Ground Control Survey Report

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UNITED STATES GEOLOGICAL SURVEY
FEMA HQ – CARBON WY QL2 LIDAR

TASK ORDER NUMBER: G15PD00641

Contractor: Woolpert, Inc.
Woolpert Project # 75826

December 2016

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UNITED STATES GEOLOGICAL SURVEY FEMA HQ – CARBON WY QL2 LIDAR

Task Order G15PD00641

Woolpert
4454 Idea Center Boulevard
Dayton, Ohio 45430.1500
Phone: 937.461.5660

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Section 1: Survey Report

TASK ORDER NAME: UNITED STATES GEOLOGICAL SURVEY CARBON COUNTY QL2 LIDAR

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This report contains a comprehensive outline of the Ground Control Survey that supported the Carbon, WY airborne LiDAR collection. All surveys were performed in such a way as to achieve ground control accuracies that meet or exceed the National Mapping Accuracy Standards.

Project Area

The project area consists of approximately 2,425 square miles over portions of Carbon County, WY.

Purpose

The purpose of this survey was to establish three-dimensional coordinates for 86 LiDAR primary control points and 190 ground classification check points. The points were collected per the flight layout and were uniformly dispersed over the project area.

Date of Survey

Multiple ground control field missions took place July 20th through August 18th, 2016.

Monumentation

Prior to aerial acquisition, Woolpert field crews performed a field reconnaissance to verify the existence and suitability of pre-selected existing National Geodetic Survey (NGS) control stations. These existing NSRS control stations were utilized as checks to ensure that quality x, y, and z coordinate values were computed for each of the newly established LiDAR control stations. Recovery information sheets for the existing NGS control stations can be found in Section 4 of this report. A control diagram showing the ground control stations used to support this mapping project can be found in Section 5 of this report.

Accuracy Standards

The relative accuracy of the lidar data will be ≤ 8 cm RMSEZ between adjacent swaths with a maximum difference of ± 16 cm.

The data collected shall meet the National Standard for Spatial Database Accuracy (NSSDA) accuracy standards. The NSSDA standards specify that vertical accuracy be reported at the 95 percent confidence level for data tested by an independent source of higher accuracy.

The accuracy (ACCz) for the derived DEM shall be calculated in three ways, and reported in the metadata accordingly.

The RMSEZ (Non-Vegetated) is required to meet ≤10.0 cm.

The Non-Vegetated Vertical Accuracy (NVA) is required to meet ≤19.6 cm at a 95% confidence level, derived according to NSSDA, i.e., based on RMSEZ of 10.0 cm in the “open terrain” and/or “urban” land cover categories.

The Vegetated Vertical Accuracy (VVA) is required to meet ≤29.4 cm at a 95th percentile level, derived according to ASPRS Guidelines, Vertical Accuracy Reporting for Lidar Data, i.e., based on the 95th percentile error in Vegetated land cover categories combined (Brush Lands/Trees and Forested Areas).

GPS Equipment

Woolpert utilized 3 Trimble Navigation R8 Model 3 GNSS dual-frequency GPS receivers, 1 Trimble Navigation R10 Model GNSS dual-frequency GPS receiver and 1 TSC3 data collector for this project.

Methodology

Real-Time Kinematic (RTK) GPS

The field crew utilized Real-Time Kinematic (RTK) and GPS Rapid Static methods throughout the ground control data collection process. Using these techniques, observations were performed on a total of 67 LiDAR control points and 156 ground classification check points. The survey was conducted using a 1-second epoch rate, in a fixed solution RTK mode, with each observation lasting between 60 to 180 seconds. Each station was occupied twice to insure the necessary horizontal and vertical accuracies were being met for this LiDAR / photogrammetric project.

GPS Data Analysis and Processing

The field crew chief processed all session baselines each day using Trimble Navigation’s Trimble Business Center (TBC) Version 3.80 baseline processor with the accompanying broadcast ephemeris. Daily processing ensured the integrity of the network as it was constructed, and allowed the field crews to immediately reschedule observations of poor baselines.

Datum Reference and Final Coordinates

The spatial reference system for this project is will be UTM Zone 13 North. The datum shall be NAD83 (2011) meters to 2 decimal places horizontal and NAVD88 Meters vertical using the latest geoid model (GEOID12B) Units for both the horizontal and vertical datum will be expressed in meters to two (2) decimal places.

Quality Assurance

Existing NSRS published continuously operating reference stations were utilized to assure that there were no discrepancies in the field observation data. Close examinations of the residuals showed no distortions in orientation or scale. The ground control data meets positional accuracies necessary to support 1.0 point per 0.3 meters squared (1’ GSD) data at 95% confidence level as outlined in the Geospatial Positioning Accuracy Standards, Part 3: National Standard for Spatial Data Accuracy (NSSDA), published by the Federal Geographic Data Committee (FGDC-STD-007.3-1998).

Section 2: Ground/Geodetic Control Coordinate Listings

Coordinate System: Grid

HORIZONTAL DATUM: NAD83 2011 UTM 13 NORTH
VERTICAL DATUM: NAVD88
GEOID MODEL: GEOID 12A
UNITS: Meters

LiDAR Ground Control

Point No.	UTM Zone 13 North (Meters)		Ortho Height (NAVD88) (m)	Description
	UTM Northing (m)	UTM Easting (m)		
1001	4549951.752	282351.588	1992.910	LiDAR Control
1002	4556820.885	277417.403	1937.379	LiDAR Control
1003	4547449.275	276528.214	1906.543	LiDAR Control
1004	4544589.577	284642.319	1959.236	LiDAR Control
1005	4553603.887	278915.355	1930.003	LiDAR Control
1006	4555837.625	297395.120	2283.650	LiDAR Control
1006 A	4555837.534	297361.634	2285.949	LiDAR Control
1007	4544490.449	300087.607	2144.672	LiDAR Control
1007 A	4544491.259	300056.538	2143.183	LiDAR Control
1008	4544440.914	293903.245	1970.783	LiDAR Control
1009	4550487.893	304170.816	2152.368	LiDAR Control
1010	4551333.973	299259.407	2033.781	LiDAR Control
1011	4591255.094	316288.563	2259.383	LiDAR Control
1012	4585720.814	307654.364	2353.490	LiDAR Control
1013	4587612.783	314057.346	2438.803	LiDAR Control
1013 A	4587672.571	314072.051	2438.545	LiDAR Control
1014	4588483.916	310188.931	2307.428	LiDAR Control
1015	4630609.000	314335.303	2095.263	LiDAR Control
1016	4627601.977	294991.908	2033.055	LiDAR Control
1016 A	4627572.032	294999.989	2032.433	LiDAR Control
1017	4617994.247	298459.464	2193.824	LiDAR Control
1018	4620899.051	311367.107	2205.152	LiDAR Control

Point No.	UTM Zone 13 North (Meters)		Ortho Height (NAVD88) (m)	Description
	UTM Northing (m)	UTM Easting (m)		
1018 A	4620865.232	311364.533	2205.261	LiDAR Control
1019	4591315.819	349118.944	2068.090	LiDAR Control
1020	4584215.858	327797.369	2255.723	LiDAR Control
1021	4562744.866	346472.651	2385.035	LiDAR Control
1022	4581592.541	353347.383	2141.799	LiDAR Control
1023	4578929.472	344360.273	2179.407	LiDAR Control
1024	4580157.153	370550.258	2394.698	LiDAR Control
1024 A	4580254.823	370445.806	2392.440	LiDAR Control
1025	4579799.145	367123.750	2379.310	LiDAR Control
1026	4564378.673	357284.052	2205.129	LiDAR Control
1027	4565437.118	372004.896	2399.428	LiDAR Control
1028	4569800.693	363331.881	2173.941	LiDAR Control
1029	4623651.458	311719.488	2181.944	LiDAR Control
1030	4622794.690	346204.742	2082.586	LiDAR Control
1031	4604762.629	332669.850	2053.943	LiDAR Control
1032	4627344.281	376743.263	2178.286	LiDAR Control
1033	4616356.873	366521.574	2200.286	LiDAR Control
1034	4603520.146	403162.701	2355.685	LiDAR Control
1035-B	4597036.612	385665.417	2604.777	LiDAR Control
1035-B2	4597005.945	385676.909	2606.345	LiDAR Control
1036-B	4605687.432	383143.160	2356.309	LiDAR Control
1036-B2	4605650.789	383142.732	2356.978	LiDAR Control
1037-B	4596281.511	381622.804	2597.863	LiDAR Control
1037-B2	4596293.681	381652.143	2597.362	LiDAR Control
1038-B	4606433.826	395864.229	2396.509	LiDAR Control
1039	4613097.842	410545.452	2184.166	LiDAR Control
1040	4635330.572	410949.452	2069.559	LiDAR Control
1041	4642232.111	402003.295	2040.779	LiDAR Control
1042	4638274.306	329585.938	1968.870	LiDAR Control
1042 A	4638244.071	329585.948	1968.663	LiDAR Control
1043	4671624.704	340991.301	2159.605	LiDAR Control
1043 A	4671609.702	340962.920	2164.019	LiDAR Control
1044	4654069.287	373834.302	1992.940	LiDAR Control
1045	4637045.986	352842.841	2077.637	LiDAR Control
1045 A	4637017.223	352839.256	2077.500	LiDAR Control
1046	4617333.475	340527.571	2053.081	LiDAR Control
1047	4632239.297	365836.429	2149.584	LiDAR Control
1048	4609074.768	394699.197	2365.949	LiDAR Control

Point No.	UTM Zone 13 North (Meters)		Ortho Height (NAVD88) (m)	Description
	UTM Northing (m)	UTM Easting (m)		
1048 A	4609081.626	394702.371	2365.838	LiDAR Control
1049	4614599.979	367597.906	2273.628	LiDAR Control
1049 A	4614606.676	367562.247	2271.845	LiDAR Control
1050	4634388.494	385690.719	2077.084	LiDAR Control
1051	4647019.479	402532.392	2068.935	LiDAR Control
1052	4634736.932	371394.010	2109.562	LiDAR Control
1052 A	4634714.271	371292.532	2109.711	LiDAR Control
1053	4649975.273	373722.119	1998.702	LiDAR Control
1054	4628398.655	355388.006	2185.198	LiDAR Control
1055	4654804.514	360475.940	2028.502	LiDAR Control
1056	4668428.759	342398.814	2043.626	LiDAR Control
1057	4639062.073	355117.351	2003.824	LiDAR Control
1058	4669011.946	342300.393	1886.966	LiDAR Control
1059	4593431.703	352322.650	2091.297	LiDAR Control
1059 A	4593413.018	352295.139	2091.838	LiDAR Control
1060	4594842.356	354238.783	2114.180	LiDAR Control
1061	4595363.032	355726.871	2115.986	LiDAR Control
1062	4559752.626	347424.543	2453.383	LiDAR Control
1062 A	4559781.623	347438.245	2451.228	LiDAR Control
1063	4595807.260	358162.524	2136.701	LiDAR Control
1064	4557011.454	351970.269	2604.348	LiDAR Control
1064 A	4556979.352	351973.835	2605.871	LiDAR Control
1065	4558920.906	347001.070	2532.946	LiDAR Control
1065 A	4558926.300	346960.151	2532.867	LiDAR Control
1066	4649663.987	396954.694	2048.772	LiDAR Control
1067	4660526.580	340808.857	2005.570	LiDAR Control

Quality Control Points

Point No.	UTM Zone 13 North (Meters)		Ortho Height (NAVD88) (m)	Description
	UTM Northing (m)	UTM Easting (m)		
2001	4552919.278	279355.501	1924.455	NVA
2001 A	4552950.932	279358.901	1924.463	NVA
2002	4548376.097	277674.283	1913.898	NVA
2003	4549516.989	279760.395	1943.190	NVA
2004	4545854.014	294852.231	2028.756	NVA
2005	4554613.841	301634.000	2151.174	NVA

Point No.	UTM Zone 13 North (Meters)		Ortho Height (NAVD88) (m)	Description
	UTM Northing (m)	UTM Easting (m)		
2006	4551301.952	299235.039	2033.079	NVA
2006 A	4551278.148	299211.506	2032.732	NVA
2007	4586856.350	309315.736	2340.882	NVA
2008	4588050.148	314197.181	2424.688	NVA
2008 A	4588118.965	314255.550	2421.611	NVA
2009	4589776.735	311910.954	2378.158	NVA
2009 A	4589737.779	311887.128	2377.589	NVA
2010	4627388.449	295049.390	2031.474	NVA
2011	4627435.711	307936.492	2113.242	NVA
2012	4620590.259	302844.169	2191.780	NVA
2013	4569391.925	363646.183	2164.336	NVA
2014	4576766.452	365653.440	2301.069	NVA
2015	4565343.375	366889.635	2258.945	NVA
2015 A	4565378.690	366869.898	2259.613	NVA
2016	4566925.009	349366.191	2208.157	NVA
2017	4589261.116	345881.097	2123.560	NVA
2018	4585342.717	329490.250	2223.980	NVA
2019	4571753.066	339348.972	2296.090	NVA
2020	4579613.959	344838.376	2168.239	NVA
2021	4627296.973	324133.070	2011.177	NVA
2022	4624877.390	346586.008	2019.426	NVA
2023	4626838.831	338242.726	1982.577	NVA
2024	4615992.277	382160.248	2214.720	NVA
2025	4605349.486	399398.068	2348.587	NVA
2025 A	4605391.732	399289.301	2348.800	NVA
2026	4612225.996	406126.234	2212.745	NVA
2026 A	4612178.603	406153.764	2212.729	NVA
2027	4637455.975	404679.875	2006.351	NVA
2028	4636714.550	368683.165	2069.715	NVA
2029	4600444.553	343212.269	2041.317	NVA
2030	4616961.096	338967.897	2073.650	NVA
2031	4669286.900	341685.211	1948.152	NVA
2032	4652826.399	382770.868	1998.152	NVA
2033	4622980.052	399293.499	2073.673	NVA
2034	4659785.974	340862.766	2005.350	NVA
2035	4638537.867	329092.126	1957.431	NVA
2036	4653731.229	362192.229	2027.378	NVA
2037	4637073.554	352864.213	2077.203	NVA

Point No.	UTM Zone 13 North (Meters)		Ortho Height (NAVD88) (m)	Description
	UTM Northing (m)	UTM Easting (m)		
2037 A	4637095.560	352832.741	2077.430	NVA
2038	4629881.195	359831.881	2127.840	NVA
2039	4642773.794	393569.127	2016.146	NVA
2040	4650022.275	373741.193	1997.978	NVA
2040 A	4650053.247	373752.370	1997.504	NVA
2041	4630588.884	375358.395	2207.215	NVA
2042	4614019.182	354507.233	2077.089	NVA
2043	4627771.443	302834.531	2108.173	NVA
2044	4587273.405	337174.780	2250.891	NVA
2044 A	4587307.928	337254.277	2248.495	NVA
2045	4564947.165	357298.236	2205.618	NVA
2046	4576958.949	357071.183	2129.434	NVA
2046 A	4576931.450	357092.952	2129.277	NVA
2047	4633875.779	338995.328	2016.501	NVA
2047 A	4633960.368	338993.003	2016.268	NVA
2048	4631710.010	332108.475	1974.919	NVA
2048 A	4631685.946	332016.495	1977.362	NVA
2049	4623308.935	381088.813	2236.888	NVA
2050	4633023.668	396444.169	2057.367	NVA
2051	4598234.871	384250.129	2530.846	NVA
2052	4608482.982	381954.703	2310.988	NVA
2053	4623098.115	372697.978	2231.255	NVA
2054	4621250.205	358835.675	2100.886	NVA
2054 A	4621251.310	358832.637	2100.825	NVA
2055	4639816.938	363717.164	2196.663	NVA
2055 A	4639839.455	363692.794	2195.832	NVA
2056	4623186.693	403864.013	2186.141	NVA
2056 A	4623217.642	403865.726	2185.732	NVA
2057	4619936.865	391007.153	2162.597	NVA
2058	4629180.997	367358.665	2097.758	NVA
2059	4612364.561	336058.174	2112.718	NVA
2059 A	4612392.841	336072.754	2114.173	NVA
2060	4619433.991	403364.942	2202.720	NVA
2061	4544469.920	299799.205	2125.981	NVA
2062	4645869.985	371776.437	2078.945	NVA
2062 A	4645898.813	371793.683	2078.973	NVA
2063	4627947.565	353768.327	2120.425	NVA
2064	4618557.727	299625.938	2217.193	NVA

Point No.	UTM Zone 13 North (Meters)		Ortho Height (NAVD88) (m)	Description
	UTM Northing (m)	UTM Easting (m)		
2064 A	4618580.059	299650.365	2217.111	NVA
2065	4621655.222	366656.816	2181.060	NVA
2066	4647382.497	365424.632	2104.837	NVA
2066 A	4647366.023	365472.921	2106.504	NVA
2067	4629442.240	391857.710	2161.124	NVA
2068	4618324.710	373189.427	2236.390	NVA
2069	4617603.373	363624.189	2139.495	NVA
2070	4619288.325	348377.739	2012.822	NVA
2071	4669669.400	340611.510	2004.007	NVA
2072	4655705.565	374559.810	2001.227	NVA
2073	4620563.554	378648.805	2240.678	NVA
2074	4635407.817	407939.842	2045.518	NVA
2075	4631404.715	395637.717	2063.560	NVA
2076	4642229.417	349915.763	1978.869	NVA
2077	4628658.287	299709.882	2067.204	NVA
2077 A	4628602.389	299712.901	2067.477	NVA
2078	4590807.426	316105.127	2300.868	NVA
2079	4548892.933	297910.267	2017.282	NVA
2080	4608900.684	395442.443	2358.438	NVA
2081	4647839.529	388586.195	2061.966	NVA
2084	4571316.360	358600.003	2147.292	NVA
2084 A	4571295.573	358574.235	2148.637	NVA
2085	4556811.637	277389.702	1937.905	NVA
2086	4595936.616	355523.934	2116.078	NVA
2087	4606578.012	354368.788	2125.822	NVA
2088	4559607.134	347377.831	2471.460	NVA
3001	4548449.029	277775.214	1912.336	VVA
3002	4557877.667	276861.319	1940.698	VVA
3002 A	4557920.164	276855.073	1940.688	VVA
3003	4545896.192	294804.485	2032.295	VVA
3005	4554964.252	301192.476	2078.262	VVA
3006	4550371.999	298578.828	2023.852	VVA
3007	4586974.930	308901.427	2363.174	VVA
3007 A	4586955.359	308887.817	2366.432	VVA
3008	4587431.584	313926.606	2427.789	VVA
3009	4589814.448	311875.789	2381.035	VVA
3009 A	4589740.783	311830.545	2382.556	VVA
3010	4627415.741	307966.791	2112.372	VVA

Point No.	UTM Zone 13 North (Meters)		Ortho Height (NAVD88) (m)	Description
	UTM Northing (m)	UTM Easting (m)		
3011	4627743.399	302741.666	2106.473	VVA
3012	4620550.659	302860.353	2190.468	VVA
3013	4618536.408	299651.898	2215.815	VVA
3014	4576861.923	365546.043	2311.039	VVA
3015	4572098.044	362886.681	2211.956	VVA
3016	4566902.732	349346.456	2207.638	VVA
3017	4571835.108	339506.363	2296.324	VVA
3018	4579679.695	344818.456	2164.840	VVA
3019	4600475.190	342774.340	2045.826	VVA
3020	4627302.380	324205.464	2011.024	VVA
3021	4626970.665	338287.255	1980.552	VVA
3021 A	4627035.784	338279.603	1978.595	VVA
3021 B	4627057.322	337939.618	1982.090	VVA
3022	4627062.023	338293.933	1974.244	VVA
3023	4615999.883	382406.432	2213.994	VVA
3024	4607705.147	381837.512	2314.306	VVA
3025	4598230.965	384262.233	2532.353	VVA
3026	4598254.078	384209.597	2526.277	VVA
3027	4605567.999	399168.728	2347.928	VVA
3028	4603900.894	397485.900	2389.761	VVA
3029	4620011.140	390347.597	2134.191	VVA
3030	4619814.933	390350.836	2152.673	VVA
3031	4637429.981	404713.819	2006.584	VVA
3032	4636761.292	368750.106	2072.407	VVA
3033	4631727.143	332547.825	1963.960	VVA
3033 A	4631749.246	332533.607	1964.211	VVA
3034	4631699.002	332081.824	1975.592	VVA
3034 B	4631695.625	332017.845	1976.337	VVA
3035	4614017.637	354428.328	2077.428	VVA
3036	4621693.503	366610.206	2182.267	VVA
3037	4618413.399	373942.000	2228.584	VVA
3038	4622996.123	399281.080	2075.544	VVA
3038 A	4622978.192	399246.115	2076.692	VVA
3039	4669648.646	340536.186	2007.087	VVA
3040	4669269.803	341710.955	1946.657	VVA
3040 A	4669265.966	341739.882	1946.356	VVA
3041	4659760.641	340849.745	2006.224	VVA
3042	4643090.482	393640.380	2011.154	VVA

Point No.	UTM Zone 13 North (Meters)		Ortho Height (NAVD88) (m)	Description
	UTM Northing (m)	UTM Easting (m)		
3043	4652817.263	382738.239	1996.218	VVA
3044	4619250.356	348405.905	2012.373	VVA
3045	4627907.160	353767.101	2115.695	VVA
3046	4647388.741	365476.214	2107.170	VVA
3047	4629221.363	367353.178	2097.988	VVA
3048	4637738.950	329346.115	1956.388	VVA
3048 A	4637772.946	329377.606	1956.199	VVA
3049	4612334.139	336096.750	2108.529	VVA
3049 A	4612303.615	336117.953	2108.278	VVA
3050	4624759.173	346587.472	2019.302	VVA
3051	4638226.842	353119.577	2082.780	VVA
3052	4629913.647	359845.290	2126.638	VVA
3053	4653691.807	362226.059	2027.656	VVA
3054	4650033.075	373721.298	1998.344	VVA
3055	4610840.194	403896.669	2225.517	VVA
3056	4655734.382	374597.131	2001.667	VVA
3057	4620596.608	378669.286	2242.693	VVA
3058	4635401.170	407890.670	2045.103	VVA
3059	4631434.519	395677.986	2063.265	VVA
3060	4639818.295	363763.169	2196.157	VVA
3060 A	4639764.750	363788.616	2195.969	VVA
3061	4633977.997	339022.177	2017.303	VVA
3061 A	4633994.483	339051.493	2017.846	VVA
3062	4590674.385	342627.924	2121.278	VVA
3062 A	4590680.005	342610.978	2120.840	VVA
3063	4622613.980	352588.139	2030.487	VVA
3064	4627273.934	295164.416	2031.336	VVA
3064 A	4627296.362	295061.088	2031.214	VVA
3065	4547833.851	297502.337	2002.777	VVA
3066	4559687.358	347381.262	2463.832	VVA
3067	4595777.365	358159.226	2136.247	VVA
3068	4606633.999	353043.607	2128.485	VVA

NGS Control Points

Point No.	UTM Zone 13 North (Meters)			Description
	UTM Northing (m)	UTM Easting (m)	Ortho Height (NAVD88) (m)	
43 JFM	4618292.426	380247.426	2217.748	CONTROL
DISH	4586941.505	336054.754	2277.705	CONTROL
C 319 RESET	4627722.859	319503.893	2023.903	CONTROL
D 324	4624428.816	348193.428	2028.175	CONTROL
S 341	4628397.833	317234.206	2041.86	CONTROL
SINCLAIR	4629873.387	328816.487	2000.386	CONTROL
U 319	4625661.676	348214.935	2025.806	CONTROL
X 341	4624795.185	346617.836	2018.319	CONTROL
WALCOTT	4623586.336	347074.465	2053.962	CONTROL

NGS Base Station Check Points

Point No.	Grid Deltas Published vs. Surveyed		
	Δ Northing (m)	Δ Easting (m)	Δ Ortho Height (NAVD88) (m)
U 319	N/A	N/A	-0.024
S 341	N/A	N/A	0.011
C 319 RESET	N/A	N/A	0.02

Coordinate System: Geodetic

HORIZONTAL DATUM: NAD83 (2011) Epoch 2010.00
VERTICAL DATUM: NAVD88
UNITS: US Survey Feet
DATE: 3/5/2015

LiDAR GROUND CONTROL

Point No.	Geodetic Coordinates NAD-83 (2011) Epoch 2010.00		Ellipsoid Height (m)	Description
	Latitude (N)	Longitude (W)		
1001	41°04'18.16283"	-107°35'26.20375"	1978.666	LiDAR Control
1002	41°07'55.87828"	-107°39'06.37177"	1922.906	LiDAR Control

Point No.	Geodetic Coordinates NAD-83 (2011) Epoch 2010.00		Ellipsoid Height (m)	Description
	Latitude (N)	Longitude (W)		
1003	41°02'51.41390"	-107°39'32.21330"	1891.970	LiDAR Control
1004	41°01'26.63947"	-107°33'41.39683"	1945.056	LiDAR Control
1005	41°06'13.13806"	-107°37'58.02302"	1915.593	LiDAR Control
1006	41°07'42.85465"	-107°24'49.13992"	2270.441	LiDAR Control
1006 A	41°07'42.82161"	-107°24'50.57471"	2272.738	LiDAR Control
1007	41°01'37.59524"	-107°22'40.49485"	2131.405	LiDAR Control
1007 A	41°01'37.59406"	-107°22'41.82510"	2129.915	LiDAR Control
1008	41°01'30.44390"	-107°27'05.02920"	1957.127	LiDAR Control
1009	41°04'55.49688"	-107°19'52.64792"	2139.478	LiDAR Control
1010	41°05'18.59991"	-107°23'23.95691"	2020.587	LiDAR Control
1011	41°27'06.71112"	-107°11'57.92170"	2246.974	LiDAR Control
1012	41°24'00.11473"	-107°18'03.43550"	2340.984	LiDAR Control
1013	41°25'06.84115"	-107°13'29.98404"	2426.496	LiDAR Control
1013 A	41°25'08.79069"	-107°13'29.41717"	2426.237	LiDAR Control
1014	41°25'31.81207"	-107°16'17.48614"	2294.951	LiDAR Control
1015	41°48'20.21995"	-107°14'05.98833"	2081.640	LiDAR Control
1016	41°46'25.65447"	-107°27'59.80478"	2018.812	LiDAR Control
1016 A	41°46'24.69192"	-107°27'59.41786"	2018.191	LiDAR Control
1017	41°41'17.59446"	-107°25'18.03517"	2179.917	LiDAR Control
1018	41°43'03.09684"	-107°16'03.43256"	2191.629	LiDAR Control
1018 A	41°43'01.99889"	-107°16'03.50533"	2191.739	LiDAR Control
1019	41°27'33.31341"	-106°48'23.74317"	2055.892	LiDAR Control
1020	41°23'27.78077"	-107°03'34.99860"	2243.846	LiDAR Control
1021	41°12'05.48951"	-106°49'51.76835"	2373.685	LiDAR Control
1022	41°22'20.98380"	-106°45'13.07430"	2130.031	LiDAR Control
1023	41°20'48.59748"	-106°51'37.30046"	2167.664	LiDAR Control
1024	41°21'45.07686"	-106°32'51.70162"	2383.669	LiDAR Control
1024 A	41°21'48.18245"	-106°32'56.27091"	2381.403	LiDAR Control
1025	41°21'31.46258"	-106°35'18.84747"	2368.094	LiDAR Control
1026	41°13'05.56761"	-106°42'09.15251"	2193.728	LiDAR Control
1027	41°13'48.74323"	-106°31'37.96937"	2388.477	LiDAR Control
1028	41°16'05.08126"	-106°37'53.89351"	2162.624	LiDAR Control
1029	41°44'32.57586"	-107°15'51.32665"	2168.370	LiDAR Control
1030	41°44'31.53364"	-106°50'58.37503"	2069.061	LiDAR Control
1031	41°34'37.34259"	-107°00'25.84322"	2041.115	LiDAR Control
1032	41°47'18.17401"	-106°29'00.12364"	2164.743	LiDAR Control
1033	41°41'16.08765"	-106°36'13.94933"	2187.244	LiDAR Control
1034	41°34'39.01237"	-106°09'41.83856"	2343.957	LiDAR Control

Point No.	Geodetic Coordinates NAD-83 (2011) Epoch 2010.00		Ellipsoid Height (m)	Description
	Latitude (N)	Longitude (W)		
1035-B	41°31'00.51145"	-106°22'12.81176"	2593.785	LiDAR Control
1035-B2	41°30'59.52319"	-106°22'12.29509"	2595.356	LiDAR Control
1036-B	41°35'39.63273"	-106°24'07.65835"	2344.476	LiDAR Control
1036-B2	41°35'38.44466"	-106°24'07.65113"	2345.149	LiDAR Control
1037-B	41°30'33.91899"	-106°25'06.63983"	2586.762	LiDAR Control
1037-B2	41°30'34.32912"	-106°25'05.38317"	2586.262	LiDAR Control
1038-B	41°36'10.16589"	-106°14'58.76904"	2384.754	LiDAR Control
1039	41°39'52.62354"	-106°04'28.22839"	2171.928	LiDAR Control
1040	41°51'53.56394"	-106°04'22.75290"	2056.851	LiDAR Control
1041	41°55'33.48873"	-106°10'54.85863"	2027.761	LiDAR Control
1042	41°52'40.93520"	-107°03'13.45383"	1955.028	LiDAR Control
1042 A	41°52'39.95549"	-107°03'13.42200"	1954.822	LiDAR Control
1043	42°10'50.22543"	-106°55'31.45647"	2146.519	LiDAR Control
1043 A	42°10'49.71854"	-106°55'32.67820"	2150.933	LiDAR Control
1044	42°01'42.76727"	-106°31'26.68269"	1979.136	LiDAR Control
1045	41°52'17.93742"	-106°46'23.85016"	2063.502	LiDAR Control
1045 A	41°52'17.00282"	-106°46'23.97983"	2063.366	LiDAR Control
1046	41°41'30.52119"	-106°54'58.76952"	2039.812	LiDAR Control
1047	41°49'50.46177"	-106°36'56.47715"	2135.617	LiDAR Control
1048	41°37'35.23061"	-106°15'50.75941"	2353.984	LiDAR Control
1048 A	41°37'35.45445"	-106°15'50.62665"	2353.873	LiDAR Control
1049	41°40'19.78799"	-106°35'26.00444"	2260.734	LiDAR Control
1049 A	41°40'19.98372"	-106°35'27.55135"	2258.950	LiDAR Control
1050	41°51'11.33997"	-106°22'37.47604"	2063.493	LiDAR Control
1051	41°58'08.91884"	-106°10'34.74319"	2055.972	LiDAR Control
1052	41°51'14.73620"	-106°32'57.57571"	2095.599	LiDAR Control
1052 A	41°51'13.94228"	-106°33'01.95745"	2095.747	LiDAR Control
1053	41°59'30.00551"	-106°31'28.38942"	1984.755	LiDAR Control
1054	41°47'39.36777"	-106°44'25.88809"	2171.391	LiDAR Control
1055	42°01'58.47530"	-106°41'08.00822"	2014.577	LiDAR Control
1056	42°09'07.68569"	-106°54'27.02068"	2030.343	LiDAR Control
1057	41°53'24.78950"	-106°44'47.00321"	1989.637	LiDAR Control
1058	42°09'26.51261"	-106°54'31.87483"	1873.722	LiDAR Control
1059	41°28'44.03789"	-106°46'07.57521"	2079.052	LiDAR Control
1059 A	41°28'43.41401"	-106°46'08.74441"	2079.594	LiDAR Control
1060	41°29'31.02176"	-106°44'46.22000"	2101.920	LiDAR Control
1061	41°29'48.86713"	-106°43'42.52041"	2103.749	LiDAR Control
1062	41°10'29.15208"	-106°49'08.23270"	2442.109	LiDAR Control

Point No.	Geodetic Coordinates NAD-83 (2011) Epoch 2010.00		Ellipsoid Height (m)	Description
	Latitude (N)	Longitude (W)		
1062 A	41°10'30.10121"	-106°49'07.67092"	2439.951	LiDAR Control
1063	41°30'04.83084"	-106°41'57.89163"	2124.532	LiDAR Control
1064	41°09'03.33625"	-106°45'50.84525"	2593.169	LiDAR Control
1064 A	41°09'02.29806"	-106°45'50.66445"	2594.694	LiDAR Control
1065	41°10'01.90679"	-106°49'25.65060"	2521.702	LiDAR Control
1065 A	41°10'02.05384"	-106°49'27.41058"	2521.623	LiDAR Control
1066	41°59'32.09061"	-106°14'38.69628"	2035.630	LiDAR Control
1067	42°04'50.45822"	-106°55'28.50576"	1991.888	LiDAR Control

Quality Control Points

Point No.	Geodetic Coordinates NAD-83 (2011) Epoch 2010.00		Ellipsoid Height (m)	Description
	Latitude (N)	Longitude (W)		
2001	41°05'51.39081"	-107°37'38.28824"	1910.063	NVA
2001 A	41°05'52.41957"	-107°37'38.18355"	1910.071	NVA
2002	41°03'22.56741"	-107°38'44.37616"	1899.386	NVA
2003	41°04'01.56837"	-107°37'16.56578"	1928.793	NVA
2004	41°02'17.09035"	-107°26'26.12065"	2015.189	NVA
2005	41°07'06.97045"	-107°21'46.07287"	2138.195	NVA
2006	41°05'17.54073"	-107°23'24.96288"	2019.883	NVA
2006 A	41°05'16.74853"	-107°23'25.94273"	2019.533	NVA
2007	41°24'38.33216"	-107°16'53.23013"	2328.414	NVA
2008	41°25'21.12942"	-107°13'24.44821"	2412.368	NVA
2008 A	41°25'23.40786"	-107°13'22.01155"	2409.289	NVA
2009	41°26'15.15992"	-107°15'04.80063"	2365.694	NVA
2009 A	41°26'13.87757"	-107°15'05.78289"	2365.126	NVA
2010	41°46'18.79062"	-107°27'57.05210"	2017.235	NVA
2011	41°46'31.92281"	-107°18'39.37866"	2099.508	NVA
2012	41°42'45.65195"	-107°22'11.61316"	2177.986	NVA
2013	41°15'52.02223"	-106°37'40.06109"	2153.032	NVA
2014	41°19'52.27978"	-106°36'19.68854"	2289.815	NVA
2015	41°13'42.73248"	-106°35'17.54016"	2247.786	NVA
2015 A	41°13'43.86555"	-106°35'18.41533"	2248.453	NVA
2016	41°14'22.93445"	-106°47'51.30192"	2196.664	NVA
2017	41°26'24.50490"	-106°50'41.35467"	2111.455	NVA
2018	41°24'05.59685"	-107°02'23.29022"	2212.073	NVA

Point No.	Geodetic Coordinates NAD-83 (2011) Epoch 2010.00		Ellipsoid Height (m)	Description
	Latitude (N)	Longitude (W)		
2019	41°16'52.47147"	-106°55'06.00184"	2284.574	NVA
2020	41°21'11.11413"	-106°51'17.36748"	2156.476	NVA
2021	41°46'40.94174"	-107°06'58.14605"	1997.655	NVA
2022	41°45'39.29626"	-106°50'43.81055"	2005.812	NVA
2023	41°46'36.89962"	-106°56'46.85433"	1968.988	NVA
2024	41°41'13.15604"	-106°24'57.41157"	2202.009	NVA
2025	41°35'36.64374"	-106°12'25.48166"	2336.838	NVA
2025 A	41°35'37.96397"	-106°12'30.20436"	2337.052	NVA
2026	41°39'22.52812"	-106°07'38.79803"	2200.509	NVA
2026 A	41°39'21.00334"	-106°07'37.58118"	2200.495	NVA
2027	41°52'59.83570"	-106°08'55.89174"	1993.413	NVA
2028	41°52'17.23308"	-106°34'56.68149"	2055.669	NVA
2029	41°32'25.09393"	-106°52'46.77440"	2028.718	NVA
2030	41°41'17.32307"	-106°56'05.84229"	2060.406	NVA
2031	42°09'34.97570"	-106°54'58.93629"	1934.938	NVA
2032	42°01'07.45743"	-106°24'57.27510"	1984.517	NVA
2033	41°45'08.15483"	-106°12'40.70145"	2060.854	NVA
2034	42°04'26.49804"	-106°55'25.43561"	1991.636	NVA
2035	41°52'49.09197"	-107°03'35.13900"	1943.592	NVA
2036	42°01'24.77925"	-106°39'52.48835"	2013.423	NVA
2037	41°52'18.84520"	-106°46'22.94812"	2063.068	NVA
2037 A	41°52'19.53732"	-106°46'24.33250"	2063.294	NVA
2038	41°48'30.29048"	-106°41'14.68217"	2113.943	NVA
2039	41°55'47.11694"	-106°17'01.32342"	2002.792	NVA
2040	41°59'31.53997"	-106°31'27.59702"	1984.033	NVA
2040 A	41°59'32.55030"	-106°31'27.13536"	1983.560	NVA
2041	41°49'02.56554"	-106°30'02.55762"	2193.492	NVA
2042	41°39'52.74353"	-106°44'51.38646"	2063.936	NVA
2043	41°46'38.29667"	-107°22'20.59486"	2094.246	NVA
2044	41°25'13.90145"	-106°56'54.40096"	2238.945	NVA
2044 A	41°25'15.07824"	-106°56'51.01161"	2236.546	NVA
2045	41°13'24.00374"	-106°42'09.02159"	2194.208	NVA
2046	41°19'53.20560"	-106°42'28.91401"	2117.857	NVA
2046 A	41°19'52.32816"	-106°42'27.95461"	2117.701	NVA
2047	41°50'25.49337"	-106°56'21.14832"	2002.646	NVA
2047 A	41°50'28.23287"	-106°56'21.33187"	2002.410	NVA
2048	41°49'10.16395"	-107°01'17.37676"	1961.227	NVA
2048 A	41°49'09.31399"	-107°01'21.33676"	1963.672	NVA

Point No.	Geodetic Coordinates NAD-83 (2011) Epoch 2010.00		Ellipsoid Height (m)	Description
	Latitude (N)	Longitude (W)		
2049	41°45'09.75546"	-106°25'49.00236"	2223.701	NVA
2050	41°50'32.42439"	-106°14'50.36253"	2044.179	NVA
2051	41°31'38.62371"	-106°23'14.68515"	2519.705	NVA
2052	41°37'09.62492"	-106°25'00.96177"	2298.871	NVA
2053	41°44'58.24023"	-106°31'52.05260"	2217.867	NVA
2054	41°43'49.91478"	-106°41'50.45752"	2087.417	NVA
2054 A	41°43'49.94868"	-106°41'50.58991"	2087.357	NVA
2055	41°53'54.76156"	-106°38'34.60488"	2182.542	NVA
2055 A	41°53'55.47622"	-106°38'35.68081"	2181.710	NVA
2056	41°45'16.89281"	-106°09'22.95321"	2173.440	NVA
2056 A	41°45'17.89688"	-106°09'22.89703"	2173.031	NVA
2057	41°43'25.56598"	-106°18'37.41606"	2149.789	NVA
2058	41°48'12.25777"	-106°35'48.04429"	2083.924	NVA
2059	41°38'46.22667"	-106°58'07.09763"	2099.649	NVA
2059 A	41°38'47.15395"	-106°58'06.49563"	2101.104	NVA
2060	41°43'15.01664"	-106°09'42.36667"	2190.143	NVA
2061	41°01'36.67516"	-107°22'52.81041"	2112.696	NVA
2062	41°57'15.81208"	-106°32'49.70277"	2064.925	NVA
2062 A	41°57'16.75655"	-106°32'48.97651"	2064.954	NVA
2063	41°47'23.67898"	-106°45'35.63530"	2106.636	NVA
2064	41°41'36.90940"	-107°24'28.30120"	2203.321	NVA
2064 A	41°41'37.65502"	-107°24'27.27234"	2203.239	NVA
2065	41°44'07.90422"	-106°36'12.36858"	2167.664	NVA
2066	41°58'01.02494"	-106°37'26.74936"	2090.759	NVA
2066 A	41°58'00.52064"	-106°37'24.63865"	2092.427	NVA
2067	41°48'34.11936"	-106°18'06.83792"	2147.886	NVA
2068	41°42'23.79787"	-106°31'27.12140"	2223.321	NVA
2069	41°41'54.72194"	-106°38'20.26003"	2126.315	NVA
2070	41°42'39.39884"	-106°49'21.13059"	1999.412	NVA
2071	42°09'46.58645"	-106°55'46.07640"	1990.832	NVA
2072	42°02'36.22071"	-106°30'56.40287"	1987.511	NVA
2073	41°43'39.43554"	-106°27'32.60982"	2227.589	NVA
2074	41°51'54.82796"	-106°06'33.32108"	2032.709	NVA
2075	41°49'39.56139"	-106°15'24.29666"	2050.376	NVA
2076	41°55'03.94437"	-106°48'35.51213"	1964.661	NVA
2077	41°47'04.21103"	-107°24'36.90685"	2053.134	NVA
2077 A	41°47'02.40288"	-107°24'36.70833"	2053.408	NVA
2078	41°26'52.05406"	-107°12'05.33153"	2288.475	NVA

Point No.	Geodetic Coordinates NAD-83 (2011) Epoch 2010.00		Ellipsoid Height (m)	Description
	Latitude (N)	Longitude (W)		
2079	41°03'58.30566"	-107°24'18.84872"	2003.955	NVA
2080	41°37'29.93902"	-106°15'18.53670"	2346.483	NVA
2081	41°58'28.84918"	-106°20'41.08140"	2048.440	NVA
2084	41°16'51.27846"	-106°41'18.44909"	2135.832	NVA
2084 A	41°16'50.58843"	-106°41'19.53895"	2137.177	NVA
2085	41°07'55.55134"	-107°39'07.54654"	1923.429	NVA
2086	41°30'07.32652"	-106°43'51.76445"	2103.807	NVA
2087	41°35'51.47696"	-106°44'50.85174"	2113.034	NVA
2088	41°10'24.40470"	-106°49'10.10597"	2460.191	NVA
3001	41°03'25.02924"	-107°38'40.15137"	1897.829	VVA
3002	41°08'29.56206"	-107°39'31.58042"	1926.201	VVA
3002 A	41°08'30.93253"	-107°39'31.90367"	1926.192	VVA
3003	41°02'18.41363"	-107°26'28.21427"	2018.726	VVA
3005	41°07'17.93556"	-107°22'05.39862"	2065.263	VVA
3006	41°04'46.82534"	-107°23'51.96923"	2010.598	VVA
3007	41°24'41.82019"	-107°17'11.19657"	2350.684	VVA
3007 A	41°24'41.17443"	-107°17'11.76008"	2353.942	VVA
3008	41°25'00.86085"	-107°13'35.41129"	2415.485	VVA
3009	41°26'16.35227"	-107°15'06.35705"	2368.569	VVA
3009 A	41°26'13.92721"	-107°15'08.22264"	2370.092	VVA
3010	41°46'31.30219"	-107°18'38.04406"	2098.639	VVA
3011	41°46'37.30504"	-107°22'24.58062"	2092.542	VVA
3012	41°42'44.38341"	-107°22'10.86626"	2176.675	VVA
3013	41°41'36.24224"	-107°24'27.15335"	2201.944	VVA
3014	41°19'55.31004"	-106°36'24.38315"	2299.779	VVA
3015	41°17'19.27791"	-106°38'14.88181"	2200.617	VVA
3016	41°14'22.19916"	-106°47'52.12953"	2196.145	VVA
3017	41°16'55.24311"	-106°54'59.31741"	2284.804	VVA
3018	41°21'13.23085"	-106°51'18.28483"	2153.075	VVA
3019	41°32'25.77755"	-106°53'05.69394"	2033.225	VVA
3020	41°46'41.17467"	-107°06'55.01795"	1997.501	VVA
3021	41°46'41.20456"	-106°56'45.05571"	1966.959	VVA
3021 A	41°46'43.30922"	-106°56'45.45083"	1964.999	VVA
3021 B	41°46'43.75755"	-106°57'00.19131"	1968.497	VVA
3022	41°46'44.17006"	-106°56'44.85612"	1960.647	VVA
3023	41°41'13.53364"	-106°24'46.77086"	2201.288	VVA
3024	41°36'44.34803"	-106°25'05.47184"	2302.252	VVA
3025	41°31'38.50340"	-106°23'14.16030"	2521.212	VVA

Point No.	Geodetic Coordinates NAD-83 (2011) Epoch 2010.00		Ellipsoid Height (m)	Description
	Latitude (N)	Longitude (W)		
3026	41°31'39.22525"	-106°23'16.44695"	2515.132	VVA
3027	41°35'43.62363"	-106°12'35.51814"	2336.170	VVA
3028	41°34'48.80673"	-106°13'47.16789"	2378.188	VVA
3029	41°43'27.64725"	-106°19'06.00486"	2121.369	VVA
3030	41°43'21.28842"	-106°19'05.73470"	2139.864	VVA
3031	41°52'59.00775"	-106°08'54.40410"	1993.648	VVA
3032	41°52'18.78811"	-106°34'53.81591"	2058.361	VVA
3033	41°49'11.05378"	-107°00'58.36164"	1950.265	VVA
3033 A	41°49'11.75919"	-107°00'59.00001"	1950.515	VVA
3034	41°49'09.78690"	-107°01'18.52006"	1961.902	VVA
3034 B	41°49'09.62866"	-107°01'21.28816"	1962.647	VVA
3035	41°39'52.64158"	-106°44'54.79556"	2064.274	VVA
3036	41°44'09.11686"	-106°36'14.41646"	2168.867	VVA
3037	41°42'27.10321"	-106°30'54.63589"	2215.524	VVA
3038	41°45'08.67014"	-106°12'41.24888"	2062.724	VVA
3038 A	41°45'08.07290"	-106°12'42.75165"	2063.872	VVA
3039	42°09'45.85871"	-106°55'49.33675"	1993.912	VVA
3040	42°09'34.44040"	-106°54'57.79831"	1933.441	VVA
3040 A	42°09'34.33709"	-106°54'56.53470"	1933.139	VVA
3041	42°04'25.66761"	-106°55'25.97714"	1992.509	VVA
3042	41°55'57.41736"	-106°16'58.43600"	1997.805	VVA
3043	42°01'07.14381"	-106°24'58.68686"	1982.581	VVA
3044	41°42'38.18764"	-106°49'19.87759"	1998.964	VVA
3045	41°47'22.36864"	-106°45'35.65256"	2101.907	VVA
3046	41°58'01.25897"	-106°37'24.51436"	2093.093	VVA
3047	41°48'13.56282"	-106°35'48.31445"	2084.153	VVA
3048	41°52'23.40150"	-107°03'23.29577"	1942.560	VVA
3048 A	41°52'24.52754"	-107°03'21.96579"	1942.369	VVA
3049	41°38'45.26934"	-106°58'05.40094"	2095.461	VVA
3049 A	41°38'44.29586"	-106°58'04.45475"	2095.211	VVA
3050	41°45'35.46605"	-106°50'43.63739"	2005.692	VVA
3051	41°52'56.39318"	-106°46'12.90695"	2068.615	VVA
3052	41°48'31.35083"	-106°41'14.12892"	2112.739	VVA
3053	42°01'23.52292"	-106°39'50.98454"	2013.700	VVA
3054	41°59'31.87853"	-106°31'28.46980"	1984.399	VVA
3055	41°38'36.64455"	-106°09'14.37664"	2213.352	VVA
3056	42°02'37.17617"	-106°30'54.80222"	1987.953	VVA
3057	41°43'40.51824"	-106°27'31.74785"	2229.603	VVA

Point No.	Geodetic Coordinates NAD-83 (2011) Epoch 2010.00		Ellipsoid Height (m)	Description
	Latitude (N)	Longitude (W)		
3058	41°51'54.59188"	-106°06'35.44994"	2032.292	VVA
3059	41°49'40.54668"	-106°15'22.57022"	2050.081	VVA
3060	41°53'54.83409"	-106°38'32.61019"	2182.036	VVA
3060 A	41°53'53.11442"	-106°38'31.46179"	2181.849	VVA
3061	41°50'28.82551"	-106°56'20.08480"	2003.444	VVA
3061 A	41°50'29.38122"	-106°56'18.83051"	2003.986	VVA
3062	41°27'08.03705"	-106°53'02.79508"	2109.126	VVA
3062 A	41°27'08.20722"	-106°53'03.53036"	2108.688	VVA
3063	41°44'30.03235"	-106°46'21.98285"	2016.915	VVA
3064	41°46'15.18774"	-107°27'51.93232"	2017.102	VVA
3064 A	41°46'15.81833"	-107°27'56.43154"	2016.976	VVA
3065	41°03'23.62572"	-107°24'35.05903"	1989.408	VVA
3066	41°10'27.00724"	-106°49'10.03078"	2452.561	VVA
3067	41°30'03.85978"	-106°41'58.00851"	2124.079	VVA
3068	41°35'52.41768"	-106°45'48.11922"	2115.678	VVA

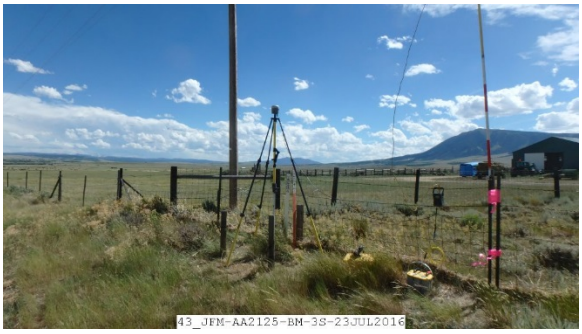
NGS Control Points

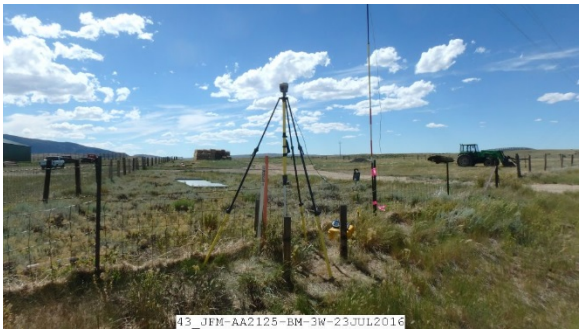
Point No.	Geodetic Coordinates NAD-83 (2011) Epoch 2010.00		Ellipsoid Height (m)	Description
	Latitude (N)	Longitude (W)		
43 JFM	41°42'26.68887"	-106°26'21.79244"	2204.837	CONTROL
DISH	41°25'02.32537"	-106°57'42.30004"	2265.779	CONTROL
C 319 RESET	41°46'51.00000"	-107°10'19.00000"	2010.353	CONTROL
D 324	41°45'25.87061"	-106°49'33.82091"	2014.532	CONTROL
S 341	41°47'11.00000"	-107°11'58.00000"	2028.283	CONTROL
SINCLAIR	41°48'08.11469"	-107°03'38.07380"	1986.779	CONTROL
U 319	41°46'05.84095"	-106°49'34.02319"	2012.119	CONTROL
X 341	41°45'36.65427"	-106°50'42.35656"	2004.675	CONTROL
WALCOTT	41°44'57.79412"	-106°50'21.47268"	2040.393	CONTROL

Section 3: Ground/Geodetic Control Logs and Photos

This section contains the station recovery information sheets and photographs for the ground control, geodetic control and checkpoint stations established for the project. The stations appear as they are ordered in the final coordinate listing of Section 2.

The data is assembled on the following pages.

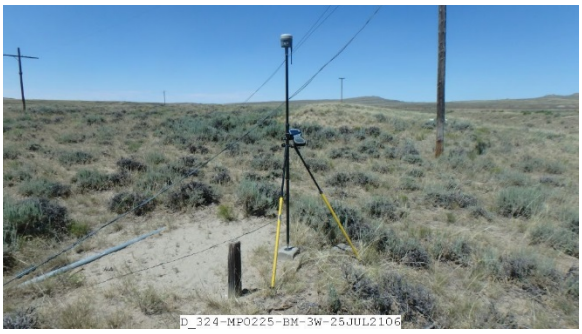





U.S. COAST & GEODETIC SURVEY
ELEV.
$250 FINE OR IMPRISONMENT
D 324
1947
FEET
FOR DISTURBING THIS MARK
ABOVE MEAN SEA LEVEL
BENCHMARK
D_324-MP0225-BM-1-25JUL2106


D_324-MP0225-BM-2-25JUL2106


D_324-MP0225-BM-3S-25JUL2106


D_324-MP0225-BM-3W-25JUL2106


U.S.COAST & GEODETIC SURVEY
ELEV.
$250 FINE OR IMPRISONMENT
U319
1947
FEET
FOR DISTURBING THIS MARK
ABOVE MEAN SEA LEVEL
BENCH MARK
U_319-MP0197-BM-1-25JUL2016


U_319-MP0197-BM-2-25JUL2016


U_319-MP0197-BM-3N-25JUL2016


U_319-MP0197-BM-3W-25JUL2016


X 341-MP0478-BM-1-25JUL2016

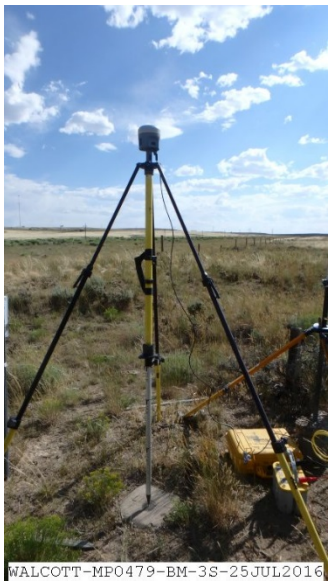

X 341-MP0478-BM-2-25JUL2016


X 341-MP0478-BM-3S-25JUL2016


X 341-MP0478-BM-3W-25JUL2016

WALCOTT-MP0479-BM-1-25JUL2016


WALCOTT-MP0479-BM-2-25JUL2016


WALCOTT-MP0479-BM-3S-25JUL2016


WALCOTT-MP0479-BM-3W-25JUL2016

Section 4: Existing NGS Datasheets

This section contains the published National Geodetic Survey (NGS) datasheets for those existing monumented control stations that were used to establish 3-dimensional coordinates for each of the newly established ground control survey points for the project.

See file dsdata.txt for more information about the datasheet.

```
PROGRAM = datasheet95, VERSION = 8.11
1         National Geodetic Survey,   Retrieval Date = DECEMBER 14, 2016
 MP0499 ***********************************************************************
 MP0499  FBN          -  This is a Federal Base Network Control Station.
 MP0499  DESIGNATION -  B 343
 MP0499  PID          -  MP0499
 MP0499  STATE/COUNTY-  WY/CARBON
 MP0499  COUNTRY      -  US
 MP0499  USGS QUAD    -  MEDICINE BOW (1971)
 MP0499
 MP0499                         *CURRENT SURVEY CONTROL
 MP0499  ______________________________________________________________________
 MP0499* NAD 83(2011) POSITION- 41 53 15.58732(N) 106 09 57.34765(W)   ADJUSTED
 MP0499* NAD 83(2011) ELLIP HT-  2005.646 (meters)        (06/27/12)   ADJUSTED
 MP0499* NAD 83(2011) EPOCH   -  2010.00
 MP0499* NAVD 88 ORTHO HEIGHT -  2018.645 (meters)     6622.84  (feet) ADJUSTED
 MP0499  ______________________________________________________________________
 MP0499  GEOID HEIGHT    -        -12.986 (meters)                     GEOID12B
 MP0499  NAD 83(2011) X  - -1,324,397.336 (meters)                     COMP
 MP0499  NAD 83(2011) Y  - -4,568,744.137 (meters)                     COMP
 MP0499  NAD 83(2011) Z  -  4,237,662.181 (meters)                     COMP
 MP0499  LAPLACE CORR    -          5.62  (seconds)                    DEFLEC12B
 MP0499  DYNAMIC HEIGHT  -       2016.949 (meters)     6617.27  (feet) COMP
 MP0499  MODELED GRAVITY -    979,710.4   (mgal)                       NAVD 88
 MP0499
 MP0499  VERT ORDER      -  FIRST     CLASS II
 MP0499
 MP0499  Network accuracy estimates per FGDC Geospatial Positioning Accuracy
 MP0499  Standards:
 MP0499         FGDC (95% conf, cm)     Standard deviation (cm)     CorrNE
 MP0499            Horiz  Ellip           SD_N   SD_E   SD_h      (unitless)
 MP0499  ------------------------------------------------------------------
 MP0499  NETWORK    0.93   2.76           0.41   0.34   1.41      0.07816190
 MP0499  ------------------------------------------------------------------
 MP0499  Click here for local accuracies and other accuracy information.
 MP0499
 MP0499
 MP0499.The horizontal coordinates were established by GPS observations
 MP0499.and adjusted by the National Geodetic Survey in June 2012.
 MP0499
 MP0499.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
 MP0499.been affixed to the stable North American tectonic plate. See
 MP0499.NA2011 for more information.
```

```
MP0499
MP0499.The horizontal coordinates are valid at the epoch date displayed above
MP0499.which is a decimal equivalence of Year/Month/Day.
MP0499
MP0499.The orthometric height was determined by differential leveling and
MP0499.adjusted by the NATIONAL GEODETIC SURVEY
MP0499.in June 1991.
MP0499
MP0499.Significant digits in the geoid height do not necessarily reflect accuracy.
MP0499.GEOID12B height accuracy estimate available here.
MP0499
MP0499.The X, Y, and Z were computed from the position and the ellipsoidal ht.
MP0499
MP0499.The Laplace correction was computed from DEFLEC12B derived deflections.
MP0499
MP0499.The ellipsoidal height was determined by GPS observations
MP0499.and is referenced to NAD 83.
MP0499
MP0499.The dynamic height is computed by dividing the NAVD 88
MP0499.geopotential number by the normal gravity value computed on the
MP0499.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
MP0499.degrees latitude (g = 980.6199 gals.).
MP0499
MP0499.The modeled gravity was interpolated from observed gravity values.
MP0499
MP0499. The following values were computed from the NAD 83(2011) position.
MP0499
MP0499;                    North         East     Units Scale Factor Converg.
MP0499;SPC WYEC     -   254,760.047   496,884.875   MT  1.00005297   +0 46 46.2
MP0499;SPC WYEC     -   835,825.25  1,630,196.46   sFT  1.00005297   +0 46 46.2
MP0499;UTM  13      - 4,637,960.882   403,270.077   MT  0.99971513   -0 46 42.7
MP0499
MP0499!             -  Elev Factor  x  Scale Factor =   Combined Factor
MP0499!SPC WYEC     -   0.99968553  x   1.00005297  =   0.99973848
MP0499!UTM  13      -   0.99968553  x   0.99971513  =   0.99940075
MP0499
MP0499_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TDG0327037960(NAD 83)
MP0499
MP0499                           SUPERSEDED SURVEY CONTROL
MP0499
MP0499  NAD 83(2007)-  41 53 15.58708(N)    106 09 57.34864(W) AD(2002.00) 0
MP0499  ELLIP H (02/10/07) 2005.673  (m)                       GP(2002.00)
MP0499  NAD 83(1993)-  41 53 15.58700(N)    106 09 57.34876(W) AD(       ) A
MP0499  ELLIP H (02/28/01) 2005.671  (m)                       GP(       ) 2 1
MP0499  NAVD 88            2018.65   (m)         6622.9    (f) LEVELING    3
MP0499  NGVD 29 (06/08/92) 2017.503  (m)         6619.09   (f) ADJUSTED    1 2
MP0499
MP0499.Superseded values are not recommended for survey control.
MP0499
MP0499.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
MP0499.See file dsdata.txt to determine how the superseded data were derived.
MP0499
MP0499_MARKER: I = METAL ROD
MP0499_SETTING: 49 = STAINLESS STEEL ROD W/O SLEEVE (10 FT.+)
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 MP0499_STAMPING: B 343 1983
 MP0499_MARK LOGO: NGS
 MP0499_PROJECTION: FLUSH
 MP0499_MAGNETIC: N = NO MAGNETIC MATERIAL
 MP0499_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
 MP0499_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
 MP0499+SATELLITE: SATELLITE OBSERVATIONS - July 25, 1999
 MP0499_ROD/PIPE-DEPTH: 4.9  meters
 MP0499
 MP0499  HISTORY     - Date     Condition        Report By
 MP0499  HISTORY     - 1983     MONUMENTED       NGS
 MP0499  HISTORY     - 1987     GOOD             USPSQD
 MP0499  HISTORY     - 19990725 GOOD             NGS
 MP0499
 MP0499                          STATION DESCRIPTION
 MP0499
 MP0499'DESCRIBED BY NATIONAL GEODETIC SURVEY 1983
 MP0499'3.1 KM (1.95 MI) EAST FROM MEDICINE BOW.
 MP0499'3.1 KM (1.95 MI) EASTERLY ALONG THE UNION PACIFIC RAILROAD FROM THE
 MP0499'STATION IN MEDICINE BOW, 62.2 METERS (204.1 FT) SOUTHWEST OF THE
 MP0499'CENTERLINE OF U.S. HIGHWAY 30 AND 287, 24.1 METERS (79.1 FT) NORTHEAST
 MP0499'OF THE NEAR RAIL, AND 1.2 METERS (3.9 FT) NORTHWEST OF MILEPOST 621.
 MP0499'NOTE=ACCESS TO THE DATUM POINT IS THROUGH A 5-INCH LOGO CAP.
 MP0499'THE MARK IS 0.3 METERS  SE FROM A WITNESS POST.
 MP0499'THE MARK IS 0.3 M ABOVE THE TRACKS.
 MP0499
 MP0499                          STATION RECOVERY (1987)
 MP0499
 MP0499'RECOVERY NOTE BY US POWER SQUADRON 1987 (LT)
 MP0499'RECOVERED IN GOOD CONDITION.
 MP0499
 MP0499                          STATION RECOVERY (1999)
 MP0499
 MP0499'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1999 (CSM)
 MP0499'RECOVERED BY NATIONAL GEODETIC SURVEY 1999.  RECOVERED IN GOOD
 MP0499'CONDITION.  NEW DESCRIPTION FOLLOWS, THE STATION IS LOCATED ABOUT 3.46
 MP0499'KM (2.15 MI) EAST OF MEDICINE BOW ABOUT 60.96 M (200.00 FT) SOUTHWEST
 MP0499'OF THE HIGHWAY ON THE NORTHWEST SIDE OF THE UNION PACIFIC RAILROAD AT
 MP0499'MILEPOST 621 ATTACHED TO A POWER POLE.  TO REACH THE STATION FROM THE
 MP0499'JUNCTIONS OF US HIGHWAY 30, 287 AND STATE HIGHWAY 487 IN MEDICINE BOW,
 MP0499'GO EAST ON COMBINED HIGHWAY 30 AND 287 FOR 3.46 KM (2.15 MI) TO THE
 MP0499'STATION ON THE RIGHT ABOUT 60.96 M (200.00 FT) SOUTHWEST OF THE
 MP0499'HIGHWAY.  THE STATION IS A PUNCH MARK ON THE TOP OF A STAINLESS STEEL
 MP0499'ROD DRIVEN TO REFUSAL, ENCASED IN A 13 CM PVC PIPE WITH AN NGS LOGO
 MP0499'CAP SURROUNDED BY CONCRETE AND ABOUT FLUSH WITH THE GROUND AND ABOUT
 MP0499'0.3 M (1.0 FT) ABOVE THE TRACKS.  LOCATED 62.8 M (206.0 FT) SOUTHWEST
 MP0499'OF THE CENTER OF THE HIGHWAY, 24.08 M (79.00 FT) NORTHEAST OF THE
 MP0499'NORTHEAST RAIL OF THE TRACKS, 1.2 M (3.9 FT) NORTHWEST OF A POWER POLE
 MP0499'WITH RAILROAD MILEPOST 621 SIGN ATTACHED AND 0.3 M (1.0 FT) SOUTHEAST
 MP0499'OF A FIBERGLASS WITNESS POST.
1        National Geodetic Survey,   Retrieval Date = DECEMBER 14, 2016
 MP0552 ***********************************************************************
 MP0552  CBN         -  This is a Cooperative Base Network Control Station.
 MP0552  DESIGNATION -  BARRETT
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MP0552  PID          -  MP0552
MP0552  STATE/COUNTY-  WY/CARBON
MP0552  COUNTRY      -  US
MP0552  USGS QUAD    -  RYAN PARK (1992)
MP0552
MP0552                         *CURRENT SURVEY CONTROL
MP0552  ______________________________________________________________________________
MP0552* NAD 83(2011) POSITION- 41 19 35.67787(N) 106 31 34.57981(W)   ADJUSTED
MP0552* NAD 83(2011) ELLIP HT-  2751.158 (meters)        (06/27/12)   ADJUSTED
MP0552* NAD 83(2011) EPOCH   -  2010.00
MP0552* NAVD 88 ORTHO HEIGHT -  2762.2   (meters)     9062.    (feet) GPS OBS
MP0552  ______________________________________________________________________________
MP0552  NAVD 88 orthometric height was determined with geoid model    GEOID93
MP0552  GEOID HEIGHT    -         -10.52 (meters)                     GEOID93
MP0552  GEOID HEIGHT    -        -10.862 (meters)                     GEOID12B
MP0552  NAD 83(2011) X  - -1,365,038.157 (meters)                     COMP
MP0552  NAD 83(2011) Y  - -4,600,544.065 (meters)                     COMP
MP0552  NAD 83(2011) Z  -  4,191,544.305 (meters)                     COMP
MP0552  LAPLACE CORR    -          7.99  (seconds)                    DEFLEC12B
MP0552
MP0552  Network accuracy estimates per FGDC Geospatial Positioning Accuracy
MP0552  Standards:
MP0552         FGDC (95% conf, cm)     Standard deviation (cm)     CorrNE
MP0552            Horiz  Ellip           SD_N   SD_E   SD_h      (unitless)
MP0552  ------------------------------------------------------------------------
MP0552  NETWORK    1.80   5.15           0.83   0.60   2.63      0.06517090
MP0552  ------------------------------------------------------------------------
MP0552  Click here for local accuracies and other accuracy information.
MP0552
MP0552
MP0552.The horizontal coordinates were established by GPS observations
MP0552.and adjusted by the National Geodetic Survey in June 2012.
MP0552
MP0552.NAD 83(2011) refers to NAD 83 coordinates where the reference frame has
MP0552.been affixed to the stable North American tectonic plate. See
MP0552.NA2011 for more information.
MP0552
MP0552.The horizontal coordinates are valid at the epoch date displayed above
MP0552.which is a decimal equivalence of Year/Month/Day.
MP0552
MP0552.The orthometric height was determined by GPS observations and a
MP0552.high-resolution geoid model.
MP0552
MP0552.Significant digits in the geoid height do not necessarily reflect accuracy.
MP0552.GEOID12B height accuracy estimate available here.
MP0552
MP0552.The X, Y, and Z were computed from the position and the ellipsoidal ht.
MP0552
MP0552.The Laplace correction was computed from DEFLEC12B derived deflections.
MP0552
MP0552.The ellipsoidal height was determined by GPS observations
MP0552.and is referenced to NAD 83.
MP0552
MP0552. The following values were computed from the NAD 83(2011) position.
```

```
MP0552
MP0552;                    North         East     Units Scale Factor Converg.
MP0552;SPC WYEC     -   192,101.736   467,562.046   MT  0.99999366   +0 31 58.7
MP0552;SPC WYEC     -   630,253.78  1,533,993.15   sFT  0.99999366   +0 31 58.7
MP0552;UTM  13      - 4,576,134.816   372,271.878   MT  0.99980078   -1 00 28.8
MP0552
MP0552!             -  Elev Factor  x  Scale Factor =   Combined Factor
MP0552!SPC WYEC     -   0.99956866  x   0.99999366  =   0.99956232
MP0552!UTM  13      -   0.99956866  x   0.99980078  =   0.99936952
MP0552
MP0552:                Primary Azimuth Mark                    Grid Az
MP0552:SPC WYEC     -  MEDICINE BOW                            077 17 59.6
MP0552:UTM  13      -  MEDICINE BOW                            078 50 27.1
MP0552
MP0552_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TCF7227176134(NAD 83)
MP0552
MP0552|----------------------------------------------------------------------|
MP0552| PID    Reference Object                    Distance      Geod. Az  |
MP0552|                                                          dddmmss.s |
MP0552| MP0546 MEDICINE BOW                      APPROX.17.9 KM 0774958.3 |
MP0552| CP5324 BARRETT LOT RM 1                    9.285 METERS 14330     |
MP0552| CP5325 BARRETT LOT RM 2                    9.369 METERS 25058     |
MP0552|----------------------------------------------------------------------|
MP0552
MP0552                          SUPERSEDED SURVEY CONTROL
MP0552
MP0552  NAD 83(2007)-  41 19 35.67766(N)    106 31 34.58063(W) AD(2002.00) 0
MP0552  ELLIP H (02/10/07) 2751.178  (m)                       GP(2002.00)
MP0552  ELLIP H (09/07/01) 2751.186  (m)                       GP(       ) 4 1
MP0552  NAD 83(1993)-  41 19 35.67695(N)    106 31 34.58050(W) AD(       ) B
MP0552  ELLIP H (10/19/94) 2751.229  (m)                       GP(       ) 4 1
MP0552  NAD 83(1986)-  41 19 35.67052(N)    106 31 34.57480(W) AD(       ) 3
MP0552  NAD 27      -  41 19 35.79300(N)    106 31 32.49000(W) AD(       ) 3
MP0552  NGVD 29 (07/19/86) 2766.     (m)         9075.     (f) VERT ANG
MP0552
MP0552.Superseded values are not recommended for survey control.
MP0552
MP0552.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
MP0552.See file dsdata.txt to determine how the superseded data were derived.
MP0552
MP0552_MARKER: DS = TRIANGULATION STATION DISK
MP0552_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
MP0552_STAMPING: BARRETT 1948
MP0552_MARK LOGO: CGS
MP0552_MAGNETIC: N = NO MAGNETIC MATERIAL
MP0552_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
MP0552+STABILITY: SURFACE MOTION
MP0552_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
MP0552+SATELLITE: SATELLITE OBSERVATIONS - August 12, 1993
MP0552
MP0552  HISTORY     - Date     Condition        Report By
MP0552  HISTORY     - 1948     MONUMENTED       CGS
MP0552  HISTORY     - 1959     GOOD             USGS
MP0552  HISTORY     - 19930812 GOOD             NGS
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MP0552
MP0552                          STATION DESCRIPTION
MP0552
MP0552'DESCRIBED BY COAST AND GEODETIC SURVEY 1948 (DHK)
MP0552'THE STATION IS LOCATED ABOUT 17.0 MILES AIRLINE SOUTHEAST OF
MP0552'SARATOGA, ON A HIGH, HEAVILY TIMBERED, NORTHWEST-SOUTHEAST
MP0552'RIDGE, WHICH IS LOCALLY KNOWN AS BARRETT RIDGE.  THE STATION
MP0552'IS BELIEVED TO BE NEAR THE HIGHEST POINT, IN THE CENTER OF THE
MP0552'BASE OF THE BARRETT RIDGE FOREST SERVICE LOOKOUT TOWER,
MP0552'APPROXIMATELY 25 YARDS SOUTHEAST OF THE HIGHEST POINT, 19
MP0552'FEET WEST-NORTHWEST OF A 4X4 WITNESS POST, PROJECTS 3 INCHES,
MP0552'STAMPED, BARRETT 1948.
MP0552'
MP0552'REFERENCE MARK NO. 1, IS APPROXIMATELY 3 FEET LOWER THAN
MP0552'THE STATION, 18 FEET SOUTH OF A 4X4 WITNESS POST, PROJECTS
MP0552'3 INCHES, STAMPED, BARRETT NO 1 1948.
MP0552'
MP0552'REFERENCE MARK NO. 2, IS APPROXIMATELY 2 FEET LOWER THAN THE
MP0552'STATION, ON THE WEST SLOPE, PROJECTS 4 INCHES, STAMPED, BARRETT
MP0552'NO 2 1948.
MP0552'
MP0552'TRIANGULATION STATION MEDICINE BOW 1948 IS THE AZIMUTH.
MP0552'
MP0552'TO REACH FROM SARATOGA.  GO SOUTH ON STATE HIGHWAY 230 FOR
MP0552'8.4 MILES TO THE JUNCTION OF STATE HIGHWAY 130.  TURN LEFT (EAST)
MP0552'AND FOLLOW STATE HIGHWAY 130 FOR 12.1 MILES TO THE BRUSH CREEK
MP0552'RANGER STATION ON LEFT.  CONTINUE STRAIGHT AHEAD FOR 1.85
MP0552'MILES TO A DIRT ROAD SHARP RIGHT.  TURN RIGHT ON DIRT ROAD
MP0552'FOR 0.25 MILE TO A FORK.  TAKE THE EXTREME LEFT FORK FOR
MP0552'0.1 MILE TO A FORK.  TAKE THE RIGHT FORK MAIN TRAVELED ROAD
MP0552'(PASSING CABINS) FOR 0.35 TO A FORK.  TAKE THE LEFT FORK UP
MP0552'HILL AND CONTINUE FOR 0.95 MILE TO A FORK AND SIGN BARRETT
MP0552'RIDGE LOOKOUT.  TAKE THE RIGHT FORK UP HILL FOR 0.5 MILE TO THE
MP0552'HIGHEST POINT AND STATION AS DESCRIBED.  A DRIVE
MP0552'STATION.
MP0552
MP0552                          STATION RECOVERY (1959)
MP0552
MP0552'RECOVERY NOTE BY US GEOLOGICAL SURVEY 1959
MP0552'RECOVERED.
MP0552'
MP0552'STATION MARK--STANDARD USC AND GS DISK, STAMPED ---BARRETT 1948---.
MP0552
MP0552                          STATION RECOVERY (1993)
MP0552
MP0552'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1993 (GRH)
MP0552'STATION MARK AND REFERENCE MARKS 1 AND 2 WERE RECOVERED IN GOOD
MP0552'CONDITION.  NO AZIMUTH MARK FOR THIS STATION.  THE LOOKOUT TOWER HAS
MP0552'BEEN REMOVED, LEAVING ONLY THE CONCRETE PAD FOR THE LADDER. STATION IS
MP0552'LOCATED ABOUT 29 KM (18.00 MI) SOUTHEAST OF SARATOGA, 32 KM (19.90 MI)
MP0552'WEST OF CENTENNIAL, 2 KM (1.25 MI) NORTHWEST OF THE RYAN PARK
MP0552'COMMUNITY, IN THE MEDICINE BOW NATIONAL FOREST, ON BARRETT RIDGE, ON A
MP0552'MOSTLY CLEAR KNOLL, IN THE NORTHWEST 1/4 OF SECTION 29, T 16 N, R 81
MP0552'W.  OWNERSHIP--US DEPARTMENT OF AGRICULTURE. TO REACH FROM THE
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 MP0552'CENTENNIAL SCHOOL IN CENTENNIAL, GO WEST ON STATE HIGHWAY 130 FOR
 MP0552'18.93 KM (11.75 MI) TO THE LIBBY FLATS OBSERVATION POINT ON THE LEFT.
 MP0552'CONTINUE AHEAD FOR 21.75 KM (13.50 MI) TO THE ENTRANCE TO THE RYAN
 MP0552'PARK CAMPGROUND ON THE LEFT.  CONTINUE AHEAD FOR 1.02 KM (0.65 MI) TO
 MP0552'A DIRT ROAD LEFT.  TURN LEFT, SOUTHWEST, ON RYAN PARK ROAD FOR 0.38 KM
 MP0552'(0.25 MI) TO A FORK.  BEAR LEFT, SOUTHEAST, ON GRADED ROAD FOR 0.23 KM
 MP0552'(0.15 MI) TO A FORK.  BEAR RIGHT, SOUTHERLY, ON GRADED ROAD FOR 0.26
 MP0552'KM (0.15 MI) TO A ROAD RIGHT.  TURN RIGHT, WEST, ON FOREST SERVICE
 MP0552'ROAD 210 FOR 1.07 KM (0.65 MI) TO A CATTLE GUARD.  CONTINUE AHEAD,
 MP0552'WEST, ON GRADED ROAD FOR 0.82 KM (0.50 MI) TO A FORK.  BEAR RIGHT,
 MP0552'NORTHWEST, UPHILL, ON ROAD 232 FOR 0.31 KM (0.20 MI) TO A TRACK ROAD
 MP0552'RIGHT AT TOP OF GRADE.  TURN RIGHT, NORTH, ON ROAD 232 1A FOR 0.67 KM
 MP0552'(0.40 MI) TO TOP OF RISE AND STATION ON THE LEFT. STATION MARK IS A
 MP0552'DISK SET IN THE TOP OF A 30-CM SQUARE CONCRETE POST PROJECTING 5 CM
 MP0552'ABOVE GROUND.  IT IS ON THE SOUTHEAST END OF THE SHORT
 MP0552'NORTHWEST-SOUTHEAST ROCKY KNOLL THAT IS COVERED WITH LOW ASPEN AND
 MP0552'PINES.  IT IS 13.9 M (45.6 FT) NORTH OF, AND 1 M (3.3 FT) HIGHER THAN
 MP0552'THE ROAD CENTER, 1.5 M (4.9 FT) NORTH OF THE SMALL CONCRETE PAD, AND
 MP0552'1.1 M (3.6 FT) SOUTH OF A FIBERGLASS WITNESS POST. DESCRIBED BY
 MP0552'G.R.HEID
1        National Geodetic Survey,   Retrieval Date = DECEMBER 14, 2016
 MP0471 ***********************************************************************
 MP0471  DESIGNATION -  C 319 RESET
 MP0471  PID         -  MP0471
 MP0471  STATE/COUNTY-  WY/CARBON
 MP0471  COUNTRY     -  US
 MP0471  USGS QUAD   -  RAWLINS (1981)
 MP0471
 MP0471                        *CURRENT SURVEY CONTROL
 MP0471  ______________________________________________________________________
 MP0471* NAD 83(1986) POSITION- 41 46 51.     (N) 107 10 19.     (W)   SCALED
 MP0471* NAVD 88 ORTHO HEIGHT -  2023.903 (meters)     6640.09  (feet) ADJUSTED
 MP0471  ______________________________________________________________________
 MP0471  GEOID HEIGHT    -        -13.550 (meters)                     GEOID12B
 MP0471  DYNAMIC HEIGHT  -       2022.207 (meters)     6634.52  (feet) COMP
 MP0471  MODELED GRAVITY -    979,712.1   (mgal)                       NAVD 88
 MP0471
 MP0471  VERT ORDER      -  FIRST     CLASS II
 MP0471
 MP0471.The horizontal coordinates were scaled from a topographic map and have
 MP0471.an estimated accuracy of +/- 6 seconds.
 MP0471.
 MP0471.The orthometric height was determined by differential leveling and
 MP0471.adjusted by the NATIONAL GEODETIC SURVEY
 MP0471.in June 1991.
 MP0471
 MP0471.Significant digits in the geoid height do not necessarily reflect accuracy.
 MP0471.GEOID12B height accuracy estimate available here.
 MP0471
 MP0471.The dynamic height is computed by dividing the NAVD 88
 MP0471.geopotential number by the normal gravity value computed on the
 MP0471.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 MP0471.degrees latitude (g = 980.6199 gals.).
 MP0471
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 MP0471.The modeled gravity was interpolated from observed gravity values.
 MP0471
 MP0471;                     North         East     Units  Estimated Accuracy
 MP0471;SPC WYEC     -   242,250.      413,420.      MT  (+/- 180 meters Scaled)
 MP0471
 MP0471_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TCG195277(NAD 83)
 MP0471
 MP0471                           SUPERSEDED SURVEY CONTROL
 MP0471
 MP0471  NGVD 29 (06/08/92) 2022.766  (m)         6636.36   (f) ADJUSTED    1 2
 MP0471
 MP0471.Superseded values are not recommended for survey control.
 MP0471
 MP0471.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 MP0471.See file dsdata.txt to determine how the superseded data were derived.
 MP0471
 MP0471_MARKER: DB = BENCH MARK DISK
 MP0471_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
 MP0471_STAMPING: C 319 RESET 1979
 MP0471_MARK LOGO: NGS
 MP0471_PROJECTION: PROJECTING 10 CENTIMETERS
 MP0471_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
 MP0471+STABILITY: SURFACE MOTION
 MP0471_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
 MP0471+SATELLITE: SATELLITE OBSERVATIONS - June 16, 2008
 MP0471
 MP0471  HISTORY     - Date     Condition        Report By
 MP0471  HISTORY     - 1979     MONUMENTED       NGS
 MP0471  HISTORY     - 1983     GOOD             NGS
 MP0471  HISTORY     - 20030624 GOOD             NGS
 MP0471  HISTORY     - 20080616 GOOD             NGS
 MP0471
 MP0471                           STATION DESCRIPTION
 MP0471
 MP0471'DESCRIBED BY NATIONAL GEODETIC SURVEY 1983
 MP0471'3.6 MI EAST FROM RAWLINS.
 MP0471'3.6 MILES EAST ALONG THE UNION PACIFIC RAILWAY FROM THE STATION AT
 MP0471'RAWLINS, 209 FEET NORTH OF THE NORTH RAIL OF THE NORTH TRACK, 156 FEET
 MP0471'NORTHWEST OF A POWER LINE POLE WITH A TRANSFORMER ATTACHED, 43 FEET
 MP0471'SOUTH OF THE CENTERLINE OF OLD US HIGHWAY 30, 12 FEET EAST-SOUTHEAST
 MP0471'OF A SAWED OFF POWER LINE POLE PROJECTING ABOUT 5 FEET.
 MP0471'THE MARK IS 2.0 FT  E FROM A WITNESS POST.
 MP0471'THE MARK IS 3 FT BELOW OLD US HIGHWAY 30.
 MP0471
 MP0471                           STATION RECOVERY (2003)
 MP0471
 MP0471'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 2003 (DW)
 MP0471'OLD US 30 IS NOW WY 76.
 MP0471
 MP0471                           STATION RECOVERY (2008)
 MP0471
 MP0471'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 2008 (DW)
 MP0471'AT WY87 MILEPOST 217.
1        National Geodetic Survey,   Retrieval Date = DECEMBER 14, 2016
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MP0225 ***********************************************************************
MP0225  DESIGNATION -  D 324
MP0225  PID         -  MP0225
MP0225  STATE/COUNTY-  WY/CARBON
MP0225  COUNTRY     -  US
MP0225  USGS QUAD   -  WALCOTT (1982)
MP0225
MP0225                        *CURRENT SURVEY CONTROL
MP0225  ______________________________________________________________________
MP0225* NAD 83(1986) POSITION- 41 45 25.9    (N) 106 49 33.9    (W)   HD_HELD2
MP0225* NAVD 88 ORTHO HEIGHT -  2028.175 (meters)     6654.10  (feet) ADJUSTED
MP0225  ______________________________________________________________________
MP0225  GEOID HEIGHT    -        -13.616 (meters)                     GEOID12B
MP0225  DYNAMIC HEIGHT  -       2026.417 (meters)     6648.34  (feet) COMP
MP0225  MODELED GRAVITY -    979,683.5   (mgal)                       NAVD 88
MP0225
MP0225  VERT ORDER      -  FIRST     CLASS II
MP0225
MP0225.The horizontal coordinates were established by autonomous hand held GPS
MP0225.observations and have an estimated accuracy of +/- 10 meters.
MP0225.
MP0225.The orthometric height was determined by differential leveling and
MP0225.adjusted by the NATIONAL GEODETIC SURVEY
MP0225.in June 1991.
MP0225
MP0225.Significant digits in the geoid height do not necessarily reflect accuracy.
MP0225.GEOID12B height accuracy estimate available here.
MP0225
MP0225.Photographs are available for this station.
MP0225
MP0225.The dynamic height is computed by dividing the NAVD 88
MP0225.geopotential number by the normal gravity value computed on the
MP0225.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
MP0225.degrees latitude (g = 980.6199 gals.).
MP0225
MP0225.The modeled gravity was interpolated from observed gravity values.
MP0225
MP0225;                    North         East     Units  Estimated Accuracy
MP0225;SPC WYEC     -   239,735.      442,183.      MT  (+/- 10 meters HH2 GPS)
MP0225
MP0225_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TCG4819124429(NAD 83)
MP0225
MP0225                           SUPERSEDED SURVEY CONTROL
MP0225
MP0225  NGVD 29 (??/??/92) 2026.992  (m)         6650.22   (f) SUPERSEDED  1 2
MP0225  NGVD 29 (06/08/92) 2026.984  (m)         6650.20   (f) ADJUSTED    1 2
MP0225
MP0225.Superseded values are not recommended for survey control.
MP0225
MP0225.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
MP0225.See file dsdata.txt to determine how the superseded data were derived.
MP0225
MP0225_MARKER: DB = BENCH MARK DISK
MP0225_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
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 MP0225_STAMPING: D 324 1947
 MP0225_MARK LOGO: CGS
 MP0225_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
 MP0225+STABILITY: SURFACE MOTION
 MP0225_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
 MP0225+SATELLITE: SATELLITE OBSERVATIONS - May 24, 2009
 MP0225
 MP0225  HISTORY     - Date     Condition        Report By
 MP0225  HISTORY     - 1947     MONUMENTED       CGS
 MP0225  HISTORY     - 1983     GOOD             NGS
 MP0225  HISTORY     - 20090524 GOOD             GEOCAC
 MP0225
 MP0225                          STATION DESCRIPTION
 MP0225
 MP0225'DESCRIBED BY COAST AND GEODETIC SURVEY 1947
 MP0225'1.1 MI SE FROM WALCOTT.
 MP0225'1.1 MILES SOUTHEAST ALONG THE SARATOGA AND ENCAMPMENT VALLEY RAILROAD
 MP0225'FROM THE STATION AT WALCOTT, AT THE CROSSING OF U. S. HIGHWAY 30,
 MP0225'171.0 FEET NORTHWEST OF THE CENTER LINE OF THE HIGHWAY, 65.0 FEET
 MP0225'SOUTHWEST OF THE SOUTHWEST RAIL OF THE TRACK AND 6.0 FEET HIGHER, 28.0
 MP0225'FEET SOUTHEAST OF THE FIRST TELEPHONE POLE SOUTHWEST OF THE TRACK, 3.0
 MP0225'FEET NORTHWEST OF A REFERENCE POST, SET IN THE TOP OF A CONCRETE POST
 MP0225'AND PROJECTS 0.4 FOOT ABOVE THE GROUND.
 MP0225
 MP0225                          STATION RECOVERY (1983)
 MP0225
 MP0225'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1983
 MP0225'RECOVERED IN GOOD CONDITION.
 MP0225
 MP0225                          STATION RECOVERY (2009)
 MP0225
 MP0225'RECOVERY NOTE BY GEOCACHING 2009 (MEL)
 MP0225'THE MARK IS EIGHT FEET NORTH OF A POWER POLE GUY WIRE.
1        National Geodetic Survey,   Retrieval Date = DECEMBER 14, 2016
 MP0470 ***********************************************************************
 MP0470  DESIGNATION -  S 341
 MP0470  PID         -  MP0470
 MP0470  STATE/COUNTY-  WY/CARBON
 MP0470  COUNTRY     -  US
 MP0470  USGS QUAD   -  RAWLINS (1981)
 MP0470
 MP0470                         *CURRENT SURVEY CONTROL
 MP0470 ______________________________________________________________________
 MP0470* NAD 83(1986) POSITION- 41 47 11.     (N) 107 11 58.     (W)   SCALED
 MP0470* NAVD 88 ORTHO HEIGHT -  2041.860 (meters)     6699.00  (feet) ADJUSTED
 MP0470 ______________________________________________________________________
 MP0470  GEOID HEIGHT    -        -13.576 (meters)                     GEOID12B
 MP0470  DYNAMIC HEIGHT  -       2040.140 (meters)     6693.36  (feet) COMP
 MP0470  MODELED GRAVITY -    979,707.4   (mgal)                       NAVD 88
 MP0470
 MP0470  VERT ORDER      -  FIRST     CLASS II
 MP0470
 MP0470.The horizontal coordinates were scaled from a topographic map and have
 MP0470.an estimated accuracy of +/- 6 seconds.
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 MP0470.
 MP0470.The orthometric height was determined by differential leveling and
 MP0470.adjusted by the NATIONAL GEODETIC SURVEY
 MP0470.in June 1991.
 MP0470
 MP0470.Significant digits in the geoid height do not necessarily reflect accuracy.
 MP0470.GEOID12B height accuracy estimate available here.
 MP0470
 MP0470.The dynamic height is computed by dividing the NAVD 88
 MP0470.geopotential number by the normal gravity value computed on the
 MP0470.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 MP0470.degrees latitude (g = 980.6199 gals.).
 MP0470
 MP0470.The modeled gravity was interpolated from observed gravity values.
 MP0470
 MP0470;                     North         East     Units  Estimated Accuracy
 MP0470;SPC WYEC     -   242,860.      411,130.      MT  (+/- 180 meters Scaled)
 MP0470
 MP0470_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TCG172283(NAD 83)
 MP0470
 MP0470                           SUPERSEDED SURVEY CONTROL
 MP0470
 MP0470  NGVD 29 (06/08/92) 2040.715  (m)         6695.25   (f) ADJUSTED    1 2
 MP0470
 MP0470.Superseded values are not recommended for survey control.
 MP0470
 MP0470.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 MP0470.See file dsdata.txt to determine how the superseded data were derived.
 MP0470
 MP0470_MARKER: I = METAL ROD
 MP0470_SETTING: 49 = STAINLESS STEEL ROD W/O SLEEVE (10 FT.+)
 MP0470_STAMPING: S 341 1983
 MP0470_MARK LOGO: NGS
 MP0470_PROJECTION: FLUSH
 MP0470_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
 MP0470_ROD/PIPE-DEPTH: 3.1  meters
 MP0470
 MP0470  HISTORY     - Date     Condition        Report By
 MP0470  HISTORY     - 1983     MONUMENTED       NGS
 MP0470
 MP0470                           STATION DESCRIPTION
 MP0470
 MP0470'DESCRIBED BY NATIONAL GEODETIC SURVEY 1983
 MP0470'3.5 KM (2.15 MI) EAST FROM RAWLINS.
 MP0470'3.5 KM (2.15 MI) EASTERLY ALONG THE UNION PACIFIC RAILROAD FROM THE
 MP0470'STATION IN RAWLINS, 0.4 KM (0.25 MI) EAST OF THE INTERSTATE HIGHWAY 80
 MP0470'RAILROAD OVERPASS, 0.3 KM (0.2 MI) EAST OF MILEPOST 681, 26.9 METERS
 MP0470'(88.3 FT) NORTH OF THE NEAR RAIL, 20.7 METERS (67.9 FT) NORTH OF A
 MP0470'SIGNAL BOX, AND 1.4 METERS (4.6 FT) EAST OF A UTILITY POLE.
 MP0470'NOTE=ACCESS TO THE DATUM POINT IS THROUGH A 5-INCH LOGO CAP.
 MP0470'THE MARK IS 0.3 METERS  W FROM A WITNESS POST.
 MP0470'THE MARK IS 0.3 M ABOVE THE TRACK.
1        National Geodetic Survey,   Retrieval Date = DECEMBER 14, 2016
 MP0232 ***********************************************************************
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MP0232  DESIGNATION -  SINCLAIR
MP0232  PID         -  MP0232
MP0232  STATE/COUNTY-  WY/CARBON
MP0232  COUNTRY     -  US
MP0232  USGS QUAD   -  SINCLAIR (1981)
MP0232
MP0232                        *CURRENT SURVEY CONTROL
MP0232  ______________________________________________________________________
MP0232* NAD 83(1986) POSITION- 41 48 07.     (N) 107 03 38.     (W)   SCALED
MP0232* NAVD 88 ORTHO HEIGHT -  2000.386 (meters)     6562.93  (feet) ADJUSTED
MP0232  ______________________________________________________________________
MP0232  GEOID HEIGHT    -        -13.607 (meters)                     GEOID12B
MP0232  DYNAMIC HEIGHT  -       1998.716 (meters)     6557.45  (feet) COMP
MP0232  MODELED GRAVITY -    979,716.5   (mgal)                       NAVD 88
MP0232
MP0232  VERT ORDER      -  FIRST     CLASS II
MP0232
MP0232.The horizontal coordinates were scaled from a topographic map and have
MP0232.an estimated accuracy of +/- 6 seconds.
MP0232.
MP0232.The orthometric height was determined by differential leveling and
MP0232.adjusted by the NATIONAL GEODETIC SURVEY
MP0232.in June 1991.
MP0232
MP0232.Significant digits in the geoid height do not necessarily reflect accuracy.
MP0232.GEOID12B height accuracy estimate available here.
MP0232
MP0232.The dynamic height is computed by dividing the NAVD 88
MP0232.geopotential number by the normal gravity value computed on the
MP0232.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
MP0232.degrees latitude (g = 980.6199 gals.).
MP0232
MP0232.The modeled gravity was interpolated from observed gravity values.
MP0232
MP0232;                   North         East     Units  Estimated Accuracy
MP0232;SPC WYEC     -   244,620.      422,670.      MT  (+/- 180 meters Scaled)
MP0232
MP0232_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TCG288298(NAD 83)
MP0232
MP0232                           SUPERSEDED SURVEY CONTROL
MP0232
MP0232  NGVD 29 (??/??/92) 1999.269  (m)         6559.27   (f) ADJ UNCH    1 2
MP0232
MP0232.Superseded values are not recommended for survey control.
MP0232
MP0232.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
MP0232.See file dsdata.txt to determine how the superseded data were derived.
MP0232
MP0232_MARKER: DB = BENCH MARK DISK
MP0232_SETTING: 36 = SET IN A MASSIVE STRUCTURE
MP0232_SP_SET: FOUNDATION
MP0232_STAMPING: SINCLAIR 1944
MP0232_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
MP0232
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 MP0232  HISTORY      - Date     Condition        Report By
 MP0232  HISTORY      - 1944     MONUMENTED       CGS
 MP0232  HISTORY      - 1947     GOOD             CGS
 MP0232  HISTORY      - 1983     MARK NOT FOUND   NGS
 MP0232
 MP0232                          STATION DESCRIPTION
 MP0232
 MP0232'DESCRIBED BY COAST AND GEODETIC SURVEY 1947
 MP0232'3.7 MI NE FROM PARCO (SINCLAIR).
 MP0232'3.7 MILES NORTHEAST OF PARCO (SINCLAIR) AT THE SINCLAIR AIRPORT,
 MP0232'APPROXIMATELY 74 YARDS NORTH OF THE ADMINISTRATION BUILDING, 125.0
 MP0232'FEET EAST OF THE CENTER LINE OF THE MAIN ENTRANCE TO THE AIRPORT, SET
 MP0232'IN A DRILL HOLE IN THE CENTER OF THE TOP OF THE CONCRETE FOUNDATION OF
 MP0232'THE BEACON TOWER AND 0.2 FOOT ABOVE THE SURFACE OF THE GROUND.
 MP0232
 MP0232                          STATION RECOVERY (1983)
 MP0232
 MP0232'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1983
 MP0232'MARK NOT FOUND.
1        National Geodetic Survey,   Retrieval Date = DECEMBER 14, 2016
 MP0197 ***********************************************************************
 MP0197  DESIGNATION -  U 319
 MP0197  PID         -  MP0197
 MP0197  STATE/COUNTY-  WY/CARBON
 MP0197  COUNTRY     -  US
 MP0197  USGS QUAD   -  WALCOTT (1982)
 MP0197
 MP0197                         *CURRENT SURVEY CONTROL
 MP0197  ______________________________________________________________________
 MP0197* NAD 83(1986) POSITION- 41 46 06.     (N) 106 49 34.     (W)   SCALED
 MP0197* NAVD 88 ORTHO HEIGHT -  2025.806 (meters)     6646.33  (feet) ADJUSTED
 MP0197  ______________________________________________________________________
 MP0197  GEOID HEIGHT    -        -13.664 (meters)                     GEOID12B
 MP0197  DYNAMIC HEIGHT  -       2024.041 (meters)     6640.54  (feet) COMP
 MP0197  MODELED GRAVITY -    979,679.9   (mgal)                       NAVD 88
 MP0197
 MP0197  VERT ORDER      -  FIRST     CLASS II
 MP0197
 MP0197.The horizontal coordinates were scaled from a topographic map and have
 MP0197.an estimated accuracy of +/- 6 seconds.
 MP0197.
 MP0197.The orthometric height was determined by differential leveling and
 MP0197.adjusted by the NATIONAL GEODETIC SURVEY
 MP0197.in June 1991.
 MP0197
 MP0197.Significant digits in the geoid height do not necessarily reflect accuracy.
 MP0197.GEOID12B height accuracy estimate available here.
 MP0197
 MP0197.The dynamic height is computed by dividing the NAVD 88
 MP0197.geopotential number by the normal gravity value computed on the
 MP0197.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
 MP0197.degrees latitude (g = 980.6199 gals.).
 MP0197
 MP0197.The modeled gravity was interpolated from observed gravity values.
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 MP0197
 MP0197;                     North         East     Units  Estimated Accuracy
 MP0197;SPC WYEC     -   240,970.      442,170.      MT  (+/- 180 meters Scaled)
 MP0197
 MP0197_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TCG482256(NAD 83)
 MP0197
 MP0197                            SUPERSEDED SURVEY CONTROL
 MP0197
 MP0197  NGVD 29 (??/??/92) 2024.604  (m)         6642.39   (f) SUPERSEDED  1 2
 MP0197  NGVD 29 (06/08/92) 2024.604  (m)         6642.39   (f) ADJUSTED    1 2
 MP0197
 MP0197.Superseded values are not recommended for survey control.
 MP0197
 MP0197.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
 MP0197.See file dsdata.txt to determine how the superseded data were derived.
 MP0197
 MP0197_MARKER: DB = BENCH MARK DISK
 MP0197_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT
 MP0197_STAMPING: U 319 1947
 MP0197_MARK LOGO: CGS
 MP0197_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
 MP0197+STABILITY: SURFACE MOTION
 MP0197
 MP0197  HISTORY     - Date     Condition        Report By
 MP0197  HISTORY     - 1947     MONUMENTED       CGS
 MP0197  HISTORY     - 1983     GOOD             NGS
 MP0197
 MP0197                            STATION DESCRIPTION
 MP0197
 MP0197'DESCRIBED BY COAST AND GEODETIC SURVEY 1947
 MP0197'1.1 MI E FROM WALCOTT.
 MP0197'1.1 MILES EAST ALONG THE UNION PACIFIC RAILWAY FROM THE STATION AT
 MP0197'WALCOTT, 11 POLES EAST OF MILEPOST 661, 336.5 FEET SOUTHWEST OF A
 MP0197'FENCE CORNER, 272.0 FEET WEST OF RAILWAY SIGNAL 6607, 194.4 FEET
 MP0197'NORTHWEST OF THE NORTHWEST RAIL OF THE NORTHWEST TRACK, 2.5 FEET
 MP0197'NORTHEAST OF A REFERENCE POST, 2.0 FEET SOUTHEAST OF A FENCE, SET IN
 MP0197'THE TOP OF A CONCRETE POST AND PROJECTS 0.4 FOOT ABOVE THE GROUND.
 MP0197
 MP0197                            STATION RECOVERY (1983)
 MP0197
 MP0197'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1983
 MP0197'RECOVERED IN GOOD CONDITION EXCEPT ADD 0.5 KM (0.3 MI) EAST OF
 MP0197'MILEPOST 661.  DELETE 11 POLES EAST OF MILEPOST 661.
1        National Geodetic Survey,   Retrieval Date = DECEMBER 14, 2016
 MP0478 ***********************************************************************
 MP0478  DESIGNATION -  X 341
 MP0478  PID         -  MP0478
 MP0478  STATE/COUNTY-  WY/CARBON
 MP0478  COUNTRY     -  US
 MP0478  USGS QUAD   -  WALCOTT (1982)
 MP0478
 MP0478                           *CURRENT SURVEY CONTROL
 MP0478  ______________________________________________________________________
 MP0478* NAD 83(1986) POSITION- 41 45 36.7    (N) 106 50 42.5    (W)   HD_HELD2
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MP0478* NAVD 88 ORTHO HEIGHT -  2018.319 (meters)     6621.77  (feet) ADJUSTED
MP0478  ____________________________________________________________________
MP0478  GEOID HEIGHT    -        -13.612 (meters)                     GEOID12B
MP0478  DYNAMIC HEIGHT  -       2016.569 (meters)     6616.03  (feet) COMP
MP0478  MODELED GRAVITY -    979,683.8   (mgal)                       NAVD 88
MP0478
MP0478  VERT ORDER      -  FIRST     CLASS II
MP0478
MP0478.The horizontal coordinates were established by autonomous hand held GPS
MP0478.observations and have an estimated accuracy of +/- 10 meters.
MP0478.
MP0478.The orthometric height was determined by differential leveling and
MP0478.adjusted by the NATIONAL GEODETIC SURVEY
MP0478.in June 1991.
MP0478
MP0478.Significant digits in the geoid height do not necessarily reflect accuracy.
MP0478.GEOID12B height accuracy estimate available here.
MP0478
MP0478.Photographs are available for this station.
MP0478
MP0478.The dynamic height is computed by dividing the NAVD 88
MP0478.geopotential number by the normal gravity value computed on the
MP0478.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
MP0478.degrees latitude (g = 980.6199 gals.).
MP0478
MP0478.The modeled gravity was interpolated from observed gravity values.
MP0478
MP0478;                     North         East     Units  Estimated Accuracy
MP0478;SPC WYEC     -   240,059.      440,596.      MT  (+/- 10 meters HH2 GPS)
MP0478
MP0478_U.S. NATIONAL GRID SPATIAL ADDRESS: 13TCG4661424796(NAD 83)
MP0478
MP0478                           SUPERSEDED SURVEY CONTROL
MP0478
MP0478  NGVD 29 (06/08/92) 2017.128  (m)         6617.86   (f) ADJUSTED    1 2
MP0478
MP0478.Superseded values are not recommended for survey control.
MP0478
MP0478.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
MP0478.See file dsdata.txt to determine how the superseded data were derived.
MP0478
MP0478_MARKER: I = METAL ROD
MP0478_SETTING: 49 = STAINLESS STEEL ROD W/O SLEEVE (10 FT.+)
MP0478_STAMPING: X 341 1983
MP0478_MARK LOGO: NGS
MP0478_PROJECTION: FLUSH
MP0478_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
MP0478_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
MP0478+SATELLITE: SATELLITE OBSERVATIONS - April 25, 2012
MP0478_ROD/PIPE-DEPTH: 10.4 meters
MP0478
MP0478  HISTORY     - Date     Condition        Report By
MP0478  HISTORY     - 1983     MONUMENTED       NGS
MP0478  HISTORY     - 20120425 GOOD             GEOCAC
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MP0478
MP0478                          STATION DESCRIPTION
MP0478
MP0478'DESCRIBED BY NATIONAL GEODETIC SURVEY 1983
MP0478'IN WALCOTT.
MP0478'IN WALCOTT, AT THE JUNCTION OF THE UNION PACIFIC RAILROAD AND A DIRT
MP0478'ROAD, 59.7 METERS (195.9 FT) SOUTHWEST OF THE SOUTHWEST CORNER OF THE
MP0478'RAILROAD STATION, 48.2 METERS (158.1FT) SOUTH OF THE NEAR RAIL,
MP0478'29.1 METERS (95.5 FT) NORTH OF A UTILITY POLE, 16.5 METERS (54.1 FT)
MP0478'EAST OF THE CENTER OF THE DIRT ROAD, AND 12.3 METERS (40.4 FT) EAST OF
MP0478'A FENCE CORNER.  NOTE=ACCESS TO THE DATUM POINT IS THROUGH A 5-INCH
MP0478'LOGO CAP.
MP0478'THE MARK IS 0.3 METERS  N FROM  A WITNESS POST AND FENCE
MP0478'THE MARK IS 1.0 M BELOW THE TRACKS.
MP0478
MP0478                          STATION RECOVERY (2012)
MP0478
MP0478'RECOVERY NOTE BY GEOCACHING 2012 (BRB)
MP0478'RECOVERED IN GOOD CONDITION.
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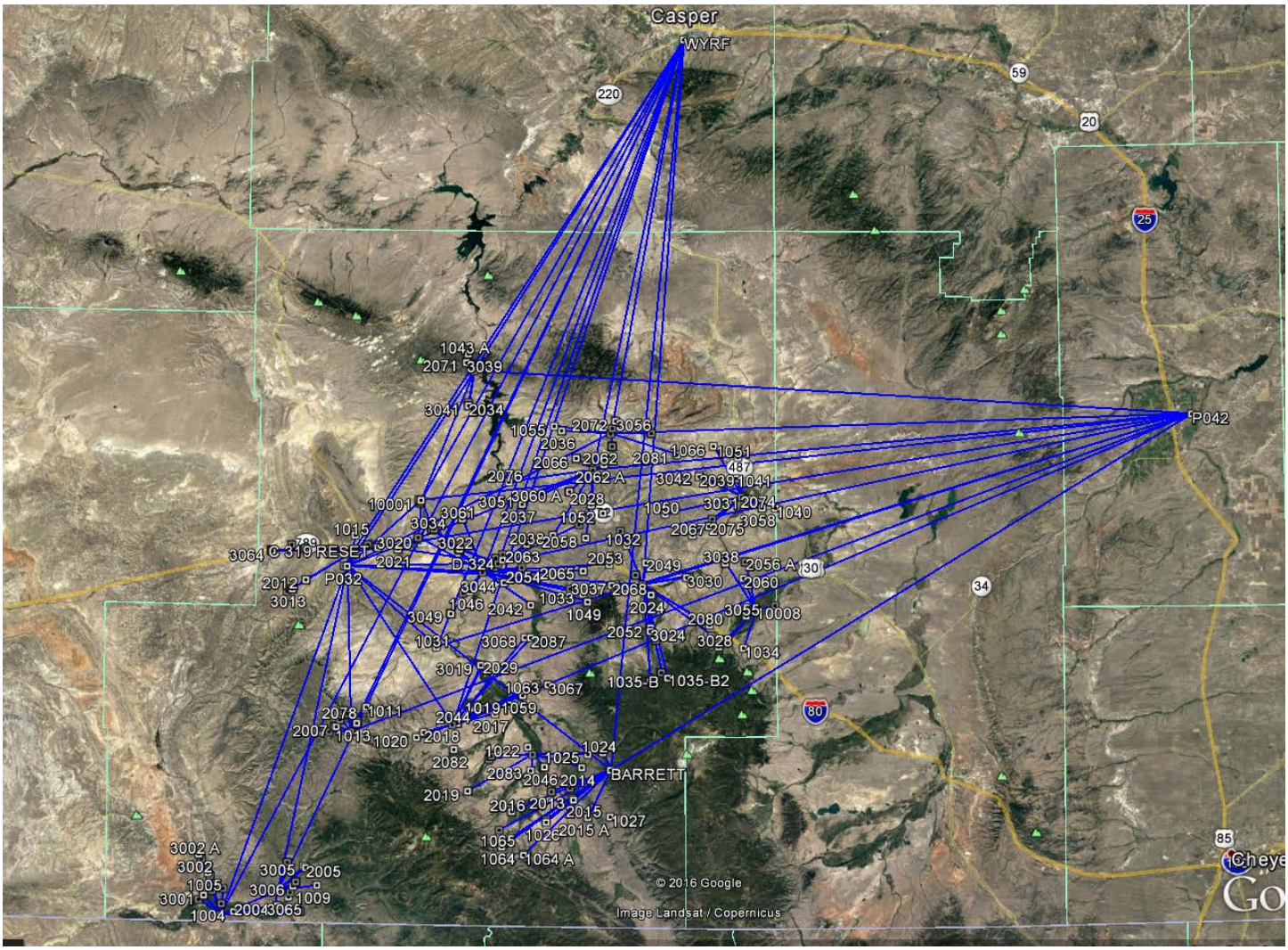
Section 5: GPS Control Diagram

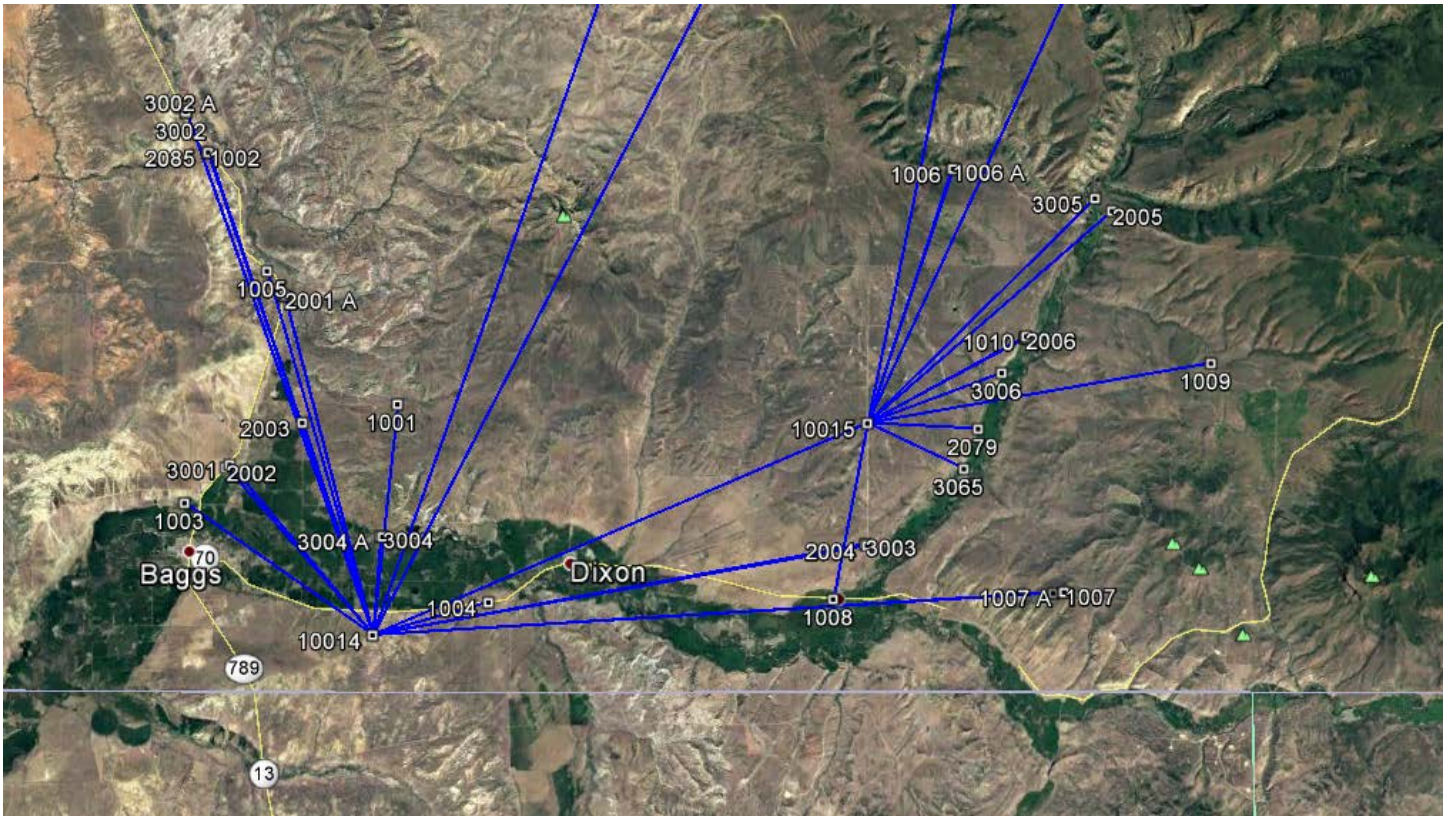
This section contains a graphical representation of the new and existing control stations used for the project.

Overview of Control Network



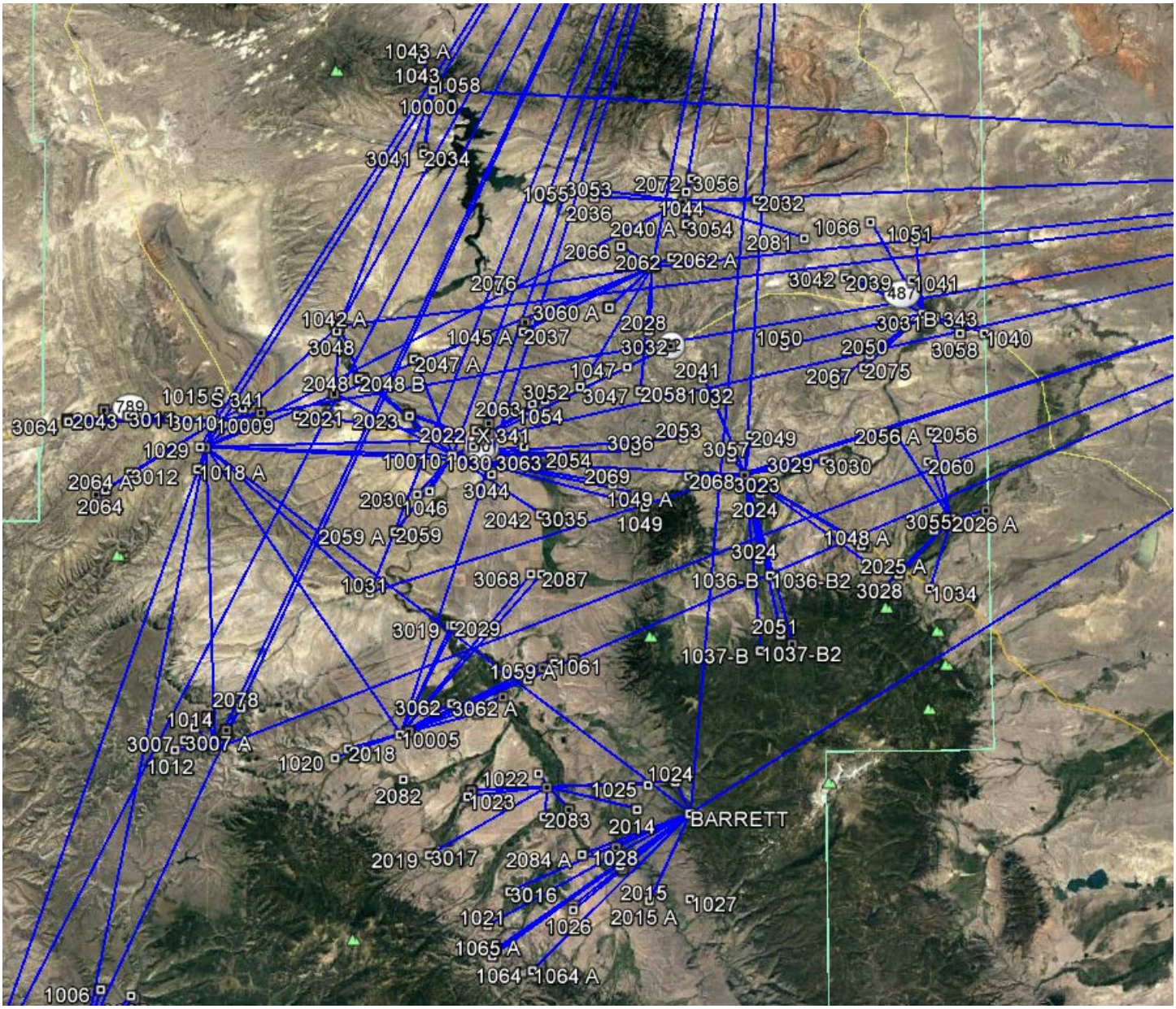
N

Not to Scale



N

Not to Scale



N

Not to Scale