

Check Point Survey Report

“WV FEMA R3 SouthCentral 2018 QL2 LiDAR”

USGS Contract: G16PC00020

Task Order Number: 140G0219F0019

Prepared for:

United States Geological Survey (USGS)



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	Including: a) Point Documentation Report & Photos of Survey Points	
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1. INTRODUCTION

1.1 *Project Summary*

Dewberry Engineers Inc is under contract to the United States Geological Survey to provide 434 Check Points in the State of West Virginia. Under the above referenced USGS Task Order, Dewberry is tasked to complete the quality assurance of LiDAR products. As part of this work Dewberry staff will complete Check Point surveys that will be used to evaluate vertical and horizontal accuracy. The ground survey was conducted January 21, 2019 thru March 5, 2019.

Existing NGS Control Points were located and surveyed to check the accuracy of the RTK/GPS survey equipment with the results shown in Section 2.4 of this Report.

As an internal QA/QC procedure and to verify that the Check Points meet the 95% confidence level approximately 50% of the points were re-observed and are shown in Section 5 of this report.

Final horizontal coordinates are referenced to Albers Equal Area, NAD83 (2011) in meters. Final Vertical elevations are referenced to NAVD88 in meters using Geoid model 2012B (Geoid12B).

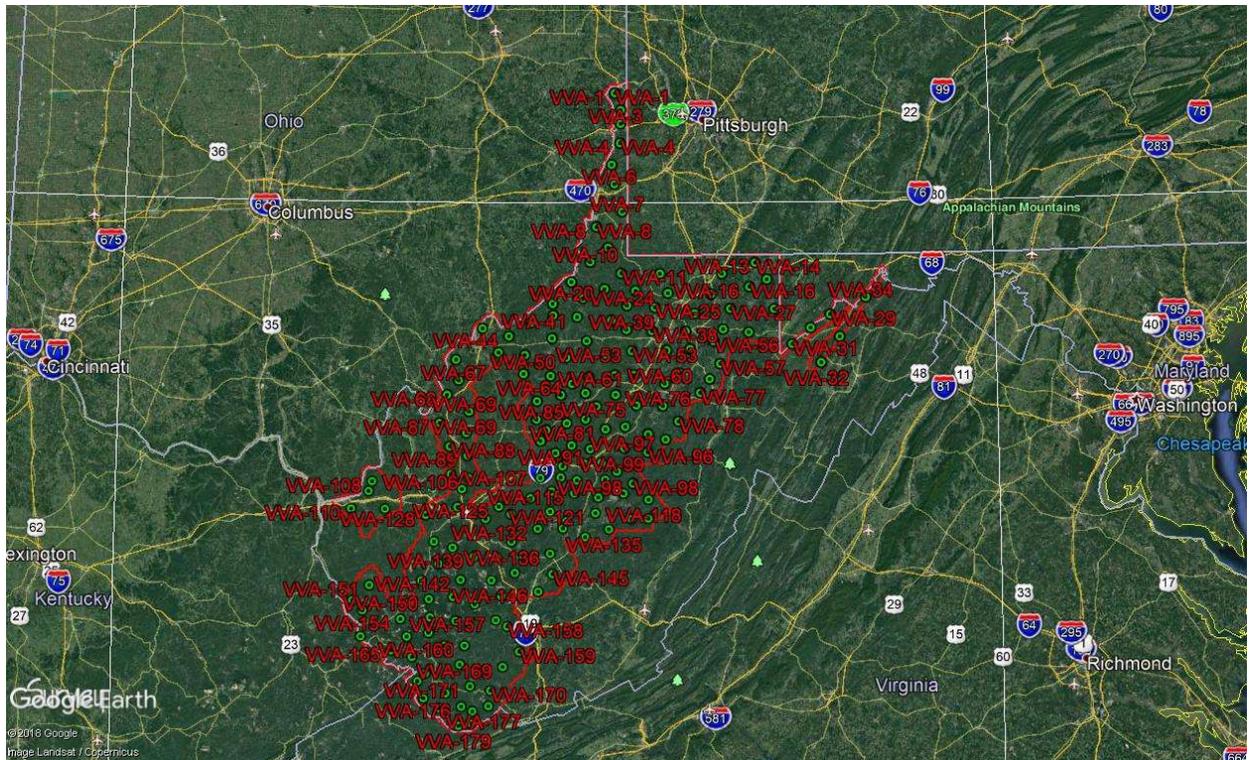
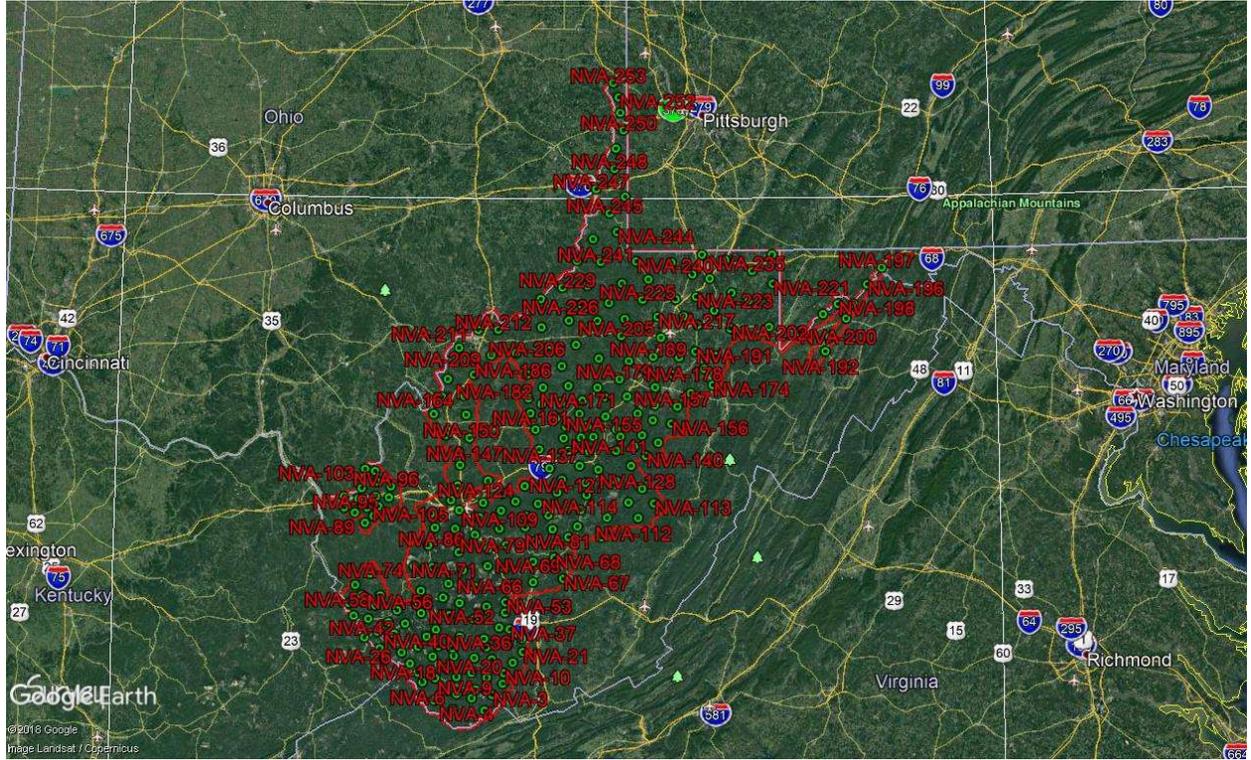
1.2 *Points of Contact*

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

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1.3 Project Area



PROJECT DETAILS

2.1 *Survey Equipment*

In performing the GPS observations Trimble R-10 GNSS receiver/antenna attached to a two meter fixed height pole with a Trimble TSC3 Data Collector to collect GPS raw data were used to perform the field surveys.

2.2 *Survey Point Detail*

The 434 Check Points were well distributed throughout the project area.

A sketch was made for each location and a nail was set at the point where possible or at an identifiable point. The Check Point locations are detailed on the “Check Point Documentation Report” sheets attached to this report.

2.3 *Network Design*

The GPS survey performed by Dewberry Engineers Inc office located in Lanham, MD was tied to a Real Time Network operated by KEYNT. The network is a series of “real-time” continuously operating, high precision GPS reference stations. All of the reference stations have been linked together using Trimble GPSNet software, creating a Virtual Reference Station System (VRS).

The Trimble NetR5 Reference Station is a multi-channel, multi-frequency GNSS (Global Navigation Satellite System) receiver designed for use as a stand-alone reference station or as part of a GNSS infrastructure solution. Trimble R-Track technology in the NetR5 receiver supports the modernized GPS L2C and L5 signals as well as GLONASS L1/L2 signals.

2.4 Field Survey Procedures and Analysis

Dewberry field surveyors used Trimble R-10 GNSS receivers, which is a geodetic quality dual frequency GPS receiver, to collect data at each surveyed location.

All locations were occupied once with approximately 50% of the locations being re-observed. All re-observations matched the initially derived station positions within the allowable tolerance of $\pm 5\text{cm}$ or within the 95% confidence level. Each occupation which utilized the VRS network was occupied for approximately three (3) minutes in duration and measured to 180 epochs.

Each occupation which utilized OPUS (if used) was occupied between 20 and 30 minutes. Field GPS observations are detailed on the “Control Point Documentation Reports” submitted as part of this report.

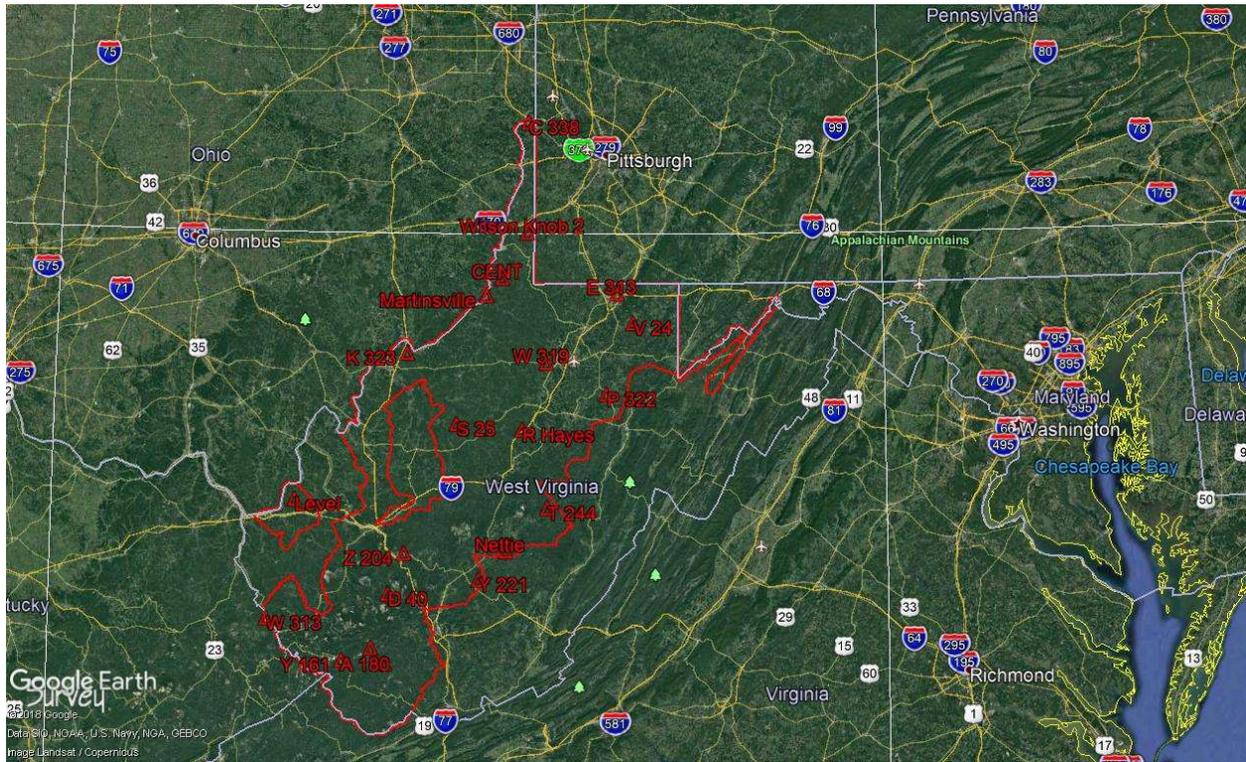
Eighteen (18) existing NGS monument listed in the NSRS database were located as an additional QA/QC method to check the horizontal and vertical accuracy of the VRS network as well as being the primary project control monuments designated as KY2952, JW1512, JW1043, JW0338, JW1091, JX1767, JW0969, AA9347, HX1183, HX1904, AA9351, HY0047, GY0228, GX3470, GX1344, HY0481 and HY0481 The results are as follows:

(*) Indicates a vertical NGS Mark (**) Indicates a horizontal NGS Mark

UTM 17									
	Observed Values			Data Sheet Values					
PT. #	NORTHING	EASTING	ELEVS.	NORTHING	EASTING	ELEVS.	ΔX	ΔY	ΔZ
C338	4496955.807	536805.362	230.101	4,496,955.801	536,805.346	230.135	0.006	0.016	-0.034
DAN	4383446.366	680574.560	881.926	4,383,446.368	680,574.568	881.892	-0.002	-0.008	0.034
E313	4391652.859	592696.042	377.934	4,391,652.836	592,696.054	377.956	0.023	-0.012	-0.022
L18	4357382.700	673135.190	313.896	4,357,382.697	673,135.197	313.893	0.003	-0.007	0.003
P322	4329537.571	586885.569	556.886	4,329,537.569	586,885.572	556.874	0.002	-0.003	0.012
W319	4348724.127	549560.532	365.151	4,348,724.117	549,560.521	365.178	0.010	0.011	-0.027
V 24	4373647.420	602833.165	523.991	4,373,647.415	602,833.163	524.016	0.005	0.002	-0.025
R HAYES	4307214.159	535046.749	368.648	4,307,214.164	535,046.750	368.610	-0.005	-0.001	0.038
W319RC	4348724.113	549560.536	365.171	4,348,724.117	549,560.521	365.178	-0.004	0.015	-0.007
Y-221	4214550.149	508764.378	688.545	4,214,550.160	508,764.353	688.519	-0.011	0.025	0.026
Z-204	4230316.127	462268.355	188.167	4,230,316.117	462,268.347	188.181	0.010	0.008	-0.014
12V_A	4255341.768	395133.072	172.957	4,255,341.786	395,133.073	173.000	-0.018	-0.001	-0.043
*J116	4269200.777	388234.914	178.195	N/A	N/A	178.174	N/A	N/A	0.021
*K144	4188116.310	409505.653	209.100	N/A	N/A	209.094	N/A	N/A	0.006
**KEEPORT	4161624.900	450697.193	533.525	4,161,624.900	450,697.185	N/A	0.000	0.008	N/A
*L182	4133190.789	460996.407	507.949	N/A	N/A	507.900	N/A	N/A	0.049
*R38	4252139.855	388114.406	175.079	N/A	N/A	175.087	N/A	N/A	-0.008
*Y161	4163323.376	423506.539	252.500	N/A	N/A	252.478	N/A	N/A	0.022

The above results indicate that the VRS network is providing positional values within the 5cm parameters for this survey.

NGS Monuments



2.5 Adjustment

The survey data was collected using Virtual Reference Stations (VRS) methodology within a Virtual Reference System (VRS).

The system is designed to provide a true Network RTK performance, the RTKNet software enables high-accuracy positioning in real time across a geographic region. The RTKNet software package uses real-time data streams from the KEYNET system user and generates correction models for high-accuracy RTK GPS corrections throughout the network. Therefore, corrections were applied to the points as they were being collected, thus negating the need for a post process adjustment.

2.6 Data Processing Procedures

After field data is collected the information is downloaded from the data collectors into the office software. The Software program used is called Trimble Business Center.

Downloaded data is run through the TBC program to obtain the following reports; points report, point comparison report and a point detail report. The reports are reviewed for point accuracy and precision.

After review of the point data an “ASCII” or “txt” file which is the industry standard is created. Point files are loaded into our CADD program (Carlson Survey 2018) to make a visual check of the point data (Pt. #, Coordinates, Elev. and Description). The data can now be imported into the final product.

3. ***FINAL COORDINATES/ELEVATIONS***

NVA's			
Point ID	Northing	Easting	Elevation
NVA-1	1679554.387	1252989.595	414.802
NVA-2	1682746.273	1270960.645	494.223
NVA-3	1691934.100	1274300.028	575.765
NVA-4	1687970.822	1262707.846	428.563
NVA-5	1690207.081	1241682.471	316.126
NVA-6	1692698.871	1232809.847	318.174
NVA-7	1689043.427	1253600.277	443.312
NVA-8	1693456.402	1264164.630	441.286
NVA-9	1699602.743	1279271.704	657.732
NVA-10	1705817.277	1279046.379	577.591
NVA-11	1701564.803	1269482.897	718.741
NVA-12	1698995.504	1251914.487	360.729
NVA-13	1696159.524	1239813.956	308.891
NVA-14	1697815.243	1229111.834	286.147
NVA-15	1702060.793	1208887.785	221.830
NVA-16	1702396.639	1223948.387	255.480
NVA-17	1708619.139	1236336.908	315.723
NVA-18	1703142.092	1245402.721	392.387
NVA-19	1702939.647	1260291.154	455.561
NVA-20	1712927.918	1283046.251	629.768
NVA-21	1720235.700	1287680.760	649.899
NVA-22	1712756.873	1270689.090	425.522
NVA-23	1713760.633	1258130.224	533.039
NVA-24	1711119.669	1248431.019	352.075
NVA-25	1713151.600	1227037.983	288.553
NVA-26	1708149.707	1218069.920	349.230
NVA-27	1708390.095	1205018.232	213.257
NVA-28	1713251.099	1195070.699	263.412
NVA-29	1717895.373	1202307.124	226.065
NVA-30	1718391.454	1211974.063	528.282
NVA-31	1719842.728	1231017.252	231.893
NVA-32	1716563.702	1239041.313	338.794
NVA-33	1715538.346	1246884.279	384.541
NVA-34	1719391.678	1266254.621	590.333
NVA-35	1723292.710	1278364.896	514.844
NVA-36	1727964.163	1286077.223	797.596

NVA-37	1732216.538	1278158.821	618.410
NVA-38	1732222.072	1271943.701	585.529
NVA-39	1724103.136	1264226.174	552.034
NVA-40	1722890.727	1250088.640	382.226
NVA-41	1724951.406	1235664.152	267.539
NVA-42	1725408.035	1217430.025	247.285
NVA-43	1724759.461	1207596.638	490.030
NVA-44	1724639.005	1195568.975	218.801
NVA-45	1724969.757	1186884.731	194.498
NVA-46	1731943.042	1183034.798	186.595
NVA-47	1733194.934	1198470.977	268.684
NVA-48	1732448.375	1211505.725	267.342
NVA-49	1733167.507	1225714.233	252.685
NVA-50	1734713.568	1242226.092	392.600
NVA-51	1734778.097	1256654.853	859.242
NVA-52	1741544.833	1273905.026	543.148
NVA-53	1747598.982	1273137.396	493.395
NVA-54	1743305.940	1262716.818	399.946
NVA-55	1742752.060	1246819.791	330.378
NVA-56	1746917.198	1236484.421	301.398
NVA-57	1738655.836	1223096.597	251.765
NVA-58	1739549.242	1200449.408	286.487
NVA-59	1737796.092	1190219.016	284.577
NVA-60	1743259.189	1184915.140	229.706
NVA-60-2	1743264.152	1184902.275	229.513
NVA-61	1751379.738	1192436.056	237.904
NVA-62	1745821.629	1222972.819	294.857
NVA-63	1753022.192	1238631.292	248.578
NVA-64	1753583.360	1254156.844	261.114
NVA-65	1758832.661	1275352.176	441.268
NVA-66	1761939.950	1287130.978	594.651
NVA-67	1766797.207	1304043.890	699.222
NVA-68	1778261.636	1296987.986	659.449
NVA-69	1773848.091	1285107.809	409.160
NVA-70	1767558.407	1269416.421	355.563
NVA-71	1767010.420	1259527.165	268.690
NVA-72	1762235.414	1245454.113	259.144
NVA-73	1761110.614	1227721.227	236.876
NVA-74	1759888.450	1217177.637	268.742
NVA-75	1773500.694	1223327.041	209.031

NVA-76	1772336.227	1241529.784	208.969
NVA-77	1777192.268	1258089.230	204.074
NVA-78	1781148.137	1268246.208	196.234
NVA-79	1786843.769	1284812.000	266.481
NVA-80	1791628.590	1303074.477	506.458
NVA-81	1794605.340	1322060.697	836.974
NVA-82	1798697.898	1307228.479	569.887
NVA-83	1794690.950	1293248.055	331.488
NVA-84	1793406.416	1277409.263	259.694
NVA-85	1790067.302	1262727.181	245.450
NVA-86	1784042.666	1249296.640	188.740
NVA-87	1785686.778	1237281.736	246.251
NVA-88	1784395.945	1225540.282	204.861
NVA-89	1780514.964	1184755.131	201.304
NVA-90	1785530.473	1189619.409	179.823
NVA-91	1785529.318	1177938.452	289.922
NVA-92	1787570.813	1171328.361	262.800
NVA-93	1789648.794	1184442.892	185.144
NVA-94	1791523.014	1190989.427	241.940
NVA-95	1797711.107	1196250.871	197.459
NVA-96	1804300.768	1196307.929	207.001
NVA-97	1796987.847	1188501.925	188.514
NVA-98	1793955.542	1178771.057	209.200
NVA-99	1793894.890	1170174.229	169.140
NVA-100	1800536.852	1179627.764	170.693
NVA-101	1805785.465	1187573.959	293.205
NVA-102	1811839.489	1185807.003	174.820
NVA-103	1812089.698	1179841.535	178.456
NVA-104	1792308.959	1222003.212	201.838
NVA-105	1796938.599	1237932.166	181.132
NVA-106	1794657.705	1250320.505	194.666
NVA-107	1800681.483	1261995.832	225.394
NVA-108	1799955.764	1276832.912	321.281
NVA-109	1807925.248	1286473.081	274.341
NVA-110	1808588.487	1307581.989	565.047
NVA-111	1806596.521	1323424.147	699.796
NVA-112	1809244.174	1341364.007	766.256
NVA-113	1821964.774	1347803.730	718.343
NVA-114	1817434.801	1334224.789	720.386
NVA-115	1817852.749	1309530.671	659.057

NVA-116	1816549.108	1292484.306	253.010
NVA-117	1808137.608	1282503.741	259.511
NVA-118	1807367.480	1269418.099	301.603
NVA-119	1803534.741	1250955.943	213.953
NVA-120	1802049.788	1232203.779	206.751
NVA-121	1811160.447	1234553.740	201.483
NVA-122	1816867.454	1251649.186	207.934
NVA-123	1810818.201	1260932.597	217.562
NVA-124	1817206.627	1273219.247	203.269
NVA-125	1824397.687	1293907.713	401.344
NVA-126	1824828.973	1307687.254	455.249
NVA-127	1828718.066	1325182.222	463.320
NVA-128	1826644.037	1340736.094	443.638
NVA-129	1838993.915	1332268.199	320.560
NVA-130	1833729.079	1313798.960	339.512
NVA-131	1834106.816	1302772.688	320.171
NVA-132	1829827.279	1285714.445	258.069
NVA-133	1823347.181	1234138.085	200.472
NVA-134	1830836.548	1232299.101	283.267
NVA-135	1840216.678	1278439.527	244.857
NVA-136	1842006.531	1294903.785	262.442
NVA-137	1843407.099	1306860.023	264.424
NVA138	1846329.670	1322203.245	346.715
NVA-139	1850390.866	1332220.412	540.705
NVA-140	1846171.289	1339878.685	453.751
NVA-141	1855567.606	1345675.105	715.988
NVA-142	1857731.143	1335634.248	309.621
NVA-143	1854850.077	1323340.443	372.251
NVA-144	1852148.495	1307935.682	278.575
NVA-145	1849734.287	1301453.025	414.545
NVA-146	1848632.953	1290964.473	234.031
NVA-147	1839976.381	1236989.515	309.632
NVA-148	1839473.669	1223079.093	228.620
NVA-149	1850590.354	1214180.421	184.953
NVA-150	1853201.316	1232874.062	311.921
NVA-151	1851037.653	1274088.530	224.835
NVA-152	1855827.053	1291203.364	367.043
NVA-153	1857968.905	1303420.651	250.566
NVA-154	1858770.632	1320302.136	251.774
NVA-155	1867445.936	1340365.477	525.111

NVA-156	1867214.761	1351214.431	550.821
NVA-157	1877746.549	1353114.216	501.800
NVA-158	1876513.961	1340064.947	463.017
NVA-159	1869946.288	1330987.825	332.750
NVA-160	1865282.330	1312930.836	233.855
NVA-161	1864368.751	1297740.849	233.950
NVA-162	1859791.038	1284777.021	217.349
NVA-163	1860029.089	1269608.861	354.861
NVA164	1864056.822	1229961.287	190.126
NVA-165	1861375.430	1217332.267	185.550
NVA-166	1868689.746	1267046.828	227.842
NVA-167	1866479.801	1275172.364	243.882
NVA-168	1869280.584	1286161.725	240.205
NVA-169	1872368.951	1298213.147	225.753
NVA-170	1876413.190	1310440.699	238.662
NVA-171	1878922.106	1323351.954	384.747
NVA-172	1886884.304	1338575.871	372.755
NVA-173	1886724.764	1359372.775	625.726
NVA-174	1893552.526	1371259.317	518.321
NVA-175	1910654.993	1370213.140	446.462
NVA-176	1902213.453	1364944.247	543.533
NVA-177	1895879.707	1347360.347	438.214
NVA-178	1896126.116	1331355.487	314.973
NVA-179	1888191.073	1317403.179	333.923
NVA-180	1881302.252	1305550.793	236.005
NVA-181	1879550.541	1288736.363	246.455
NVA-182	1876246.353	1274343.902	284.316
NVA-183	1872250.672	1218919.963	204.253
NVA-184	1877220.098	1233532.262	215.676
NVA-185	1882369.169	1264215.357	204.330
NVA-186	1890462.389	1283115.399	227.297
NVA-187	1898314.639	1303564.412	277.228
NVA-188	1899659.926	1321051.130	309.312
NVA-189	1904455.145	1334566.297	336.161
NVA-190	1906598.028	1349533.691	321.911
NVA-191	1910833.447	1358239.029	414.657
NVA-192	1923755.586	1432755.758	474.626
NVA-193	1928466.462	1433436.467	566.697
NVA-194	1944766.315	1441678.987	356.053
NVA-195	1953912.616	1444320.692	245.583

NVA-196	1966745.614	1450500.487	227.767
NVA-197	1977879.339	1457373.647	188.106
NVA-198	1951382.876	1434897.541	608.465
NVA-199	1945139.417	1427863.894	495.499
NVA-200	1932130.136	1415993.439	709.351
NVA-201	1931858.318	1396987.213	832.940
NVA-202	1928080.685	1376223.525	512.897
NVA-203	1927050.081	1356923.490	301.393
NVA-204	1916218.497	1337259.403	381.132
NVA-205	1913593.223	1314305.061	328.195
NVA-206	1904171.011	1289217.591	263.032
NVA-207	1898591.683	1274263.967	253.884
NVA-208	1893802.059	1255621.428	212.456
NVA-209	1890296.722	1241615.172	191.588
NVA-210	1891506.859	1222429.708	222.791
NVA-211	1903734.894	1231775.798	224.908
NVA-212	1905754.626	1243224.564	235.277
NVA-213	1911130.999	1267778.604	305.402
NVA-214	1917557.119	1282884.502	264.311
NVA-215	1920052.007	1299210.993	252.120
NVA-216	1923550.607	1315111.598	325.433
NVA-217	1928101.877	1333233.196	322.541
NVA-218	1930851.155	1348281.346	413.706
NVA-219	1936789.372	1365532.181	516.531
NVA-220	1946352.667	1383738.233	552.024
NVA-221	1958093.277	1396129.084	772.379
NVA-222	1948927.898	1373350.357	523.389
NVA-223	1943358.701	1353417.314	409.806
NVA-224	1939976.567	1342001.691	312.640
NVA-225	1936606.187	1323078.686	313.453
NVA-226	1931631.915	1304143.328	291.762
NVA-227	1928086.893	1288718.824	217.813
NVA-228	1927516.937	1264716.325	190.301
NVA-229	1936183.606	1275949.720	236.433
NVA-230	1939715.355	1290289.033	389.937
NVA-231	1944100.766	1309761.429	269.646
NVA-232	1948945.853	1324506.481	303.772
NVA-233	1956055.222	1349185.808	306.971
NVA-234	1955180.023	1359492.761	406.146
NVA-235	1963669.142	1383060.720	568.550

NVA-236	1975020.118	1392974.566	646.430
NVA-237	1967456.109	1366632.734	311.727
NVA-238	1968349.589	1352811.690	288.198
NVA-239	1960880.771	1336003.610	307.262
NVA-240	1958300.151	1315813.516	315.355
NVA-241	1954667.381	1295529.654	419.170
NVA-242	1953210.366	1281757.313	205.531
NVA-243	1967241.357	1288935.629	210.323
NVA-244	1973628.702	1301959.255	314.214
NVA-245	1983985.768	1295926.099	353.852
NVA-246	1994979.209	1303311.150	432.252
NVA-247	1996864.658	1285894.629	197.702
NVA-248	2010294.396	1294530.878	328.908
NVA-249	2022222.594	1293403.893	305.417
NVA-250	2033685.348	1295993.753	242.776
NVA-251	2043663.184	1292510.436	339.674
NVA-252	2052493.403	1290146.649	309.590
NVA-253	2060518.545	1285509.802	228.731
VVA's			
VVA-1	2058401.554	1289402.090	383.454
VVA-2	2047274.535	1290940.801	364.154
VVA-3	2039754.405	1293306.563	335.292
VVA-4	2028355.608	1294825.215	353.534
VVA-5	2014943.576	1292132.966	339.890
VVA-6	2000254.799	1297607.630	294.377
VVA-7	1988463.567	1302762.942	248.987
VVA-8	1978007.494	1289160.129	206.974
VVA-9	1966033.670	1298002.780	233.329
VVA-10	1956115.083	1288102.579	324.850
VVA-11	1952612.514	1309472.978	444.825
VVA-12	1955820.461	1330165.774	500.377
VVA-13	1961589.163	1365600.362	410.459
VVA-14	1971149.899	1383610.687	544.549
VVA-15	1963453.446	1393073.007	680.132
VVA-16	1956532.436	1382667.575	671.998
VVA-17	1949806.299	1362829.850	558.180
VVA-18	1945073.548	1336563.166	301.716
VVA-19	1940908.716	1319349.886	310.004
VVA-20	1941606.304	1299858.424	219.059
VVA-21	1942579.700	1280235.832	231.122
VVA-22	1928233.040	1271719.247	197.135
VVA-23	1933593.705	1287448.557	383.834

VVA-24	1936721.024	1311323.596	262.660
VVA-25	1935579.579	1330497.390	294.205
VVA-26	1940598.905	1347528.203	332.916
VVA-27	1940802.688	1374571.105	443.653
VVA-28	1945418.258	1398468.165	785.408
VVA-29	1948147.819	1431628.052	467.422
VVA-30	1936429.408	1424951.546	835.185
VVA-31	1927202.773	1412554.242	777.121
VVA-32	1921189.654	1431572.558	534.655
VVA-33	1936582.277	1439487.570	430.347
VVA-34	1963052.558	1451002.212	513.257
VVA-35	1929996.813	1386571.182	431.986
VVA-36	1929288.989	1371506.523	406.236
VVA-37	1924499.024	1350459.723	337.735
VVA-38	1920720.509	1330956.889	326.086
VVA-39	1919967.304	1316325.797	326.517
VVA-40	1924128.066	1306806.631	245.288
VVA-41	1922755.239	1286825.994	218.313
VVA-42	1922124.358	1270910.785	251.425
VVA-43	1917094.381	1258565.323	262.764
VVA-44	1905167.898	1249549.817	195.646
VVA-45	1907353.944	1233545.276	285.872
VVA-46	1886653.147	1221422.014	280.913
VVA-47	1894742.139	1245157.600	273.402
VVA-48	1896543.901	1260708.175	297.678
VVA-49	1907469.569	1274500.871	249.243
VVA-50	1897990.512	1284637.463	259.220
VVA-51	1909741.257	1294607.959	361.746
VVA-52	1903723.953	1307050.653	301.214
VVA-53	1908087.696	1321497.588	397.703
VVA-54	1911443.264	1343105.282	312.807
VVA-55	1916142.567	1357123.689	350.097
VVA-56	1921838.593	1367001.566	497.030
VVA-57	1914359.281	1375727.342	498.950
VVA-58	1899490.697	1368127.201	514.251
VVA-59	1898066.892	1351618.411	432.352
VVA-60	1891658.634	1344201.599	438.435
VVA-61	1894208.786	1324510.224	318.032
VVA-62	1893286.501	1313964.796	279.581
VVA-63	1888823.347	1299279.993	239.378

VVA-64	1882912.681	1290287.492	266.292
VVA-65	1885894.159	1277250.938	212.757
VVA-66	1884603.187	1261558.687	231.630
VVA-67	1874552.835	1225665.471	202.029
VVA-68	1865430.664	1219788.060	174.650
VVA-69	1857853.899	1233252.061	195.625
VVA-70	1871072.607	1271972.163	319.714
VVA-71	1875861.081	1285004.407	322.107
VVA-72	1879218.170	1298207.582	235.356
VVA-73	1872546.764	1306373.756	225.742
VVA-74	1881001.925	1316461.444	358.644
VVA-75	1876798.622	1328825.991	386.244
VVA-76	1879000.642	1344364.033	456.331
VVA-77	1890126.866	1364515.822	704.983
VVA-78	1871527.254	1354822.294	664.484
VVA-79	1861227.775	1338599.364	587.275
VVA-80	1863359.290	1324785.381	252.722
VVA-81	1860186.172	1313773.536	236.466
VVA-82	1863973.577	1301389.637	277.154
VVA-83	1859886.196	1291069.805	229.781
VVA-84	1854002.848	1279907.751	366.547
VVA-85	1859287.242	1273342.818	356.158
VVA-86	1844911.149	1234316.131	199.187
VVA-87	1848199.169	1217972.752	185.162
VVA-88	1835367.745	1226079.411	208.149
VVA-89	1831875.033	1237186.243	312.066
VVA-90	1847230.988	1277692.391	231.749
VVA-91	1841745.049	1287342.911	276.006
VVA-92	1847447.244	1295890.074	257.798
VVA-93	1847259.122	1306885.700	294.368
VVA-94	1840256.953	1314673.221	462.644
VVA-95	1850911.437	1326397.431	479.109
VVA-96	1850670.988	1340125.991	507.608
VVA-97	1859675.196	1349222.273	731.393
VVA-98	1831069.859	1334541.451	355.237
VVA-99	1836546.545	1324247.794	328.023
VVA-100	1829649.647	1317659.031	626.743
VVA101	1838111.659	1304846.354	299.873
VVA-102	1827442.755	1302337.516	409.160
VVA-103	1834592.650	1292442.854	271.856

VVA-104	1831457.390	1295080.444	240.586
VVA-105	1824292.200	1282808.421	392.624
VVA-106	1818800.620	1239944.844	197.952
VVA-107	1819360.440	1229308.220	279.128
VVA-108	1807773.317	1184619.107	298.245
VVA-109	1801752.179	1183500.261	292.791
VVA-110	1789806.367	1174988.500	189.554
VVA-111	1792865.388	1194670.397	192.222
VVA-112	1811765.410	1236256.276	192.989
VVA-113	1812459.304	1277618.285	210.143
VVA-114	1819946.391	1290164.577	408.047
VVA-115	1819789.929	1302022.072	480.060
VVA-116	1819785.906	1316066.339	426.016
VVA-117	1819683.256	1329604.274	681.724
VVA-118	1821085.474	1346427.586	711.320
VVA-119	1813061.868	1342722.070	695.169
VVA-120	1810285.379	1337089.255	942.669
VVA-121	1808904.185	1310201.105	567.570
VVA-122	1802044.930	1299971.854	436.864
VVA-123	1809858.158	1287114.777	441.810
VVA-124	1803504.395	1266342.822	436.463
VVA-125	1804941.150	1259975.109	282.324
VVA-126	1796561.647	1253491.565	214.030
VVA-127	1800828.475	1236212.606	184.409
VVA-128	1793034.150	1218693.350	183.839
VVA-129	1778927.594	1223937.371	209.531
VVA-130	1776509.997	1237360.204	226.710
VVA-131	1783962.916	1269928.509	228.248
VVA-132	1794154.027	1282201.600	246.485
VVA-133	1798353.022	1298734.791	385.423
VVA-134	1796120.971	1312007.659	675.645
VVA-135	1802204.332	1325261.127	584.916
VVA-136	1782370.452	1293842.095	551.257
VVA-137	1778868.756	1278497.413	193.985
VVA-138	1774886.300	1263633.104	219.122
VVA-139	1771443.434	1252195.357	495.596
VVA-140	1765742.294	1230743.447	259.000
VVA-141	1754472.956	1222352.672	297.029
VVA-142	1758540.250	1244867.844	299.816
VVA-143	1761183.230	1262681.722	355.449

VVA-144	1767856.221	1275406.632	337.134
VVA-145	1770606.776	1297134.768	644.010
VVA-146	1759066.532	1290614.425	507.493
VVA-147	1753055.056	1269850.127	413.731
VVA-148	1745663.830	1255295.294	300.921
VVA-149	1747770.768	1242112.748	283.470
VVA-150	1744222.069	1228415.202	274.934
VVA-151	1746644.847	1192722.002	363.858
VVA-152	1736121.807	1184343.131	214.095
VVA-153	1731154.416	1191069.963	409.862
VVA-154	1729798.941	1213898.983	250.490
VVA-155	1733623.157	1230815.093	383.805
VVA-156	1734499.236	1245423.739	461.711
VVA-157	1738294.983	1268941.706	573.752
VVA-158	1735755.539	1276084.364	585.676
VVA-159	1721926.982	1285162.834	566.623
VVA-160	1720371.491	1253297.436	408.743
VVA-161	1718157.409	1241686.346	381.137
VVA-162	1724466.563	1231378.861	238.274
VVA-163	1720117.043	1219219.062	308.302
VVA-164	1715673.036	1192403.014	198.700
VVA-165	1710475.692	1211470.166	299.888
VVA-166	1708582.713	1224057.764	501.699
VVA-167	1700171.778	1233150.949	338.307
VVA-168	1708721.577	1252333.567	372.948
VVA-169	1711504.813	1277316.862	700.472
VVA-170	1696382.508	1272395.244	563.260
VVA-171	1696954.597	1260277.804	439.777
VVA-172	1690473.450	1246806.493	650.444
VVA-173	1694872.005	1229493.240	323.718
VVA-174	1686734.244	1236954.472	603.435
VVA-175	1680949.549	1244386.250	401.971
VVA-176	1685677.460	1254070.365	601.102
VVA-177	1687020.315	1272737.240	514.450
VVA-178	1682358.190	1264046.820	532.866
VVA-179	1672487.476	1257362.816	475.977
VVA-180	1674978.192	1264655.618	537.999

4. GPS OBSERVATIONS

NVA's					
POINT ID	OBSERV. DATE	JULIAN DATE	TIME OF DAY (AST)	RE-OBSERV. DATE	RE-OBSERV. TIME
NVA-1	2/13/2019	44	15:10	N/A	N/A
NVA-2	2/7/2019	38	14:04	N/A	N/A
NVA-3	2/7/2019	38	11:09	2/7/2019	11:15
NVA-4	2/12/2019	43	16:10	3/14/2019	14:45
NVA-5	2/14/2019	45	12:45	N/A	N/A
NVA-6	2/6/2019	37	15:10	N/A	N/A
NVA-7	2/12/2019	43	10:45	2/19/2019	12:00
NVA-8	2/11/2019	42	17:00	2/18/2019	18:20
NVA-9	2/6/2019	37	13:54	N/A	N/A
NVA-10	2/6/2019	37	11:58	N/A	N/A
NVA-11	2/6/2019	37	16:30	2/6/2019	16:35
NVA-12	2/11/2019	42	15:25	N/A	N/A
NVA-13	2/6/2019	37	16:55	N/A	N/A
NVA-14	2/6/2019	37	11:00	N/A	N/A
NVA-15	2/5/2019	36	16:20	N/A	N/A
NVA-16	2/5/2019	36	10:40	N/A	N/A
NVA-17	2/7/2019	38	9:00	N/A	N/A
NVA-18	2/7/2019	38	11:45	N/A	N/A
NVA-19	2/8/2019	39	12:04	N/A	N/A
NVA-20	2/6/2019	37	9:43	N/A	N/A
NVA-21	2/1/2019	32	12:58	N/A	N/A
NVA-22	2/5/2019	36	14:16	N/A	N/A
NVA-23	2/5/2019	36	12:25	2/5/2019	12:40
NVA-24	2/7/2019	38	13:25	N/A	N/A
NVA-25	2/4/2019	35	17:40	N/A	N/A
NVA-26	2/5/2019	36	13:00	N/A	N/A
NVA-27	2/5/2019	36	15:40	3/13/2019	14:45
NVA-28	2/15/2019	46	11:00	3/13/2019	15:35
NVA-29	1/22/2019	22	18:00	3/13/2019	16:30
NVA-30	1/22/2019	22	16:20	N/A	N/A
NVA-31	1/29/2019	29	16:05	N/A	N/A
NVA-32	1/28/2019	28	11:00	N/A	N/A
NVA-33	2/7/2019	58	14:40	N/A	N/A
NVA-34	2/5/2019	36	7:26	2/13/2019	7:10
NVA-35	2/1/2019	32	14:39	2/12/2019	13:49

NVA-36	2/1/2019	32	10:05	2/12/2019	11:31
NVA-37	2/4/2019	35	10:30	2/12/2019	15:04
NVA-38	2/4/2019	35	11:24	2/4/2019	11:29
NVA-39	2/5/2019	36	9:00	2/13/2019	8:20
NVA-40	2/4/2019	35	15:56	2/13/2019	10:51
NVA-41	1/29/2019	29	14:40	N/A	N/A
NVA-42	1/22/2019	22	11:35	N/A	N/A
NVA-43	1/23/2019	23	12:25	N/A	N/A
NVA-44	1/23/2019	23	18:55	N/A	N/A
NVA-45	1/23/2019	23	15:30	1/28/2019	16:55
NVA-46	1/23/2019	23	16:30	1/30/2019	9:00
NVA-47	1/24/2019	24	9:50	N/A	N/A
NVA-48	1/23/2019	23	9:55	3/12/2019	16:50
NVA-49	1/29/2019	29	8:20	N/A	N/A
NVA-50	1/29/2019	29	11:25	2/21/2019	12:00
NVA-51	2/4/2019	35	15:05	2/4/2019	15:10
NVA-52	2/4/2019	35	12:55	2/12/2019	17:06
NVA-53	1/27/2019	27	12:52	1/27/2019	12:55
NVA-54	1/26/2019	26	15:00	1/26/2019	15:03
NVA-55	1/26/2019	26	16:08	2/3/2019	17:11
NVA-56	3/2/2019	61	12:17	N/A	N/A
NVA-57	1/24/2019	24	14:00	3/12/2019	17:30
NVA-58	1/24/2019	24	11:48	3/14/2019	11:00
NVA-59	2/4/2019	35	12:00	N/A	N/A
NVA-60	1/28/2019	28	11:30	N/A	N/A
NVA-60-2	3/13/2019	72	9:15	N/A	N/A
NVA-61	1/25/2019	25	12:50	N/A	N/A
NVA-62	2/3/2019	34	14:39	2/3/2019	14:42
NVA-63	1/26/2019	26	16:58	2/3/2019	17:55
NVA-64	1/26/2019	26	13:34	1/26/2019	13:37
NVA-65	1/27/2019	27	13:37	N/A	N/A
NVA-66	1/27/2019	27	14:24	N/A	N/A
NVA-67	2/4/2019	35	11:49	N/A	N/A
NVA-68	1/27/2019	27	15:52	2/4/2019	9:56
NVA-69	1/27/2019	27	14:54	1/27/2019	14:57
NVA-70	1/28/2019	28	9:25	N/A	N/A
NVA-71	1/27/2019	27	10:24	N/A	N/A
NVA-72	1/26/2019	26	17:28	N/A	N/A
NVA-73	1/23/2019	23	14:58	2/3/2019	13:43
NVA-74	2/3/2019	34	11:45	N/A	N/A

NVA-75	1/23/2019	23	14:04	2/3/2019	10:48
NVA-76	1/26/2019	26	11:18	N/A	N/A
NVA-77	1/27/2019	27	9:58	N/A	N/A
NVA-78	1/25/2019	25	11:54	2/4/2019	8:22
NVA-79	1/28/2019	28	10:36	N/A	N/A
NVA-80	1/28/2019	28	12:28	N/A	N/A
NVA-81	1/28/2019	28	14:44	N/A	N/A
NVA-82	1/28/2019	28	13:20	2/4/2019	13:23
NVA-83	1/28/2019	28	12:00	N/A	N/A
NVA-84	1/25/2019	25	13:46	N/A	N/A
NVA-85	1/25/2019	25	10:56	N/A	N/A
NVA-86	1/25/2019	25	9:36	2/2/2019	16:38
NVA-87	1/26/2019	26	10:20	N/A	N/A
NVA-88	1/23/2019	23	13:26	2/3/2019	10:07
NVA-89	1/25/2019	25	15:25	N/A	N/A
NVA-90	1/28/2019	28	14:23	2/11/2019	17:09
NVA-91	1/25/2019	25	12:45	2/11/2019	13:15
NVA-92	1/25/2019	25	11:20	2/11/2019	12:20
NVA-93	1/24/2019	24	16:30	N/A	N/A
NVA-94	1/28/2019	28	12:00	2/11/2019	17:45
NVA-95	1/19/2019	19	15:30	N/A	N/A
NVA-96	1/24/2019	24	8:47	N/A	N/A
NVA-97	1/19/2019	19	14:50	N/A	N/A
NVA-98	1/18/2019	18	10:30	3/21/2019	9:30
NVA-99	1/21/2019	21	12:00	1/21/2019	12:03
NVA-100	1/23/2019	23	15:00	1/29/2019	9:10
NVA-101	1/23/2019	23	14:10	1/29/2019	13:14
NVA-102	1/24/2019	24	12:25	1/29/2019	12:20
NVA-103	1/24/2019	24	13:55	1/29/2019	9:40
NVA-104	1/23/2019	23	12:32	N/A	N/A
NVA-105	1/23/2019	23	10:06	N/A	N/A
NVA-106	1/25/2019	25	9:10	N/A	N/A
NVA-107	1/24/2019	24	14:30	N/A	N/A
NVA-108	1/25/2019	25	14:52	N/A	N/A
NVA-109	3/2/2019	61	11:30	3/2/2019	11:33
NVA-110	3/2/2019	61	16:18	3/2/2019	16:21
NVA-111	3/4/2019	63	10:47	3/4/2019	10:50
NVA-112	3/4/2019	63	12:36	N/A	N/A
NVA-113	3/4/2019	63	14:26	N/A	N/A
NVA-114	3/4/2019	63	13:26	N/A	N/A

NVA-115	3/2/2019	61	16:00	3/3/2019	16:28
NVA-116	3/2/2019	61	12:58	3/2/2019	13:01
NVA-117	3/2/2019	61	12:24	3/2/2019	12:27
NVA-118	1/25/2019	25	16:55	N/A	N/A
NVA-119	1/24/2019	24	13:27	N/A	N/A
NVA-120	1/24/2019	24	9:23	N/A	N/A
NVA-121	1/24/2019	24	10:08	N/A	N/A
NVA-122	1/24/2019	24	12:20	N/A	N/A
NVA-123	3/1/2019	60	11:22	3/3/2019	11:01
NVA-124	3/1/2019	60	12:15	3/3/2019	12:59
NVA-125	3/1/2019	60	14:50	3/1/2019	14:53
NVA-126	3/2/2019	61	15:36	3/3/2019	16:08
NVA-127	3/4/2019	63	17:32	3/4/2019	17:35
NVA-128	3/4/2019	63	15:05	3/4/2019	15:08
NVA-129	3/4/2019	63	16:05	3/4/2019	16:08
NVA-130	3/2/2019	61	17:12	3/2/2019	17:15
NVA-131	2/7/2019	38	12:00	2/20/2019	9:00
NVA-132	2/12/2019	43	9:15	N/A	N/A
NVA-133	1/24/2019	24	10:54	N/A	N/A
NVA-134	2/16/2019	47	12:10	2/17/2019	10:40
NVA-135	2/12/2019	43	10:20	2/18/2019	23:15
NVA-136	2/12/2019	43	11:50	2/18/2019	14:10
NVA-137	2/8/2019	39	13:20	2/20/2019	10:10
NVA-138	2/7/2019	38	9:55	2/20/2019	12:15
NVA-139	2/5/2019	36	11:05	2/20/2019	13:25
NVA-140	2/5/2019	36	11:45	N/A	N/A
NVA-141	2/4/2019	35	13:40	2/5/2019	13:10
NVA-142	2/4/2019	35	10:50	N/A	N/A
NVA-143	2/5/2019	36	9:50	N/A	N/A
NVA-144	2/7/2019	38	14:05	N/A	N/A
NVA-145	2/7/2019	38	15:00	N/A	N/A
NVA-146	2/12/2019	43	14:35	2/18/2019	14:45
NVA-147	2/16/2019	47	13:30	2/17/2019	11:40
NVA-148	2/16/2019	47	11:15	2/17/2019	9:55
NVA-149	2/16/2019	47	10:15	2/17/2019	9:10
NVA-150	2/16/2019	47	15:08	2/17/2019	13:00
NVA-151	2/18/2019	49	9:55	2/18/2019	16:30
NVA-152	2/12/2019	43	15:05	2/18/2019	15:15
NVA-153	2/7/2018	38	15:41	N/A	N/A
NVA-154	2/5/2019	36	9:20	2/20/2019	14:40

NVA-155	2/4/2019	35	9:40	N/A	N/A
NVA-156	2/3/2019	34	13:30	N/A	N/A
NVA-157	2/3/2019	34	12:00	2/5/2019	16:25
NVA-158	2/3/2019	34	10:15	2/5/2019	15:40
NVA-159	2/4/2019	35	8:20	2/5/2019	7:50
NVA-160	2/7/2019	38	8:25	2/12/2019	7:25
NVA-161	2/12/2019	43	16:05	2/12/2019	23:30
NVA-162	2/18/2019	49	9:00	N/A	N/A
NVA-163	2/14/2019	45	12:40	2/19/2019	9:40
NVA-164	2/16/2019	47	16:50	2/17/2019	14:40
NVA-165	2/16/2019	47	9:36	2/17/2019	8:50
NVA-166	2/14/2019	45	13:35	2/19/2019	12:00
NVA-167	2/14/2019	45	10:45	2/19/2019	10:40
NVA-168	2/14/2019	45	8:40	2/21/2019	8:40
NVA-169	2/11/2019	42	16:10	2/21/2019	9:20
NVA-170	2/11/2019	42	14:05	2/21/2019	10:30
NVA-171	2/4/2019	35	6:45	2/5/2019	6:45
NVA-172	1/31/2019	31	10:49	2/2/2019	16:14
NVA-173	1/31/2019	31	12:08	2/2/2019	15:52
NVA-174	1/31/2019	31	13:10	2/2/2019	14:47
NVA-175	2/1/2019	32	12:00	N/A	N/A
NVA-176	1/31/2019	31	15:09	N/A	N/A
NVA-177	2/2/2019	33	13:03	N/A	N/A
NVA-178	1/31/2019	31	10:02	2/2/2019	16:40
NVA-179	2/2/2019	33	16:15	2/11/2019	13:10
NVA-180	2/2/2019	33	14:40	2/11/2019	13:35
NVA-181	2/13/2019	44	16:45	N/A	N/A
NVA-182	2/14/2019	45	15:30	2/19/2019	13:10
NVA-183	2/16/2019	47	8:20	N/A	N/A
NVA-184	2/16/2019	47	17:25	2/17/2019	15:10
NVA-185	2/14/2019	45	16:10	3/5/2019	11:44
NVA-186	2/13/2019	44	11:40	3/5/2019	15:26
NVA-187	2/2/2019	33	12:25	N/A	N/A
NVA-188	2/2/2019	33	8:50	2/13/2019	7:30
NVA-189	1/31/2019	31	9:40	2/2/2019	17:02
NVA-190	2/2/2019	33	11:35	2/2/2019	11:38
NVA-191	1/31/2019	31	16:17	N/A	N/A
NVA-192	1/29/2019	29	16:05	N/A	N/A
NVA-193	1/29/2019	29	15:46	N/A	N/A
NVA-194	1/29/2019	29	14:49	N/A	N/A

NVA-195	1/30/2019	30	21:19	2/13/2019	10:55
NVA-196	1/24/2019	24	15:52	1/24/2019	15:55
NVA-197	1/24/2019	24	15:50	2/13/2019	9:39
NVA-198	1/30/2019	30	12:44	N/A	N/A
NVA-199	1/30/2019	30	14:00	N/A	N/A
NVA-200	1/30/2019	30	15:50	N/A	N/A
NVA-201	1/22/2019	22	1:42	1/24/2019	10:23
NVA-202	1/22/2019	22	10:21	1/23/2019	9:34
NVA-203	1/22/2019	22	9:13	1/24/2019	8:47
NVA-204	1/23/2019	23	13:37	2/2/2019	10:05
NVA-205	1/23/2019	23	14:45	2/4/2019	10:00
NVA-206	2/13/2019	44	9:30	N/A	N/A
NVA-207	2/15/2019	46	11:45	2/19/2019	14:20
NVA-208	2/15/2019	46	14:10	N/A	N/A
NVA-209	2/15/2019	46	7:00	2/15/2019	15:40
NVA-210	2/15/2019	46	16:20	2/16/2019	7:00
NVA-211	2/14/2019	45	14:40	2/15/2019	10:06
NVA-212	2/14/2019	45	13:06	N/A	N/A
NVA-213	2/14/2019	45	10:48	2/15/2019	13:27
NVA-214	2/2/2019	33	13:04	2/2/2019	13:07
NVA-215	2/2/2019	33	17:35	2/2/2019	17:38
NVA-216	1/23/2019	23	16:14	N/A	N/A
NVA-217	1/23/2019	23	11:28	N/A	N/A
NVA-218	1/23/2019	23	8:08	N/A	N/A
NVA-219	1/23/2019	23	16:17	N/A	N/A
NVA-220	1/22/2019	22	15:48	N/A	N/A
NVA-221	1/22/2019	22	14:09	N/A	N/A
NVA-222	1/23/2019	23	15:06	N/A	N/A
NVA-223	1/23/2019	23	7:57	N/A	N/A
NVA-224	1/22/2019	22	16:49	1/24/2019	9:32
NVA-225	1/23/2019	23	10:43	N/A	N/A
NVA-226	2/4/2019	35	12:56	N/A	N/A
NVA-227	2/2/2019	33	13:49	N/A	N/A
NVA-228	2/17/2019	48	11:16	N/A	N/A
NVA-229	2/16/2019	47	14:32	N/A	N/A
NVA-230	2/16/2019	47	12:27	2/17/2019	14:44
NVA-231	2/4/2019	35	14:09	2/4/2019	14:12
NVA-232	2/3/2019	34	12:23	2/3/2019	12:26
NVA-233	1/22/2019	22	13:48	N/A	N/A
NVA-234	1/22/2019	22	13:10	N/A	N/A

NVA-235	1/23/2019	23	13:44	N/A	N/A
NVA-236	1/23/2019	23	11:47	N/A	N/A
NVA-237	1/22/2019	22	12:23	N/A	N/A
NVA-238	1/22/2019	22	11:13	N/A	N/A
NVA-239	2/2/2019	33	23:34	N/A	N/A
NVA-240	2/3/2019	34	12:48	N/A	N/A
NVA-241	2/16/2019	47	10:56	N/A	N/A
NVA-242	2/16/2019	47	9:45	2/17/2019	9:21
NVA-243	2/6/2019	37	14:30	2/6/2019	14:33
NVA-244	2/6/2019	37	12:59	2/17/2019	11:16
NVA-245	2/6/2019	37	12:04	2/18/2019	11:50
NVA-246	2/6/2019	37	10:16	2/19/2019	12:45
NVA-247	2/7/2019	38	8:42	N/A	N/A
NVA-248	2/5/2019	36	10:36	N/A	N/A
NVA-249	2/5/2019	36	11:37	N/A	N/A
NVA-250	2/5/2019	36	13:06	N/A	N/A
NVA-251	2/5/2019	36	14:12	N/A	N/A
NVA-252	2/5/2019	36	15:13	N/A	N/A
NVA-253	2/5/2019	36	16:00	N/A	N/A
VVA's					
POINT ID	OBSERV. DATE	JULIAN DATE	TIME OF DAY (AST)	RE-OBSERV. DATE	RE-OBSERV. TIME
VVA-1	2/5/2019	36	15:40	N/A	N/A
VVA-2	2/5/2019	36	14:51	N/A	N/A
VVA-3	2/5/2019	36	13:47	N/A	N/A
VVA-4	2/5/2019	36	12:15	N/A	N/A
VVA-5	2/5/2019	36	11:09	N/A	N/A
VVA-6	2/5/2019	36	9:47	N/A	N/A
VVA-7	2/6/2019	37	11:03	2/18/2019	12:20
VVA-8	2/6/2019	37	15:25	2/6/2019	15:28
VVA-9	2/6/2019	37	13:43	2/18/2019	10:25
VVA-10	2/16/2019	47	10:30	2/17/2019	16:30
VVA-11	2/14/2019	45	15:11	N/A	N/A
VVA-12	2/3/2019	34	10:54	N/A	N/A
VVA-13	1/23/2019	23	22:22	N/A	N/A
VVA-14	1/23/2019	23	22:22	N/A	N/A
VVA-15	1/23/2019	23	13:18	N/A	N/A
VVA-16	1/23/2019	23	14:18	N/A	N/A
VVA-17	1/23/2019	23	8:40	N/A	N/A
VVA-18	1/22/2019	22	16:01	N/A	N/A

VVA-19	2/4/2019	35	13:25	N/A	N/A
VVA-20	2/16/2019	47	11:54	2/17/2019	15:30
VVA-21	2/16/2019	47	15:23	2/17/2019	10:34
VVA-22	2/17/2019	48	11:52	2/17/2019	11:55
VVA-23	2/16/2019	47	13:19	2/17/2019	13:55
VVA-24	2/4/2019	35	11:52	2/4/2019	11:55
VVA-25	1/23/2019	23	10:11	N/A	N/A
VVA-26	1/23/2019	23	17:00	N/A	N/A
VVA-27	1/23/2019	23	15:47	N/A	N/A
VVA-28	1/22/2019	22	13:00	N/A	N/A
VVA-29	1/30/2019	30	13:10	N/A	N/A
VVA-30	1/30/2019	30	15:03	N/A	N/A
VVA-31	1/30/2019	30	16:20	N/A	N/A
VVA-32	1/29/2019	29	17:00	N/A	N/A
VVA-33	1/30/2019	30	11:05	N/A	N/A
VVA-34	1/29/2019	29	13:01	2/13/2019	10:21
VVA-35	1/22/2019	22	11:04	1/24/2019	10:00
VVA-36	1/22/2019	22	10:03	1/24/2019	9:22
VVA-37	1/22/2019	22	8:53	1/24/2019	8:35
VVA-38	1/23/2019	23	12:27	1/23/2019	12:30
VVA-39	1/23/2019	23	15:36	1/23/2019	15:39
VVA-40	2/4/2019	35	11:26	N/A	N/A
VVA-41	2/2/2019	33	13:25	2/2/2019	13:28
VVA-42	2/17/2019	48	12:49	2/17/2019	12:52
VVA-43	2/14/2019	45	11:32	2/14/2019	11:36
VVA-44	2/14/2019	45	12:35	2/15/2019	11:53
VVA-45	2/14/2019	45	14:12	2/15/2019	10:19
VVA-46	2/15/2019	46	16:45	2/16/2019	7:15
VVA-47	2/15/2019	46	15:05	2/19/2019	15:15
VVA-48	2/15/2019	46	12:40	N/A	N/A
VVA-49	2/14/2019	45	10:13	2/15/2019	13:08
VVA-50	2/13/2019	44	11:10	N/A	N/A
VVA-51	2/2/2019	33	11:38	2/4/2019	10:37
VVA-52	2/2/2019	33	11:40	N/A	N/A
VVA-53	2/2/2019	33	10:10	N/A	N/A
VVA-54	2/2/2019	33	10:10	2/2/2019	10:13
VVA-55	1/31/2019	31	16:42	1/31/2019	16:45
VVA-56	2/1/2019	32	14:01	2/1/2019	14:04
VVA-57	2/1/2019	32	13:00	2/1/2019	13:03
VVA-58	1/31/2019	31	14:42	1/31/2019	14:45

VVA-59	2/2/2019	33	12:45	2/2/2019	12:48
VVA-60	2/2/2019	33	13:28	2/2/2019	13:31
VVA-61	2/3/2019	34	17:20	N/A	N/A
VVA-62	2/2/2019	33	16:45	N/A	N/A
VVA-63	2/2/2019	33	13:00	2/21/2019	14:45
VVA-64	2/13/2019	44	15:30	N/A	N/A
VVA-65	2/13/2019	44	13:20	2/19/2019	13:40
VVA-66	2/15/2019	46	8:20	N/A	N/A
VVA-67	2/16/2019	47	7:50	2/17/2019	7:50
VVA-68	2/16/2019	47	9:10	2/17/2019	8:35
VVA-69	2/16/2019	47	16:25	2/17/2019	14:15
VVA-70	3/5/2019	64	10:54	3/5/2019	10:57
VVA-71	2/14/2019	45	9:15	N/A	N/A
VVA-72	2/2/2019	33	14:05	N/A	N/A
VVA-73	2/11/2019	42	14:50	2/21/2019	10:00
VVA-74	3/5/2019	64	14:06	3/5/2019	14:09
VVA-75	2/4/2019	35	7:50	2/5/2019	7:20
VVA-76	2/3/2019	34	10:40	2/5/2019	16:00
VVA-77	1/31/2019	31	13:41	1/31/2019	13:44
VVA-78	2/3/2019	34	12:45	N/A	N/A
VVA-79	2/4/2019	35	10:10	N/A	N/A
VVA-80	2/5/2019	36	8:40	N/A	N/A
VVA-81	2/7/2019	38	8:55	2/12/2019	7:45
VVA-82	2/12/2019	43	16:30	2/21/2019	11:15
VVA-83	2/12/2019	43	15:30	2/18/2019	15:30
VVA-84	2/18/2019	49	20:25	N/A	N/A
VVA-85	2/14/2019	45	12:05	2/19/2019	10:00
VVA-86	2/16/2019	47	14:00	2/17/2019	0:00
VVA-87	2/16/2019	47	10:45	2/17/2019	9:25
VVA-88	2/16/2019	47	11:40	2/17/2019	10:15
VVA-89	2/16/2019	47	12:40	2/17/2019	11:00
VVA-90	2/18/2019	49	10:35	2/19/2019	8:30
VVA-91	2/12/2019	43	11:00	2/18/2019	13:00
VVA-92	2/12/2019	43	13:00	N/A	N/A
VVA-93	2/7/2019	38	13:40	N/A	N/A
VVA-94	2/7/2018	38	11:10	N/A	N/A
VVA-95	2/5/2019	36	10:40	2/20/2019	12:50
VVA-96	3/5/2019	64	12:42	3/5/2019	12:45
VVA-97	2/4/2019	35	14:20	2/5/2019	13:35
VVA-98	1/29/2019	29	17:34	N/A	N/A

VVA-99	1/29/2019	29	14:22	N/A	N/A
VVA-100	3/4/2019	63	17:30	N/A	N/A
VVA-101	2/7/2019	38	12:40	N/A	N/A
VVA-102	3/2/2019	61	14:57	N/A	N/A
VVA-103	2/12/2019	43	8:45	2/18/2019	12:30
VVA-104	3/1/2019	60	14:13	3/3/2019	15:06
VVA-105	3/1/2019	60	13:15	3/1/2019	13:18
VVA-106	3/1/2019	60	10:22	3/3/2019	10:19
VVA-107	3/1/2018	60	9:32	3/3/2019	9:43
VVA-108	1/23/2019	23	13:20	1/23/2019	13:25
VVA-109	1/23/2019	23	12:20	2/11/2019	10:45
VVA-110	1/25/2019	25	12:05	2/11/2019	12:50
VVA-111	1/28/2019	28	10:12	3/1/2019	17:37
VVA-112	3/1/2019	60	9:05	3/3/2019	9:18
VVA-113	3/1/2019	60	16:40	N/A	N/A
VVA-114	3/1/2019	60	15:37	N/A	N/A
VVA-115	3/2/2019	61	14:08	N/A	N/A
VVA-116	3/4/2019	63	16:25	N/A	N/A
VVA-117	3/4/2019	63	18:05	N/A	N/A
VVA-118	3/4/2019	63	14:09	3/5/2019	23:26
VVA-119	2/28/2019	59	16:45	N/A	N/A
VVA-120	3/4/2019	63	12:00	3/4/2019	12:03
VVA-121	3/4/2019	63	10:17	3/5/2019	10:05
VVA-122	3/4/2019	63	9:12	3/5/2019	9:03
VVA-123	3/2/2019	61	11:55	3/2/2019	11:58
VVA-124	3/1/2019	60	17:52	N/A	N/A
VVA-125	3/3/2019	62	11:45	3/3/2019	11:48
VVA-126	3/2/2019	61	8:02	N/A	N/A
VVA-127	3/1/2019	60	8:27	3/3/2019	8:55
VVA-128	3/1/2019	60	7:50	3/1/2019	7:53
VVA-129	3/1/2019	60	14:18	3/2/2019	10:06
VVA-130	3/3/2019	62	10:26	N/A	N/A
VVA-131	3/4/2019	63	11:46	N/A	N/A
VVA-132	3/2/2019	61	10:33	N/A	N/A
VVA-133	3/4/2019	63	9:33	N/A	N/A
VVA-134	3/4/2019	63	9:03	N/A	N/A
VVA-135	3/4/2019	63	11:09	N/A	N/A
VVA-136	3/4/2019	63	9:53	N/A	N/A
VVA-137	3/3/2019	62	17:47	N/A	N/A
VVA-138	3/3/2019	62	17:00	3/3/2019	17:03

VVA-139	3/3/2019	62	16:03	3/3/2019	16:06
VVA-140	3/1/2019	60	14:58	3/2/2019	10:40
VVA-141	3/1/2019	60	15:52	3/2/2019	11:10
VVA-142	3/3/2019	62	11:15	N/A	N/A
VVA-143	3/3/2019	62	14:33	N/A	N/A
VVA-144	3/4/2019	63	12:30	3/4/2019	0:33
VVA-145	3/4/2019	63	13:51	3/4/2019	13:54
VVA-146	3/4/2019	63	13:09	3/4/2019	13:12
VVA-147	3/3/2019	62	12:59	N/A	N/A
VVA-148	3/2/2019	61	17:13	N/A	N/A
VVA-149	3/2/2019	61	15:13	N/A	N/A
VVA-150	3/1/2019	60	16:43	N/A	N/A
VVA-151	1/25/2019	25	14:15	N/A	N/A
VVA-152	1/28/2019	28	13:10	N/A	N/A
VVA-153	2/4/2019	35	14:20	N/A	N/A
VVA-154	1/23/2019	23	8:35	N/A	N/A
VVA-155	1/29/2019	29	9:45	3/12/2019	8:00
VVA-156	2/8/2019	39	12:45	N/A	N/A
VVA-157	2/4/2019	35	13:55	2/12/2019	17:35
VVA-158	2/4/2019	35	12:04	2/12/2019	16:33
VVA-159-2	2/22/2019	53	12:15	N/A	N/A
VVA-160	2/5/2019	36	10:02	N/A	N/A
VVA-161	2/7/2019	38	17:25	N/A	N/A
VVA-162	1/29/2019	29	14:00	3/12/2019	16:00
VVA-163	1/22/2019	22	13:15	N/A	N/A
VVA-164	2/15/2019	46	10:30	3/13/2019	16:00
VVA-165	2/5/2019	36	15:00	3/13/2019	14:00
VVA-166	2/5/2019	36	8:30	3/13/2019	10:00
VVA-167	2/6/2019	37	9:40	N/A	N/A
VVA-168	2/11/2019	42	13:50	N/A	N/A
VVA-169	2/5/2019	36	16:14	2/5/2019	16:20
VVA-170	2/7/2019	38	9:12	N/A	N/A
VVA-171	2/8/2019	39	10:05	2/13/2019	13:22
VVA-172	2/14/2019	45	14:30	N/A	N/A
VVA-173	2/6/2019	37	13:40	N/A	N/A
VVA-174-2	2/25/2019	56	17:30	N/A	N/A
VVA-175	2/13/2019	44	12:30	N/A	N/A
VVA-176	2/14/2019	45	10:30	N/A	N/A
VVA-177	2/7/2019	38	12:29	N/A	N/A
VVA-178	2/12/2019	43	8:30	N/A	N/A

VVA-179	2/13/2019	44	8:40	N/A	N/A
VVA-180	2/7/2019	38	15:40	N/A	N/A

5. POINT COMPARISON

Point ID	Point CK ID	Delta North (M)	Delta East (M)	Vertical Difference (M)
NVA-3	NVA CK-3	-0.004	-0.002	0.002
NVA-4	NVA CK-4	0.010	0.007	-0.021
NVA-7	NVA CK-7	0.013	0.000	-0.017
NVA-8	NVA CK-8	0.001	0.015	-0.017
NVA-11	NVA CK-11	-0.013	-0.007	-0.007
NVA-23	NVA CK-23	0.002	0.000	0.011
NVA-27	NVA CK-27	0.004	0.002	0.012
NVA-28	NVA CK-28	0.004	-0.009	-0.009
NVA-29	NVA CK-29	0.000	-0.002	0.000
NVA-34	NVA CK-34	-0.009	-0.004	0.016
NVA-35	NVA CK-35	0.044	0.036	0.047
NVA-36	NVA CK-36	0.016	0.027	0.027
NVA-37	NVA CK-37	0.025	0.011	0.004
NVA-38	NVA CK-38	0.004	0.006	-0.004
NVA-39	NVA CK-39	-0.027	0.003	0.005
NVA-40	NVA CK-40	0.018	-0.015	0.028
NVA-45	NVA CK-45	0.008	-0.005	-0.010
NVA-46	NVA CK-46	0.039	0.029	-0.032
NVA-48	NVA CK-48	0.006	-0.001	-0.010
NVA-50	NVA CK-50	0.004	0.009	-0.033
NVA-51	NVA CK-51	-0.013	0.001	-0.002
NVA-52	NVA CK-52	0.003	0.003	-0.006
NVA-53	NVA CK-53	0.005	0.007	0.001
NVA-54	NVA CK-54	-0.004	-0.005	-0.001
NVA-55	NVA CK-55	-0.002	0.001	-0.033
NVA-57	NVA CK-57	0.002	0.002	0.010
NVA-58	NVA CK-58	0.001	-0.001	0.033
NVA-62	NVA CK-62	0.009	-0.014	0.033
NVA-63	NVA CK-63	0.010	-0.027	0.030
NVA-64	NVA CK-64	-0.004	-0.013	-0.015
NVA-68	NVA CK-68	-0.014	-0.013	-0.011
NVA-69	NVA CK-69	-0.001	0.000	-0.005
NVA-73	NVA CK-73	-0.012	0.014	0.012
NVA-75	NVA CK-75	-0.017	0.011	0.029
NVA-78	NVA CK-78	-0.010	-0.012	0.000
NVA-82	NVA CK-82	-0.004	-0.031	0.020
NVA-86	NVA CK-86	0.003	0.016	-0.006
NVA-88	NVA CK-88	-0.018	0.031	0.025
NVA-90	NVA CK-90	-0.004	0.010	0.000
NVA-91	NVA CK-91	-0.019	-0.023	-0.010

NVA-92	NVA CK-92	-0.007	-0.003	0.010
NVA-94	NVA CK-94	0.028	0.008	-0.016
NVA-98	NVA CK-98	-0.011	-0.007	0.005
NVA-99	NVA CK-99	-0.004	0.001	0.004
NVA-100	NVA CK-100	-0.006	-0.003	0.000
NVA-101	NVA CK-101	0.002	0.004	0.000
NVA-102	NVA CK-102	0.001	0.003	-0.010
NVA-103	NVA CK-103	-0.003	-0.001	-0.010
NVA-109	NVA CK-109	0.020	0.002	0.016
NVA-110	NVA CK-110	0.009	-0.011	0.031
NVA-111	NVA CK-111	0.001	0.000	-0.011
NVA-115	NVA CK-115	0.012	0.011	0.011
NVA-116	NVA CK-116	-0.008	-0.004	-0.015
NVA-117	NVA CK-117	0.005	-0.008	0.011
NVA-123	NVA CK-123	0.035	-0.023	0.023
NVA-124	NVA CK-124	0.025	-0.025	0.008
NVA-125	NVA CK-125	-0.016	-0.022	0.001
NVA-126	NVA CK-126	-0.004	0.005	0.006
NVA-127	NVA CK-127	-0.003	0.003	0.012
NVA-128	NVA CK-128	0.010	-0.007	0.007
NVA-129	NVA CK-129	0.003	-0.008	-0.016
NVA-130	NVA CK-130	0.010	-0.018	0.009
NVA-131	NVA CK-131	0.000	-0.004	0.025
NVA-134	NVA CK-134	-0.002	0.007	-0.028
NVA-135	NVA CK-135	-0.001	-0.015	-0.021
NVA-136	NVA CK-136	-0.012	0.005	0.020
NVA-137	NVA CK-137	0.032	0.006	-0.032
NVA-138	NVA CK-138	-0.030	0.000	0.031
NVA-139	NVA CK-139	-0.007	0.013	-0.022
NVA-141	NVA CK-141	-0.017	0.012	0.017
NVA-146	NVA CK-146	-0.003	-0.009	-0.005
NVA-147	NVA CK-147	-0.006	-0.002	-0.019
NVA-148	NVA CK-148	-0.015	0.01	0.017
NVA-149	NVA CK-149	0.031	-0.008	0.028
NVA-150	NVA CK-150	0.000	0.001	-0.032
NVA-151	NVA CK-151	0.005	-0.017	-0.026
NVA-152	NVA CK-152	0.006	0.016	0.021
NVA-154	NVA CK-154	0.004	-0.007	0.030
NVA-157	NVA CK-157	0.004	0.002	-0.006
NVA-158	NVA CK-158	-0.016	0.009	0.022
NVA-159	NVA CK-159	-0.006	-0.006	-0.001
NVA-160	NVA CK-160	-0.016	-0.009	-0.007

NVA-161	NVA CK-161	-0.009	0.021	-0.004
NVA-166	NVA CK-166	0.001	0.005	-0.034
NVA-167	NVA CK-167	-0.013	0.001	0.006
NVA-168	NVA CK-168	-0.021	-0.006	0.017
NVA-169	NVA CK-169	-0.003	-0.008	0.012
NVA-170	NVA CK-170	-0.021	0.021	0.032
NVA-171	NVA CK-171	0.010	0.008	0.019
NVA-172	NVA CK-172	0.005	-0.016	0.014
NVA-173	NVA CK-173	-0.005	-0.003	0.001
NVA-174	NVA CK-174	-0.007	0.002	0.020
NVA-178	NVA CK-178	-0.005	0.008	-0.019
NVA-179	NVA CK-179	0.015	0.018	-0.041
NVA-180	NVA CK-180	-0.005	0.004	-0.001
NVA-182	NVA CK-182	0.001	0.004	-0.012
NVA-184	NVA CK-184	0.015	-0.013	0.007
NVA-185	NVA CK-185	-0.023	-0.010	0.000
NVA-186	NVA CK-186	-0.023	-0.013	0.040
NVA-188	NVA CK-188	-0.011	0.007	-0.022
NVA-189	NVA CK-189	-0.007	0.002	-0.030
NVA-190	NVA CK-190	-0.001	0.003	-0.009
NVA-195	NVA CK-195	-0.006	0.015	-0.011
NVA-196	NVA CK-196	-0.005	-0.001	0.001
NVA-197	NVA CK-197	-0.014	0.000	-0.005
NVA-201	NVA CK-201	-0.009	-0.019	-0.020
NVA-202	NVA CK-202	-0.012	0.031	-0.012
NVA-203	NVA CK-203	0.005	0.007	-0.008
NVA-204	NVA CK-204	-0.003	0.008	-0.007
NVA-205	NVA CK-205	0.004	-0.014	0.001
NVA-207	NVA CK-207	-0.005	0.008	0.002
NVA-209	NVA CK-209	-0.007	-0.006	0.012
NVA-210	NVA CK-210	0.027	-0.014	0.033
NVA-211	NVA CK-211	0.011	0.011	-0.018
NVA-213	NVA CK-213	-0.003	-0.013	0.019
NVA-214	NVA CK-214	-0.003	-0.001	0.014
NVA-215	NVA CK-215	-0.002	0.013	-0.017
NVA-224	NVA CK-224	0.014	0.007	0.021
NVA-230	NVA CK-230	-0.008	-0.025	0.007
NVA-231	NVA CK-231	0.013	-0.010	-0.014
NVA-232	NVA CK-232	0.002	0.001	-0.008
NVA-242	NVA CK-242	0.004	0.011	-0.007
NVA-243	NVA CK-243	0.002	0.009	0.012
NVA-244	NVA CK-244	-0.012	0.001	0.014

NVA-245	NVA CK-245	0.005	0.004	-0.016
NVA-246	NVA CK-246	0.010	0.012	0.003
VVA				
VVA-7	VVA CK-7	-0.003	0.021	-0.007
VVA-8	VVA CK-8	-0.004	0.007	-0.014
VVA-9	VVA CK-9	-0.008	0.004	0.014
VVA-10	VVA CK-10	-0.017	-0.009	0.010
VVA-20	VVA CK-20	-0.017	-0.003	0.009
VVA-21	VVA CK-21	0.011	-0.005	0.034
VVA-22	VVA CK-22	0.011	-0.002	-0.021
VVA-23	VVA CK-23	-0.005	0.002	0.024
VVA-24	VVA CK-24	0.011	-0.006	-0.003
VVA-34	VVA CK-34	-0.011	0.006	-0.034
VVA-35	VVA CK-35	-0.005	-0.014	0.026
VVA-36	VVA CK-36	-0.009	0.020	0.001
VVA-37	VVA CK-37	-0.014	0.025	-0.005
VVA-38	VVA CK-38	0.002	0.011	0.021
VVA-39	VVA CK-39	0.002	0.023	-0.008
VVA-41	VVA CK-41	-0.002	0.000	-0.003
VVA-42	VVA CK-42	-0.023	0.020	-0.023
VVA-43	VVA CK-43	-0.007	0.001	0.031
VVA-44	VVA CK-44	-0.034	-0.018	-0.023
VVA-45	VVA CK-45	-0.017	0.011	-0.015
VVA-46	VVA CK-46	-0.033	-0.009	0.023
VVA-47	VVA CK-47	-0.012	0.003	0.008
VVA-49	VVA CK-49	0.005	-0.012	0.016
VVA-51	VVA CK-51	0.038	-0.023	-0.009
VVA-54	VVA CK-54	-0.001	0.001	-0.003
VVA-55	VVA CK-55	-0.002	-0.005	0.025
VVA-56	VVA CK-56	-0.003	-0.007	0.004
VVA-57	VVA CK-57	0.003	-0.015	0.018
VVA-58	VVA CK-58	0.009	-0.018	-0.016
VVA-59	VVA CK-59	-0.007	-0.003	0.030
VVA-60	VVA CK-60	-0.011	0.008	0.024
VVA-63	VVA CK-63	0.006	0.003	0.029
VVA-65	VVA CK-65	-0.015	0.006	0.028
VVA-67	VVA CK-67	-0.005	0.017	-0.003
VVA-68	VVA CK-68	-0.016	0.009	0.042
VVA-69	VVA CK-69	0.034	-0.001	-0.024
VVA-70	VVA CK-70	0.001	0.000	-0.014
VVA-73	VVA CK-73	-0.002	0.003	0.024
VVA-74 A	VVA CK-74 A	-0.019	-0.017	0.000

VVA-75	VVA CK-75	0.006	0.015	0.041
VVA-76	VVA CK-76	0.032	-0.002	0.026
VVA-77	VVA CK-77	-0.004	0.005	0.011
VVA-81	VVA CK-81	0.034	-0.012	0.040
VVA-82	VVA CK-82	0.005	0.010	0.002
VVA-83	VVA CK-83	0.008	-0.024	-0.021
VVA-85	VVA CK-85	0.004	-0.022	-0.040
VVA-86	VVA CK-86	-0.004	0.012	-0.025
VVA-87	VVA CK-87	0.004	-0.005	0.041
VVA-88	VVA CK-88	0.013	0.009	0.027
VVA-89	VVA CK-89	-0.019	0.002	0.012
VVA-90	VVA CK-90	-0.015	0.020	-0.033
VVA-91	VVA CK-91	-0.001	0.004	0.023
VVA-95	VVA CK-95	-0.019	0.004	0.000
VVA-96	VVA CK-96	-0.018	0.028	-0.041
VVA-97	VVA CK-97	0.014	0.010	0.006
VVA-103	VVA CK-103	0.003	0.005	-0.031
VVA-104	VVA CK-104	-0.019	0.017	-0.008
VVA-105	VVA CK-105	0.004	-0.013	0.020
VVA-106	VVA CK-106	-0.003	0.012	-0.011
VVA-107	VVA CK-107	-0.031	0.044	0.022
VVA-108	VVA CK-108	0.007	0.004	0.000
VVA-109	VVA CK-109	0.003	-0.034	-0.015
VVA-110	VVA CK-110	0.002	0.005	-0.020
VVA-111	VVA CK-111	0.000	0.002	0.005
VVA-112	VVA CK-112	-0.005	0.018	-0.015
VVA-118	VVA CK-118	-0.008	-0.024	0.030
VVA-120	VVA CK-120	-0.030	0.003	0.015
VVA-121	VVA CK-121	0.008	0.012	0.002
VVA-122	VVA CK-122	0.026	-0.010	-0.021
VVA-123	VVA CK-123	-0.019	-0.016	-0.021
VVA-125	VVA CK-125	-0.031	-0.007	-0.018
VVA-127	VVA CK-127	-0.019	0.012	-0.022
VVA-128	VVA CK-128	0.008	-0.004	0.011
VVA-129	VVA CK-129	0.019	0.015	-0.004
VVA-138	VVA CK-138	-0.001	0.000	-0.012
VVA-139	VVA CK-139	-0.004	-0.004	0.001
VVA-140	VVA CK-140	-0.018	-0.002	-0.024
VVA-141	VVA CK-141	-0.023	0.003	0.034
VVA-144	VVA CK-144	0.009	0.021	-0.019
VVA-145	VVA CK-145	0.008	0.002	-0.029
VVA-146	VVA CK-146	0.004	-0.001	0.000

VVA-155	VVA CK-155	0.012	0.016	-0.027
VVA-157	VVA CK-157	0.003	-0.017	0.031
VVA-158	VVA CK-158	-0.002	0.007	0.003
VVA-162	VVA CK-162	-0.009	-0.017	-0.030
VVA-164	VVA CK-164	0.004	0.001	-0.004
VVA-165	VVA CK-165	-0.020	0.013	0.006
VVA-166	VVA CK-166	0.004	-0.002	-0.003
VVA-169	VVA CK-169	-0.009	-0.002	0.018
VVA-171	VVA CK-171	0.008	-0.001	0.013