing stop time: 4/14/2014 10:37:14 AM (Local: UTC-4hr)
Processing duration: 00:56:15
Processing interval: 15 seconds

Occupations

	From	To
Point ID:	NCJA	ESP_A_011
Data file:	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ncja1040.14o	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ESP_A_11_71061041.T01
Receiver type:	NetR5	R8 Model 2
Receiver serial number:	4831K57548	4624117106
Antenna type:	Zephyr Geodetic 2 RoHS	R8 GNSS/SPS88x Internal
Antenna serial number:	30962892	-----
Antenna height (measured):	0.000 ft	6.562 ft
Antenna method:	Bottom of antenna mount	Bottom of antenna mount

Processing style

Elevation mask: 15.0 deg
Auto start processing: Yes
Start automatic ID numbering: AUTO0001
Continuous vectors: No
Generate residuals: Yes
Antenna model: Automatic
Ephemeris type: Automatic
Frequency: Multiple Frequencies

Processing Interval: Use all data

Force float: No

Acceptance Criteria

Vector Component	Flag 	Fail 
Horizontal Precision >	0.164 ft + 1.000 ppm	0.328 ft + 1.000 ppm
Vertical Precision >	0.328 ft + 1.000 ppm	0.656 ft + 1.000 ppm

NCJA - NCGA (8:59:44 AM-7:59:44 PM) (S55)

Baseline observation: [NCJA --- NCGA \(B55\)](#)

Processed: 4/24/2014 3:59:20 PM

Solution type: Fixed

Frequency used: Dual Frequency (L1, L2)

Horizontal precision: 0.016 ft

Vertical precision: 0.046 ft

RMS: 0.001 ft

Maximum PDOP: 5.430

Ephemeris used: Broadcast

Antenna model: NGS Absolute

Processing start time: 4/14/2014 8:59:44 AM (Local: UTC-4hr)

Processing stop time: 4/14/2014 7:59:44 PM (Local: UTC-4hr)

Processing duration: 11:00:00

Processing interval: 1 second

Occupations

	From	To
Point ID:	NCJA	NCGA
Data file:	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ncja1040.14o	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ncga1040.14o
Receiver type:	NetR5	NetR5
Receiver serial number:	4831K57548	4833K57791
Antenna type:	Zephyr Geodetic 2 RoHS	Zephyr Geodetic 2 RoHS
Antenna serial number:	30962892	30975448
Antenna height (measured):	0.000 ft	0.000 ft
Antenna method:	Bottom of antenna mount	Bottom of antenna mount

Processing style

Elevation mask: 15.0 deg
 Auto start processing: Yes
 Start automatic ID numbering: AUTO0001
 Continuous vectors: No
 Generate residuals: Yes
 Antenna model: Automatic
 Ephemeris type: Automatic
 Frequency: Multiple Frequencies
 Processing Interval: Use all data
 Force float: No

Acceptance Criteria

Vector Component	Flag 	Fail 
Horizontal Precision >	0.164 ft + 1.000 ppm	0.328 ft + 1.000 ppm
Vertical Precision >	0.328 ft + 1.000 ppm	0.656 ft + 1.000 ppm

NCGA - ESP_A_14 (2:41:29 PM-3:36:59 PM) (S61)

Baseline observation: [NCGA --- ESP_A_14 \(B61\)](#)

Processed: 4/24/2014 4:04:15 PM

Solution type: Fixed

Frequency used: Dual Frequency (L1, L2)

Horizontal precision: 0.054 ft

Vertical precision: 0.079 ft

RMS: 0.002 ft

Maximum PDOP: 3.067

Ephemeris used: Broadcast

Antenna model: NGS Absolute

Processing start time: 4/14/2014 2:41:44 PM (Local: UTC-4hr)

Processing stop time: 4/14/2014 3:36:59 PM (Local: UTC-4hr)

Processing duration: 00:55:15

Processing interval: 15 seconds

Occupations

	From	To
Point ID:	NCGA	ESP_A_14
Data file:	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ncga1040.14o	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ESP_A_14_71061044.T01
Receiver type:	NetR5	R8 Model 2
Receiver serial number:	4833K57791	4624117106
Antenna type:	Zephyr Geodetic 2 RoHS	R8 GNSS/SPS88x Internal
Antenna serial number:	30975448	-----
Antenna height (measured):	0.000 ft	6.562 ft
Antenna method:	Bottom of antenna mount	Bottom of antenna mount

Processing style

Elevation mask: 15.0 deg

Auto start processing: Yes

Start automatic ID numbering: AUTO0001

Continuous vectors: No

Generate residuals: Yes

Antenna model: Automatic

Ephemeris type: Automatic

Frequency: Multiple Frequencies

Processing Interval: Use all data

Force float: No

Acceptance Criteria

Vector Component	Flag 	Fail 
Horizontal Precision >	0.164 ft + 1.000 ppm	0.328 ft + 1.000 ppm
Vertical Precision >	0.328 ft + 1.000 ppm	0.656 ft + 1.000 ppm

LS02 - ESP_B_15 (12:47:59 PM-1:46:14 PM) (S76)

Baseline observation: [LS02 --- ESP_B_15 \(B76\)](#)

Processed: 4/24/2014 4:01:24 PM

Solution type: Fixed

Frequency used: Dual Frequency (L1, L2)

Horizontal precision: 0.025 ft

Vertical precision: 0.044 ft

RMS: 0.002 ft

Maximum PDOP: 5.427

Ephemeris used: Broadcast

Antenna model: NGS Absolute

Processing start time: 4/14/2014 12:47:59 PM (Local: UTC-4hr)

Processing stop time: 4/14/2014 1:46:14 PM (Local: UTC-4hr)

Processing duration: 00:58:15

Processing interval: 15 seconds

Occupations

	From	To
Point ID:	LS02	ESP_B_15
Data file:	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ls021040.14o	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ESP_B_15_71061043.T01
Receiver type:	GRX1200GGPRO	R8 Model 2
Receiver serial number:	355936	4624117106
Antenna type:	AX1202GG	R8 GNSS/SPS88x Internal
Antenna serial number:	08090163	-----
Antenna height (measured):	0.000 ft	6.562 ft
Antenna method:	Bottom of antenna mount	Bottom of antenna mount

Processing style

Elevation mask: 15.0 deg
 Auto start processing: Yes
 Start automatic ID numbering: AUTO0001
 Continuous vectors: No
 Generate residuals: Yes
 Antenna model: Automatic
 Ephemeris type: Automatic
 Frequency: Multiple Frequencies
 Processing Interval: Use all data
 Force float: No

Acceptance Criteria

Vector Component	Flag 	Fail 
Horizontal Precision >	0.164 ft + 1.000 ppm	0.328 ft + 1.000 ppm
Vertical Precision >	0.328 ft + 1.000 ppm	0.656 ft + 1.000 ppm

LS02 - ESP_A_31 (11:18:29 AM-12:13:59 PM) (S78)

Baseline observation: [LS02 --- ESP_A_31 \(B78\)](#)

Processed: 4/24/2014 4:01:23 PM

Solution type: Fixed

Frequency used: Dual Frequency (L1, L2)

Horizontal precision: 0.018 ft

Vertical precision: 0.032 ft

RMS: 0.002 ft

Maximum PDOP: 3.060

Ephemeris used: Broadcast

Antenna model: NGS Absolute

Processing start time: 4/14/2014 11:18:29 AM (Local: UTC-4hr)

Processing stop time: 4/14/2014 12:13:59 PM (Local: UTC-4hr)

Processing duration: 00:55:30

Processing interval: 15 seconds

Occupations

	From	To
Point ID:	LS02	ESP_A_31
Data file:	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ls021040.14o	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ESP_A_31_71061042.T01
Receiver type:	GRX1200GGPRO	R8 Model 2
Receiver serial number:	355936	4624117106
Antenna type:	AX1202GG	R8 GNSS/SPS88x Internal
Antenna serial number:	08090163	-----
Antenna height (measured):	0.000 ft	6.562 ft
Antenna method:	Bottom of antenna mount	Bottom of antenna mount

Processing style

Elevation mask: 15.0 deg

Auto start processing: Yes

Start automatic ID numbering: AUTO0001

Continuous vectors: No

Generate residuals: Yes

Antenna model: Automatic

Ephemeris type: Automatic

Frequency: Multiple Frequencies

Processing Interval: Use all data

Force float: No

Acceptance Criteria

Vector Component	Flag 	Fail 
Horizontal Precision >	0.164 ft + 1.000 ppm	0.328 ft + 1.000 ppm
Vertical Precision >	0.328 ft + 1.000 ppm	0.656 ft + 1.000 ppm

LS02 - ESP_A_15 (6:10:59 PM-7:07:44 PM) (S79)

Baseline observation: [LS02 --- ESP_A_15 \(B79\)](#)

Processed: 4/24/2014 4:01:24 PM

Solution type: Fixed

Frequency used: Dual Frequency (L1, L2)

Horizontal precision: 0.018 ft

Vertical precision: 0.030 ft

RMS: 0.001 ft

Maximum PDOP: 3.457

Ephemeris used: Broadcast

Antenna model: NGS Absolute

Processing start time: 4/14/2014 6:10:59 PM (Local: UTC-4hr)

Processing stop time: 4/14/2014 7:07:44 PM (Local: UTC-4hr)

Processing duration: 00:56:45

Processing interval: 15 seconds

Occupations

	From	To
Point ID:	LS02	ESP_A_15
Data file:	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ls021040.14o	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ESP_A_15_71061046.T01
Receiver type:	GRX1200GGPRO	R8 Model 2
Receiver serial number:	355936	4624117106
Antenna type:	AX1202GG	R8 GNSS/SPS88x Internal
Antenna serial number:	08090163	-----
Antenna height (measured):	0.000 ft	6.562 ft
Antenna method:	Bottom of antenna mount	Bottom of antenna mount

Processing style

Elevation mask: 15.0 deg
Auto start processing: Yes
Start automatic ID numbering: AUTO0001
Continuous vectors: No
Generate residuals: Yes
Antenna model: Automatic
Ephemeris type: Automatic
Frequency: Multiple Frequencies
Processing Interval: Use all data
Force float: No

Acceptance Criteria

Vector Component	Flag 	Fail 
Horizontal Precision >	0.164 ft + 1.000 ppm	0.328 ft + 1.000 ppm
Vertical Precision >	0.328 ft + 1.000 ppm	0.656 ft + 1.000 ppm

LS02 - ESP_A_011 (9:40:59 AM-10:37:14 AM) (S81)

Baseline observation: [LS02 --- ESP_A_011 \(B81\)](#)
Processed: 4/24/2014 4:01:23 PM
Solution type: Fixed
Frequency used: Dual Frequency (L1, L2)
Horizontal precision: 0.022 ft
Vertical precision: 0.045 ft
RMS: 0.001 ft
Maximum PDOP: 3.245
Ephemeris used: Broadcast
Antenna model: NGS Absolute
Processing start time: 4/14/2014 9:40:59 AM (Local: UTC-4hr)
Processing stop time: 4/14/2014 10:37:14 AM (Local: UTC-4hr)
Processing duration: 00:56:15
Processing interval: 15 seconds

Occupations

	From	To
Point ID:	LS02	ESP_A_011
Data file:	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ls021040.14o	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ESP_A_11_71061041.T01
Receiver type:	GRX1200GGPRO	R8 Model 2
Receiver serial number:	355936	4624117106
Antenna type:	AX1202GG	R8 GNSS/SPS88x Internal
Antenna serial number:	08090163	-----
Antenna height (measured):	0.000 ft	6.562 ft
Antenna method:	Bottom of antenna mount	Bottom of antenna mount

Processing style

Elevation mask: 15.0 deg
Auto start processing: Yes
Start automatic ID numbering: AUTO0001
Continuous vectors: No
Generate residuals: Yes
Antenna model: Automatic
Ephemeris type: Automatic
Frequency: Multiple Frequencies

Processing Interval: Use all data

Force float: No

Acceptance Criteria

Vector Component	Flag 	Fail 
Horizontal Precision >	0.164 ft + 1.000 ppm	0.328 ft + 1.000 ppm
Vertical Precision >	0.328 ft + 1.000 ppm	0.656 ft + 1.000 ppm

LS02 - LOYX (8:59:44 AM-7:59:44 PM) (S82)

Baseline observation: [LS02 --- LOYX \(B82\)](#)

Processed: 4/24/2014 3:59:12 PM

Solution type: Fixed

Frequency used: Dual Frequency (L1, L2)

Horizontal precision: 0.016 ft

Vertical precision: 0.045 ft

RMS: 0.001 ft

Maximum PDOP: 6.153

Ephemeris used: Broadcast

Antenna model: NGS Absolute

Processing start time: 4/14/2014 8:59:44 AM (Local: UTC-4hr)

Processing stop time: 4/14/2014 7:59:44 PM (Local: UTC-4hr)

Processing duration: 11:00:00

Processing interval: 1 second

Occupations

	From	To
Point ID:	LOYX	LS02
Data file:	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\loyx1040.14o	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ls021040.14o
Receiver type:	GRX1200GGPRO	GRX1200GGPRO
Receiver serial number:	353214	355936
Antenna type:	AX1202GG	AX1202GG
Antenna serial number:	07020036	08090163
Antenna height (measured):	0.000 ft	0.000 ft
Antenna method:	Bottom of antenna mount	Bottom of antenna mount

Processing style

Elevation mask: 15.0 deg
 Auto start processing: Yes
 Start automatic ID numbering: AUTO0001
 Continuous vectors: No
 Generate residuals: Yes
 Antenna model: Automatic
 Ephemeris type: Automatic
 Frequency: Multiple Frequencies
 Processing Interval: Use all data
 Force float: No

Acceptance Criteria

Vector Component	Flag 	Fail 
Horizontal Precision >	0.164 ft + 1.000 ppm	0.328 ft + 1.000 ppm
Vertical Precision >	0.328 ft + 1.000 ppm	0.656 ft + 1.000 ppm

LOYX - ESP_A_34 (4:31:59 PM-5:30:29 PM) (S88)

Baseline observation: [LOYX --- ESP_A_34 \(B88\)](#)
Processed: 4/24/2014 3:56:57 PM
Solution type: Fixed
Frequency used: Dual Frequency (L1, L2)
Horizontal precision: 0.021 ft
Vertical precision: 0.036 ft
RMS: 0.001 ft
Maximum PDOP: 3.267
Ephemeris used: Broadcast
Antenna model: NGS Absolute
Processing start time: 4/14/2014 4:31:59 PM (Local: UTC-4hr)
Processing stop time: 4/14/2014 5:30:29 PM (Local: UTC-4hr)
Processing duration: 00:58:30
Processing interval: 15 seconds

Occupations

	From	To
Point ID:	LOYX	ESP_A_34
Data file:	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\loyx1040.14o	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ESP_A_34_71061045.T01
Receiver type:	GRX1200GGPRO	R8 Model 2
Receiver serial number:	353214	4624117106
Antenna type:	AX1202GG	R8 GNSS/SPS88x Internal
Antenna serial number:	07020036	-----
Antenna height (measured):	0.000 ft	6.562 ft
Antenna method:	Bottom of antenna mount	Bottom of antenna mount

Processing style

Elevation mask: 15.0 deg
Auto start processing: Yes
Start automatic ID numbering: AUTO0001
Continuous vectors: No
Generate residuals: Yes
Antenna model: Automatic
Ephemeris type: Automatic
Frequency: Multiple Frequencies

Processing Interval: Use all data

Force float: No

Acceptance Criteria

Vector Component	Flag 	Fail 
Horizontal Precision >	0.164 ft + 1.000 ppm	0.328 ft + 1.000 ppm
Vertical Precision >	0.328 ft + 1.000 ppm	0.656 ft + 1.000 ppm

LOYX - ESP_A_15 (6:10:59 PM-7:07:44 PM) (S90)

Baseline observation: [LOYX --- ESP_A_15 \(B90\)](#)

Processed: 4/24/2014 3:56:58 PM

Solution type: Fixed

Frequency used: Dual Frequency (L1, L2)

Horizontal precision: 0.018 ft

Vertical precision: 0.031 ft

RMS: 0.002 ft

Maximum PDOP: 3.457

Ephemeris used: Broadcast

Antenna model: NGS Absolute

Processing start time: 4/14/2014 6:10:59 PM (Local: UTC-4hr)

Processing stop time: 4/14/2014 7:07:44 PM (Local: UTC-4hr)

Processing duration: 00:56:45

Processing interval: 15 seconds

Occupations

	From	To
Point ID:	LOYX	ESP_A_15
Data file:	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\loyx1040.14o	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ESP_A_15_71061046.T01
Receiver type:	GRX1200GGPRO	R8 Model 2
Receiver serial number:	353214	4624117106
Antenna type:	AX1202GG	R8 GNSS/SPS88x Internal
Antenna serial number:	07020036	-----
Antenna height (measured):	0.000 ft	6.562 ft
Antenna method:	Bottom of antenna mount	Bottom of antenna mount

Processing style

Elevation mask: 15.0 deg
Auto start processing: Yes
Start automatic ID numbering: AUTO0001
Continuous vectors: No
Generate residuals: Yes
Antenna model: Automatic
Ephemeris type: Automatic
Frequency: Multiple Frequencies
Processing Interval: Use all data
Force float: No

Acceptance Criteria

Vector Component	Flag 	Fail 
Horizontal Precision >	0.164 ft + 1.000 ppm	0.328 ft + 1.000 ppm
Vertical Precision >	0.328 ft + 1.000 ppm	0.656 ft + 1.000 ppm

LOYX - ESP_A_14 (2:41:29 PM-3:36:59 PM) (S91)

Baseline observation: [LOYX --- ESP_A_14 \(B91\)](#)

Processed: 4/24/2014 3:56:58 PM

Solution type: Fixed

Frequency used: Dual Frequency (L1, L2)

Horizontal precision: 0.323 ft

Vertical precision: 0.107 ft

RMS: 0.001 ft

Maximum PDOP: 14.479

Ephemeris used: Broadcast

Antenna model: NGS Absolute

Processing start time: 4/14/2014 2:41:44 PM (Local: UTC-4hr)

Processing stop time: 4/14/2014 3:36:59 PM (Local: UTC-4hr)

Processing duration: 00:55:15

Processing interval: 15 seconds

Occupations

	From	To
Point ID:	LOYX	ESP_A_14
Data file:	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\loyx1040.14o	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ESP_A_14_71061044.T01
Receiver type:	GRX1200GGPRO	R8 Model 2
Receiver serial number:	353214	4624117106
Antenna type:	AX1202GG	R8 GNSS/SPS88x Internal
Antenna serial number:	07020036	-----
Antenna height (measured):	0.000 ft	6.562 ft
Antenna method:	Bottom of antenna mount	Bottom of antenna mount

Processing style

Elevation mask: 15.0 deg

Auto start processing: Yes

Start automatic ID numbering: AUTO0001

Continuous vectors: No

Generate residuals: Yes

Antenna model: Automatic

Ephemeris type: Automatic

Frequency: Multiple Frequencies

Processing Interval: Use all data

Force float: No

Acceptance Criteria

Vector Component	Flag 	Fail 
Horizontal Precision >	0.164 ft + 1.000 ppm	0.328 ft + 1.000 ppm
Vertical Precision >	0.328 ft + 1.000 ppm	0.656 ft + 1.000 ppm

LOYX - LOYZ (8:59:44 AM-7:59:44 PM) (S93)

Baseline observation: [LOYX --- LOYZ \(B93\)](#)

Processed: 4/24/2014 3:59:08 PM

Solution type: Fixed

Frequency used: Dual Frequency (L1, L2)

Horizontal precision: 0.009 ft

Vertical precision: 0.035 ft

RMS: 0.001 ft

Maximum PDOP: 5.430

Ephemeris used: Broadcast

Antenna model: NGS Absolute

Processing start time: 4/14/2014 8:59:44 AM (Local: UTC-4hr)

Processing stop time: 4/14/2014 7:59:44 PM (Local: UTC-4hr)

Processing duration: 11:00:00

Processing interval: 1 second

Occupations

	From	To
Point ID:	LOYX	LOYZ
Data file:	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\loyx1040.14o	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\loyz1040.14o
Receiver type:	GRX1200GGPRO	GRX1200GGPRO
Receiver serial number:	353214	355208
Antenna type:	AX1202GG	AX1202GG
Antenna serial number:	07020036	07210069
Antenna height (measured):	0.000 ft	0.000 ft
Antenna method:	Bottom of antenna mount	Bottom of antenna mount

Processing style

Elevation mask: 15.0 deg
 Auto start processing: Yes
 Start automatic ID numbering: AUTO0001
 Continuous vectors: No
 Generate residuals: Yes
 Antenna model: Automatic
 Ephemeris type: Automatic
 Frequency: Multiple Frequencies
 Processing Interval: Use all data
 Force float: No

Acceptance Criteria

Vector Component	Flag 	Fail 
Horizontal Precision >	0.164 ft + 1.000 ppm	0.328 ft + 1.000 ppm
Vertical Precision >	0.328 ft + 1.000 ppm	0.656 ft + 1.000 ppm

NCGA - LOYZ (8:59:44 AM-7:59:44 PM) (S96)

Baseline observation: [NCGA --- LOYZ \(B96\)](#)
Processed: 4/24/2014 4:03:03 PM
Solution type: Fixed
Frequency used: Dual Frequency (L1, L2)
Horizontal precision: 0.009 ft
Vertical precision: 0.036 ft
RMS: 0.001 ft
Maximum PDOP: 5.430
Ephemeris used: Broadcast
Antenna model: NGS Absolute
Processing start time: 4/14/2014 8:59:44 AM (Local: UTC-4hr)
Processing stop time: 4/14/2014 7:59:44 PM (Local: UTC-4hr)
Processing duration: 11:00:00
Processing interval: 1 second

Occupations

	From	To
Point ID:	LOYZ	NCGA
Data file:	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\loyz1040.14o	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ncga1040.14o
Receiver type:	GRX1200GGPRO	NetR5
Receiver serial number:	355208	4833K57791
Antenna type:	AX1202GG	Zephyr Geodetic 2 RoHS
Antenna serial number:	07210069	30975448
Antenna height (measured):	0.000 ft	0.000 ft
Antenna method:	Bottom of antenna mount	Bottom of antenna mount

Processing style

Elevation mask: 15.0 deg
Auto start processing: Yes
Start automatic ID numbering: AUTO0001
Continuous vectors: No
Generate residuals: Yes
Antenna model: Automatic
Ephemeris type: Automatic
Frequency: Multiple Frequencies

Processing Interval: Use all data

Force float: No

Acceptance Criteria

Vector Component	Flag 	Fail 
Horizontal Precision >	0.164 ft + 1.000 ppm	0.328 ft + 1.000 ppm
Vertical Precision >	0.328 ft + 1.000 ppm	0.656 ft + 1.000 ppm

LOYZ - ESP_A_34 (4:31:59 PM-5:30:29 PM) (S100)

Baseline observation: [LOYZ --- ESP_A_34 \(B100\)](#)

Processed: 4/24/2014 4:01:19 PM

Solution type: Fixed

Frequency used: Dual Frequency (L1, L2)

Horizontal precision: 0.021 ft

Vertical precision: 0.035 ft

RMS: 0.001 ft

Maximum PDOP: 3.268

Ephemeris used: Broadcast

Antenna model: NGS Absolute

Processing start time: 4/14/2014 4:31:59 PM (Local: UTC-4hr)

Processing stop time: 4/14/2014 5:30:29 PM (Local: UTC-4hr)

Processing duration: 00:58:30

Processing interval: 15 seconds

Occupations

	From	To
Point ID:	LOYZ	ESP_A_34
Data file:	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\loyz1040.14o	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network\ESP_A_34_71061045.T01
Receiver type:	GRX1200GGPRO	R8 Model 2
Receiver serial number:	355208	4624117106
Antenna type:	AX1202GG	R8 GNSS/SPS88x Internal
Antenna serial number:	07210069	-----
Antenna height (measured):	0.000 ft	6.562 ft
Antenna method:	Bottom of antenna mount	Bottom of antenna mount

Processing style

Elevation mask: 15.0 deg
 Auto start processing: Yes
 Start automatic ID numbering: AUTO0001
 Continuous vectors: No
 Generate residuals: Yes
 Antenna model: Automatic
 Ephemeris type: Automatic
 Frequency: Multiple Frequencies
 Processing Interval: Use all data
 Force float: No

Acceptance Criteria

Vector Component	Flag 	Fail 
Horizontal Precision >	0.164 ft + 1.000 ppm	0.328 ft + 1.000 ppm
Vertical Precision >	0.328 ft + 1.000 ppm	0.656 ft + 1.000 ppm

4/24/2014 5:19:05 PM	E:\Digital Aerial Solutions\2014_VA LiDAR Ground Control\Work Files\TBC\Static\Static Network.vce	Trimble Business Center
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Project File Data	Coordinate System
	Name: US State Plane 1983
	Datum: NAD 1983 (Conus)
	Zone: Virginia South 4502
	Geoid: GEOID12A (Conus)
	Vertical datum:

Network Free Adjustment Report

Adjustment Settings

Set-Up Errors

GNSS

Error in Height of Antenna: 0.000 ft

Centering Error: 0.000 ft

Covariance Display

Horizontal:

Propagated Linear Error [E]: U.S.

Constant Term [C]: 0.000 ft

Scale on Linear Error [S]: 1.960

Three-Dimensional

Propagated Linear Error [E]: U.S.

Constant Term [C]: 0.000 ft

Scale on Linear Error [S]: 1.960

Adjustment Statistics

Number of Iterations for Successful Adjustment: 2

Network Reference Factor: 1.00

Chi Square Test (95%): Passed

Precision Confidence Level: 95%

Degrees of Freedom: 60

Post Processed Vector Statistics

Reference Factor: 1.00
Redundancy Number: 60.00
A Priori Scalar: 2.32

Control Coordinate Comparisons

Values shown are control coordinates minus adjusted coordinates.

Point ID	ΔNorthing (US survey foot)	ΔEasting (US survey foot)	ΔElevation (US survey foot)	ΔHeight (US survey foot)
LOYX	0.036	0.001	?	-0.022
LOYZ	0.035	-0.013	?	-0.038
LS02	0.056	-0.018	?	-0.002
NCGA	0.026	-0.028	?	-0.007
NCJA	0.035	-0.044	?	-0.040

Control Point Constraints

Point ID	Type	North σ (US survey foot)	East σ (US survey foot)	Height σ (US survey foot)	Elevation σ (US survey foot)
Fixed = 0.000003(US survey foot)					

Adjusted Grid Coordinates

Point ID	Northing (US survey foot)	Northing Error (US survey foot)	Easting (US survey foot)	Easting Error (US survey foot)	Elevation (US survey foot)	Elevation Error (US survey foot)	Constraint
ESP A 011	3520544.365	0.033	11799099.482	0.031	141.830	0.084	
ESP A 013	3502994.779	0.031	11826455.591	0.022	101.805	0.147	
ESP A 14	3485412.998	0.040	11879675.102	0.041	102.179	0.100	
ESP A 15	3554918.630	0.019	11875440.072	0.020	119.871	0.051	
ESP A 31	3520107.962	0.026	11763023.915	0.025	188.957	0.064	
ESP A 33	3505173.638	0.027	11850873.525	0.022	58.411	0.142	

ESP_A_34	3523217.243	0.021	11929433.513	0.026	108.488	0.060	
ESP_B_15	3482163.909	0.033	11759172.821	0.028	219.397	0.076	
LOYX	3629210.086	0.010	12007914.099	0.012	123.027	0.040	
LOYZ	3479643.282	0.010	12046455.445	0.013	55.380	0.047	
LS02	3621253.172	0.010	11799790.986	0.011	89.475	0.038	
NCGA	3323452.511	0.011	12006182.662	0.014	51.306	0.051	
NCJA	3309956.811	0.012	11795582.624	0.015	156.412	0.044	

Coordinates from a free adjustment should only be used for analysis of the inner accuracy of the network. They should not be distributed as final results.

Adjusted Geodetic Coordinates

Point ID	Latitude	Longitude	Height (US survey foot)	Height Error (US survey foot)	Constraint
ESP_A_011	N36°59'12.27029"	W77°25'02.75284"	30.593	0.084	
ESP_A_013	N36°56'15.52148"	W77°19'28.29018"	-10.206	0.147	
ESP_A_14	N36°53'14.63485"	W77°08'35.92909"	-11.217	0.100	
ESP_A_15	N37°04'42.41872"	W77°09'15.86021"	7.885	0.051	
ESP_A_31	N36°59'11.81258"	W77°32'27.43983"	78.643	0.064	
ESP_A_33	N36°56'33.95060"	W77°14'27.18679"	-53.971	0.142	
ESP_A_34	N36°59'20.87243"	W76°58'15.97110"	-5.972	0.060	
ESP_B_15	N36°52'57.03296"	W77°33'19.58401"	109.153	0.076	
LOYX	N37°16'35.03009"	W76°41'43.81955"	7.253	0.040	
LOYZ	N36°51'48.91897"	W76°34'24.80864"	-63.945	0.047	
LS02	N37°15'47.89924"	W77°24'39.91245"	-20.769	0.038	
NCGA	N36°26'12.65490"	W76°43'16.51624"	-67.158	0.051	
NCJA	N36°24'30.56300"	W77°26'15.30825"	43.534	0.044	

Coordinates from a free adjustment should only be used for analysis of the inner accuracy of the network. They should not be distributed as final results.

Adjusted ECEF Coordinates

Point ID	X (US survey foot)	X Error (US survey foot)	Y (US survey foot)	Y Error (US survey foot)	Z (US survey foot)	Z Error (US survey foot)	3D Error (US survey foot)	Constraint
ESP_A_011	3645692.336	0.034	16333229.701	0.075	12520393.532	0.047	0.095	
ESP_A_013	3674523.609	0.035	16337751.541	0.118	12506085.472	0.089	0.152	
ESP_A_14	3728621.819	0.042	16336759.548	0.078	12491457.554	0.074	0.115	
ESP_A_15	3716158.990	0.023	16296696.776	0.043	12547035.641	0.032	0.058	
ESP_A_31	3610485.315	0.028	16341116.170	0.054	12520385.463	0.041	0.073	
ESP_A_33	3698114.264	0.036	16331243.492	0.111	12507548.896	0.089	0.146	
ESP_A_34	3772690.034	0.028	16303796.433	0.051	12521066.462	0.037	0.069	
ESP_B_15	3611267.687	0.032	16364293.938	0.065	12490105.922	0.050	0.088	
LOYX	3836540.893	0.014	16224025.260	0.032	12604462.083	0.025	0.043	
LOYZ	3892087.477	0.015	16303893.464	0.037	12484491.230	0.029	0.050	
LS02	3634245.344	0.013	16273469.796	0.030	12600651.599	0.023	0.041	
NCGA	3871347.796	0.017	16404132.392	0.041	12359840.279	0.031	0.054	
NCJA	3667313.264	0.017	16457320.170	0.036	12351598.358	0.027	0.048	

Coordinates from a free adjustment should only be used for analysis of the inner accuracy of the network. They should not be distributed as final results.

Error Ellipse Components

Point ID	Semi-major axis (US survey foot)	Semi-minor axis (US survey foot)	Azimuth
ESP_A_011	0.041	0.038	10°
ESP_A_013	0.039	0.028	177°
ESP_A_14	0.060	0.039	134°

ESP_A_15	0.028	0.022	129°
ESP_A_31	0.033	0.030	21°
ESP_A_33	0.034	0.026	22°
ESP_A_34	0.033	0.025	68°
ESP_B_15	0.041	0.035	180°
LOYX	0.015	0.012	98°
LOYZ	0.016	0.013	96°
LS02	0.014	0.012	104°
NCGA	0.018	0.014	95°
NCJA	0.019	0.015	97°

Adjusted GNSS Observations

Observation ID		Observation	A-posteriori Error	Residual	Standardized Residual
NCJA --> ESP_A_14 (PV53)	Az.	26°15'14"	0.052 sec	-0.017 sec	-1.035
	ΔHt.	-54.752 ft	0.106 ft	0.192 ft	3.706
	Ellip Dist.	194562.098 ft	0.034 ft	-0.005 ft	-0.367
LS02 --> ESP_A_15 (PV79)	Az.	131°54'28"	0.038 sec	-0.006 sec	-0.324
	ΔHt.	28.655 ft	0.053 ft	-0.081 ft	-3.641
	Ellip Dist.	100618.258 ft	0.024 ft	0.011 ft	0.919
LOYX --> ESP_A_14 (PV91)	Az.	222°49'17"	0.057 sec	0.493 sec	1.685
	ΔHt.	-18.470 ft	0.112 ft	-0.416 ft	-3.634
	Ellip Dist.	192680.666 ft	0.035 ft	-0.295 ft	-1.383
LOYX --> ESP_A_15	Az.	241°48'40"	0.031 sec	0.022 sec	1.333

(PV90)					
	ΔHt.	0.632 ft	0.054 ft	0.087 ft	3.545
	Ellip Dist.	151890.858 ft	0.020 ft	0.013 ft	1.157
NCJA --> ESP A 34 (PV50)	Az.	32°45'41"	0.022 sec	-0.016 sec	-0.350
	ΔHt.	-49.507 ft	0.074 ft	0.184 ft	2.497
	Ellip Dist.	251781.436 ft	0.028 ft	-0.031 ft	-0.806
LS02 --> ESP A 31 (PV78)	Az.	200°38'14"	0.050 sec	-0.012 sec	-0.792
	ΔHt.	99.412 ft	0.065 ft	0.035 ft	1.892
	Ellip Dist.	107625.309 ft	0.028 ft	0.014 ft	1.613
NCJA --> ESP A 31 (PV51)	Az.	351°50'15"	0.029 sec	0.005 sec	0.272
	ΔHt.	35.109 ft	0.076 ft	-0.078 ft	-1.786
	Ellip Dist.	212654.644 ft	0.029 ft	0.034 ft	1.683
LS02 --> ESP A 011 (PV81)	Az.	181°03'15"	0.064 sec	0.002 sec	0.360
	ΔHt.	51.362 ft	0.088 ft	0.041 ft	1.451
	Ellip Dist.	100715.687 ft	0.035 ft	-0.002 ft	-0.206
NCJA --> NCGA (PV31)	Az.	86°58'59"	0.010 sec	0.004 sec	0.388
	ΔHt.	-110.693 ft	0.056 ft	-0.081 ft	-1.422
	Ellip Dist.	211015.103 ft	0.018 ft	-0.004 ft	-0.218
NCGA --> ESP A 14 (PV61)	Az.	323°05'02"	0.034 sec	0.036 sec	1.332

	ΔHt.	55.941 ft	0.108 ft	-0.093 ft	-1.237
	Ellip Dist.	205507.683 ft	0.052 ft	-0.015 ft	-0.365
NCJA --> ESP A 011 (PV54)	Az.	1°36'06"	0.037 sec	0.001 sec	0.010
	ΔHt.	-12.942 ft	0.095 ft	-0.085 ft	-1.280
	Ellip Dist.	210613.245 ft	0.036 ft	-0.007 ft	-0.181
LOYZ --> ESP A 34 (PV100)	Az.	291°35'28"	0.039 sec	0.014 sec	0.641
	ΔHt.	57.972 ft	0.060 ft	-0.033 ft	-1.160
	Ellip Dist.	124874.342 ft	0.023 ft	-0.004 ft	-0.324
LOYX --> LS02 (PV82)	Az.	268°54'19"	0.010 sec	-0.002 sec	-0.291
	ΔHt.	-28.023 ft	0.050 ft	-0.050 ft	-1.051
	Ellip Dist.	208286.234 ft	0.017 ft	-0.004 ft	-0.338
LOYX --> LOYZ (PV1)	Az.	166°38'43"	0.015 sec	-0.001 sec	-0.103
	ΔHt.	-71.198 ft	0.046 ft	0.023 ft	0.432
	Ellip Dist.	154458.821 ft	0.009 ft	-0.010 ft	-0.902
NCJA --> ESP A 15 (PV52)	Az.	18°42'08"	0.022 sec	0.027 sec	0.880
	ΔHt.	-35.649 ft	0.069 ft	0.057 ft	0.752
	Ellip Dist.	257647.413 ft	0.022 ft	-0.005 ft	-0.211
LOYX --> LS02 (PV16)	Az.	268°54'19"	0.010 sec	-0.010 sec	-0.847

	ΔHt.	-28.023 ft	0.050 ft	-0.017 ft	-0.288
	Ellip Dist.	208286.234 ft	0.017 ft	-0.001 ft	-0.036
LOYX --> ESP A 34 (PV88)	Az.	217°36'44"	0.033 sec	0.001 sec	0.048
	ΔHt.	-13.226 ft	0.060 ft	-0.024 ft	-0.808
	Ellip Dist.	131891.085 ft	0.026 ft	0.002 ft	0.170
NCJA --> ESP A 013 (PV47)	Az.	9°43'55"	0.031 sec	0.032 sec	0.621
	ΔHt.	-53.741 ft	0.163 ft	-0.135 ft	-0.761
	Ellip Dist.	195486.906 ft	0.035 ft	-0.030 ft	-0.548
NCJA --> NCGA (PV42)	Az.	86°58'59"	0.010 sec	-0.002 sec	-0.128
	ΔHt.	-110.693 ft	0.056 ft	-0.044 ft	-0.733
	Ellip Dist.	211015.103 ft	0.018 ft	0.000 ft	0.018
LOYZ --> NCGA (PV96)	Az.	195°37'37"	0.015 sec	0.005 sec	0.630
	ΔHt.	-3.214 ft	0.051 ft	0.022 ft	0.671
	Ellip Dist.	161295.163 ft	0.009 ft	0.001 ft	0.322
LOYX --> LOYZ (PV13)	Az.	166°38'43"	0.015 sec	-0.003 sec	-0.242
	ΔHt.	-71.198 ft	0.046 ft	0.007 ft	0.137
	Ellip Dist.	154458.821 ft	0.009 ft	0.006 ft	0.663
LOYZ --> NCGA (PV39)	Az.	195°37'37"	0.015 sec	-0.011 sec	-0.657
	ΔHt.	-3.214 ft	0.051 ft	0.026 ft	0.504

	Ellip Dist.	161295.163 ft	0.009 ft	-0.002 ft	-0.205
LOYX --> ESP A 33 (PV14)	Az.	232°47'29"	0.027 sec	0.029 sec	0.426
	ΔHt.	-61.224 ft	0.156 ft	0.057 ft	0.368
	Ellip Dist.	200125.555 ft	0.029 ft	-0.027 ft	-0.593
LOYX --> LS02 (PV2)	Az.	268°54'19"	0.010 sec	0.004 sec	0.377
	ΔHt.	-28.023 ft	0.050 ft	-0.033 ft	-0.585
	Ellip Dist.	208286.234 ft	0.017 ft	0.009 ft	0.502
NCJA --> NCGA (PV55)	Az.	86°58'59"	0.010 sec	-0.002 sec	-0.328
	ΔHt.	-110.693 ft	0.056 ft	-0.019 ft	-0.418
	Ellip Dist.	211015.103 ft	0.018 ft	0.006 ft	0.506
LS02 --> ESP A 013 (PV19)	Az.	167°57'17"	0.038 sec	-0.002 sec	-0.211
	ΔHt.	10.563 ft	0.158 ft	0.024 ft	0.500
	Ellip Dist.	121232.408 ft	0.032 ft	-0.001 ft	-0.242
LS02 --> ESP A 33 (PV18)	Az.	156°54'31"	0.042 sec	0.004 sec	0.376
	ΔHt.	-33.201 ft	0.153 ft	-0.013 ft	-0.233
	Ellip Dist.	126827.671 ft	0.025 ft	0.002 ft	0.420
LOYZ --> NCGA (PV36)	Az.	195°37'37"	0.015 sec	-0.003 sec	-0.173
	ΔHt.	-3.214 ft	0.051 ft	0.018 ft	0.323
	Ellip	161295.163	0.009 ft	-0.004 ft	-0.399

	Dist.	ft			
LS02 --> ESP B 15 (PV76)	Az.	196°56'24"	0.042 sec	0.004 sec	0.394
	ΔHt.	129.923 ft	0.081 ft	-0.012 ft	-0.393
	Ellip Dist.	144904.530 ft	0.035 ft	0.004 ft	0.292
NCJA --> ESP B 15 (PV49)	Az.	348°42'21"	0.040 sec	0.016 sec	0.390
	ΔHt.	65.619 ft	0.086 ft	0.010 ft	0.204
	Ellip Dist.	176009.331 ft	0.036 ft	0.000 ft	0.020
NCJA --> ESP A 33 (PV46)	Az.	16°27'34"	0.027 sec	0.000 sec	0.000
	ΔHt.	-97.505 ft	0.159 ft	-0.047 ft	-0.236
	Ellip Dist.	202891.440 ft	0.032 ft	-0.005 ft	-0.088
LOYX --> LOYZ (PV93)	Az.	166°38'43"	0.015 sec	0.001 sec	0.112
	ΔHt.	-71.198 ft	0.046 ft	-0.003 ft	-0.086
	Ellip Dist.	154458.821 ft	0.009 ft	0.000 ft	-0.080

Covariance Terms

From Point	To Point		Components	A-posteriori Error	Horiz. Precision (Ratio)	3D Precision (Ratio)
ESP_A_011	LS02	Az.	1°03'02"	0.064 sec	1 : 2861415	1 : 2859497
		ΔHt.	-51.362 ft	0.088 ft		
		ΔElev.	-52.354 ft	0.088 ft		
		Ellip	100715.687	0.035 ft		

		Dist.	ft			
ESP_A_011	NCJA	Az.	181°36'49"	0.037 sec	1 : 5718779	1 : 5716064
		ΔHt.	12.942 ft	0.095 ft		
		ΔElev.	14.583 ft	0.095 ft		
		Ellip Dist.	210613.245 ft	0.037 ft		
ESP_A_013	LS02	Az.	348°00'25"	0.038 sec	1 : 3783132	1 : 3778311
		ΔHt.	-10.563 ft	0.158 ft		
		ΔElev.	-12.330 ft	0.158 ft		
		Ellip Dist.	121232.408 ft	0.032 ft		
ESP_A_013	NCJA	Az.	189°47'58"	0.031 sec	1 : 5535296	1 : 5541036
		ΔHt.	53.741 ft	0.163 ft		
		ΔElev.	54.607 ft	0.163 ft		
		Ellip Dist.	195486.906 ft	0.035 ft		
ESP_A_14	LOYX	Az.	42°33'04"	0.057 sec	1 : 5569258	1 : 5570863
		ΔHt.	18.470 ft	0.112 ft		
		ΔElev.	20.848 ft	0.112 ft		
		Ellip Dist.	192680.666 ft	0.035 ft		
ESP_A_14	NCGA	Az.	142°49'55"	0.033 sec	1 : 3987508	1 : 3992483
		ΔHt.	-55.941 ft	0.108 ft		
		ΔElev.	-50.874 ft	0.108 ft		
		Ellip Dist.	205507.683 ft	0.052 ft		
ESP_A_14	NCJA	Az.	206°25'46"	0.052 sec	1 : 5686226	1 : 5722109
		ΔHt.	54.752 ft	0.106 ft		
		ΔElev.	54.233 ft	0.106 ft		
		Ellip Dist.	194562.098 ft	0.034 ft		
ESP_A_15	LOYX	Az.	61°32'01"	0.031 sec	1 : 7565570	1 : 7539399
		ΔHt.	-0.632 ft	0.054 ft		
		ΔElev.	3.156 ft	0.054 ft		

		Ellip Dist.	151890.858 ft	0.020 ft		
ESP_A_15	LS02	Az.	312°03'46"	0.038 sec	1 : 4216975	1 : 4220171
		ΔHt.	-28.655 ft	0.053 ft		
		ΔElev.	-30.396 ft	0.053 ft		
		Ellip Dist.	100618.258 ft	0.024 ft		
ESP_A_15	NCJA	Az.	198°52'18"	0.022 sec	1 : 11569307	1 : 11584507
		ΔHt.	35.649 ft	0.069 ft		
		ΔElev.	36.541 ft	0.069 ft		
		Ellip Dist.	257647.413 ft	0.022 ft		
ESP_A_31	LS02	Az.	20°33'32"	0.050 sec	1 : 3838628	1 : 3837575
		ΔHt.	-99.412 ft	0.065 ft		
		ΔElev.	-99.482 ft	0.065 ft		
		Ellip Dist.	107625.309 ft	0.028 ft		
ESP_A_31	NCJA	Az.	171°46'32"	0.028 sec	1 : 7237098	1 : 7233732
		ΔHt.	-35.109 ft	0.076 ft		
		ΔElev.	-32.544 ft	0.076 ft		
		Ellip Dist.	212654.644 ft	0.029 ft		
ESP_A_33	LOYX	Az.	52°27'45"	0.027 sec	1 : 6814262	1 : 6821942
		ΔHt.	61.224 ft	0.156 ft		
		ΔElev.	64.616 ft	0.156 ft		
		Ellip Dist.	200125.555 ft	0.029 ft		
ESP_A_33	LS02	Az.	337°00'40"	0.042 sec	1 : 5115774	1 : 5097504
		ΔHt.	33.201 ft	0.153 ft		
		ΔElev.	31.064 ft	0.153 ft		
		Ellip Dist.	126827.671 ft	0.025 ft		
ESP_A_33	NCJA	Az.	196°34'37"	0.027 sec	1 : 6343846	1 : 6340612
		ΔHt.	97.505 ft	0.159 ft		

		ΔElev.	98.002 ft	0.159 ft		
		Ellip Dist.	202891.440 ft	0.032 ft		
ESP A 34	LOYX	Az.	37°26'45"	0.033 sec	1 : 5128361	1 : 5111102
		ΔHt.	13.226 ft	0.060 ft		
		ΔElev.	14.539 ft	0.060 ft		
		Ellip Dist.	131891.085 ft	0.026 ft		
ESP A 34	LOYZ	Az.	111°21'08"	0.039 sec	1 : 5373353	1 : 5402654
		ΔHt.	-57.972 ft	0.060 ft		
		ΔElev.	-53.107 ft	0.060 ft		
		Ellip Dist.	124874.342 ft	0.023 ft		
ESP A 34	NCJA	Az.	213°02'24"	0.022 sec	1 : 9029683	1 : 8987089
		ΔHt.	49.507 ft	0.074 ft		
		ΔElev.	47.924 ft	0.074 ft		
		Ellip Dist.	251781.436 ft	0.028 ft		
ESP B 15	LS02	Az.	16°51'11"	0.042 sec	1 : 4144896	1 : 4147469
		ΔHt.	-129.923 ft	0.081 ft		
		ΔElev.	-129.922 ft	0.081 ft		
		Ellip Dist.	144904.530 ft	0.035 ft		
ESP B 15	NCJA	Az.	168°38'08"	0.039 sec	1 : 4904738	1 : 4904773
		ΔHt.	-65.619 ft	0.086 ft		
		ΔElev.	-62.985 ft	0.086 ft		
		Ellip Dist.	176009.331 ft	0.036 ft		
LOYX	LS02	Az.	268°54'19"	0.010 sec	1 : 12529275	1 : 12510872
		ΔHt.	-28.023 ft	0.050 ft		
		ΔElev.	-33.552 ft	0.050 ft		
		Ellip Dist.	208286.234 ft	0.017 ft		
LOYZ	LOYX	Az.	346°43'08"	0.015 sec	1 : 17689855	1 :

						17747159
		ΔHt.	71.198 ft	0.046 ft		
		ΔElev.	67.647 ft	0.046 ft		
		Ellip Dist.	154458.821 ft	0.009 ft		
LOYZ	NCGA	Az.	195°37'37"	0.015 sec	1 : 17518940	1 : 17457286
		ΔHt.	-3.214 ft	0.051 ft		
		ΔElev.	-4.075 ft	0.051 ft		
		Ellip Dist.	161295.163 ft	0.009 ft		
NCJA	NCGA	Az.	86°58'59"	0.010 sec	1 : 11887264	1 : 11875327
		ΔHt.	-110.693 ft	0.056 ft		
		ΔElev.	-105.107 ft	0.056 ft		
		Ellip Dist.	211015.103 ft	0.018 ft		

Project File Data	Coordinate System
	Name: US State Plane 1983
	Datum: NAD 1983 (Conus)
	Zone: Virginia South 4502
	Geoid: GEOID12A (Conus)
	Vertical datum: NAVD 88

Full Constraint Network Adjustment Report

Adjustment Settings

Set-Up Errors

GNSS

Error in Height of Antenna: 0.000 ft

Centering Error: 0.000 ft

Covariance Display

Horizontal:

Propagated Linear Error [E]: U.S.

Constant Term [C]: 0.000 ft

Scale on Linear Error [S]: 1.960

Three-Dimensional

Propagated Linear Error [E]: U.S.

Constant Term [C]: 0.000 ft

Scale on Linear Error [S]: 1.960

Adjustment Statistics

Number of Iterations for Successful Adjustment: 2

Network Reference Factor: 1.04

Chi Square Test (95%): Passed

Precision Confidence Level: 95%

Degrees of Freedom:

68

Post Processed Vector Statistics

Reference Factor: 1.04

Redundancy Number: 68.00

A Priori Scalar: 2.32

Control Point Constraints

Point ID	Type	North σ (US survey foot)	East σ (US survey foot)	Height σ (US survey foot)	Elevation σ (US survey foot)
LOYX	Local	Fixed	Fixed	Fixed	
LOYZ	Local	Fixed	Fixed	Fixed	
LS02	Local	Fixed	Fixed	Fixed	
NCGA	Local	Fixed	Fixed	Fixed	
NCJA	Local	Fixed	Fixed	Fixed	
Fixed = 0.000003(US survey foot)					

Adjusted Grid Coordinates

Point ID	Northing (US survey foot)	Northing Error (US survey foot)	Easting (US survey foot)	Easting Error (US survey foot)	Elevation (US survey foot)	Elevation Error (US survey foot)	Constraint
ESP A 011	3520544.415	0.036	11799099.457	0.032	141.815	0.089	
ESP A 013	3502994.828	0.034	11826455.565	0.023	101.790	0.162	
ESP A 14	3485413.037	0.044	11879675.076	0.044	102.159	0.108	
ESP A 15	3554918.674	0.020	11875440.056	0.022	119.855	0.049	
ESP A 31	3520108.015	0.028	11763023.887	0.026	188.944	0.065	
ESP A 33	3505173.685	0.028	11850873.501	0.023	58.394	0.158	
ESP A 34	3523217.283	0.022	11929433.499	0.026	108.457	0.058	
ESP B 15	3482163.959	0.036	11759172.790	0.030	219.379	0.081	
LOYX	3629210.121	?	12007914.101	?	123.005	?	LLh
LOYZ	3479643.317	?	12046455.432	?	55.342	?	LLh
LS02	3621253.228	?	11799790.969	?	89.474	?	LLh
NCGA	3323452.537	?	12006182.634	?	51.299	?	LLh
NCJA	3309956.846	?	11795582.580	?	156.372	?	LLh

Adjusted Geodetic Coordinates

Point ID	Latitude	Longitude	Height (US survey foot)	Height Error (US survey foot)	Constraint
ESP_A_011	N36°59'12.27079"	W77°25'02.75314"	30.578	0.089	
ESP_A_013	N36°56'15.52196"	W77°19'28.29049"	-10.222	0.162	
ESP_A_14	N36°53'14.63524"	W77°08'35.92940"	-11.237	0.108	
ESP_A_15	N37°04'42.41916"	W77°09'15.86040"	7.870	0.049	
ESP_A_31	N36°59'11.81310"	W77°32'27.44017"	78.630	0.065	
ESP_A_33	N36°56'33.95106"	W77°14'27.18708"	-53.988	0.158	
ESP_A_34	N36°59'20.87283"	W76°58'15.97126"	-6.004	0.058	
ESP_B_15	N36°52'57.03346"	W77°33'19.58439"	109.136	0.081	
LOYX	N37°16'35.03044"	W76°41'43.81953"	7.231	?	LLh
LOYZ	N36°51'48.91932"	W76°34'24.80879"	-63.983	?	LLh
LS02	N37°15'47.89980"	W77°24'39.91266"	-20.771	?	LLh
NCGA	N36°26'12.65517"	W76°43'16.51658"	-67.165	?	LLh
NCJA	N36°24'30.56335"	W77°26'15.30879"	43.494	?	LLh

Adjusted ECEF Coordinates

Point ID	X (US survey foot)	X Error (US survey foot)	Y (US survey foot)	Y Error (US survey foot)	Z (US survey foot)	Z Error (US survey foot)	3D Error (US survey foot)	Constraint
ESP_A_011	3645692.304	0.036	16333229.666	0.081	12520393.563	0.049	0.101	
ESP_A_013	3674523.575	0.038	16337751.506	0.130	12506085.502	0.098	0.167	
ESP_A_14	3728621.785	0.045	16336759.514	0.084	12491457.574	0.081	0.125	
ESP_A_15	3716158.966	0.023	16296696.741	0.042	12547035.667	0.031	0.057	
ESP_A_31	3610485.280	0.030	16341116.135	0.055	12520385.498	0.042	0.075	
ESP_A_33	3698114.232	0.039	16331243.456	0.123	12507548.923	0.098	0.162	
ESP_A_34	3772690.010	0.028	-	0.050	12521066.476	0.035	0.067	

			16303796.388					
ESP_B_15	3611267.647	0.034	16364293.901	0.069	12490105.952	0.053	0.093	
LOYX	3836540.885	?	16224025.221	?	12604462.098	?	?	LLh
LOYZ	3892087.453	?	16303893.416	?	12484491.235	?	?	LLh
LS02	3634245.320	?	16273469.765	?	12600651.643	?	?	LLh
NCGA	3871347.764	?	16404132.378	?	12359840.296	?	?	LLh
NCJA	3667313.209	?	16457320.127	?	12351598.362	?	?	LLh

Error Ellipse Components

Point ID	Semi-major axis (US survey foot)	Semi-minor axis (US survey foot)	Azimuth
ESP_A_011	0.045	0.040	6°
ESP_A_013	0.042	0.028	178°
ESP_A_14	0.066	0.041	136°
ESP_A_15	0.029	0.023	128°
ESP_A_31	0.036	0.032	21°
ESP_A_33	0.037	0.027	23°
ESP_A_34	0.034	0.025	63°
ESP_B_15	0.045	0.037	1°

Adjusted GNSS Observations

Transformation Parameters

Deflection in Latitude: 0.009 sec (95%) 0.040 sec
 Deflection in Longitude: 0.001 sec (95%) 0.035 sec
 Azimuth Rotation: -0.016 sec (95%) 0.006 sec
 Scale Factor: 1.00000005 (95%) 0.00000003

Observation ID		Observation	A-posteriori Error	Residual	Standardized Residual
NCJA --> ESP A 14 (PV53)	Az.	26°15'14"	0.054 sec	-0.017 sec	-0.977
	ΔHt.	-54.739 ft	0.109 ft	0.205 ft	3.778
	Ellip Dist.	194562.101 ft	0.035 ft	-0.002 ft	-0.158
LS02 --> ESP A 15 (PV79)	Az.	131°54'28"	0.037 sec	-0.005 sec	-0.252
	ΔHt.	28.644 ft	0.052 ft	-0.092 ft	-3.712
	Ellip Dist.	100618.263 ft	0.024 ft	0.016 ft	1.240
LOYX --> ESP A 15 (PV90)	Az.	241°48'40"	0.031 sec	0.028 sec	1.581
	ΔHt.	0.642 ft	0.054 ft	0.097 ft	3.648
	Ellip Dist.	151890.862 ft	0.020 ft	0.016 ft	1.368
LOYX --> ESP A 14 (PV91)	Az.	222°49'17"	0.057 sec	0.501 sec	1.655
	ΔHt.	-18.462 ft	0.115 ft	-0.407 ft	-3.432
	Ellip Dist.	192680.673 ft	0.034 ft	-0.289 ft	-1.307
NCJA --> ESP A 34 (PV50)	Az.	32°45'41"	0.020 sec	-0.013 sec	-0.265
	ΔHt.	-49.507 ft	0.075 ft	0.184 ft	2.396
	Ellip Dist.	251781.445 ft	0.027 ft	-0.022 ft	-0.553
LOYX --> LOYZ (PV93)	Az.	166°38'43"	0.006 sec	0.004 sec	0.377
	ΔHt.	-71.207 ft	0.028 ft	-0.012 ft	-0.289
	Ellip Dist.	154458.811 ft	0.005 ft	-0.010 ft	-1.847

NCJA --> ESP_A_31 (PV51)	Az.	351°50'15"	0.027 sec	0.007 sec	0.380
	ΔHt.	35.126 ft	0.075 ft	-0.060 ft	-1.292
	Ellip Dist.	212654.650 ft	0.029 ft	0.038 ft	1.798
LS02 --> ESP_A_31 (PV78)	Az.	200°38'14"	0.050 sec	-0.012 sec	-0.684
	ΔHt.	99.405 ft	0.066 ft	0.028 ft	1.409
	Ellip Dist.	107625.311 ft	0.029 ft	0.016 ft	1.738
LOYX --> LOYZ (PV1)	Az.	166°38'43"	0.006 sec	0.002 sec	0.112
	ΔHt.	-71.207 ft	0.028 ft	0.015 ft	0.247
	Ellip Dist.	154458.811 ft	0.005 ft	-0.020 ft	-1.665
LOYZ --> NCGA (PV96)	Az.	195°37'37"	0.006 sec	0.005 sec	0.495
	ΔHt.	-3.176 ft	0.026 ft	0.061 ft	1.458
	Ellip Dist.	161295.168 ft	0.005 ft	0.006 ft	0.927
NCGA --> ESP_A_14 (PV61)	Az.	323°05'02"	0.033 sec	0.031 sec	1.070
	ΔHt.	55.920 ft	0.109 ft	-0.114 ft	-1.444
	Ellip Dist.	205507.682 ft	0.053 ft	-0.016 ft	-0.367
LOYZ --> NCGA (PV39)	Az.	195°37'37"	0.006 sec	-0.010 sec	-0.551
	ΔHt.	-3.176 ft	0.026 ft	0.064 ft	1.108
	Ellip Dist.	161295.168 ft	0.005 ft	0.002 ft	0.184
LS02 --> ESP_A_011 (PV81)	Az.	181°03'15"	0.066 sec	0.001 sec	0.223

	ΔHt.	51.354 ft	0.090 ft	0.032 ft	1.094
	Ellip Dist.	100715.688 ft	0.036 ft	-0.001 ft	-0.051
NCJA --> NCGA (PV55)	Az.	86°58'59"	0.006 sec	-0.008 sec	-1.056
	ΔHt.	-110.659 ft	0.041 ft	0.014 ft	0.276
	Ellip Dist.	211015.109 ft	0.007 ft	0.012 ft	0.753
NCJA --> ESP A 011 (PV54)	Az.	1°36'06"	0.033 sec	0.004 sec	0.036
	ΔHt.	-12.925 ft	0.096 ft	-0.069 ft	-0.986
	Ellip Dist.	210613.250 ft	0.036 ft	-0.002 ft	-0.040
NCJA --> ESP A 15 (PV52)	Az.	18°42'08"	0.020 sec	0.031 sec	0.954
	ΔHt.	-35.635 ft	0.069 ft	0.071 ft	0.894
	Ellip Dist.	257647.419 ft	0.021 ft	0.000 ft	-0.003
LOYZ --> ESP A 34 (PV100)	Az.	291°35'28"	0.040 sec	0.007 sec	0.294
	ΔHt.	57.977 ft	0.058 ft	-0.029 ft	-0.909
	Ellip Dist.	124874.338 ft	0.023 ft	-0.007 ft	-0.597
LOYZ --> NCGA (PV36)	Az.	195°37'37"	0.006 sec	-0.002 sec	-0.127
	ΔHt.	-3.176 ft	0.026 ft	0.056 ft	0.904
	Ellip Dist.	161295.168 ft	0.005 ft	0.001 ft	0.058
LOYX --> ESP A 34 (PV88)	Az.	217°36'44"	0.034 sec	0.008 sec	0.469

	ΔHt.	-13.230 ft	0.060 ft	-0.028 ft	-0.880
	Ellip Dist.	131891.084 ft	0.026 ft	0.001 ft	0.088
LOYX --> LS02 (PV2)	Az.	268°54'19"	0.006 sec	0.009 sec	0.835
	ΔHt.	-28.002 ft	0.040 ft	-0.012 ft	-0.209
	Ellip Dist.	208286.243 ft	0.007 ft	0.017 ft	0.871
NCJA --> NCGA (PV31)	Az.	86°58'59"	0.006 sec	-0.002 sec	-0.169
	ΔHt.	-110.659 ft	0.041 ft	-0.047 ft	-0.754
	Ellip Dist.	211015.109 ft	0.007 ft	0.002 ft	0.078
LS02 --> ESP B 15 (PV76)	Az.	196°56'24"	0.043 sec	0.005 sec	0.495
	ΔHt.	129.912 ft	0.083 ft	-0.022 ft	-0.672
	Ellip Dist.	144904.533 ft	0.036 ft	0.007 ft	0.485
NCJA --> ESP A 013 (PV47)	Az.	9°43'55"	0.026 sec	0.033 sec	0.608
	ΔHt.	-53.724 ft	0.166 ft	-0.118 ft	-0.643
	Ellip Dist.	195486.913 ft	0.034 ft	-0.024 ft	-0.411
LOYX --> LS02 (PV82)	Az.	268°54'19"	0.006 sec	0.004 sec	0.534
	ΔHt.	-28.002 ft	0.040 ft	-0.029 ft	-0.568
	Ellip Dist.	208286.243 ft	0.007 ft	0.004 ft	0.272
LOYX --> ESP A 33 (PV14)	Az.	232°47'29"	0.026 sec	0.038 sec	0.548
	ΔHt.	-61.214 ft	0.160 ft	0.068 ft	0.418
	Ellip	200125.559	0.028 ft	-0.023 ft	-0.487

	Dist.	ft			
NCJA --> NCGA (PV42)	Az.	86°58'59"	0.006 sec	-0.008 sec	-0.535
	ΔHt.	-110.659 ft	0.041 ft	-0.011 ft	-0.160
	Ellip Dist.	211015.109 ft	0.007 ft	0.006 ft	0.211
LS02 --> ESP A 33 (PV18)	Az.	156°54'31"	0.043 sec	0.005 sec	0.382
	ΔHt.	-33.212 ft	0.158 ft	-0.023 ft	-0.389
	Ellip Dist.	126827.671 ft	0.026 ft	0.003 ft	0.478
NCJA --> ESP B 15 (PV49)	Az.	348°42'21"	0.036 sec	0.018 sec	0.417
	ΔHt.	65.634 ft	0.086 ft	0.025 ft	0.471
	Ellip Dist.	176009.336 ft	0.036 ft	0.004 ft	0.176
LOYX --> LS02 (PV16)	Az.	268°54'19"	0.006 sec	-0.005 sec	-0.357
	ΔHt.	-28.002 ft	0.040 ft	0.003 ft	0.052
	Ellip Dist.	208286.243 ft	0.007 ft	0.008 ft	0.300
LOYX --> LOYZ (PV13)	Az.	166°38'43"	0.006 sec	0.000 sec	-0.005
	ΔHt.	-71.207 ft	0.028 ft	-0.002 ft	-0.039
	Ellip Dist.	154458.811 ft	0.005 ft	-0.004 ft	-0.356
LS02 --> ESP A 013 (PV19)	Az.	167°57'17"	0.039 sec	0.000 sec	0.000
	ΔHt.	10.555 ft	0.162 ft	0.016 ft	0.318
	Ellip Dist.	121232.408 ft	0.033 ft	-0.001 ft	-0.169

NCJA --> ESP A 33 (PV46)	Az.	16°27'34"	0.023 sec	0.001 sec	0.044
	ΔHt.	-97.490 ft	0.164 ft	-0.032 ft	-0.157
	Ellip Dist.	202891.447 ft	0.031 ft	0.002 ft	0.040

Covariance Terms

From Point	To Point		Components	A-posteriori Error	Horiz. Precision (Ratio)	3D Precision (Ratio)
ESP_A_011	LS02	Az.	1°03'02"	0.066 sec	1 : 2790094	1 : 2788047
		ΔHt.	-51.349 ft	0.089 ft		
		ΔElev.	-52.341 ft	0.089 ft		
		Ellip Dist.	100715.693 ft	0.036 ft		
ESP_A_011	NCJA	Az.	181°36'49"	0.032 sec	1 : 5833417	1 : 5831877
		ΔHt.	12.916 ft	0.089 ft		
		ΔElev.	14.557 ft	0.089 ft		
		Ellip Dist.	210613.260 ft	0.036 ft		
ESP_A_013	LS02	Az.	348°00'25"	0.039 sec	1 : 3640765	1 : 3636203
		ΔHt.	-10.549 ft	0.162 ft		
		ΔElev.	-12.316 ft	0.162 ft		
		Ellip Dist.	121232.414 ft	0.033 ft		
ESP_A_013	NCJA	Az.	189°47'58"	0.025 sec	1 : 5876616	1 : 5883809
		ΔHt.	53.716 ft	0.162 ft		
		ΔElev.	54.582 ft	0.162 ft		
		Ellip Dist.	195486.922 ft	0.033 ft		
ESP_A_14	LOYX	Az.	42°33'05"	0.056 sec	1 : 5851207	1 : 5859180
		ΔHt.	18.468 ft	0.108 ft		

		ΔElev.	20.846 ft	0.108 ft		
		Ellip Dist.	192680.682 ft	0.033 ft		
ESP_A_14	NCGA	Az.	142°49'55"	0.033 sec	1 : 3920209	1 : 3923702
		ΔHt.	-55.928 ft	0.108 ft		
		ΔElev.	-50.861 ft	0.108 ft		
		Ellip Dist.	205507.692 ft	0.052 ft		
ESP_A_14	NCJA	Az.	206°25'46"	0.054 sec	1 : 5448829	1 : 5482548
		ΔHt.	54.731 ft	0.108 ft		
		ΔElev.	54.213 ft	0.108 ft		
		Ellip Dist.	194562.110 ft	0.036 ft		
ESP_A_15	LOYX	Az.	61°32'01"	0.031 sec	1 : 8005938	1 : 7979833
		ΔHt.	-0.639 ft	0.049 ft		
		ΔElev.	3.149 ft	0.049 ft		
		Ellip Dist.	151890.868 ft	0.019 ft		
ESP_A_15	LS02	Az.	312°03'46"	0.037 sec	1 : 4287002	1 : 4288591
		ΔHt.	-28.641 ft	0.049 ft		
		ΔElev.	-30.382 ft	0.049 ft		
		Ellip Dist.	100618.267 ft	0.023 ft		
ESP_A_15	NCJA	Az.	198°52'18"	0.018 sec	1 : 13755164	1 : 13793666
		ΔHt.	35.624 ft	0.049 ft		
		ΔElev.	36.517 ft	0.049 ft		
		Ellip Dist.	257647.431 ft	0.019 ft		
ESP_A_31	LS02	Az.	20°33'32"	0.050 sec	1 : 3766632	1 : 3765888
		ΔHt.	-99.401 ft	0.065 ft		
		ΔElev.	-99.470 ft	0.065 ft		
		Ellip Dist.	107625.316 ft	0.029 ft		
ESP_A_31	NCJA	Az.	171°46'32"	0.026 sec	1 : 7615173	1 : 7609410

		ΔHt.	-35.136 ft	0.065 ft		
		ΔElev.	-32.572 ft	0.065 ft		
		Ellip Dist.	212654.659 ft	0.028 ft		
ESP A 33	LOYX	Az.	52°27'45"	0.025 sec	1 : 7166758	1 : 7185520
		ΔHt.	61.219 ft	0.158 ft		
		ΔElev.	64.611 ft	0.158 ft		
		Ellip Dist.	200125.568 ft	0.028 ft		
ESP A 33	LS02	Az.	337°00'40"	0.043 sec	1 : 4926727	1 : 4907636
		ΔHt.	33.217 ft	0.158 ft		
		ΔElev.	31.080 ft	0.158 ft		
		Ellip Dist.	126827.677 ft	0.026 ft		
ESP A 33	NCJA	Az.	196°34'37"	0.022 sec	1 : 6900615	1 : 6897056
		ΔHt.	97.482 ft	0.158 ft		
		ΔElev.	97.978 ft	0.158 ft		
		Ellip Dist.	202891.456 ft	0.029 ft		
ESP A 34	LOYX	Az.	37°26'45"	0.034 sec	1 : 5053663	1 : 5036529
		ΔHt.	13.234 ft	0.058 ft		
		ΔElev.	14.548 ft	0.058 ft		
		Ellip Dist.	131891.090 ft	0.026 ft		
ESP A 34	LOYZ	Az.	111°21'08"	0.040 sec	1 : 5278146	1 : 5307067
		ΔHt.	-57.979 ft	0.058 ft		
		ΔElev.	-53.115 ft	0.058 ft		
		Ellip Dist.	124874.344 ft	0.024 ft		
ESP A 34	NCJA	Az.	213°02'24"	0.018 sec	1 : 9819164	1 : 9780459
		ΔHt.	49.498 ft	0.058 ft		
		ΔElev.	47.915 ft	0.058 ft		
		Ellip Dist.	251781.456 ft	0.026 ft		

ESP_B_15	LS02	Az.	16°51'11"	0.043 sec	1 : 4086733	1 : 4089273
		ΔHt.	-129.907 ft	0.081 ft		
		ΔElev.	-129.906 ft	0.081 ft		
		Ellip Dist.	144904.539 ft	0.035 ft		
ESP_B_15	NCJA	Az.	168°38'08"	0.035 sec	1 : 4949948	1 : 4947236
		ΔHt.	-65.642 ft	0.081 ft		
		ΔElev.	-63.007 ft	0.081 ft		
		Ellip Dist.	176009.343 ft	0.036 ft		
LOYX	LS02	Az.	268°54'19"	0.000 sec	1 : 0	1 : 0
		ΔHt.	-28.002 ft	0.000 ft		
		ΔElev.	-33.531 ft	0.000 ft		
		Ellip Dist.	208286.252 ft	0.000 ft		
LOYZ	LOYX	Az.	346°43'08"	0.000 sec	1 : 0	1 : 0
		ΔHt.	71.214 ft	0.000 ft		
		ΔElev.	67.663 ft	0.000 ft		
		Ellip Dist.	154458.818 ft	0.000 ft		
LOYZ	NCGA	Az.	195°37'37"	0.000 sec	1 : 0	1 : 0
		ΔHt.	-3.182 ft	0.000 ft		
		ΔElev.	-4.044 ft	0.000 ft		
		Ellip Dist.	161295.175 ft	0.000 ft		
NCJA	NCGA	Az.	86°58'59"	0.000 sec	1 : 0	1 : 0
		ΔHt.	-110.659 ft	0.000 ft		
		ΔElev.	-105.073 ft	0.000 ft		
		Ellip Dist.	211015.119 ft	0.000 ft		

Primary Control Datasheets

The NGS Data Sheet

See file [dsdata.txt](#) for more information about the datasheet.

PROGRAM = datasheet95, VERSION = 8.4

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1      National Geodetic Survey,   Retrieval Date = MAY 14, 2014
DL3186 *****
DL3186 CORS          -   This is a GPS Continuously Operating Reference Station.
DL3186 DESIGNATION -   LOYOLA X CORS ARP
DL3186 CORS_ID      -   LOYX
DL3186 PID          -   DL3186
DL3186 STATE/COUNTY-   VA/C OF WILLIAMSBURG
DL3186 COUNTRY      -   US
DL3186 USGS QUAD    -   WILLIAMSBURG (1984)
DL3186
DL3186                      *CURRENT SURVEY CONTROL
DL3186
DL3186* NAD 83(2011) POSITION- 37 16 35.03044(N) 076 41 43.81953(W)   ADJUSTED
DL3186* NAD 83(2011) ELLIP HT-      2.204 (meters)                (08/??/11)   ADJUSTED
DL3186* NAD 83(2011) EPOCH   -   2010.00
DL3186* NAVD 88 ORTHO HEIGHT -      *(meters)                      *(feet)
DL3186
DL3186 NAD 83(2011) X   -   1,169,380.001 (meters)                COMP
DL3186 NAD 83(2011) Y   -   -4,945,092.778 (meters)                COMP
DL3186 NAD 83(2011) Z   -   3,841,847.731 (meters)                COMP
DL3186 GEOID HEIGHT    -      -35.29 (meters)                    GEOID12A
DL3186
DL3186. Formal positional accuracy estimates are not available for this CORS
DL3186. because its coordinates were determined in part using modeled
DL3186. velocities. Approximate one-sigma accuracies for latitude, longitude,
DL3186. and ellipsoid height can be obtained from the short-term time series.
DL3186. Additional information regarding modeled velocities is available on
DL3186. the CORS Coordinates and Multi-Year CORS Solution FAQ web pages.
DL3186
DL3186. The coordinates were established by GPS observations
DL3186. and adjusted by the National Geodetic Survey in August 2011.
DL3186
DL3186. NAD 83(2011) refers to NAD 83 coordinates where the reference
DL3186. frame has been affixed to the stable North American Tectonic Plate.
DL3186
DL3186. The coordinates are valid at the epoch date displayed above
DL3186. which is a decimal equivalence of Year/Month/Day.
DL3186
DL3186. The PID for the CORS L1 Phase Center is DL3187.
DL3186
DL3186. The XYZ, and position/ellipsoidal ht. are equivalent.
DL3186
DL3186. The ellipsoidal height was determined by GPS observations
DL3186. and is referenced to NAD 83.
DL3186
DL3186. The following values were computed from the NAD 83(2011) position.
DL3186
DL3186;                      North      East      Units Scale Factor Converg.
DL3186; SPC VA S      -   1,106,185.457 3,660,019.538   MT   0.99994666   +1 05 42.7
DL3186; SPC VA S      -   3,629,210.12 12,007,914.10   SFT   0.99994666   +1 05 42.7
DL3186

```

DL3186! - Elev Factor x Scale Factor = Combined Factor
DL3186!SPC VA S - 0.99999965 x 0.99994666 = 0.99994631
DL3186
DL3186 SUPERSEDED SURVEY CONTROL
DL3186
DL3186 NAD 83(CORS)- 37 16 35.03100(N) 076 41 43.82024(W) AD(2002.00) c
DL3186 ELLIP H (06/??/09) 2.208 (m) GP(2002.00) c c
DL3186
DL3186.Superseded values are not recommended for survey control.
DL3186
DL3186.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
DL3186.[See file dsdata.txt](#) to determine how the superseded data were derived.
DL3186
DL3186_U.S. NATIONAL GRID SPATIAL ADDRESS: 18SUG4968226882(NAD 83)
DL3186
DL3186_MARKER: STATION IS THE ANTENNA REFERENCE POINT OF THE GPS ANTENNA
DL3186
DL3186 STATION DESCRIPTION
DL3186
DL3186'DESCRIBED BY NATIONAL GEODETIC SURVEY 2011
DL3186'STATION IS A GPS CORS. LATEST INFORMATION INCLUDING POSITIONS AND
DL3186'VELOCITIES ARE AVAILABLE IN THE COORDINATE AND LOG FILES ACCESSIBLE
DL3186'BY ANONYMOUS FTP OR THE WORLDWIDE WEB.
DL3186' ftp://cors.ngs.noaa.gov/cors/README.txt
DL3186' ftp://cors.ngs.noaa.gov/cors/coord/coord_08
DL3186' ftp://cors.ngs.noaa.gov/cors/station_log
DL3186' http://geodesy.noaa.gov/CORS
1 National Geodetic Survey, Retrieval Date = MAY 14, 2014
DL1888 *****
DL1888 CORS - This is a GPS Continuously Operating Reference Station.
DL1888 DESIGNATION - LOYOLA Z CORS ARP
DL1888 CORS_ID - LOYZ
DL1888 PID - DL1888
DL1888 STATE/COUNTY- VA/C OF SUFFOLK
DL1888 COUNTRY - US
DL1888 USGS QUAD - CHUCKATUCK (1990)
DL1888
DL1888 *CURRENT SURVEY CONTROL
DL1888
DL1888* NAD 83(2011) POSITION- 36 51 48.91932(N) 076 34 24.80879(W) ADJUSTED
DL1888* NAD 83(2011) ELLIP HT- -19.502 (meters) (08/??/11) ADJUSTED
DL1888* NAD 83(2011) EPOCH - 2010.00
DL1888* [NAVD 88](#) ORTHO HEIGHT - *(meters) *(feet)
DL1888
DL1888 NAD 83(2011) X - 1,186,310.628 (meters) COMP
DL1888 NAD 83(2011) Y - -4,969,436.652 (meters) COMP
DL1888 NAD 83(2011) Z - 3,805,280.539 (meters) COMP
DL1888 GEOID HEIGHT - -36.37 (meters) GEOID12A
DL1888
DL1888.Formal positional accuracy estimates are not available for this CORS
DL1888.because its coordinates were determined in part using modeled
DL1888.velocities. Approximate one-sigma accuracies for latitude, longitude,
DL1888.and ellipsoid height can be obtained from the [short-term time series](#).
DL1888.Additional information regarding modeled velocities is available on
DL1888.the [CORS Coordinates](#) and [Multi-Year CORS Solution FAQ](#) web pages.
DL1888
DL1888.The coordinates were established by GPS observations
DL1888.and adjusted by the National Geodetic Survey in August 2011.
DL1888
DL1888.NAD 83(2011) refers to NAD 83 coordinates where the reference

DL1888.frame has been affixed to the stable North American Tectonic Plate.

DL1888

DL1888.The coordinates are valid at the epoch date displayed above

DL1888.which is a decimal equivalence of Year/Month/Day.

DL1888

DL1888.The PID for the CORS L1 Phase Center is DL1889.

DL1888

DL1888.The XYZ, and position/ellipsoidal ht. are equivalent.

DL1888

DL1888.The ellipsoidal height was determined by GPS observations

DL1888.and is referenced to NAD 83.

DL1888

DL1888. The following values were computed from the NAD 83(2011) position.

DL1888

	North	East	Units	Scale Factor	Converg.
DL1888; SPC VA S	- 1,060,597.404	3,671,766.959	MT	0.99998382	+1 10 09.1
DL1888; SPC VA S	- 3,479,643.32	12,046,455.43	sFT	0.99998382	+1 10 09.1
DL1888!	- Elev Factor	x Scale Factor	=	Combined Factor	
DL1888! SPC VA S	- 1.00000306	x 0.99998382	=	0.99998688	

DL1888

SUPERSEDED SURVEY CONTROL

DL1888

DL1888 NAD 83(CORS)- 36 51 48.91975(N) 076 34 24.80926(W) AD(2002.00) c

DL1888 ELLIP H (03/??/09) -19.498 (m) GP(2002.00) c c

DL1888

DL1888.Superseded values are not recommended for survey control.

DL1888

DL1888.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

DL1888.[See file dsdata.txt](#) to determine how the superseded data were derived.

DL1888

DL1888_U.S. NATIONAL GRID SPATIAL ADDRESS: 18SUF5973680895(NAD 83)

DL1888

DL1888_MARKER: STATION IS THE ANTENNA REFERENCE POINT OF THE GPS ANTENNA

DL1888

STATION DESCRIPTION

DL1888

DL1888'DESCRIBED BY NATIONAL GEODETIC SURVEY 2011

DL1888'STATION IS A GPS CORS. LATEST INFORMATION INCLUDING POSITIONS AND

DL1888'VELOCITIES ARE AVAILABLE IN THE COORDINATE AND LOG FILES ACCESSIBLE

DL1888'BY ANONYMOUS FTP OR THE WORLDWIDE WEB.

DL1888' ftp://cors.ngs.noaa.gov/cors/README.txt

DL1888' ftp://cors.ngs.noaa.gov/cors/coord/coord_08

DL1888' ftp://cors.ngs.noaa.gov/cors/station_log

DL1888' http://geodesy.noaa.gov/CORS

1 National Geodetic Survey, Retrieval Date = MAY 14, 2014

DL2314 *****

DL2314 CORS - This is a GPS Continuously Operating Reference Station.

DL2314 DESIGNATION - LOYOLA LS02 CORS ARP

DL2314 CORS_ID - LS02

DL2314 PID - DL2314

DL2314 STATE/COUNTY- VA/C OF COLONIAL HGTS

DL2314 COUNTRY - US

DL2314 USGS QUAD - CHESTER (1994)

DL2314

*CURRENT SURVEY CONTROL

DL2314

DL2314* NAD 83(2011) POSITION- 37 15 47.89980(N) 077 24 39.91266(W) ADJUSTED

DL2314* NAD 83(2011) ELLIP HT- -6.331 (meters) (08/??/11) ADJUSTED

DL2314* NAD 83(2011) EPOCH - 2010.00

DL2314

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5/14/2014

DL2314' ftp://cors.ngs.noaa.gov/cors/coord/coord_08

DL2314' ftp://cors.ngs.noaa.gov/cors/station_log

DL2314' http://geodesy.noaa.gov/CORS

1 National Geodetic Survey, Retrieval Date = MAY 14, 2014

DL6898 *****

DL6898 HT_MOD - This is a Height Modernization Survey Station.

DL6898 CORS - This is a GPS Continuously Operating Reference Station.

DL6898 DESIGNATION - GATESVILLE CORS ARP

DL6898 CORS_ID - NCGA

DL6898 PID - DL6898

DL6898 STATE/COUNTY- NC/GATES

DL6898 COUNTRY - US

DL6898 USGS QUAD - MERCHANTS MILLPOND (1981)

DL6898

DL6898 *CURRENT SURVEY CONTROL

DL6898

DL6898* NAD 83(2011) POSITION- 36 26 12.65517(N) 076 43 16.51658(W) ADJUSTED

DL6898* NAD 83(2011) ELLIP HT- -20.472 (meters) (08/??/11) ADJUSTED

DL6898* NAD 83(2011) EPOCH - 2010.00

DL6898* [NAVD 88](#) ORTHO HEIGHT - 15.68 (meters) 51.4 (feet) GPS OBS

DL6898

DL6898 NAVD 88 orthometric height was determined with geoid model GEOID09

DL6898 GEOID HEIGHT - -36.09 (meters) GEOID09

DL6898 GEOID HEIGHT - -36.11 (meters) GEOID12A

DL6898 NAD 83(2011) X - 1,179,989.158 (meters) COMP

DL6898 NAD 83(2011) Y - -4,999,989.549 (meters) COMP

DL6898 NAD 83(2011) Z - 3,767,286.857 (meters) COMP

DL6898

DL6898. Formal positional accuracy estimates are not available for this CORS

DL6898. because its coordinates were determined in part using modeled

DL6898. velocities. Approximate one-sigma accuracies for latitude, longitude,

DL6898. and ellipsoid height can be obtained from the [short-term time series](#).

DL6898. Additional information regarding modeled velocities is available on

DL6898. the [CORS Coordinates](#) and [Multi-Year CORS Solution FAQ](#) web pages.

DL6898

DL6898. The coordinates were established by GPS observations

DL6898. and adjusted by the National Geodetic Survey in August 2011.

DL6898

DL6898. NAD 83(2011) refers to NAD 83 coordinates where the reference

DL6898. frame has been affixed to the stable North American Tectonic Plate.

DL6898

DL6898. The coordinates are valid at the epoch date displayed above

DL6898. which is a decimal equivalence of Year/Month/Day.

DL6898

DL6898. The orthometric height was determined by GPS observations and a

DL6898. high-resolution geoid model using precise GPS observation and

DL6898. processing techniques.

DL6898

DL6898. The PID for the CORS L1 Phase Center is DL6899.

DL6898

DL6898. The XYZ, and position/ellipsoidal ht. are equivalent.

DL6898

DL6898. The ellipsoidal height was determined by GPS observations

DL6898. and is referenced to NAD 83.

DL6898

DL6898. The following values were computed from the NAD 83(2011) position.

DL6898

DL6898; North East Units Scale Factor Converg.

DL6898; SPC NC - 300,420.808 813,921.941 MT 1.00008662 +1 18 54.8

DL6898; SPC NC - 985,630.60 2,670,342.23 SFT 1.00008662 +1 18 54.8

DL6898

DL6898! - Elev Factor x Scale Factor = Combined Factor

DL6898!SPC NC - 1.00000321 x 1.00008662 = 1.00008983

DL6898

DL6898

SUPERSEDED SURVEY CONTROL

DL6898

DL6898 NAD 83(CORS)- 36 26 12.65558(N) 076 43 16.51725(W) AD(2002.00) c

DL6898 ELLIP H (04/??/10) -20.471 (m) GP(2002.00) c c

DL6898

DL6898.Superseded values are not recommended for survey control.

DL6898

DL6898.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

DL6898.[See file dsdata.txt](#) to determine how the superseded data were derived.

DL6898

DL6898_U.S. NATIONAL GRID SPATIAL ADDRESS: 18SUF4572033779(NAD 83)

DL6898

DL6898_MARKER: STATION IS THE ANTENNA REFERENCE POINT OF THE GPS ANTENNA

DL6898

DL6898

STATION DESCRIPTION

DL6898

DL6898'DESCRIBED BY NATIONAL GEODETIC SURVEY 2011

DL6898'STATION IS A GPS CORS. LATEST INFORMATION INCLUDING POSITIONS AND

DL6898'VELOCITIES ARE AVAILABLE IN THE COORDINATE AND LOG FILES ACCESSIBLE

DL6898'BY ANONYMOUS FTP OR THE WORLDWIDE WEB.

DL6898' ftp://cors.ngs.noaa.gov/cors/README.txt

DL6898' ftp://cors.ngs.noaa.gov/cors/coord/coord_08

DL6898' ftp://cors.ngs.noaa.gov/cors/station_log

DL6898' http://geodesy.noaa.gov/CORS

1 National Geodetic Survey, Retrieval Date = MAY 14, 2014

DH7133 *****

DH7133 HT_MOD - This is a Height Modernization Survey Station.

DH7133 CORS - This is a GPS Continuously Operating Reference Station.

DH7133 DESIGNATION - JACKSON NC CORS ARP

DH7133 CORS_ID - NCJA

DH7133 PID - DH7133

DH7133 STATE/COUNTY- NC/NORTHAMPTON

DH7133 COUNTRY - US

DH7133 USGS QUAD - JACKSON (1974)

DH7133

DH7133

*CURRENT SURVEY CONTROL

DH7133

DH7133* NAD 83(2011) POSITION- 36 24 30.56335(N) 077 26 15.30879(W) ADJUSTED

DH7133* NAD 83(2011) ELLIP HT- 13.257 (meters) (08/??/11) ADJUSTED

DH7133* NAD 83(2011) EPOCH - 2010.00

DH7133* [NAVD 88](#) ORTHO HEIGHT - 47.68 (meters) 156.4 (feet) GPS OBS

DH7133

DH7133 NAVD 88 orthometric height was determined with geoid model GEOID03

DH7133 GEOID HEIGHT - -34.40 (meters) GEOID03

DH7133 GEOID HEIGHT - -34.41 (meters) GEOID12A

DH7133 NAD 83(2011) X - 1,117,799.302 (meters) COMP

DH7133 NAD 83(2011) Y - -5,016,201.207 (meters) COMP

DH7133 NAD 83(2011) Z - 3,764,774.710 (meters) COMP

DH7133

DH7133 FGDC Geospatial Positioning Accuracy Standards (95% confidence, cm)

DH7133 Type Horiz Ellip Dist(km)

DH7133

DH7133 NETWORK

1.97 6.70

DH7133

DH7133 NOTE: Click [here](#) for information on individual local accuracy

DH7133 values and other accuracy information.

DH7133

DH7133

DH7133.The coordinates were established by GPS observations
DH7133.and adjusted by the National Geodetic Survey in August 2011.

DH7133

DH7133.NAD 83(2011) refers to NAD 83 coordinates where the reference
DH7133.frame has been affixed to the stable North American Tectonic Plate.

DH7133

DH7133.The coordinates are valid at the epoch date displayed above
DH7133.which is a decimal equivalence of Year/Month/Day.

DH7133

DH7133.The orthometric height was determined by GPS observations and a
DH7133.high-resolution geoid model using precise GPS observation and
DH7133.processing techniques.

DH7133

DH7133.The PID for the CORS L1 Phase Center is DK8266.

DH7133

DH7133.The XYZ, and position/ellipsoidal ht. are equivalent.

DH7133

DH7133.The ellipsoidal height was determined by GPS observations
DH7133.and is referenced to NAD 83.

DH7133

DH7133. The following values were computed from the NAD 83(2011) position.

DH7133

DH7133;		North	East	Units	Scale Factor	Converg.
DH7133;SPC NC	-	296,031.384	749,749.096	MT	1.00007647	+0 54 06.4
DH7133;SPC NC	-	971,229.63	2,459,801.83	sFT	1.00007647	+0 54 06.4
DH7133!	-	Elev Factor	x	Scale Factor	=	Combined Factor
DH7133!SPC NC	-	0.99999792	x	1.00007647	=	1.00007439

DH7133

DH7133 SUPERSEDED SURVEY CONTROL

DH7133

DH7133	NAD 83(CORS)-	36 24 30.56363(N)	077 26 15.30930(W)	AD(2002.00) c
DH7133	ELLIP H (11/??/05)	13.272 (m)		GP(2002.00) c c

DH7133

DH7133.Superseded values are not recommended for survey control.

DH7133

DH7133.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

DH7133.[See file dsdata.txt](#) to determine how the superseded data were derived.

DH7133

DH7133_U.S. NATIONAL GRID SPATIAL ADDRESS: 18STF8142532018(NAD 83)

DH7133

DH7133_MARKER: STATION IS THE ANTENNA REFERENCE POINT OF THE GPS ANTENNA

DH7133

DH7133 STATION DESCRIPTION

DH7133

DH7133'DESCRIBED BY NATIONAL GEODETIC SURVEY 2011

DH7133'STATION IS A GPS CORS. LATEST INFORMATION INCLUDING POSITIONS AND
DH7133'VELOCITIES ARE AVAILABLE IN THE COORDINATE AND LOG FILES ACCESSIBLE
DH7133'BY ANONYMOUS FTP OR THE WORLDWIDE WEB.

DH7133' ftp://cors.ngs.noaa.gov/cors/README.txt

DH7133' ftp://cors.ngs.noaa.gov/cors/coord/coord_08

DH7133' ftp://cors.ngs.noaa.gov/cors/station_log

DH7133' http://geodesy.noaa.gov/CORS

*** retrieval complete.

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