

# Check Point Survey Report

## VA FEMA NRCS South-Central QL2 Virginia/West Virginia LiDAR Mapping Project

Contract # G16PC00020  
Task Order Number: G17PD01206

Prepared for:  
*USGS – United States Geological Survey*



Prepared By:

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## **TABLE OF CONTENTS**

1.	Introduction	
1.1	Project Summary .....	3
1.2	Points of Contact(s) .....	3
1.3	Project Area .....	4-5
2.	Project Details	
2.1	Survey Equipment.....	6
2.2	Survey Point Details.....	6
2.3	Network Design.....	6
2.4	Field Survey Procedures and Analysis.....	7-8
2.5	Adjustment.....	9
2.6	Data processing Procedures.....	9
3.	Final Coordinates.....	10-18
4.	GPS Observation & Re-Observation Schedule.....	19-27
5.	Point Comparison Report.....	28-32
6.	Deliverables.....Sent via Electronic Transfer	
	Including: a) Point Documentation Report & Photos of Survey Points	
	b) Final Coordinate List in Excel Format	
	c) NGS Data Sheets for Project Controls	

# 1. INTRODUCTION

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## 1.1 *Project Summary*

Dewberry Engineers Inc. is under contract to USGS United States Geological Survey to provide 333 Check Points in the States of Virginia and West Virginia. Under the above referenced USGS Task Order, Dewberry is tasked to complete the quality assurance of mapping products. As part of this work Dewberry staff will complete Check Point surveys that will be used to evaluate the mapping accuracy. The ground survey was conducted between the dates of December 22, 2017 and February 7, 2018.

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 UTM Zone 17, NAD83 (2011) in meters. Final Vertical elevations are referenced to NAVD88 in meters using Geoid model 2012B (Geoid12B).

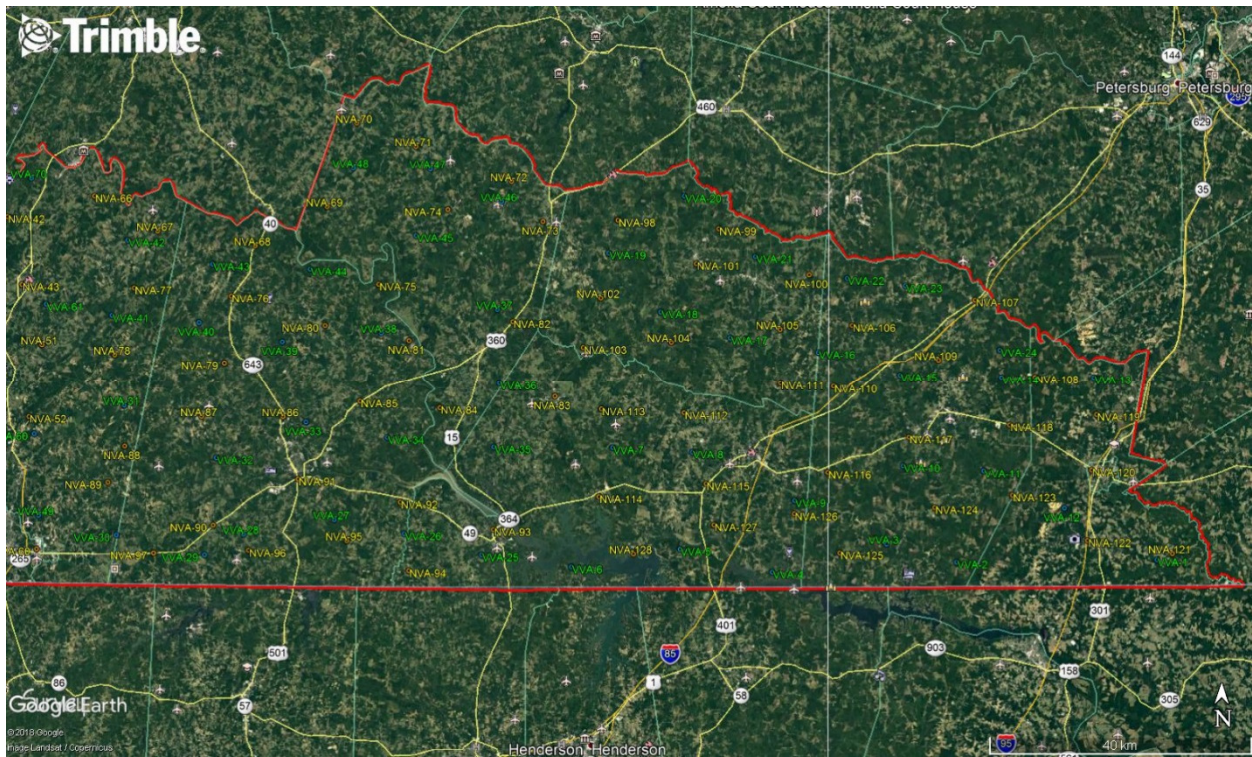
## 1.2 *Points of Contact*

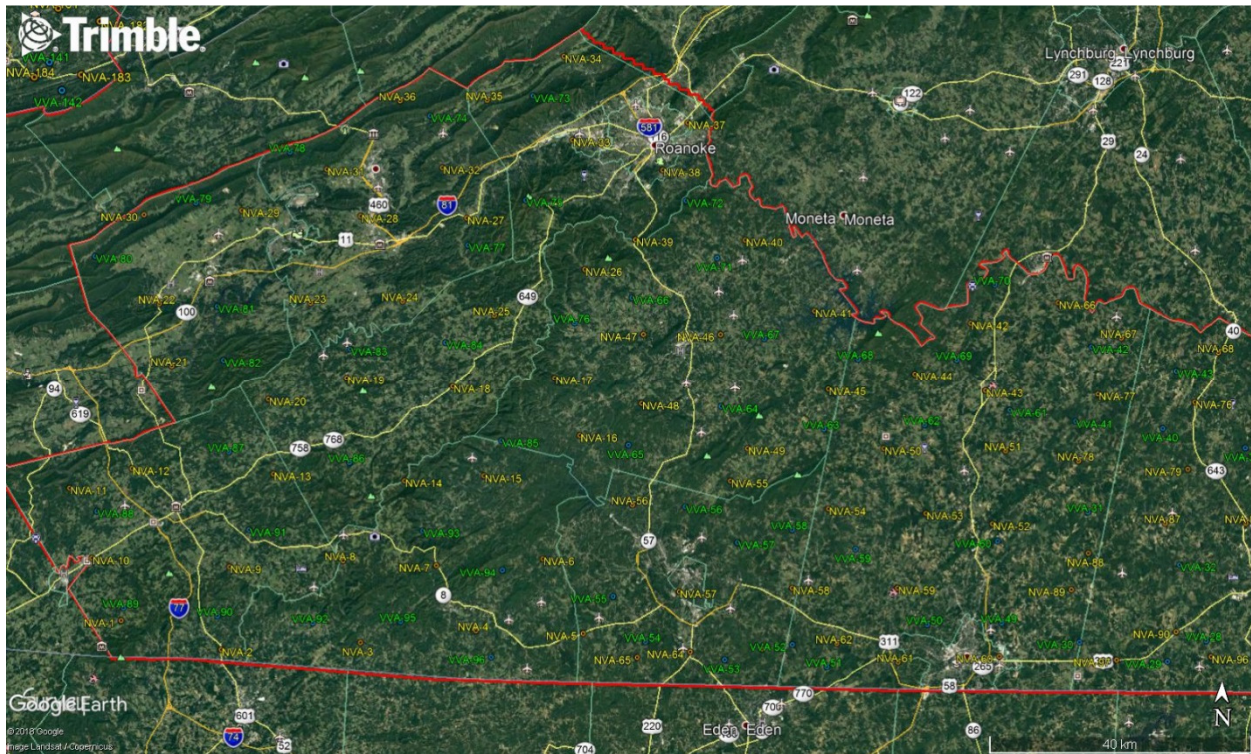
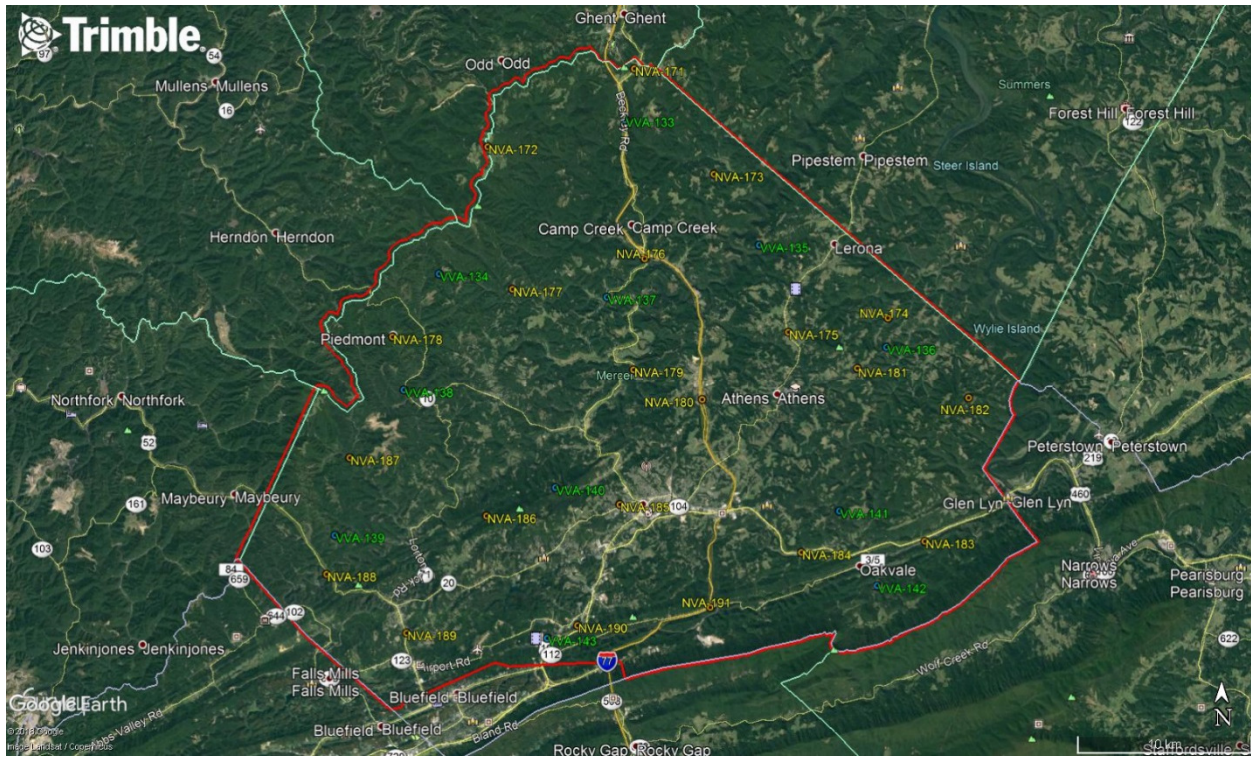
Questions regarding the technical aspects of this report should be addressed to:

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### 1.3 Project Areas





## **PROJECT DETAILS**

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### **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 333 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 KEYNET GPS, Inc. 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.

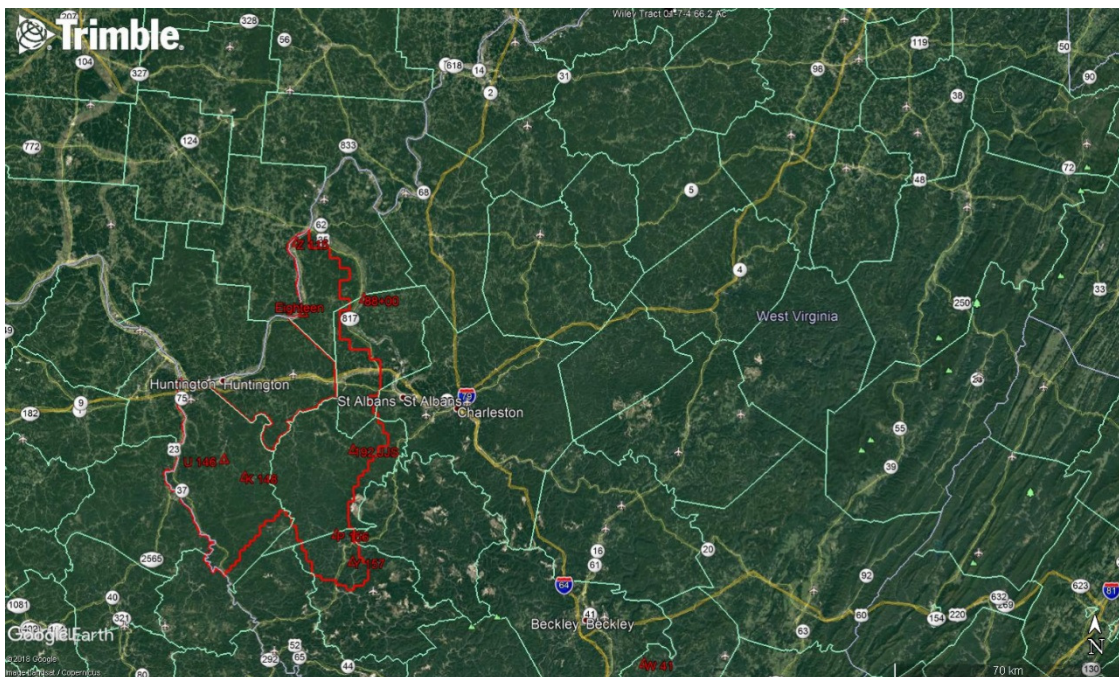
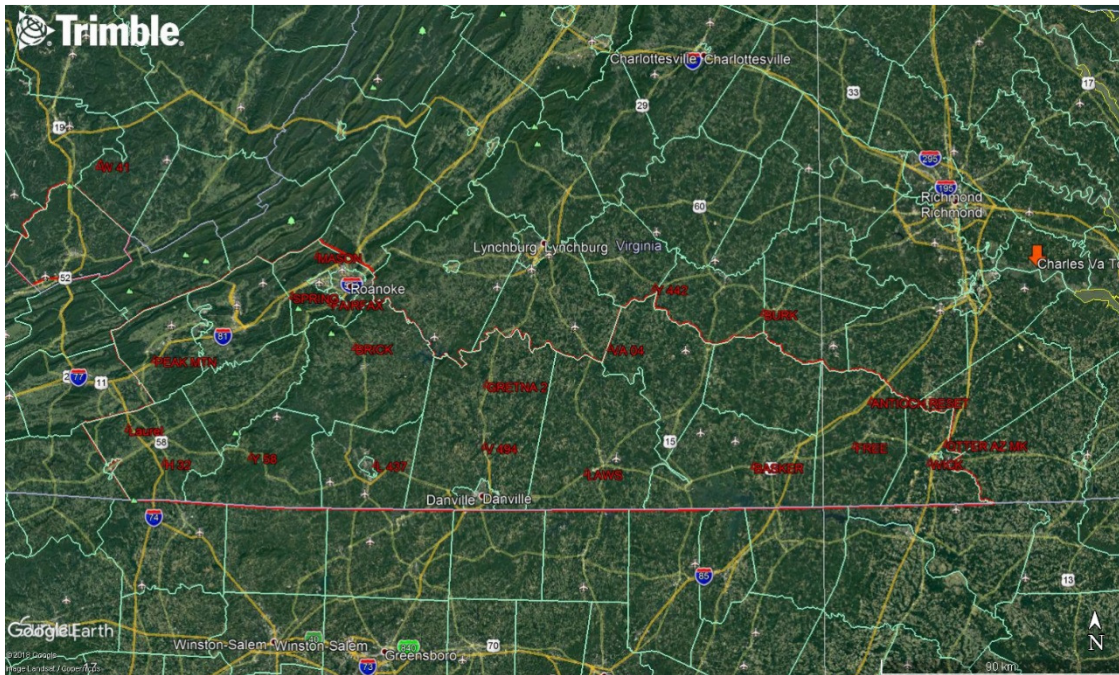
Field GPS observations are detailed on the “Check Point Documentation Reports” submitted as part of this report.

Sixteen (16) existing NGS monument listed in the NSRS database were located for the Virginia and West Virginia areas 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 GX1512, GX0386, HY0441, HY0560, HY0467, DM3999, HX2287, DL9814, HY0613, FX1611, GW0280, GW0453, FZ0560, FZ0561, FZ0006 and FX1105. The results are as follows:

PT. #	Observed Values			Data Sheet Values			$\Delta X$	$\Delta Y$	$\Delta Z$
	NORTHING (m)	EASTING (m)	ELEV. (m)	NORTHING (m)	EASTING (m)	ELEV. (m)			
H 30 GX1512	4124933.524	480506.873	780.233	N/A	N/A	780.26	N/A	N/A	0.027
W-283	4133275.168	506983.467	509.879	N/A	N/A	509.87	N/A	N/A	0.009
V109	4254492.569	380052.413	168.209	N/A	N/A	168.232	N/A	N/A	0.023
P 156	4207302.474	408118.936	194.749	N/A	N/A	194.715	N/A	N/A	0.034
D 38	4254231.946	410619.291	209.985	N/A	N/A	210.066	N/A	N/A	0.081
Athens	4142412.728	493994.112	737.007	4142412.728	493994.113	N/A	0.000	0.001	N/A
590	4269597.055	414393.58	179.739	N/A	N/A	179.719	N/A	N/A	0.020
WVOH	4205629.797	488396.18	628.892	4205629.797	488396.181	N/A	0.000	0.001	N/A
N156	4237698.805	400455.584	204.363	N/A	N/A	204.336	N/A	N/A	0.027
FREE	4070503.435	243977.075	87.003	4070503.446	243977.075	86.977	0.011	0.000	0.026
NGS BURK	4119047.489	745141.333	183.654	N/A	N/A	183.694	N/A	N/A	0.040
NGS Y442	4127355.344	705244.211	212.284	4127355.334	705244.207	212.306	0.010	0.004	0.022
NGS- H32	4060328.437	527164.824	873.574	N/A	N/A	873.575	N/A	N/A	0.001
NGS- J32	4064083.811	526883.647	849.662	N/A	N/A	849.628	N/A	N/A	0.034
NGS- Y58	4063139.112	558913.372	884.829	4063139.129	558913.327	884.79	0.017	0.045	0.039
OTTER AZ MK	4069693.921	277623.581	42.185	4069693.925	277623.585	42.172	0.004	0.004	0.013

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 KEYNET GPS, Inc 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 TBC or 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 2017) 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***

POINT ID	NORTHING (m)	EASTING (m)	ELEV. (m)
<b>UTM Zone 17 North NAD83 (2011), Meters</b>			
<b>Check Points - NVA</b>			
NVA-1	4051635.773	515801.927	883.930
NVA-2	4047699.947	530937.110	422.450
NVA-3	4049518.218	551992.993	443.755
NVA-4	4051818.184	569324.703	371.285
NVA-5	4051902.690	585501.925	277.520
NVA-6	4062922.193	579082.402	362.160
NVA-7	4061418.440	563065.031	480.525
NVA-8	4061745.798	549089.567	891.172
NVA-9	4060210.384	531967.964	781.387
NVA-10	4060816.181	511092.668	785.387
NVA-11	4071162.295	507343.469	722.797
NVA-12	4074421.554	516731.324	788.252
NVA-13	4074320.006	538176.102	776.427
NVA-14	4077043.077	560507.573	842.953
NVA-15	4075036.242	569826.576	419.401
NVA-16	4081523.492	584058.383	382.193
NVA-17	4090085.892	580016.841	473.686
NVA-18	4088284.656	564740.983	720.814
NVA-19	4089103.409	548738.254	808.300
NVA-20	4085474.786	537046.932	856.521
NVA-21	4090074.458	522202.128	597.003
NVA-22	4099369.758	520042.990	602.734
NVA-23	4100171.300	542868.716	619.514
NVA-24	4100887.490	556756.759	694.417
NVA-25	4099206.643	570628.409	795.280
NVA-26	4106545.785	583996.974	421.161
NVA-27	4113667.318	565970.556	431.847
NVA-28	4113436.233	550011.963	639.623
NVA-29	4113725.659	532044.780	545.144
NVA-30	4112796.254	517878.202	585.959
NVA-31	4120279.085	544684.403	569.113
NVA-32	4121082.994	562075.396	443.839
NVA-33	4125879.104	581529.049	359.513

NVA-34	4138325.550	579850.593	518.895
NVA-35	4131332.610	568492.506	585.580
NVA-36	4130842.396	555413.834	556.913
NVA-37	4129052.844	598807.867	354.524
NVA-38	4121811.698	595273.958	298.983
NVA-39	4111239.377	591501.892	378.906
NVA-40	4111744.776	608050.151	348.655
NVA-41	4101443.238	618844.265	247.624
NVA-42	4100379.447	642513.458	189.583
NVA-43	4090235.508	645074.019	264.443
NVA-44	4092442.964	634304.749	204.286
NVA-45	4089712.933	621315.175	210.722
NVA-46	4097446.102	604771.852	343.816
NVA-47	4097085.759	593153.086	370.834
NVA-48	4086633.775	593219.204	394.425
NVA-49	4080391.648	609403.362	322.702
NVA-50	4081027.966	629993.308	261.926
NVA-51	4081272.829	648405.576	223.237
NVA-52	4070266.591	646787.988	231.820
NVA-53	4071648.032	636425.584	231.299
NVA-54	4071756.381	621911.762	280.914
NVA-55	4075446.354	606979.262	343.724
NVA-56	4071413.054	592315.865	362.447
NVA-57	4058644.088	599798.508	232.992
NVA-58	4059708.134	616859.688	294.714
NVA-59	4060228.308	632762.104	249.065
NVA-60	4050400.350	648512.651	176.917
NVA-61	4049082.085	633205.696	194.066
NVA-62	4051609.691	623835.891	234.771
NVA-63	4050435.934	612519.180	265.188
NVA-64	4049672.257	601743.543	266.208
NVA-65	4048596.351	593749.575	312.191
NVA-66	4103908.656	655675.642	247.633
NVA-67	4098918.798	665442.359	188.521
NVA-68	4097181.146	680310.648	142.344
NVA-69	4103390.668	691006.482	181.305
NVA-70	4116080.925	695068.088	230.809
NVA-71	4112861.145	704139.945	200.175
NVA-72	4108056.081	718752.625	160.386

NVA-73	4102178.914	723707.187	192.368
NVA-74	4103523.928	709281.694	173.684
NVA-75	4091975.243	699187.883	150.400
NVA-76	4089484.636	676950.154	205.871
NVA-77	4090284.488	662177.505	186.355
NVA-78	4080101.963	659544.715	207.769
NVA-79	4079364.580	676190.262	116.108
NVA-80	4085525.497	691280.634	171.909
NVA-81	4083659.765	704110.035	114.214
NVA-82	4087004.209	719644.862	162.413
NVA-83	4075907.192	726363.564	165.080
NVA-84	4073621.840	709090.942	138.934
NVA-85	4074236.833	697002.936	125.911
NVA-86	4071515.812	685376.999	136.051
NVA-87	4071048.577	673008.230	188.777
NVA-88	4066306.157	661494.591	235.200
NVA-89	4060766.255	659100.218	196.440
NVA-90	4054878.845	675283.738	164.463
NVA-91	4062214.441	687948.447	102.968
NVA-92	4059257.081	703516.208	123.289
NVA-93	4055595.341	717718.449	97.675
NVA-94	4049023.359	705108.474	128.251
NVA-95	4053233.728	695588.881	142.855
NVA-96	4051289.269	680767.530	171.268
NVA-97	4050379.010	666359.497	154.430
NVA-98	4102751.571	735019.200	153.858
NVA-99	4101914.235	750306.774	160.025
NVA-100	4095504.232	764176.277	127.813
NVA-101	4096618.692	747069.217	172.020
NVA-102	4090983.066	732821.796	159.969
NVA-103	4083463.640	730401.160	143.913
NVA-104	4084662.295	743677.382	141.555
NVA-105	4087150.610	760052.283	130.875
NVA-106	4088101.983	770916.764	126.278
NVA-107	4092514.471	789448.038	81.637
NVA-108	4081149.116	798906.292	75.689
NVA-109	4083278.738	784166.155	102.669
NVA-110	4078807.354	768406.206	83.657
NVA-111	4079003.913	760371.547	127.883

NVA-112	4074055.051	745950.236	148.388
NVA-113	4074266.672	733141.655	132.143
NVA-114	4061043.150	733489.463	106.716
NVA-115	4063493.331	749611.920	104.099
NVA-116	4065795.559	767950.063	104.982
NVA-117	4071467.379	780066.791	68.961
NVA-118	4073778.627	795264.935	83.111
NVA-119	4075785.322	808436.147	52.558
NVA-120	4067406.056	807969.853	40.612
NVA-121	4055220.312	820720.013	24.431
NVA-122	4056798.189	807696.153	36.092
NVA-123	4063248.802	796042.530	87.712
NVA-124	4061034.068	784297.214	98.709
NVA-125	4053767.818	770166.743	102.676
NVA-126	4059441.666	763083.569	115.064
NVA-127	4057370.164	751004.129	100.172
NVA-128	4052635.959	738979.216	95.009
NVA-129	4291242.269	396089.550	176.148
NVA-130	4286666.039	397515.289	173.528
NVA-131	4285379.256	407323.746	205.073
NVA-132	4278002.915	398857.268	177.917
NVA-133	4273716.089	403361.275	173.332
NVA-134	4267371.589	399872.449	175.900
NVA-135	4264936.668	406809.793	276.768
NVA-136	4257100.878	418858.190	206.154
NVA-137	4252913.153	408732.098	215.242
NVA-138	4250520.035	419248.940	231.505
NVA-139	4243755.447	408745.136	192.161
NVA-140	4239959.874	420288.765	207.470
NVA-141	4236823.522	395167.337	179.891
NVA-142	4240878.284	381514.201	186.769
NVA-143	4243948.016	372970.188	170.837
NVA-144	4248076.647	360972.066	172.756
NVA-145	4240013.885	365293.009	178.294
NVA-146	4235367.660	373178.476	178.386
NVA-147	4230875.020	387030.474	210.094
NVA-148	4231003.752	402613.049	204.230
NVA-149	4236710.149	412532.525	246.073

NVA-150	4231286.784	419332.005	312.018
NVA-151	4224237.875	412468.126	237.941
NVA-152	4226985.247	404000.507	216.493
NVA-153	4225951.748	396901.200	181.530
NVA-154	4226355.751	379809.531	196.560
NVA-155	4226540.786	370227.402	188.015
NVA-156	4229687.092	360249.393	172.632
NVA-157	4221977.832	361147.604	195.088
NVA-158	4216747.284	364428.838	188.941
NVA-159	4215608.898	372260.062	203.519
NVA-160	4217199.802	390016.930	265.174
NVA-161	4213333.390	399522.763	191.838
NVA-162	4218662.309	405115.440	331.249
NVA-163	4210771.181	409205.803	212.160
NVA-164	4203539.201	409694.414	195.629
NVA-165	4198383.343	413751.255	209.374
NVA-166	4203236.034	399191.539	199.531
NVA-167	4208375.540	383477.572	356.268
NVA-168	4209335.841	374334.782	211.041
NVA-169	4206998.966	368139.123	182.696
NVA-170	4197731.627	372943.346	227.840
NVA-171	4160212.371	490476.006	989.362
NVA-172	4155834.149	482121.077	915.115
NVA-173	4154320.087	495027.278	655.299
NVA-174	4146127.262	504964.543	687.917
NVA-175	4145322.939	499240.931	782.990
NVA-176	4149517.402	491049.852	600.279
NVA-177	4147781.753	483508.263	811.576
NVA-178	4138183.212	474217.424	715.248
NVA-179	4143201.630	490408.871	630.940
NVA-180	4141455.386	494322.234	769.772
NVA-181	4143270.844	503173.436	783.441
NVA-182	4141521.264	509550.169	743.780
NVA-183	4133371.801	507087.983	504.125
NVA-184	4132780.110	499990.976	619.460
NVA-185	4135513.181	489613.920	743.559
NVA-186	4134884.631	482011.753	790.100
NVA-187	4138183.146	474217.485	715.285

NVA-188	4131582.375	472858.914	685.976
NVA-189	4128261.462	477436.037	792.038
NVA-190	4128662.257	487189.912	757.400
NVA-191	4129654.773	494780.587	613.305
<b>Check Points - VVA</b>			
VVA-1	4054217.027	818379.709	23.053
VVA-2	4052934.399	787902.337	100.291
VVA-3	4055314.528	777178.788	105.101
VVA-4	4050567.811	760047.812	95.694
VVA-5	4053578.472	746006.568	86.213
VVA-6	4050413.852	729675.626	111.149
VVA-7	4068471.088	735439.774	130.814
VVA-8	4068168.544	747402.962	128.137
VVA-9	4061419.585	763081.931	121.528
VVA-10	4067131.089	779325.325	56.309
VVA-11	4066739.432	791575.364	71.216
VVA-12	4061565.243	804011.260	51.384
VVA-13	4081382.381	807851.726	62.989
VVA-14	4080975.628	793821.393	86.748
VVA-15	4080799.760	778432.524	79.164
VVA-16	4083856.054	765923.667	126.480
VVA-17	4085617.794	752563.105	129.091
VVA-18	4089181.776	741947.901	137.878
VVA-19	4097767.215	733791.010	148.830
VVA-20	4106698.819	744967.094	176.236
VVA-21	4097964.659	755975.999	122.143
VVA-22	4095092.391	769923.092	126.229
VVA-23	4094334.027	778795.614	111.559
VVA-24	4085106.251	793439.402	81.523
VVA-25	4051751.709	716058.038	127.816
VVA-26	4054551.916	704275.941	112.162
VVA-27	4056292.740	693575.150	123.620
VVA-28	4053711.655	679995.767	169.095
VVA-29	4050365.568	674097.463	169.417
VVA-30	4052885.832	660623.419	164.898
VVA-31	4072469.661	661208.438	176.074
VVA-32	4065084.215	675475.820	154.650
VVA-33	4070816.908	688837.160	123.629
VVA-34	4068943.179	701271.226	160.006

VVA-35	4067992.518	717398.838	107.339
VVA-36	4077651.005	717923.501	140.587
VVA-37	4088888.221	717201.837	167.827
VVA-38	4084623.270	699828.519	119.746
VVA-39	4082843.393	684933.458	167.543
VVA-40	4085381.008	672190.958	173.872
VVA-41	4086033.650	658911.043	166.986
VVA-42	4097416.161	660966.420	207.923
VVA-43	4094191.446	673997.135	180.956
VVA-44	4093918.626	688756.399	153.502
VVA-45	4099549.726	704464.619	165.187
VVA-46	4105003.627	717356.557	128.113
VVA-47	4109595.427	706407.604	169.137
VVA-48	4109339.464	694792.151	177.921
VVA-49	4055334.922	648627.744	208.482
VVA-50	4054887.119	637413.992	185.384
VVA-51	4048071.596	622455.555	202.479
VVA-52	4051224.846	617138.406	235.448
VVA-53	4048622.048	606991.853	260.557
VVA-54	4050994.107	594942.651	265.621
VVA-55	4057620.854	589842.190	311.514
VVA-56	4071389.216	600285.546	326.999
VVA-57	4066271.644	608348.542	253.675
VVA-58	4068434.570	616532.868	319.370
VVA-59	4065833.266	626197.569	261.863
VVA-60	4067708.055	647669.229	227.045
VVA-61	4087408.265	648883.827	231.750
VVA-62	4084811.805	635966.624	270.769
VVA-63	4083663.117	620792.135	252.466
VVA-64	4086577.418	605215.189	346.506
VVA-65	4080313.915	591420.260	389.078
VVA-66	4102551.963	591248.873	362.658
VVA-67	4097169.979	611563.978	332.971
VVA-68	4094331.591	625561.278	313.499
VVA-69	4094789.367	640540.755	287.834
VVA-70	4106318.438	645949.726	253.881
VVA-71	4108861.654	603903.844	337.068
VVA-72	4117320.914	598918.731	430.162
VVA-73	4132207.205	575383.869	503.852



VVA-74	4128744.506	559989.989	608.853
VVA-75	4116571.158	574795.127	1141.919
VVA-76	4098478.933	582708.547	415.964
VVA-77	4109599.680	566319.188	461.334
VVA-78	4122700.627	539017.631	639.304
VVA-79	4114657.134	525046.817	690.488
VVA-80	4106161.105	510154.001	669.967
VVA-81	4099229.398	528819.512	615.707
VVA-82	4091193.107	530058.07	653.121
VVA-83	4093424.421	549132.898	740.472
VVA-84	4094914.675	563427.839	731.615
VVA-85	4080409.058	572289.905	434.537
VVA-86	4076406.189	549568.274	834.722
VVA-87	4077379.737	531303.938	688.799
VVA-88	4067854.113	511634.399	791.587
VVA-89	4053567.144	516128.502	893.938
VVA-90	4052647.902	530322.953	467.403
VVA-91	4065852.173	534756.487	769.623
VVA-92	4052194.729	544693.337	422.856
VVA-93	4066573.886	560894.496	486.088
VVA-94	4061028.188	573014.603	416.157
VVA-95	4052830.873	557935.708	591.689
VVA-96	4047927.27	571730.631	301.887
VVA-97	4292142.941	402075.124	267.675
VVA-98	4282630.397	403645.888	181.399
VVA-99-1	4272569.784	402201.119	187.912
VVA-100	4260644.003	410896.503	181.186
VVA-101	4247042.945	417585.873	338.332
VVA-102	4241864.005	412733.911	203.248
VVA-103	4242154.572	401660.667	218.430
VVA-104	4237307.519	395185.319	181.238
VVA-105	4233226.793	380017.168	192.882
VVA-106	4241765.985	375711.110	171.720
VVA-107	4244837.176	365629.309	189.245
VVA-108	4235169.492	367399.532	187.153
VVA-109	4227929.616	376738.002	202.735
VVA-110	4226630.225	390099.800	208.922
VVA-111	4226117.708	399364.681	343.969

VVA-112	4231394.180	408499.642	225.166
VVA-113	4236078.950	416888.619	238.437
VVA-114	4222456.881	408056.524	221.044
VVA-115	4224540.521	396696.731	177.924
VVA-116	4220051.195	383946.171	346.141
VVA-117	4220688.737	375442.401	318.167
VVA-118	4226998.142	364279.468	191.461
VVA-119	4214191.720	368955.670	203.008
VVA-120	4212149.322	381307.444	392.117
VVA-121	4214326.230	386029.969	206.415
VVA-122	4218533.984	394497.414	208.782
VVA-123	4215608.729	401236.545	186.598
VVA-124	4215159.641	408716.955	213.963
VVA-125	4207046.736	410857.551	191.047
VVA-127	4207716.462	380124.051	379.151
VVA-128	4205514.287	370787.287	182.511
VVA-129	4200444.745	371099.417	187.091
VVA-130	4201808.591	401415.860	216.689
VVA-131	4194005.611	407662.368	378.244
VVA-132	4192944.067	413314.699	200.747
VVA-133	4157360.771	489937.581	893.123
VVA-134	4148649.156	479340.784	922.948
VVA-135	4150283.397	497606.018	716.051
VVA-136	4144468.465	504870.677	707.725
VVA-137	4147333.017	488888.693	635.578
VVA-138	4142012.943	477301.998	726.807
VVA-139	4133792.184	473370.250	803.070
VVA-140	4136478.583	485952.970	844.952
VVA-141	4135114.442	502171.612	617.642
VVA-142	4130861.053	504339.504	572.111
VVA-143	4128006.646	485432.086	766.718

#### 4. GPS OBSERVATIONS

POINT ID	OBSERV. DATE	JULIAN DATE	TIME OF DAY (AST)	RE-OBSERV. DATE	RE-OBSERV. TIME
<b>Check Points - NVA</b>					
NVA-1	2/1/2018	32	13:14	2/1/2018	13:17
NVA-2	2/1/2018	32	12:11	N/A	N/A
NVA-3	1/30/2018	30	17:14	N/A	N/A
NVA-4	1/31/2018	31	9:49	N/A	N/A
NVA-5	1/31/2018	31	8:16	N/A	N/A
NVA-6	1/31/2018	31	11:18	1/31/2018	11:21
NVA-7	1/31/2018	31	12:18	N/A	N/A
NVA-8	1/30/2018	30	14:43	2/1/2018	8:31
NVA-9	2/1/2018	32	10:37	N/A	N/A
NVA-10	2/1/2018	32	14:16	2/2/2018	17:34
NVA-11	2/1/2018	32	15:12	2/2/2018	17:01
NVA-12	2/1/2018	32	17:00	N/A	N/A
NVA-13	2/1/2018	32	18:04	N/A	N/A
NVA-14	2/2/2018	33	11:25	N/A	N/A
NVA-15	1/31/2018	31	13:41	N/A	N/A
NVA-16	1/31/2018	31	15:37	2/2/2018	8:59
NVA-17	1/31/2018	31	16:24	N/A	N/A
NVA-18	2/2/2018	33	12:41	2/3/2018	10:24
NVA-19	2/2/2018	33	13:27	N/A	N/A
NVA-20	2/2/2018	33	14:25	N/A	N/A
NVA-21	2/3/2018	34	15:14	N/A	N/A
NVA-22	2/4/2018	35	9:55	2/5/2018	11:30
NVA-23	2/4/2018	35	8:10	2/5/2018	9:19
NVA-24	2/4/2018	35	7:29	N/A	N/A
NVA-25	2/6/2018	37	7:16	2/7/2018	2:34
NVA-26	2/7/2018	38	12:46	2/7/2018	12:49
NVA-27	2/6/2018	37	5:45	N/A	N/A
NVA-28	2/4/2018	35	6:17	2/5/2018	7:54
NVA-29	2/4/2018	35	13:13	N/A	N/A
NVA-30	2/4/2018	35	11:51	N/A	N/A
NVA-31	2/4/2018	35	14:23	N/A	N/A
NVA-32	2/6/2018	37	11:10	2/6/2018	11:13
NVA-33	2/6/2018	37	9:26	2/6/2018	16:03

NVA-34	2/6/2018	37	13:38	2/6/2018	13:41
NVA-35	2/6/2018	37	12:54	2/6/2018	12:57
NVA-36	2/6/2018	37	17:00	N/A	N/A
NVA-37	2/7/2018	38	7:07	2/7/2018	13:13
NVA-38	2/7/2018	38	7:39	2/7/2018	14:04
NVA-39	2/7/2018	38	9:48	2/7/2018	9:51
NVA-40	2/7/2018	38	9:04	N/A	N/A
NVA-41	1/30/2017	30	10:34	1/30/2018	10:39
NVA-42	2/7/2018	38	11:29	N/A	N/A
NVA-43	1/30/2018	30	14:11	1/30/2018	14:14
NVA-44	1/30/2018	30	13:52	N/A	N/A
NVA-45	1/30/2018	30	11:36	N/A	N/A
NVA-46	1/30/2018	30	9:03	1/30/2018	9:06
NVA-47	2/7/2018	38	11:30	N/A	N/A
NVA-48	2/3/2018	34	9:14	2/3/2018	9:18
NVA-49	2/2/2018	33	11:45	N/A	N/A
NVA-50	2/2/2018	33	12:44	N/A	N/A
NVA-51	2/2/2018	33	14:36	N/A	N/A
NVA-52	2/1/2018	32	14:23	2/3/2018	7:20
NVA-53	2/1/2018	32	13:27	N/A	N/A
NVA-54	1/31/2018	31	12:54	1/31/2018	12:57
NVA-55	2/2/2018	33	23:25	2/2/2018	23:28
NVA-56	2/2/2018	33	7:47	N/A	N/A
NVA-57	1/31/2018	31	7:12	2/1/2018	6:09
NVA-58	1/31/2018	31	11:37	1/31/2018	11:40
NVA-59	1/31/2018	31	13:38	2/3/2018	12:10
NVA-60	1/31/2018	31	16:13	2/6/2018	10:07
NVA-61	1/31/2018	31	16:41	2/3/2018	13:30
NVA-62	1/31/2018	31	17:15	N/A	N/A
NVA-63	2/1/2018	32	12:43	2/3/2018	15:20
NVA-64	2/1/2018	32	11:59	N/A	N/A
NVA-65	2/1/2018	32	11:29	2/3/2018	16:45
NVA-66	2/7/2018	38	9:41	N/A	N/A
NVA-67	2/3/2018	34	16:16	N/A	N/A
NVA-68	2/3/2018	34	15:17	2/6/2018	15:00
NVA-69	2/6/2018	37	16:33	N/A	N/A
NVA-70	2/3/2018	34	16:25	2/5/2018	15:15
NVA-71	2/3/2018	34	15:45	N/A	N/A
NVA-72	2/3/2018	34	14:45	2/5/2018	14:40

NVA-73	2/2/2018	33	14:58	N/A	N/A
NVA-74	2/3/2018	34	12:34	N/A	N/A
NVA-75	2/3/2018	34	23:05	N/A	N/A
NVA-76	2/3/2018	34	14:57	N/A	N/A
NVA-77	2/3/2018	34	17:00	2/6/2018	13:24
NVA-78	2/3/2018	34	18:06	2/6/2018	12:27
NVA-79	2/3/2018	34	14:07	2/7/2018	12:55
NVA-80	2/6/2018	37	17:50	N/A	N/A
NVA-81	2/3/2018	34	21:55	N/A	N/A
NVA-82	2/1/2018	32	16:53	N/A	N/A
NVA-83	2/2/2018	33	10:00	2/3/2018	9:38
NVA-84	2/2/2018	33	11:38	N/A	N/A
NVA-85	2/2/2018	33	12:58	N/A	N/A
NVA-86	2/3/2018	34	12:08	2/7/2018	22:56
NVA-87	2/3/2018	34	13:33	N/A	N/A
NVA-88	2/1/2018	32	15:57	2/6/2018	11:30
NVA-89	2/1/2018	32	16:16	N/A	N/A
NVA-90	2/1/2018	32	17:11	N/A	N/A
NVA-91	2/3/2018	34	11:40	N/A	N/A
NVA-92	2/2/2018	33	8:40	N/A	N/A
NVA-93	2/1/2018	32	17:25	N/A	N/A
NVA-94	2/2/2018	33	9:46	2/4/2018	9:34
NVA-95	2/4/2018	35	8:40	2/5/2018	9:00
NVA-96	2/3/2018	34	11:15	2/7/2018	8:40
NVA-97	2/1/2018	32	16:53	2/9/2018	7:52
NVA-98	2/2/2018	33	15:45	2/3/2018	17:10
NVA-99	2/1/2018	32	12:27	N/A	N/A
NVA-100	2/1/2018	32	10:35	2/3/2018	14:19
NVA-101	2/1/2018	32	13:28	2/3/2018	15:05
NVA-102	2/1/2018	32	15:28	N/A	N/A
NVA-103	2/1/2018	32	15:00	2/2/2018	19:00
NVA-104	2/1/2018	32	14:24	2/2/2018	17:35
NVA-105	2/1/2018	32	10:05	N/A	N/A
NVA-106	1/31/2018	31	17:40	N/A	N/A
NVA-107	1/31/2017	31	13:15	N/A	N/A
NVA-108	1/30/2018	30	15:14	1/31/2018	12:18
NVA-109	1/31/2018	31	14:38	2/1/2018	8:50
NVA-110	1/31/2018	31	18:10	N/A	N/A
NVA-111	2/1/2018	32	18:25	2/3/2018	12:30

NVA-112	1/31/2018	31	18:05	N/A	N/A
NVA-113	2/2/2018	33	9:35	N/A	N/A
NVA-114	2/1/2018	32	16:00	N/A	N/A
NVA-115	1/31/2018	31	12:25	2/1/2018	13:25
NVA-116	1/31/2018	31	14:40	2/1/2018	12:32
NVA-117	1/31/2018	31	16:21	2/1/2018	10:25
NVA-118	1/30/2018	30	17:50	N/A	N/A
NVA-119	1/30/2018	30	13:10	2/2/2018	19:10
NVA-120	1/30/2018	30	13:00	1/31/2018	7:50
NVA-121	1/30/2018	30	15:10	N/A	N/A
NVA-122	1/30/2018	30	16:39	1/31/2018	8:55
NVA-123	1/30/2018	30	17:38	N/A	N/A
NVA-124	1/31/2018	31	8:23	2/1/2018	11:30
NVA-125	1/31/2018	31	10:07	N/A	N/A
NVA-126	1/31/2018	31	13:53	2/1/2018	12:01
NVA-127	1/31/2018	31	11:55	2/1/2018	14:16
NVA-128	2/1/2018	32	15:10	2/1/2018	15:14
NVA-129	12/28/2017	362	9:52	12/28/2017	9:59
NVA-130	12/28/2017	362	10:18	1/3/2018	7:50
NVA-131	12/27/2017	361	11:20	N/A	N/A
NVA-132	12/28/2017	362	12:45	1/3/2018	8:18
NVA-133	12/27/2017	361	7:55	N/A	N/A
NVA-134	12/28/2017	362	14:20	N/A	NA
NVA-135	12/29/2017	363	8:55	N/A	N/A
NVA-136	12/27/2017	361	8:25	12/27/2017	16:38
NVA-137	12/27/2017	361	7:45	12/29/2017	12:20
NVA-138	12/29/2017	363	11:25	N/A	N/A
NVA-139	1/9/2018	9	9:55	1/16/2018	11:19
NVA-140	1/3/2018	3	15:38	1/16/2018	13:43
NVA-141	1/9/2018	9	12:06	1/9/2018	12:10
NVA-142	1/17/2018	17	17:38	1/17/2018	17:41
NVA-143	12/27/2017	361	10:00	N/A	N/A
NVA-144	1/15/2018	15	12:29	1/16/2018	9:44
NVA-145	1/15/2018	15	14:10	1/18/2018	16:56
NVA-146	1/16/2018	16	14:45	1/18/2018	20:59
NVA-147	1/18/2018	18	10:27	N/A	N/A
NVA-148	1/4/2018	4	11:48	N/A	N/A
NVA-149	1/9/2018	9	10:28	1/16/2018	12:01

NVA-150	1/4/2018	4	7:45	1/16/2018	13:00
NVA-151	1/4/2018	4	9:17	N/A	N/A
NVA-152	1/4/2018	4	11:00	1/15/2018	14:19
NVA-153	1/9/2018	9	13:10	N/A	N/A
NVA-154	1/17/2018	17	15:18	N/A	N/A
NVA-155	1/16/2018	16	13:10	1/17/2018	13:38
NVA-156	1/15/2018	15	15:54	1/16/2018	10:10
NVA-157	1/16/2018	16	11:15	1/17/2018	10:52
NVA-158	1/16/2018	16	12:30	1/17/2018	11:09
NVA-159	1/17/2018	17	12:10	1/18/2018	11:28
NVA-160	1/18/2018	18	12:43	N/A	N/A
NVA-161	1/10/2018	10	12:23	N/A	N/A
NVA-162	1/10/2018	10	14:20	1/11/2018	14:27
NVA-163	1/10/2018	10	11:20	N/A	N/A
NVA-164	1/10/2018	10	7:57	1/15/2018	13:10
NVA-165	1/11/2018	11	8:19	1/15/2018	11:47
NVA-166	1/11/2018	11	11:35	N/A	N/A
NVA-167	1/18/2018	18	12:42	1/18/2018	12:45
NVA-168	1/18/2018	18	11:53	1/18/2018	11:56
NVA-169	1/18/2018	18	15:07	N/A	N/A
NVA-170	1/18/2018	18	13:38	N/A	N/A
NVA-171	12/28/2017	362	16:34	N/A	N/A
NVA-172	12/28/2017	362	17:40	N/A	N/A
NVA-173	12/28/2017	362	15:40	N/A	N/A
NVA-174	12/28/2017	362	10:37	N/A	N/A
NVA-175	12/28/2017	362	11:12	1/4/2018	11:40
NVA-176	12/28/2017	362	14:28	N/A	N/A
NVA-177	12/29/2017	363	12:43	N/A	N/A
NVA-178	12/29/2017	363	15:14	N/A	N/A
NVA-179	12/28/2017	362	13:32	N/A	N/A
NVA-180	12/28/2017	362	13:03	N/A	N/A
NVA-181	12/28/2017	362	9:41	1/4/2018	10:12
NVA-182	12/27/2017	361	17:04	N/A	N/A
NVA-183	12/27/2017	361	15:24	N/A	N/A
NVA-184	12/27/2017	361	13:34	1/4/2018	9:15
NVA-185	12/22/2017	356	9:58	1/3/2018	14:59
NVA-186	12/29/2017	363	8:25	N/A	N/A

NVA-187	12/29/2017	363	10:00	N/A	N/A
NVA-188	12/26/2017	360	14:23	N/A	N/A
NVA-189	12/29/2017	363	13:58	1/3/2018	13:13
NVA-190	12/22/2017	356	9:14	1/3/2018	15:45
NVA-191	12/29/2017	363	8:25	1/3/2018	16:30
<b>Check Points - VVA</b>					
VVA-1	1/30/2018	30	15:18	1/31/2018	9:30
VVA-2	1/31/2018	31	8:57	N/A	N/A
VVA-3	1/31/2018	31	9:34	1/31/2018	9:40
VVA-4	1/31/2018	31	10:35	N/A	N/A
VVA-5	1/31/2018	31	11:13	2/1/2018	14:40
VVA-6	2/2/2018	33	13:13	2/2/2018	13:17
VVA-7	2/2/2018	33	8:15	N/A	N/A
VVA-8	1/31/2018	31	17:25	N/A	N/A
VVA-9	1/31/2018	31	13:35	2/1/2018	12:18
VVA-10	1/31/2018	31	15:25	2/1/2018	11:00
VVA-11	1/31/2018	31	7:47	2/2/2018	15:30
VVA-12	1/30/2018	30	14:05	N/A	N/A
VVA-13	1/30/2018	30	13:44	N/A	N/A
VVA-14	1/30/2018	30	17:10	1/31/2018	11:45
VVA-15	1/31/2018	31	15:20	N/A	N/A
VVA-16	2/1/2018	32	8:51	2/3/2018	12:50
VVA-17	2/1/2018	32	9:33	2/3/2018	13:26
VVA-18	2/1/2018	32	14:00	2/2/2018	18:05
VVA-19	2/1/2018	32	15:52	N/A	N/A
VVA-20	2/2/2018	33	16:18	2/3/2018	16:24
VVA-21	2/1/2018	32	11:49	2/3/2018	14:43
VVA-22	2/1/2018	32	11:05	2/1/2018	11:08
VVA-23	1/31/2018	31	17:00	N/A	N/A
VVA-24	1/30/2018	30	16:08	1/31/2018	12:04
VVA-25	2/2/2018	33	10:20	2/4/2018	10:30
VVA-26	2/2/2018	33	9:22	N/A	N/A
VVA-27	2/4/2018	35	8:10	2/5/2018	8:58
VVA-28	2/3/2018	34	10:28	N/A	N/A
VVA-29	2/3/2018	34	9:50	N/A	N/A
VVA-30	2/1/2018	32	16:38	2/7/2018	7:30
VVA-31	2/3/2018	34	18:26	2/6/2018	11:59



VVA-32	2/3/2018	34	13:06	2/7/2018	11:42
VVA-33	2/3/2018	34	12:27	2/7/2018	10:30
VVA-34	2/2/2018	33	12:28	N/A	N/A
VVA-35	2/2/2018	33	11:05	2/3/2018	10:00
VVA-36	2/2/2018	33	10:34	2/3/2018	9:12
VVA-37	2/2/2018	33	14:04	N/A	N/A
VVA-38	2/4/2018	35	12:50	N/A	N/A
VVA-39	2/6/2018	37	18:20	N/A	N/A
VVA-40	2/3/2018	34	14:36	N/A	N/A
VVA-41	2/3/2018	34	17:25	N/A	N/A
VVA-42	2/3/2018	34	16:38	2/6/2018	13:45
VVA-43	2/3/2018	34	15:39	2/6/2018	14:24
VVA-44	2/6/2018	37	15:29	2/7/2018	15:05
VVA-45	2/3/2018	34	12:11	2/5/2018	13:30
VVA-46	2/3/2018	34	13:55	2/5/2018	14:05
VVA-47	2/3/2018	34	15:10	N/A	N/A
VVA-48	2/3/2018	34	17:43	N/A	N/A
VVA-49	1/31/2018	31	15:56	2/6/2018	10:37
VVA-50	1/31/2018	31	13:57	N/A	N/A
VVA-51	1/31/2018	31	17:33	1/31/2018	17:36
VVA-52	1/31/2018	31	17:58	N/A	N/A
VVA-53	2/1/2018	32	12:20	2/1/2018	12:23
VVA-54	2/1/2018	32	11:03	N/A	N/A
VVA-55	1/31/2018	31	7:43	2/1/2018	6:32
VVA-56	2/2/2018	33	7:05	2/3/2018	7:47
VVA-57	2/1/2018	32	10:06	2/1/2018	10:09
VVA-58	1/31/2018	31	12:08	N/A	N/A
VVA-59	1/31/2018	31	13:16	1/31/2018	13:19
VVA-60	2/1/2018	32	14:44	N/A	N/A
VVA-61	2/2/2018	33	13:50	2/3/2018	9:50
VVA-62	2/2/2018	33	13:17	2/2/2018	13:20
VVA-63	1/30/2018	30	12:22	1/30/2018	12:25
VVA-64	2/2/2018	33	12:06	N/A	N/A
VVA-65	2/2/2018	33	8:22	2/3/2018	8:49
VVA-66	2/7/2018	38	12:05	2/7/2018	12:08
VVA-67	1/30/2018	30	9:51	N/A	N/A
VVA-68	1/30/2018	30	12:57	N/A	N/A

VVA-69	2/7/2018	38	11:04	N/A	N/A
VVA-70	2/7/2018	38	8:46	N/A	N/A
VVA-71	2/7/2018	38	8:39	2/7/2018	8:42
VVA-72	2/7/2018	38	8:13	2/7/2018	8:17
VVA-73	2/6/2018	37	15:00	N/A	N/A
VVA-74	2/6/2018	37	12:05	2/6/2018	12:08
VVA-75	2/6/2018	37	0:00	N/A	N/A
VVA-76	2/7/2018	38	13:27	N/A	N/A
VVA-77	2/6/2018	37	6:17	2/6/2018	6:20
VVA-78	2/5/2018	36	16:32	2/5/2018	16:35
VVA-79	2/4/2018	35	10:47	2/5/2018	15:02
VVA-80	2/5/2018	36	13:57	N/A	N/A
VVA-81	2/4/2018	35	9:16	N/A	N/A
VVA-82	2/5/2018	36	10:29	N/A	N/A
VVA-83	2/3/2018	34	12:20	2/3/2018	12:23
VVA-84	2/3/2018	34	11:29	N/A	N/A
VVA-85	1/31/2018	31	14:22	N/A	N/A
VVA-86	2/1/2018	32	18:45	N/A	N/A
VVA-87	2/1/2018	32	17:37	2/2/2018	15:51
VVA-88	2/1/2018	32	14:46	N/A	N/A
VVA-89	2/1/2018	32	13:38	N/A	N/A
VVA-90	2/1/2018	32	11:25	N/A	N/A
VVA-91	2/1/2018	32	9:08	N/A	N/A
VVA-92	1/30/2018	30	15:25	N/A	N/A
VVA-93	1/30/2018	30	13:05	N/A	N/A
VVA-94	1/31/2018	31	10:32	N/A	N/A
VVA-95	1/30/2018	30	18:00	N/A	N/A
VVA-96	1/31/2018	31	9:10	N/A	N/A
VVA-97	12/27/2017	361	12:37	12/28/2017	8:45
VVA-98	12/28/2017	362	11:13	12/18/2017	11:20
VVA-99-1	12/28/2017	362	15:22	N/A	N/A
VVA-100	12/29/2017	363	9:45	1/3/2018	10:58
VVA-101	1/3/2018	3	14:45	1/3/2018	14:50
VVA-102	1/9/2018	9	8:59	N/A	N/A
VVA-103	1/4/2018	4	13:55	1/15/2018	15:41
VVA-104	1/9/2018	9	11:20	1/11/2018	15:23
VVA-105	1/17/2018	17	16:30	1/17/2018	16:33

VVA-106	1/16/2018	16	15:21	1/16/2018	15:25
VVA-107	1/15/2018	15	13:02	N/A	N/A
VVA-108	1/15/2018	15	14:46	N/A	N/A
VVA-109	1/17/2018	17	14:47	1/17/2018	16:33
VVA-110	1/18/2018	18	10:10	N/A	N/A
VVA-111	1/18/2018	18	9:12	N/A	N/A
VVA-112	1/4/2018	4	14:44	N/A	N/A
VVA-113	1/9/2018	9	8:02	N/A	N/A
VVA-114	1/4/2018	4	9:15	N/A	N/A
VVA-115	1/9/2018	9	13:43	N/A	N/A
VVA-116	1/18/2018	18	14:03	N/A	N/A
VVA-117	1/17/2018	17	12:53	1/17/2018	12:56
VVA-118	1/15/2018	15	16:21	N/A	N/A
VVA-119	1/17/2018	17	11:30	1/18/2018	15:36
VVA-120	1/18/2018	18	19:07	1/18/2018	19:10
VVA-121	1/18/2018	18	16:27	N/A	N/A
VVA-122	1/9/2018	9	15:26	N/A	N/A
VVA-123	1/10/2018	10	15:01	N/A	N/A
VVA-124	1/10/2018	10	15:45	N/A	N/A
VVA-125	1/10/2018	10	9:08	1/15/2018	11:02
VVA-127	1/18/2018	18	12:20	1/18/2018	12:23
VVA-128	1/18/2018	18	14:49	1/18/2018	14:52
VVA-129	1/18/2018	18	14:14	1/18/2018	14:17
VVA-130	1/11/2018	11	10:52	N/A	N/A
VVA-131	1/11/2018	11	9:45	1/15/2018	12:40
VVA-132	1/11/2018	11	8:57	1/15/2018	12:39
VVA-133	12/28/2017	362	16:13	N/A	N/A
VVA-134	12/29/2017	363	13:33	N/A	N/A
VVA-135	12/28/2017	362	12:17	1/4/2018	13:35
VVA-136	12/28/2017	362	10:07	1/4/2018	10:50
VVA-137	12/28/2017	362	14:00	N/A	N/A
VVA-138	12/29/2017	363	10:50	N/A	N/A
VVA-139	12/26/2017	360	15:14	1/3/2018	14:08
VVA-140	12/27/2017	361	11:49	N/A	N/A
VVA-141	12/27/2017	361	14:05	N/A	N/A
VVA-142	12/27/2017	361	14:57	1/3/2018	17:29
VVA-143	12/27/2017	361	14:57	1/3/2018	17:29

## 5. POINT COMPARISON

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Point ID	Point CK	Delta North (M)	Delta East (M)	Vertical Difference (M)
<b>Check Points - NVA</b>				
NVA-1	NVA-1CK	0.002	-0.007	-0.012
NVA-6	NVA-6CK	-0.002	0.011	-0.017
NVA-8	NVA-8CK	0.004	0.002	-0.008
NVA-10	NVA-10CK	0.011	-0.003	-0.016
NVA-11	NVA-11CK	0.008	-0.002	0.011
NVA-16	NVA-16CK	-0.004	0.003	0.004
NVA-18	NVA-18CK	0.004	-0.002	-0.001
NVA-22	NVA-22CK	0.006	-0.006	-0.007
NVA-23	NVA-23CK	-0.005	-0.007	-0.001
NVA-25	NVA-25K	0.002	-0.008	-0.005
NVA-26	NVA-26CK	-0.001	-0.002	-0.025
NVA-28	NVA-28CK	0.003	-0.002	-0.009
NVA-32	NVA-32CK	-0.001	0.001	0.012
NVA-33	NVA-33CK	-0.001	0.000	-0.004
NVA-34	NVA-34CK	-0.001	-0.002	-0.004
NVA-35	NVA-35CK	0.008	-0.001	-0.006
NVA-37	NVA-37CK	0.001	0.002	-0.005
NVA-38	NVA-38CK	0.006	-0.002	0.011
NVA-39	NVA-39CK	0.008	0.003	-0.012
NVA-41	NVA-41CK	0.011	-0.005	0.004
NVA-43	NVA-43CK	-0.004	0.006	-0.002
NVA-46	NVA-46CK	-0.006	0.001	-0.003
NVA-48	NVA-48CK	0.013	0.003	0.007
NVA-52	NVA-52CK	0.003	-0.002	0.005
NVA-54	NVA-54CK	0.004	0.009	0.007
NVA-55	NVA-55CK	-0.004	-0.003	0.004
NVA-57	NVA-57CK	-0.002	0.008	-0.008
NVA-58	NVA-58CK	0.002	-0.001	-0.008
NVA-59	NVA-59CK	0.000	-0.010	0.006
NVA-60	NVA-60CK	-0.009	0.003	-0.004
NVA-61	NVA-61CK	0.008	-0.018	0.007
NVA-63	NVA-63CK	0.004	0.006	-0.007
NVA-65	NVA-65CK	0.001	0.002	-0.004
NVA-68	NVA-68CK	-0.003	0.000	-0.008
NVA-70	NVA-70CK	0.005	0.009	-0.002

NVA-72	NVA-72CK	0.002	0.002	0.006
NVA-77	NVA-77CK	-0.001	-0.006	0.006
NVA-78	NVA-78CK	-0.002	-0.001	0.013
NVA-79	NVA-79CK	0.007	0.003	-0.007
NVA-83	NVA-83CK	0.003	0.008	-0.004
NVA-86	NVA-86CK	-0.004	0.011	-0.011
NVA-88	NVA-88CK	0.004	-0.002	-0.005
NVA-94	NVA-94CK	-0.003	0.002	-0.002
NVA-95	NVA-95CK	-0.004	0.002	-0.002
NVA-96	NVA-96CK	0.008	0.006	-0.005
NVA-97	NVA-97CK	-0.001	0.001	0.007
NVA-98	NVA-98CK	-0.003	0.002	-0.008
NVA-100	NVA-100CK	-0.007	0.000	-0.006
NVA-101	NVA-101CK	0.007	0.001	-0.012
NVA-103	NVA-103CK	0.014	-0.017	-0.011
NVA-104	NVA-104CK	0.007	-0.002	-0.020
NVA-108	NVA-108CK	-0.003	0.000	-0.004
NVA-109	NVA-109CK	0.000	-0.001	0.009
NVA-111	NVA-111CK	-0.005	-0.001	0.009
NVA-115	NVA-115CK	0.000	0.001	-0.003
NVA-116	NVA-116CK	0.000	0.000	-0.005
NVA-117	NVA-117CK	0.003	-0.002	-0.005
NVA-119	NVA-119CK	0.001	0.002	-0.004
NVA-120	NVA-120CK	0.006	0.002	0.000
NVA-122	NVA-122CK	0.007	-0.002	0.004
NVA-124	NVA-124CK	0.009	-0.001	-0.004
NVA-126	NVA-126CK	-0.006	-0.005	-0.003
NVA-127	NVA-127CK	0.000	-0.002	-0.004
NVA-128	NVA-128CK	0.009	-0.007	0.007
NVA-129	NVA-129 CK	0.000	0.001	0.002
NVA-130	NVA-130 CK	0.001	0.007	0.001
NVA-132	NVA-132 CK	0.003	0.000	0.013
NVA-136	NVA-136 CK	0.006	0.008	0.001
NVA-137	NVA-137 CK	0.029	0.002	0.011
NVA-139	NVA-139 CK	0.004	0.004	0.031
NVA-140	NVA-140 CK	0.003	0.002	0.011
NVA-141	NVA-141 CK	0.000	0.001	0.006
NVA-142	NVA-142 CK	0.001	0.001	0.018
NVA-143	NVA-143 CK	0.001	0.002	0.001
NVA-144	NVA-144 CK	0.003	0.001	0.013
NVA-145	NVA-145 CK	0.014	0.014	0.024

NVA-146	NVA-146 CK	0.013	0.014	0.013
NVA-149	NVA-149 CK	0.001	0.002	0.031
NVA-150	NVA-150 CK	0.003	0.017	0.023
NVA-152	NVA-152 CK	0.007	0.013	0.009
NVA-155	NVA-155 CK	0.013	0.014	0.013
NVA-156	NVA-156 CK	0.005	0.002	0.020
NVA-157	NVA-157 CK	0.007	0.002	0.003
NVA-158	NVA-158 CK	0.001	0.002	0.000
NVA-159	NVA-159 CK	0.001	0.003	0.002
NVA-162	NVA-162 CK	0.008	0.009	0.003
NVA-164	NVA-164 CK	0.004	0.007	0.015
NVA-165	NVA-165 CK	0.000	0.000	0.005
NVA-167	NVA-167 CK	0.005	0.000	0.005
NVA-168	NVA-168 CK	0.014	0.008	0.009
NVA-175	NVA-175 CK	0.007	0.011	0.001
NVA-181	NVA-181 CK	0.011	0.017	0.013
NVA-184	NVA-184 CK	0.019	0.008	0.026
NVA-185	NVA-185 CK	0.007	0.002	0.018
NVA-189	NVA-189 CK	0.022	0.019	0.000
NVA-190	NVA-190 CK	0.018	0.015	0.008
<b>Check Points - VVA</b>				
VVA-1	VVA-1CK	-0.010	-0.003	0.007
VVA-3	VVA-3CK	-0.006	0.002	-0.003
VVA-5	VVA-5CK	-0.001	0.002	-0.010
VVA-6	VVA-6CK	0.003	0.021	0.019
VVA-9	VVA-9CK	-0.002	-0.002	0.005
VVA-10	VVA-10CK	-0.001	-0.005	0.003
VVA-11	VVA-11CK	-0.001	0.000	-0.002
VVA-14	VVA-14CK	0.000	-0.006	-0.011
VVA-16	VVA-16CK	-0.001	-0.004	0.017
VVA-17	VVA-17CK	-0.016	0.018	-0.014
VVA-18	VVA-18CK	-0.013	0.015	-0.014
VVA-20	VVA-20CK	-0.006	-0.005	0.009
VVA-21	VVA-21CK	-0.012	0.006	-0.011
VVA-22	VVA-22CK	0.005	0.002	0.016
VVA-24	VVA-24CK	-0.005	0.006	0.013
VVA-25	VVA-25CK	-0.005	-0.024	-0.027
VVA-27	VVA-27CK	0.006	-0.006	-0.016
VVA-30	VVA-30CK	-0.012	0.009	-0.006
VVA-31	VVA-31CK	0.001	-0.010	0.008

VVA-32	VVA-32CK	0.000	-0.012	-0.006
VVA-33	VVA-33CK	0.004	0.004	0.016
VVA-35	VVA-35CK	0.007	-0.005	-0.007
VVA-36	VVA-36CK	-0.014	-0.002	0.003
VVA-42	VVA-42CK	-0.012	-0.011	0.019
VVA-43	VVA-43CK	-0.009	0.004	0.003
VVA-44	VVA-44CK	0.004	0.004	-0.005
VVA-45	VVA-45CK	0.005	0.004	-0.004
VVA-46	VVA-46CK	-0.005	0.000	0.005
VVA-49	VVA-49CK	-0.002	-0.009	0.011
VVA-51	VVA-51CK	-0.003	0.005	-0.004
VVA-53	VVA-53CK	0.004	0.001	-0.009
VVA-55	VVA-55CK	0.000	-0.001	0.011
VVA-56	VVA-56CK	-0.002	0.012	0.018
VVA-57	VVA-57CK	0.000	-0.002	-0.016
VVA-59	VVA-59CK	-0.004	-0.002	-0.019
VVA-61	VVA-61CK	-0.002	0.003	-0.008
VVA-62	VVA-62CK	-0.002	-0.008	0.015
VVA-63	VVA-63CK	0.006	0.001	-0.003
VVA-65	VVA-65CK	-0.005	0.002	-0.001
VVA-66	VVA-66CK	-0.002	-0.002	-0.018
VVA-71	VVA-71CK	0.003	-0.003	-0.002
VVA-72	VVA-72CK	-0.007	-0.007	0.005
VVA-74	VVA-74CK	-0.001	-0.001	0.017
VVA-77	VVA-77CK	0.009	-0.007	0.013
VVA-78	VVA-78CK	0.013	-0.010	-0.004
VVA-79	VVA-79CK	-0.003	-0.008	-0.008
VVA-83	VVA-83CK	0.006	-0.003	0.005
VVA-87	VVA-87CK	-0.004	-0.004	-0.003
VVA-97	VVA-97CK	0.014	0.005	0.037
VVA-98	VVA-98CK	0.002	0.007	0.029
VVA-100	VVA-100CK	0.000	0.007	0.007
VVA-101	VVA-101CK	0.019	0.010	0.014
VVA-103	VVA-103CK	0.011	0.002	0.027
VVA-104	VVA-104CK	0.002	0.001	0.009
VVA-105	VVA-105CK	0.012	0.002	0.006
VVA-106	VVA-106CK	0.001	0.000	0.007
VVA-109	VVA-109CK	0.015	0.024	0.006
VVA-117	VVA-117CK	0.011	0.005	0.004
VVA-119	VVA-119CK	0.001	0.001	0.008

VVA-120	VVA-120CK	0.004	0.007	0.014
VVA-125	VVA-125CK	0.006	0.008	0.032
VVA-127	VVA-127CK	0.003	0.008	0.015
VVA-128	VVA-128CK	0.001	0.003	0.000
VVA-129	VVA-129CK	0.008	0.013	0.009
VVA-131	VVA-131CK	0.002	0.000	0.006
VVA-132	VVA-132CK	0.001	0.001	0.002
VVA-135	VVA-135CK	0.023	0.024	0.036
VVA-136	VVA-136CK	0.019	0.005	0.050
VVA-139	VVA-139CK	0.024	0.010	0.050
VVA-142	VVA-142CK	0.000	0.007	0.009
VVA-143	VVA-143CK	0.019	0.017	0.015