

Final Survey Report

Light Detection and Ranging (LiDAR)
Contract Number 39891
Kansas Department of Agriculture South AOI
6531 SE Forbes Suite B
Topeka, Kansas
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Section 1: Executive Summary

1.1 Introduction

In support of the 2016 Kansas Department of Agriculture North AOI Light Detection and Ranging (LiDAR) project, a geodetic control survey was required to provide geographic coordinates for the aerial LiDAR, and, quality assurance and quality control (QA/QC) verification. The importance of this survey was twofold; to ensure a homogenous project meeting the United States Geological Survey (USGS) version 1.2 November 2014 standards for LiDAR Base Specification and to “tie” the mapping to the existing National Geodetic Survey (NGS) framework. This allows for repeatable accuracies for current and future surveying and mapping needs.

A primary control survey was established using Nine (9) existing NGS control monuments. To ensure the validity and “fit” of the 9 NGS control stations within the network, a GNSS static survey was performed. Two static sessions a minimum of 3 hours was performed during consecutive days. These 9 control monuments were used as the centralized base station support for aerial collection and the subsequent radial survey checkpoints.

To control the LiDAR acquisition, one hundred and forty-one (141) Ground Calibration Points (GCP) were strategically positioned throughout the project area of interest (AOI) and survey locations were derived by performing a Global Navigation Satellite System (GNSS) survey. In addition to the 141 Ground Calibration Points, 415 checkpoints were surveyed to be used for LiDAR vertical assessment. The checkpoints were distributed throughout the AOI representing a good sample of different types of land cover classes. Checkpoints surveyed were classified into two (2) ground cover sample groups being Non-Vegetated Vertical Accuracy (NVA) and Vegetated Vertical Accuracy (VVA).

The GNSS methodology used in the collection of all checkpoints were performed to meet the (USGS) version 1.2 November 2014 standards for LiDAR Base Specification which equates to having the digital elevation model RMSE equal to or less than 10.0 cm. (0.33 ft.); an accuracy equal to or less than of 19.6 cm. (0.64 ft.) at the 95% confidence level for NVA checkpoints; and an accuracy equal to or less than 29.4 cm. (0.96 ft.) at the 95% confidence level for VVA checkpoints. Typically, surveys should be at least three times as accurate as the final product being tested. Based on primary control survey network design, local network accuracies, and survey techniques, accuracies are within 3 cm.

All GCP's and Checkpoints meet and exceed the required accuracy, and were established utilizing the UTM, Zone 14 (NAD83), 2007 Epoch of 2002.00, (HARN) horizontally, and NAVD88 utilizing Geoid 12B. The following sections within this report contain the methodology and results with additional supporting documentation in a separate document - [15164_Survey_Report_2016_Kansas_LiDAR_North-AOI_Appendix.pdf](#).

Section 2: Survey Standards and Equipment

2.1 Introduction

Several different survey methods and procedures were used in the development of this survey. The survey consisted of the following step:

1. NGS control monument reconnaissance and condition evaluation
2. GNSS survey of all NGS control monuments
 - 2.a Minimum collection of 3 hours' sessions on multiple consecutive days
3. Evaluate the integrity of the NGS control monuments
4. Identify locations for GCP's and Checkpoints for adequate positioning.
5. GNSS survey of GCP's and Checkpoints.
6. Review the quality of GCP and checkpoint computed coordinates through data processing.

2.2 Applicable Standards

The accuracy standard for the survey was United States Geological Survey (USGS) version 1.2 November 2014 standards for LiDAR Base Specification of Quality Level 2 (QL2). Quality Level 2 ensures that point cloud and derivative products are suitable for the 3D Elevation Program (3DEP) and the National Elevation Dataset (NED).

Table 1 – USGS Vertical Accuracy for digital elevation models (QL2)

Non-vegetated (NVA) RMSE	Non-vegetated (NVA) 95% Confidence Level	Vegetated (VVA) 95% Confidence Level
≤ 10.0 cm.	≤ 19.6 cm.	≤ 29.4 cm.

2.3 Datum and Coordinate Systems

All monumented survey control coordinates are reported in UTM, Zone 14 North American Datum 1983 (NAD83), 2007 Epoch of 2002.00 High Accuracy Reference Network (HARN) horizontally, and the North American Vertical Datum of 1988 (NAVD88) utilizing Geoid 12B vertically.

2.4 Survey Equipment

The following survey equipment was utilized to collect the survey coordinates:

- Leica SR530 GPS System SN 136534 (Dual Frequency)
- Leica SR530 GPS System SN 136512 (Dual Frequency)
- Leica SR530 GPS System SN 136496 (Dual Frequency)
- Topcon HiPer V GPS System SN 1132-10004 (Dual Frequency)
- Topcon HiPer V GPS System SN 1132-10002 (Dual Frequency)
- Trimble R10 GPS System SN463813854 (Dual Frequency)
- Trimble R10 GPS System SN463817776 (Dual Frequency)
- Trimble R10 GPS System SN463817846 (Dual Frequency)

Section 3: Survey Methodology and Processing Results

A survey crew mobilized to the North Kansas AOI to perform the survey between January 1st and May 12th, 2016.

3.1 Primary Control Network Survey

A primary control network was performed to check the integrity of nine (9) existing NGS monuments, one (1) CORS station and three (3) Atlantic set points as illustrated in Figure 1. Final values from the primary control network was used as central control for ground calibration points and checkpoints to control the LiDAR acquired.

The survey crew recovered NGS Monuments *SYFA, Z77, Z_155, F82, DUSTY, Z151, HLC_C, A20, and M98* to be used as primary control along with set project control monuments: ATL01-ATL03. Each GNSS observation consisted of; setting the receiver on a fixed height tripod or a fixed 2 meter rod which mitigates antenna height errors, the collection of dual frequency GNSS data with Global Positioning System (GPS) Leica w/ Leica AT502 antenna receivers and Topcon HiPer V (GPS) receivers both configured to log data at 1 Hz, and at 10 degrees mask for a minimum of 3 hour observations on six (6) consecutive days, and post-processing data using GrafNet 8.60.2105 with their respective GPS antenna type and antenna height reading. The NGS monument datasheets can be found in a separate document - *15164_Survey_Report_2016_Kansas_LiDAR_South-AOI_Appendix.pdf*.

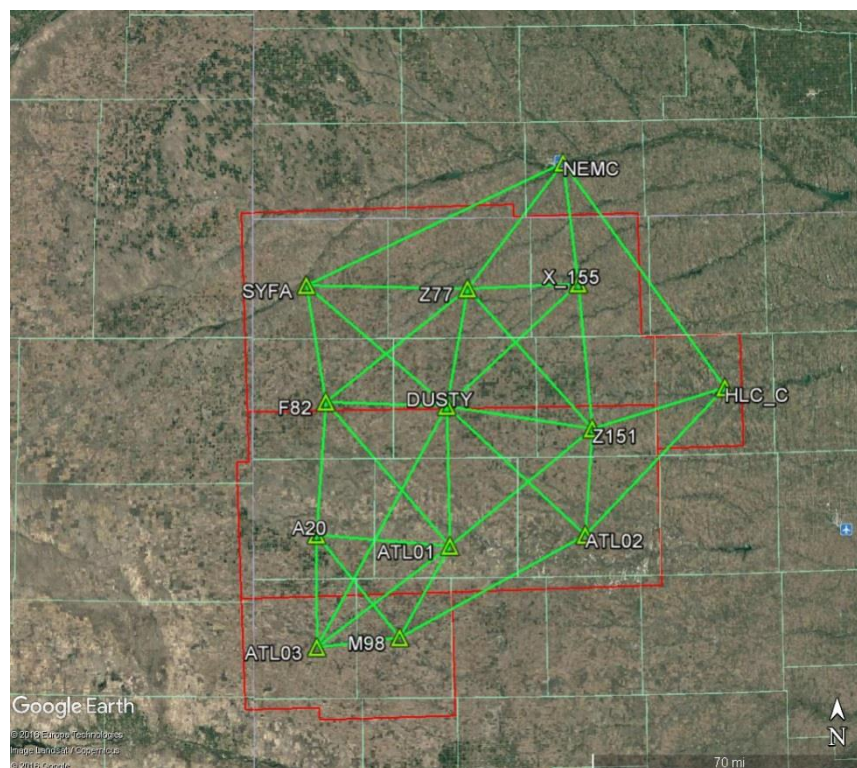


Figure 1 - NGS Control Monuments in Primary Network Survey

Observations for each session was processed using GrafNet 8.60.2105 with their respective GPS antenna type, and antenna height reading, and two (2) adjustments were made during network's development.

A minimally constrained network adjustment was performed, holding National Geodetic Survey (NGS) Monument (**NEMC**) as a horizontal and vertical control point. During this adjustment, baselines were analyzed and evaluated against other redundant baselines to see if it should remain or be rejected. The purpose of the minimally constrained adjustment is to check the integrity of vector measurements against the NGS control points and to compare the computed values versus the published values.

After full evaluation of the minimally constrained adjustment, the network was constrained for a final network adjustment, **A20, Dusty, F82, SYFA, M98, x_155, Z151, Z77, AND NEMC** holding as a horizontal and vertical control point and applying the scale factor. Point residuals for NGS Monuments and Atlantic set monuments were reviewed based on the distance between each point and are found to be within acceptable limits. The network adjustment reports can be found in a separate document - *15164_Survey_Report_2016_Kansas_LiDAR_North-AOI_Appendix.pdf*.

3.2 Real Time Kinematic GNSS Radial Survey

A Real Time Kinematic GNSS Radial Survey was performed utilizing Trimble R10 GNSS receivers, four hundred and fifteen (415) total checkpoints were collected, two hundred and thirty-eight (238) NVA and one hundred and seventy-seven (177) VVA. This survey was controlled by using the final NGS control monument values derived from the primary control network for each GNSS session. Trimble R10 GNSS receiver solutions provided high-accuracy real-time corrections via cellular collection at the GNSS base Global Positioning System (GPS) receiver.

Each GNSS observation consisted of the following:

1. Setting a Trimble R10 base receiver on a fixed height tripod over the primary NGS control monument for session control.
2. Collect dual frequency base GNSS data at base receiver and receive real-time corrections from the Trimble R10 base receiver. Base GPS receiver was configured to log data at 1 Hz, and at a 10 degree mask for the duration of the session.
3. Setting a Trimble R10 rover receiver on a fixed 2 meter rod for checkpoint collection.
4. Collect dual frequency rover GNSS data on each checkpoint using the radial line survey method. GPS receiver was configured to log data at 1 Hz, and at a 10 degree mask for a minimum of 10 second observations.

The advantages of using Real-Time Kinematic (RTK) first and foremost is the accuracy (typically +/- 10mm (0.03 ft.) + 1ppm RMS). All final point solutions utilized from this method for this project were all fixed integers with an estimated RMS values less than 0.02m horizontally and 0.03m vertically. See Figure 2)

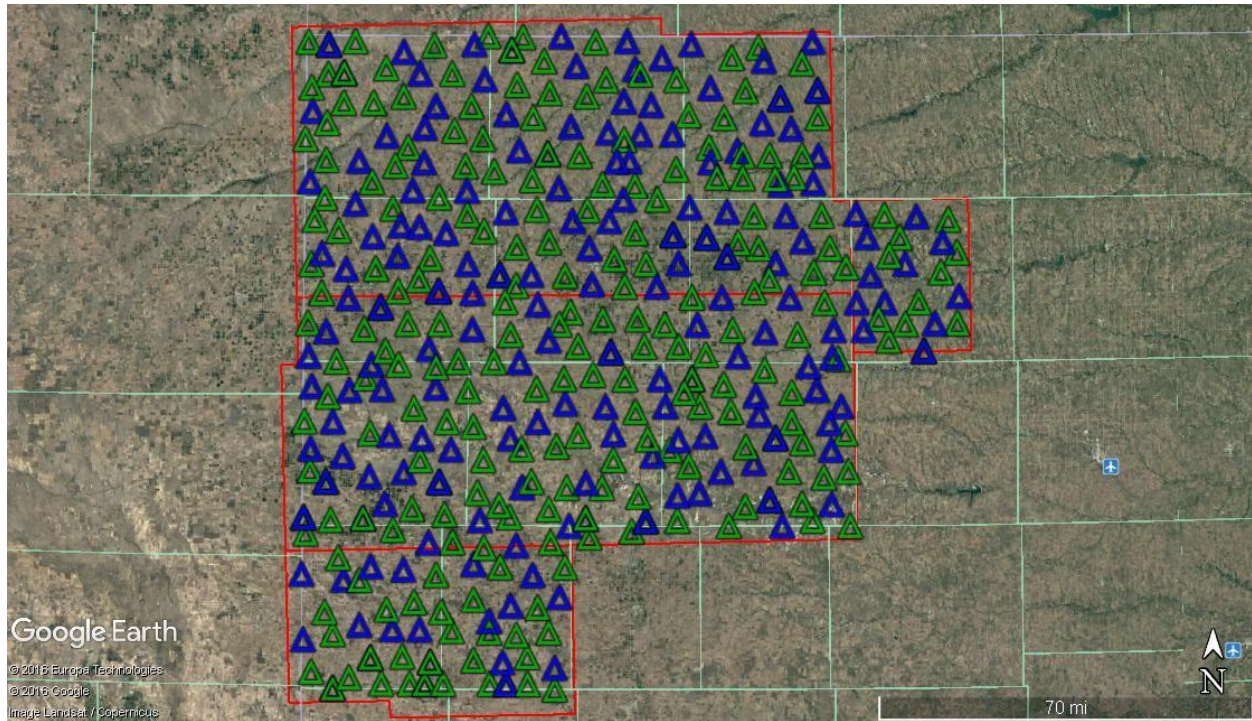


Figure 2 – Real Time Kinematic GNSS Radial Survey Points

3.3 Static GNSS Radial Survey

Using the 11 primary network control points as base station locations, static GNSS radial baselines were surveyed to collect three-dimensional positions on one hundred and forty-one (141) Ground Calibration Points (GCP). These calibration points were strategically positioned throughout the project AOI to be used as control during calibration of the LiDAR. See Figure 3)

Each GNSS observation consisted of the following:

1. Setting Topcon GPS HiPer V base receiver or on a fixed height tripod over the primary NGS control monument for session control.
2. Collect dual frequency base GNSS data at base receiver. Base GPS receiver was configured to log data at 1 Hz, and at a 10 degree mask for the duration of the session.
3. Setting a Topcon GPS HiPer V rover receiver on a fixed 2 meter rod for GCP and checkpoint collection.
4. Collect dual frequency rover GNSS data on each checkpoint using the radial line survey method. GPS receiver was configured to log data at 1 Hz, and at a 10 degree mask for a minimum of 30 minute observations.
5. All observations were post-processing data using GrafNet 8.60.2105 with their respective GPS antenna type and antenna height reading.

The advantages of using Static GNSS Radial is that the accuracy (typically +/- 10mm (0.03 ft.) + 1ppm RMS) is equal to the accuracies obtained from Real-Time Kinematic (RTK) and the ability to tie all points collected into the established network for final coordinates. The network adjustment reports can be found in a separate document - [15164_Survey_Report_2016_Kansas_LiDAR_North-AOI_Appendix.pdf](#).

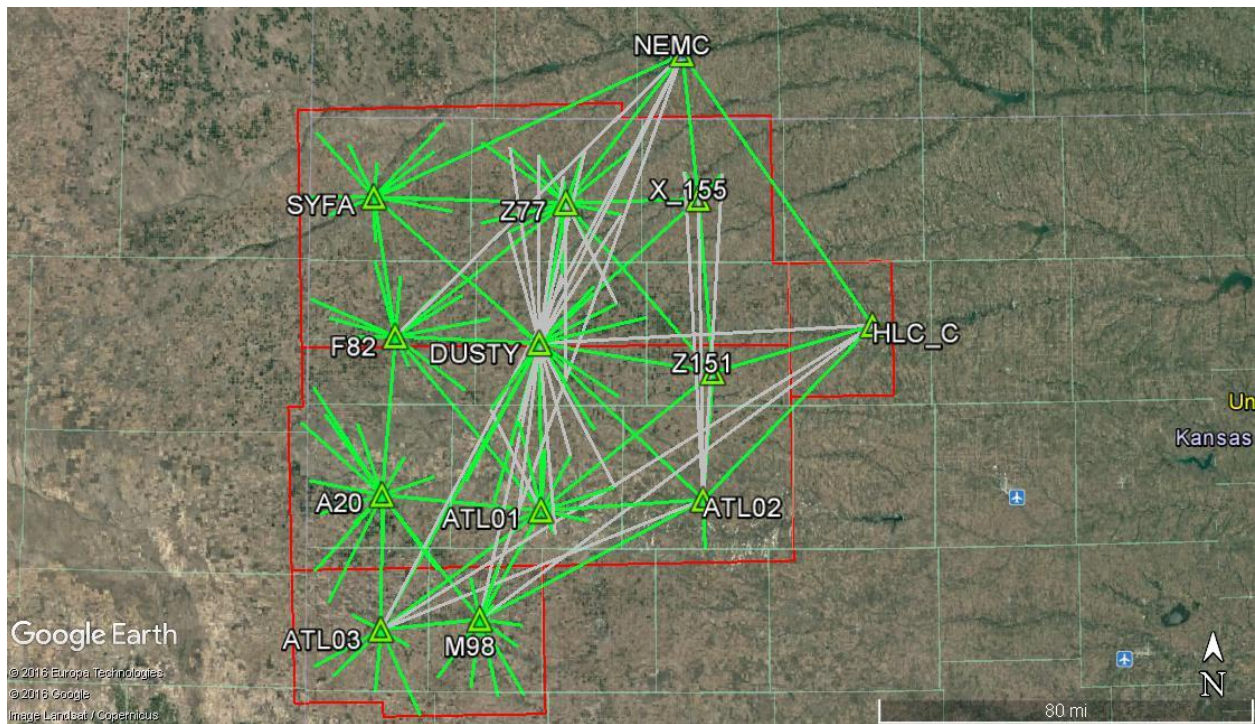


Figure 3 – Ground Calibration Point and Checkpoint Static GNSS Radial Survey

3.4 Final Ground Control Coordinates

Table 2 lists the final coordinates derived from the primary control network survey, Ground Calibration Point and Checkpoint Network Survey, and Real Time Kinematic (RTK) GNSS Survey.

Table 2 - Final Coordinates to be used for the LiDAR solution.

Point ID	Easting (m)	Northing (m)	Height (m)	Class
GCP001	252238.998	4422899.596	1058.513	Control Point
GCP002	271118.758	4408971.318	1053.270	Control Point
GCP002A	270312.097	4409010.392	1049.563	Control Point
GCP003	286929.660	4399699.966	1049.341	Control Point
GCP004	305849.331	4392254.774	944.915	Control Point
GCP005	323505.091	4377840.212	968.061	Control Point
GCP006	341847.153	4367577.517	923.040	Control Point
GCP007	359019.602	4356930.803	884.769	Control Point
GCP007A	241168.301	4427415.720	1078.913	Control Point
GCP008	375445.882	4342826.631	847.262	Control Point
GCP009	395331.324	4332170.781	780.098	Control Point
GCP010	430026.038	4341432.923	712.602	Control Point
GCP011	412609.502	4353930.184	724.899	Control Point



GCP012	395231.980	4367775.322	786.139	Control Point
GCP013	377767.260	4379146.538	840.119	Control Point
GCP014	358603.061	4387790.487	874.812	Control Point
GCP015	343968.519	4397392.430	858.922	Control Point
GCP017	306744.267	4420836.670	989.688	Control Point
GCP018	284560.280	4429520.433	947.576	Control Point
GCP020	378299.970	4410470.341	816.112	Control Point
GCP021	431367.757	4375344.630	724.667	Control Point
GCP022	395217.896	4298369.800	746.683	Control Point
GCP023	376636.744	4310077.126	787.499	Control Point
GCP024	358992.787	4321709.389	864.947	Control Point
GCP025	341628.928	4336384.408	921.482	Control Point
GCP026	316229.711	4348262.788	987.843	Control Point
GCP027	308504.759	4359848.666	1011.846	Control Point
GCP028	290013.231	4371548.058	1055.003	Control Point
GCP029	268911.012	4378498.607	1089.497	Control Point
GCP030	260566.395	4390022.153	1111.834	Control Point
GCP031	252237.655	4358038.776	1153.601	Control Point
GCP032	271129.887	4347859.068	1110.490	Control Point
GCP033	290179.805	4339318.000	1048.594	Control Point
GCP034	307961.574	4328851.350	993.360	Control Point
GCP035	325215.094	4316745.903	964.486	Control Point
GCP036	340089.257	4305946.250	897.277	Control Point
GCP037	359590.483	4287940.894	794.620	Control Point
GCP038	306858.951	4295638.322	937.649	Control Point
GCP039	289658.770	4308891.982	951.762	Control Point
GCP039A	289661.996	4308891.378	951.644	Control Point
GCP040	269068.793	4317386.601	1052.756	Control Point
GCP041	253439.582	4328921.503	1143.306	Control Point
GCP042	236581.624	4310152.591	1172.434	Control Point
GCP043	251247.895	4295235.028	1155.227	Control Point
GCP045	290595.643	4276472.369	1024.409	Control Point
GCP046	307931.413	4259976.763	977.157	Control Point
GCP047	289933.026	4239394.233	1015.868	Control Point
GCP048	269360.234	4253565.843	1074.647	Control Point
GCP049	250192.716	4264559.550	1132.512	Control Point
GCP050	237763.473	4279483.195	1180.770	Control Point
GCP051	236946.544	4247306.701	1163.068	Control Point
GCP052	244939.318	4399320.784	1095.103	Control Point
GCP053	261724.658	4416791.018	1043.082	Control Point
GCP054	297230.137	4422726.484	1011.306	Control Point



GCP055	280602.095	4403885.016	1063.818	Control Point
GCP056	260388.695	4383636.731	1095.483	Control Point
GCP057	244433.450	4364720.341	1165.923	Control Point
GCP058	242390.499	4332506.755	1199.180	Control Point
GCP059	263442.190	4354507.516	1133.121	Control Point
GCP060	282382.629	4373346.377	1069.730	Control Point
GCP061	296429.015	4395421.323	1021.215	Control Point
GCP062	316282.964	4418128.048	950.415	Control Point
GCP063	347849.955	4419130.003	812.633	Control Point
GCP064	331021.305	4402556.360	941.252	Control Point
GCP065	315232.696	4383646.324	985.003	Control Point
GCP066	298975.782	4363314.171	1028.597	Control Point
GCP067	279030.287	4342860.024	1090.872	Control Point
GCP068	262846.945	4320615.379	1110.275	Control Point
GCP069	239933.913	4298813.463	1169.185	Control Point
GCP070	242270.983	4268868.588	1164.881	Control Point
GCP071	261449.194	4288529.437	1104.682	Control Point
GCP072	279256.199	4310703.017	989.047	Control Point
GCP073	298492.960	4332880.145	1026.736	Control Point
GCP074	309970.686	4354955.099	1014.104	Control Point
GCP075	334441.823	4373573.850	941.262	Control Point
GCP076	349114.684	4394138.991	883.014	Control Point
GCP077	365543.080	4411492.803	832.739	Control Point
GCP078	386181.059	4404700.586	806.892	Control Point
GCP079	368110.370	4383074.238	853.884	Control Point
GCP080	351830.948	4361918.554	906.029	Control Point
GCP080A	351830.948	4361918.554	906.029	Control Point
GCP080B	351848.872	4362714.463	907.474	Control Point
GCP081	324082.492	4341551.096	973.823	Control Point
GCP082	316638.362	4319327.779	970.793	Control Point
GCP083	299039.253	4302269.637	1005.245	Control Point
GCP084	279591.009	4279261.629	1053.613	Control Point
GCP085	259775.077	4257849.874	1101.362	Control Point
GCP086	243270.027	4243834.574	1140.415	Control Point
GCP087	278713.470	4242876.707	1045.569	Control Point
GCP089	319528.413	4290404.847	916.002	Control Point
GCP090	334572.440	4309211.214	924.974	Control Point
GCP091	350612.605	4328230.735	906.700	Control Point
GCP092	367659.750	4351978.447	858.992	Control Point
GCP093	385547.129	4370946.931	819.808	Control Point
GCP094	419339.914	4370440.077	764.080	Control Point



GCP095	403424.262	4357640.575	737.755	Control Point
GCP096	385019.730	4337175.560	799.678	Control Point
GCP097	366729.847	4313411.414	813.870	Control Point
GCP098	351802.122	4297753.653	846.312	Control Point
GCP099	330929.361	4294794.891	866.831	Control Point
GCP100	370035.290	4286976.769	774.920	Control Point
GCP101	385797.762	4303449.714	786.380	Control Point
GCP102	423671.006	4345696.862	725.957	Control Point
GCP103	433608.373	4359108.337	644.705	Control Point
GCP104	394416.508	4283957.423	795.401	Control Point
GCP104A	238748.344	4341527.387	1212.777	Control Point
GCP105	238246.360	4371230.461	1183.534	Control Point
GCP106	237643.472	4405769.970	1143.168	Control Point
GCP108	281159.210	4419992.329	1015.144	Control Point
GCP109	332246.002	4419761.365	919.356	Control Point
GCP110	383361.892	4424965.928	777.800	Control Point
GCP111	383730.625	4284219.501	771.554	Control Point
GCP112	412704.214	4338334.445	758.152	Control Point
GCP113	307911.681	4236341.037	972.912	Control Point
GCP114	299113.336	4236012.032	990.447	Control Point
GCP115	306129.669	4252876.620	977.951	Control Point
GCP116	257477.827	4238195.067	1096.792	Control Point
GCP117	272544.959	4230228.744	1055.479	Control Point
GCP118	411408.096	4378597.974	766.071	Control Point
GCP119	398919.397	4319233.840	782.089	Control Point
GCP120	234228.593	4329727.941	1234.716	Control Point
GCP121	324400.854	4280553.432	945.521	Control Point
GCPX001	365761.031	4422816.053	839.149	Control Point
GCPX002	366389.678	4368073.812	869.449	Control Point
GCPX003	342025.132	4355685.984	931.463	Control Point
GCPX004	343784.522	4320373.602	891.819	Control Point
GCPX005	431807.725	4351115.042	696.436	Control Point
GCPX006	309560.480	4340476.358	993.035	Control Point
GCPX007	306629.110	4351151.868	1018.387	Control Point
GCPX008	317510.586	4403460.930	893.556	Control Point
GCPX009	392759.264	4306504.645	736.961	Control Point
GCPX010	392575.876	4290396.212	732.986	Control Point
GCPX011	393188.537	4345993.662	812.263	Control Point
GCPX012	328870.037	4291668.425	865.581	Control Point
GCPX013	314563.082	4285716.191	936.470	Control Point
GCPX014	287411.569	4355002.175	1050.199	Control Point

GCPX015	242550.283	4355967.410	1189.339	Control Point
GCPX016	265828.218	4302636.455	1093.579	Control Point
GCPX017	255557.026	4301529.277	1140.430	Control Point
NVA001	236839.782	4244043.505	1169.011	Bare Earth/Open Terrain
NVA002	243565.535	4255114.787	1150.229	Urban Terrain
NVA003	259758.788	4262084.411	1100.692	Urban Terrain
NVA004	277666.602	4289808.469	1070.300	Urban Terrain
NVA005	287577.979	4295991.353	1029.302	Urban Terrain
NVA006	289532.060	4305674.640	991.257	Urban Terrain
NVA007	305745.598	4326259.371	1014.224	Urban Terrain
NVA008	318330.708	4338537.472	981.598	Urban Terrain
NVA009	325824.080	4346365.438	967.646	Bare Earth/Open Terrain
NVA010	332496.769	4355893.378	952.838	Bare Earth/Open Terrain
NVA011	338988.675	4362428.693	927.476	Bare Earth/Open Terrain
NVA012	360576.896	4387517.398	859.944	Urban Terrain
NVA013	379914.747	4410386.533	808.163	Bare Earth/Open Terrain
NVA014	386562.906	4420870.026	775.193	Urban Terrain
NVA015	369605.434	4412997.186	814.694	Bare Earth/Open Terrain
NVA016	363101.509	4405105.987	794.038	Bare Earth/Open Terrain
NVA017	358445.076	4396390.371	866.182	Bare Earth/Open Terrain
NVA018	348503.137	4390144.660	875.087	Urban Terrain
NVA019	342731.539	4381379.308	913.690	Bare Earth/Open Terrain
NVA020	335991.953	4371620.280	928.051	Bare Earth/Open Terrain
NVA021	329587.416	4364054.980	953.999	Urban Terrain
NVA022	316268.152	4348694.768	983.697	Bare Earth/Open Terrain
NVA023	286777.234	4315577.850	974.986	Bare Earth/Open Terrain
NVA024	268039.195	4291738.933	1098.771	Urban Terrain
NVA025	262220.010	4285639.284	1101.655	Bare Earth/Open Terrain
NVA026	241291.187	4261644.562	1165.455	Bare Earth/Open Terrain
NVA027	245743.179	4277644.437	1161.627	Urban Terrain
NVA028	278953.770	4317139.567	1017.067	Bare Earth/Open Terrain
NVA029	285456.813	4326161.980	1044.449	Urban Terrain
NVA030	293269.349	4334498.377	1010.538	Bare Earth/Open Terrain
NVA031	298391.334	4342442.078	1034.733	Bare Earth/Open Terrain
NVA032	314893.937	4359467.290	985.930	Urban Terrain
NVA033	352543.390	4406102.850	860.468	Bare Earth/Open Terrain
NVA034	365747.233	4422815.090	839.120	Bare Earth/Open Terrain
NVA035	349165.426	4416634.637	863.797	Urban Terrain
NVA036	310343.003	4369427.107	1002.065	Bare Earth/Open Terrain
NVA037	296977.514	4352111.315	1048.668	Urban Terrain
NVA038	282754.336	4334786.548	1030.789	Bare Earth/Open Terrain



NVA039	269243.540	4321366.507	1088.914	Bare Earth/Open Terrain
NVA041	243740.111	4288922.701	1167.816	Urban Terrain
NVA042	236237.726	4285071.698	1191.601	Bare Earth/Open Terrain
NVA043	256072.792	4314243.576	1079.524	Bare Earth/Open Terrain
NVA044	264990.978	4334363.893	1123.056	Urban Terrain
NVA045	277512.490	4346084.763	1099.092	Bare Earth/Open Terrain
NVA046	300749.745	4368231.142	1031.704	Urban Terrain
NVA047	307017.702	4379171.649	1008.168	Bare Earth/Open Terrain
NVA048	319946.440	4394774.680	950.023	Urban Terrain
NVA049	338468.339	4418482.854	867.600	Bare Earth/Open Terrain
NVA051	322444.534	4412331.658	901.722	Bare Earth/Open Terrain
NVA052	305746.711	4387942.184	1007.521	Urban Terrain
NVA053	291206.275	4373130.891	1050.189	Bare Earth/Open Terrain
NVA054	267894.118	4346329.429	1124.760	Urban Terrain
NVA055	261195.316	4338445.781	1146.809	Bare Earth/Open Terrain
NVA056	236625.421	4318208.362	1188.301	Urban Terrain
NVA057	243739.435	4325357.950	1181.761	Urban Terrain
NVA058	246562.526	4335656.261	1192.569	Bare Earth/Open Terrain
NVA059	254966.439	4345054.675	1157.358	Urban Terrain
NVA060	274961.434	4365487.418	1097.892	Bare Earth/Open Terrain
NVA061	294543.035	4390668.830	1027.147	Bare Earth/Open Terrain
NVA062	306424.666	4406398.762	984.131	Bare Earth/Open Terrain
NVA063	311483.202	4413547.711	941.949	Bare Earth/Open Terrain
NVA064	325439.038	4428337.243	920.320	Urban Terrain
NVA065	309995.576	4423026.874	962.686	Bare Earth/Open Terrain
NVA066	301877.030	4416141.225	1008.357	Urban Terrain
NVA067	291359.783	4400401.731	1037.356	Bare Earth/Open Terrain
NVA068	286045.036	4392465.274	1050.748	Urban Terrain
NVA069	278052.562	4383403.881	1082.836	Bare Earth/Open Terrain
NVA070	258797.992	4362768.784	1131.978	Bare Earth/Open Terrain
NVA071	264225.893	4380454.703	1104.580	Bare Earth/Open Terrain
NVA072	288177.109	4410130.013	1041.957	Bare Earth/Open Terrain
NVA073	282650.455	4419918.721	998.202	Urban Terrain
NVA074	265221.913	4393072.016	1086.004	Bare Earth/Open Terrain
NVA075	247962.053	4374272.911	1159.798	Urban Terrain
NVA076	244018.186	4384065.364	1152.666	Bare Earth/Open Terrain
NVA077	268084.476	4413485.799	1013.617	Urban Terrain
NVA078	277503.756	4428487.691	933.192	Bare Earth/Open Terrain
NVA079	263063.542	4422060.584	991.864	Bare Earth/Open Terrain
NVA080	259137.382	4411822.683	1046.639	Urban Terrain
NVA081	244683.254	4395313.054	1073.650	Bare Earth/Open Terrain

NVA082	245101.947	4406240.581	1121.835	Urban Terrain
NVA083	254005.753	4430243.230	1055.752	Bare Earth/Open Terrain
NVA084	240764.969	4416863.493	1122.587	Bare Earth/Open Terrain
NVA085	240061.361	4430504.111	1018.000	Urban Terrain
NVA086	376356.919	4393656.439	823.944	Bare Earth/Open Terrain
NVA087	357102.392	4369853.165	886.710	Bare Earth/Open Terrain
NVA088	322623.673	4330134.665	967.209	Bare Earth/Open Terrain
NVA089	300878.044	4308673.912	913.121	Bare Earth/Open Terrain
NVA090	279834.566	4281598.638	1050.180	Urban Terrain
NVA091	274760.389	4272003.660	1067.104	Bare Earth/Open Terrain
NVA092	268026.294	4264065.146	1079.476	Bare Earth/Open Terrain
NVA093	248068.645	4242095.592	1126.138	Urban Terrain
NVA094	264138.741	4248060.903	1088.360	Bare Earth/Open Terrain
NVA095	289098.497	4279770.591	1029.691	Bare Earth/Open Terrain
NVA096	296922.393	4288686.865	1014.055	Bare Earth/Open Terrain
NVA097	303673.570	4298947.495	968.386	Bare Earth/Open Terrain
NVA098	317716.169	4312315.354	919.745	Urban Terrain
NVA099	332018.151	4328566.273	946.876	Bare Earth/Open Terrain
NVA100	337914.135	4338069.424	935.223	Bare Earth/Open Terrain
NVA101	344149.662	4344369.274	926.733	Bare Earth/Open Terrain
NVA102	352389.194	4352258.214	900.609	Urban Terrain
NVA103	366370.092	4368074.047	869.269	Bare Earth/Open Terrain
NVA104	371321.082	4375863.431	842.521	Bare Earth/Open Terrain
NVA105	386018.441	4393428.693	784.045	Urban Terrain
NVA106	375382.612	4357015.353	816.059	Bare Earth/Open Terrain
NVA107	348133.629	4337869.208	905.493	Urban Terrain
NVA108	334916.408	4318890.286	937.682	Bare Earth/Open Terrain
NVA109	314061.834	4296995.081	936.579	Bare Earth/Open Terrain
NVA110	308602.914	4290761.828	979.483	Urban Terrain
NVA111	293808.606	4273926.107	1012.868	Bare Earth/Open Terrain
NVA112	285667.924	4264491.933	1030.744	Bare Earth/Open Terrain
NVA113	279036.807	4255373.876	1048.785	Urban Terrain
NVA114	266125.567	4239960.548	1079.296	Bare Earth/Open Terrain
NVA115	276111.629	4239722.285	1051.839	Bare Earth/Open Terrain
NVA116	285278.751	4246528.746	1028.019	Urban Terrain
NVA117	308927.520	4280921.586	979.311	Bare Earth/Open Terrain
NVA118	313023.329	4273510.926	967.702	Bare Earth/Open Terrain
NVA119	304720.609	4261708.036	974.402	Bare Earth/Open Terrain
NVA120	298181.537	4253712.461	984.013	Bare Earth/Open Terrain
NVA121	289923.416	4239395.961	1015.984	Urban Terrain
NVA122	307788.028	4254335.385	978.002	Bare Earth/Open Terrain



NVA123	309228.163	4237419.061	969.579	Bare Earth/Open Terrain
NVA124	324529.911	4296708.372	884.434	Bare Earth/Open Terrain
NVA125	328046.928	4304891.401	878.256	Urban Terrain
NVA126	338352.023	4310786.396	911.801	Bare Earth/Open Terrain
NVA127	356093.408	4335294.668	892.449	Bare Earth/Open Terrain
NVA128	364217.077	4342359.738	874.920	Bare Earth/Open Terrain
NVA129	370906.582	4353513.469	849.601	Urban Terrain
NVA130	391419.076	4375640.777	813.403	Bare Earth/Open Terrain
NVA131	393564.034	4365931.874	790.066	Bare Earth/Open Terrain
NVA132	388631.495	4358907.039	762.917	Urban Terrain
NVA133	361260.419	4326399.976	875.092	Bare Earth/Open Terrain
NVA134	354118.610	4320108.183	883.886	Urban Terrain
NVA135	335230.014	4293915.160	836.657	Bare Earth/Open Terrain
NVA136	350372.342	4302590.349	862.283	Bare Earth/Open Terrain
NVA137	363161.916	4318376.119	846.513	Urban Terrain
NVA138	383416.667	4340591.251	819.492	Bare Earth/Open Terrain
NVA139	391686.747	4349892.403	814.752	Bare Earth/Open Terrain
NVA140	398294.103	4360227.233	771.040	Bare Earth/Open Terrain
NVA141	410093.417	4375395.802	771.874	Urban Terrain
NVA142	414498.878	4368781.083	762.996	Bare Earth/Open Terrain
NVA143	419691.183	4349523.415	729.827	Bare Earth/Open Terrain
NVA144	415611.028	4343139.274	765.046	Urban Terrain
NVA145	381394.834	4323616.164	826.563	Bare Earth/Open Terrain
NVA146	367398.310	4307865.158	860.451	Urban Terrain
NVA147	346670.053	4286563.580	848.477	Bare Earth/Open Terrain
NVA148	366885.941	4290238.233	761.347	Urban Terrain
NVA149	381200.121	4314835.815	798.034	Bare Earth/Open Terrain
NVA150	380027.909	4300360.879	772.765	Bare Earth/Open Terrain
NVA151	383783.173	4290659.411	747.047	Urban Terrain
NVA152	390419.531	4298400.081	758.768	Bare Earth/Open Terrain
NVA153	361879.156	4284690.581	812.333	Urban Terrain
NVA154	384247.244	4308727.115	762.160	Bare Earth/Open Terrain
NVA155	245749.681	4420702.342	1101.632	Bare Earth/Open Terrain
NVA156	303935.545	4430329.610	977.675	Bare Earth/Open Terrain
NVA157	240954.774	4377713.588	1170.223	Urban Terrain
NVA158	373762.373	4425792.267	799.545	Bare Earth/Open Terrain
NVA159	390956.290	4404634.928	804.879	Bare Earth/Open Terrain
NVA160	429076.313	4373738.119	733.014	Bare Earth/Open Terrain
NVA161	431498.889	4363982.520	695.467	Urban Terrain
NVA162	431092.721	4343025.678	726.508	Bare Earth/Open Terrain
NVA163	395346.868	4333260.767	757.264	Bare Earth/Open Terrain



NVA164	397707.613	4299938.232	756.877	Bare Earth/Open Terrain
NVA165	398006.156	4283870.569	781.372	Urban Terrain
NVA166	386843.475	4285723.401	769.350	Bare Earth/Open Terrain
NVA167	333052.841	4283700.093	862.261	Bare Earth/Open Terrain
NVA168	320420.726	4282225.926	953.597	Bare Earth/Open Terrain
NVA169	301282.656	4247194.390	985.872	Urban Terrain
NVA170	290136.932	4254707.964	1014.247	Bare Earth/Open Terrain
NVA171	237939.515	4303709.093	1187.790	Bare Earth/Open Terrain
NVA172	238290.057	4347201.426	1209.678	Urban Terrain
NVA173	239637.486	4364572.143	1192.318	Bare Earth/Open Terrain
NVA174	238592.017	4401657.719	1116.127	Bare Earth/Open Terrain
NVA175	410522.175	4338339.424	756.716	Bare Earth/Open Terrain
NVA176	397093.920	4311232.033	771.267	Urban Terrain
NVA177	293573.040	4430849.442	983.942	Bare Earth/Open Terrain
NVA178	336190.915	4385587.277	930.204	Bare Earth/Open Terrain
NVA179	407672.183	4344818.124	779.171	Bare Earth/Open Terrain
NVA180	344826.442	4307490.714	874.931	Urban Terrain
NVA181	255080.142	4330549.551	1143.843	Bare Earth/Open Terrain
NVA182	271547.127	4359167.035	1106.272	Bare Earth/Open Terrain
NVA183	286318.397	4378054.128	1055.158	Bare Earth/Open Terrain
NVA184	321908.547	4378674.874	977.407	Urban Terrain
NVA185	269121.165	4398369.938	1065.247	Bare Earth/Open Terrain
NVA186	333282.994	4399264.177	920.041	Bare Earth/Open Terrain
NVA187	349465.114	4324288.398	902.398	Bare Earth/Open Terrain
NVA188	312909.146	4345167.690	996.607	Urban Terrain
NVA189	270790.138	4306040.783	1029.336	Bare Earth/Open Terrain
NVA190	276082.083	4333313.027	1075.682	Bare Earth/Open Terrain
NVA191	300362.895	4356820.004	1028.685	Urban Terrain
NVA192	251938.773	4270996.406	1135.388	Bare Earth/Open Terrain
NVA193	411226.893	4363329.319	755.094	Bare Earth/Open Terrain
NVA194	276028.270	4261048.043	1056.850	Bare Earth/Open Terrain
NVA195	257708.653	4240174.846	1097.225	Urban Terrain
NVA196	293870.799	4292138.630	1034.143	Bare Earth/Open Terrain
NVA197	242549.851	4355947.827	1189.480	Bare Earth/Open Terrain
NVA198	250241.996	4412060.353	1105.532	Bare Earth/Open Terrain
NVA199	282999.547	4403034.231	1057.113	Urban Terrain
NVA200	313922.233	4329053.020	987.856	Bare Earth/Open Terrain
NVA201	311276.258	4309222.672	890.799	Bare Earth/Open Terrain
NVA202	336068.868	4346160.278	940.175	Bare Earth/Open Terrain
NVA203	328263.683	4417030.919	924.053	Urban Terrain
NVA204	372469.206	4366343.384	851.770	Bare Earth/Open Terrain



NVA205	373460.014	4330391.511	856.030	Bare Earth/Open Terrain
NVA206	426549.023	4358171.368	674.799	Urban Terrain
NVA207	368209.599	4387157.923	820.139	Bare Earth/Open Terrain
NVA208	265315.498	4356009.311	1129.338	Bare Earth/Open Terrain
NVA209	326587.271	4386097.774	936.160	Urban Terrain
NVA211	258213.075	4388458.420	1118.458	Bare Earth/Open Terrain
NVA212	383414.115	4387092.121	808.129	Bare Earth/Open Terrain
NVA213	301213.863	4239141.295	989.536	Urban Terrain
NVAX001	391080.814	4412734.428	804.758	Bare Earth/Open Terrain
NVAX002	363089.222	4364118.597	874.239	Bare Earth/Open Terrain
NVAX003	347178.845	4370829.527	901.697	Urban Terrain
NVAX004	351863.245	4328230.589	901.404	Bare Earth/Open Terrain
NVAX005	420938.907	4335056.522	724.134	Bare Earth/Open Terrain
NVAX006	327970.614	4336637.093	947.517	Urban Terrain
NVAX007	295625.010	4360194.406	1041.755	Bare Earth/Open Terrain
NVAX008	310526.067	4395545.578	926.817	Bare Earth/Open Terrain
NVAX009	300493.169	4426535.046	1000.093	Urban Terrain
NVAX010	374212.067	4292064.435	774.444	Bare Earth/Open Terrain
NVAX011	376276.164	4310290.492	781.843	Bare Earth/Open Terrain
NVAX012	337299.410	4286677.674	915.018	Bare Earth/Open Terrain
NVAX013	319484.567	4287810.935	896.179	Bare Earth/Open Terrain
NVAX014	277312.797	4355745.803	1098.518	Urban Terrain
NVAX015	260022.695	4351381.966	1140.007	Bare Earth/Open Terrain
NVAX016	276311.679	4299444.038	1084.097	Bare Earth/Open Terrain
NVAX017	242622.752	4300312.230	1156.714	Bare Earth/Open Terrain
NVAX018	246074.903	4429468.392	1081.513	Urban Terrain
NVAX019	250488.979	4420911.345	1068.944	Bare Earth/Open Terrain
NVAX020	243136.829	4239008.880	1141.958	Bare Earth/Open Terrain
NVAX021	254632.000	4247867.826	1111.045	Urban Terrain
NVAX022	270590.373	4239852.974	1067.386	Bare Earth/Open Terrain
NVAX023	272394.911	4246247.204	1066.504	Bare Earth/Open Terrain
NVAX024	294799.848	4239300.787	1003.927	Urban Terrain
NVAX025	253411.859	4289227.366	1133.055	Bare Earth/Open Terrain
NVAX026	235715.177	4289855.021	1195.494	Bare Earth/Open Terrain
NVAX500	368351.815	4393733.096	841.565	Bare Earth/Open Terrain
NVAX501	377845.436	4386712.077	831.901	Bare Earth/Open Terrain
VVA001	251604.973	4257699.741	1124.423	Brush
VVA002	265061.618	4273830.138	1097.098	Trees
VVA003	272719.894	4281689.165	1077.883	High Grass
VVA004	297588.029	4311950.294	939.451	Brush
VVA005	347154.434	4370834.914	901.439	High Grass



VVA006	352231.350	4378869.555	890.868	Trees
VVA007	366793.306	4395371.310	848.813	Brush
VVA008	374295.190	4403291.912	833.888	Trees
VVA009	375286.160	4421762.489	816.526	High Grass
VVA010	322869.471	4356777.890	971.590	Brush
VVA011	309610.196	4340478.566	990.892	Trees
VVA012	300874.029	4334325.429	1023.741	High Grass
VVA013	295751.439	4320916.716	957.914	Brush
VVA014	280019.554	4309023.748	974.575	High Grass
VVA015	276318.450	4299455.868	1083.982	Trees
VVA016	255345.585	4274920.533	1133.562	High Grass
VVA017	247132.425	4271185.667	1151.700	Brush
VVA018	234675.051	4253761.677	1175.735	High Grass
VVA019	234730.739	4273169.884	1177.123	Trees
VVA020	253409.319	4289210.452	1132.905	Trees
VVA021	265828.327	4302617.322	1093.262	Brush
VVA022	271408.831	4312513.542	1017.041	High Grass
VVA023	306647.644	4351157.990	1018.222	Trees
VVA024	328377.439	4375300.542	938.984	Brush
VVA025	332673.296	4381630.055	937.380	Brush
VVA026	334757.759	4392851.800	920.348	High Grass
VVA027	347630.228	4400566.874	879.864	Trees
VVA028	359184.657	4414016.188	864.497	High Grass
VVA029	353847.014	4427125.811	870.964	Brush
VVA030	338094.936	4400758.760	921.278	High Grass
VVA031	330995.883	4392889.453	932.682	Trees
VVA032	317513.512	4375592.285	981.031	High Grass
VVA033	304881.444	4359987.514	1020.290	Brush
VVA034	287127.639	4344329.908	1060.623	Trees
VVA035	275926.027	4327301.850	1019.857	High Grass
VVA036	255570.921	4301513.670	1139.717	Brush
VVA037	235698.574	4289846.906	1194.838	Trees
VVA038	242589.894	4300325.766	1157.517	High Grass
VVA039	247736.985	4307764.808	1150.267	Brush
VVA040	259928.598	4327236.189	1102.154	Trees
VVA041	287390.341	4354985.697	1049.713	High Grass
VVA042	313571.946	4385349.235	994.662	Brush
VVA043	328594.754	4401520.656	948.541	Trees
VVA044	333433.682	4410537.155	902.442	High Grass
VVA045	334806.622	4428449.156	899.308	Brush
VVA046	317542.502	4403473.118	893.108	Trees



VVA047	310531.541	4395538.258	926.738	High Grass
VVA048	297750.967	4378594.923	1031.640	Brush
VVA049	286092.341	4363575.105	1063.818	Trees
VVA050	277320.031	4355766.672	1098.545	High Grass
VVA051	256935.529	4334548.521	1149.070	Brush
VVA052	250164.243	4327144.883	1149.390	Trees
VVA053	245085.654	4317968.807	1179.187	Brush
VVA054	260040.419	4351394.445	1140.138	High Grass
VVA055	279909.873	4372865.677	1083.179	Trees
VVA056	286331.552	4385241.643	1043.217	High Grass
VVA057	302124.081	4396846.379	1005.416	Brush
VVA058	319566.019	4421419.137	930.567	Trees
VVA059	315227.522	4430292.596	932.708	Brush
VVA060	298476.884	4407619.860	1012.543	High Grass
VVA061	272023.952	4374846.897	1072.499	Trees
VVA062	265349.814	4366430.942	1110.078	High Grass
VVA063	250481.453	4354324.709	1164.185	Brush
VVA064	243675.858	4344625.732	1196.206	High Grass
VVA065	249955.881	4362924.967	1158.205	Trees
VVA066	258078.973	4372338.352	1132.545	Brush
VVA067	273780.170	4393840.910	1067.792	High Grass
VVA068	292301.557	4418048.142	1033.731	Trees
VVA069	300475.440	4426530.872	999.884	Brush
VVA070	289425.044	4428542.435	987.397	High Grass
VVA071	277679.626	4410479.279	1059.791	Trees
VVA072	274176.795	4404102.029	1066.499	Brush
VVA073	253139.585	4382217.419	1136.038	High Grass
VVA074	254461.250	4394790.036	1105.563	Trees
VVA075	262801.664	4401986.726	1046.026	High Grass
VVA076	273137.490	4420197.955	991.613	Brush
VVA077	268387.612	4426776.278	1023.212	Trees
VVA078	250502.316	4420918.656	1068.144	High Grass
VVA079	246087.902	4429479.366	1081.196	Brush
VVA080	391057.806	4412744.563	803.760	Trees
VVA081	382887.206	4401570.010	807.647	High Grass
VVA082	363315.077	4377353.467	869.502	Brush
VVA083	348599.552	4362364.429	915.567	Trees
VVA084	342046.210	4355716.180	929.705	High Grass
VVA085	327988.071	4336636.676	947.707	Brush
VVA086	314175.049	4321813.194	981.453	High Grass
VVA087	305903.051	4316577.164	952.173	Trees



VVA088	288123.180	4287968.402	1035.359	Brush
VVA089	254609.196	4247896.160	1110.924	Trees
VVA090	269474.578	4255967.495	1074.888	High Grass
VVA091	285905.003	4274981.730	1024.799	Brush
VVA092	326097.730	4320647.439	956.385	High Grass
VVA093	379373.130	4385061.866	817.053	Trees
VVA094	389093.553	4385306.243	808.403	High Grass
VVA095	380763.308	4375837.758	814.635	Brush
VVA096	361240.081	4352111.931	885.161	High Grass
VVA097	353814.965	4344188.197	909.014	Trees
VVA098	342337.992	4328410.458	919.874	Brush
VVA099	328277.760	4312507.392	926.249	High Grass
VVA100	319766.441	4298334.261	912.109	Trees
VVA101	298742.892	4280283.108	1003.066	High Grass
VVA102	272387.757	4246265.422	1066.022	Brush
VVA103	290237.915	4258082.943	1008.418	High Grass
VVA104	303390.341	4271376.462	989.799	Trees
VVA105	293909.265	4245772.319	1008.654	High Grass
VVA106	309336.394	4243823.755	953.113	Brush
VVA107	319469.275	4287746.803	895.789	Trees
VVA108	343781.534	4320357.324	891.510	Brush
VVA109	351864.432	4328212.457	901.406	High Grass
VVA110	385525.838	4368201.712	818.834	Trees
VVA111	401687.066	4376022.988	782.057	Brush
VVA112	381395.300	4351663.949	783.488	High Grass
VVA113	373838.677	4341612.477	850.515	Trees
VVA114	365709.007	4334629.921	837.150	Brush
VVA115	347415.305	4310362.803	894.727	Trees
VVA116	339737.662	4305977.559	885.439	High Grass
VVA118	337279.297	4286667.509	915.173	Brush
VVA119	346841.866	4294031.448	789.174	High Grass
VVA120	355449.124	4311303.406	861.870	Trees
VVA121	370683.909	4322958.309	856.362	Brush
VVA122	404730.073	4369007.137	765.207	Trees
VVA123	401259.455	4349766.717	791.906	High Grass
VVA124	394235.007	4341810.292	799.580	Trees
VVA125	403162.661	4341667.200	781.349	Brush
VVA126	409646.740	4349652.566	765.521	Trees
VVA127	415951.841	4360897.671	736.589	High Grass
VVA128	427204.271	4367240.316	719.404	Trees
VVA129	431814.473	4351132.321	695.687	Brush



VVA130	386480.076	4331381.896	815.586	High Grass
VVA131	371602.813	4317287.857	841.693	Trees
VVA132	359832.322	4300782.435	809.952	High Grass
VVA133	353365.530	4294555.527	814.479	Brush
VVA134	369685.987	4303094.070	835.643	Trees
VVA135	376291.968	4310299.540	781.249	High Grass
VVA136	392348.480	4314395.408	782.249	Brush
VVA137	374189.056	4292052.083	774.080	Trees
VVA138	392571.129	4290418.989	732.995	High Grass
VVA139	377772.406	4284383.312	776.337	Brush
VVA140	274079.956	4338735.080	1070.842	Trees
VVA141	242908.346	4367685.313	1174.865	High Grass
VVA142	239734.094	4389006.346	1131.174	Brush
VVA143	240869.857	4409903.187	1133.811	High Grass
VVA144	238261.730	4337514.454	1207.292	Trees
VVA145	344989.234	4423145.833	867.804	High Grass
VVA146	239031.045	4328517.005	1198.618	Brush
VVA147	389853.157	4427195.192	767.356	Trees
VVA148	419585.470	4374824.556	727.965	Brush
VVA149	395996.703	4319280.871	787.185	Trees
VVA150	392770.173	4306494.981	737.660	High Grass
VVA151	314555.178	4285727.695	936.777	Brush
VVA152	311257.336	4264747.219	969.400	Trees
VVA153	294805.233	4239334.330	1003.639	High Grass
VVA154	270613.323	4239887.490	1066.969	Brush
VVA155	243110.699	4239033.887	1141.806	Trees
VVA156	270236.959	4385734.685	1085.875	Brush
VVA157	420943.861	4335081.901	724.305	High Grass
VVA158	300848.971	4297388.286	969.139	Trees
VVA159	363070.464	4364101.435	874.374	Brush
VVA160	296708.954	4262455.637	1002.930	Trees
VVA161	261325.491	4256242.265	1095.406	High Grass
VVA162	238232.225	4310111.712	1190.563	Brush
VVA163	260020.823	4293366.950	1110.985	Trees
VVA164	261788.158	4313658.506	1044.363	Brush
VVA166	295589.537	4360196.391	1040.564	Trees
VVA167	322256.245	4367437.814	973.886	High Grass
VVA168	336982.991	4420124.372	894.280	Brush
VVA169	341519.144	4409392.780	906.372	Trees
VVA170	388832.998	4324285.735	819.709	Brush
VVA171	424406.874	4343141.620	733.443	Trees

VVA172	377433.063	4361866.124	844.594	Brush
VVA173	405508.574	4357807.984	713.292	High Grass
VVA174	266484.033	4375437.098	1108.732	Trees
VVA175	390850.082	4393355.845	785.550	Brush
VVAX001	379918.272	4410440.114	808.798	Brush
VVAX002	357096.573	4369863.027	887.267	Trees
VVAX500	358723.402	4392048.899	864.374	Brush
VVAX501	393608.429	4333770.234	770.029	High Grass

Section 4: Accuracy

4.1 Summary of Survey Accuracies

The accuracy of this survey can be defined multiple ways due to the methods for how the control points, ground calibration points, and checkpoints were derived. In most cases the accuracy is defined as either a network accuracy which consists of the standard deviations based on a series of statistical analysis. Table 3 summarizes the estimated accuracies.

Table 3 - Survey and Coordinate Accuracies

Method	Estimated Accuracy
Ground Control Network	0.014 m (0.045 ft) horizontally, 0.022 m (0.071 ft) vertically
GCP and Checkpoint Network Survey	0.030 m (0.098 ft) horizontally, 0.030 m (0.098 ft) vertically
Real Time Kinematic GNSS Survey	0.030 m (0.098 ft) horizontally, 0.030 m (0.098 ft) vertically

With all three methods, the accuracy far surpasses the United States Geological Survey (USGS) version 1.2 November 2014 standards for LiDAR Base Specification standard and the results can be found in the LiDAR report previously submitted.

Section 5: Custody Transference Assurance

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