



**LIDAR GROUND
CONTROL
FINAL SURVEY REPORT**



NEW ENGLAND CMGP SANDY LIDAR

USGS/NGTOC

CONTRACT NUMBER: G10PC00057
ORDER NUMBER: G13PD00796

WOOLPERT PROJECT #73667
OCTOBER 2014

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Introduction

This report contains an outline of the ground control surveys that supported the topographic lidar along the Atlantic coast of New Jersey; Contract Number G10PC00057, Order Number G13PD00796; Woolpert Number 73667.

Project Area

The project area encompasses over 2,120 square miles in southern Rhode Island, in Washington and Newport Counties, central and eastern Massachusetts in Hampshire, Worcester, Middlesex, Essex, Suffolk, Norfolk, Bristol, Plymouth, Barnstable, Nantucket, and Dukes Counties, and eastern New Hampshire in Rockingham County.

Purpose

The purpose of this survey was to establish three-dimensional coordinates for airborne sensor system calibrations and ground-truthing in support of topographic lidar data acquisition in northeastern New Jersey.

Date of Survey

All ground control field operations took place between December 12, 2013 and April 15, 2014.

Existing Project Control

Prior to the lidar mission, Woolpert staff researched suitable NGS, CORS and KeyNetGPS stations staggered throughout the project limits. CORS stations utilized were HAMP and NHUN; KeyNetGPS stations were ABL1, CP01, KP10, KP16, KP18, KPI6, KPI9, NHCK and PTCS. Woolpert crews also performed reconnaissance on existing NGS control stations 844 6493 TIDAL 10, CHAGUM, E 28, G 22, KELLY, PORTSMOUTH USCG, STACH AZ MK, W 56, WE 002, and Z 39 to compare resulting coordinates when processed with CORS and KeyNetGPS stations.

Ground Truthing and Calibration Sites

Information sheets for the newly established photogrammetric control stations can be found in Section 3 of this report. These information sheets consist of photographs, description of the point observed, and geographic coordinates. A diagram showing the ground control stations used to support this photogrammetric mapping project can be found in Section 5 of this report.

Methodology

Two types of GPS survey techniques were performed for this project: Rapid-Static GPS and Real-Time Kinematics (RTK) GPS. Conventional survey methodology was used as well in obscured areas.

Rapid Static GPS

Rapid-Static GPS surveying techniques were used for establishing primary control from which ground-truthing was performed. Rapid-Static GPS surveying, requires a minimum of two receivers to occupy stations at either end of a baseline for a set duration based on the baseline length, number of satellites, and satellite geometry. For this survey mission, field crews utilized Woolpert-owned, Trimble Navigation R8 series and Trimble Navigation 4000 series dual-frequency geodetic GPS receivers. Each observation session utilized a 10-second sync rate, lasting up to (2) two hours for longer baselines.

Real-Time Kinematics (RTK) GPS

The field crews utilized RTK GPS by setting a base station on control previously set by rapid-static methodology noted above. RTK GPS is a technique used in land surveying based on the use of carrier phase measurements of the GPS and GLONASS signals where a single reference station provides the real-time corrections, providing up to centimeter-level accuracy. This methodology allowed for efficient survey grade observations for sensor calibrations and ground-truthing. Woolpert utilized Trimble Navigation R8 dual-frequency geodetic GPS receivers on the base and rover end of the vector for this task. The survey was conducted using a 1-second epoch rate, in a fixed solution RTK mode with each GPS session lasting 90 seconds to 180 seconds each.

Datum Reference and Final Coordinates

All horizontal GPS control was based on the Universal Transverse Mercator (UTM) Zone 19, referenced to the North American Datum 1983, National Re-adjustment of 2002 (NAD83/2002). All vertical control was based on the North American Vertical Datum of 1988 (NAVD88). These final coordinates for the ground control survey are expressed in Meters and can be found in Section 2 of this report.

GPS Data Analysis and Processing

All session baselines were processed each day using *Trimble Navigation's* Trimble Business Center (TBX) version 3.1 baseline processor with the broadcast ephemeris.

Daily processing allowed immediate feedback to field crews to discover any weak links in the network and immediately schedule re-observations of the affected baselines. Once the fieldwork was complete, the processed baselines were then run through a rigorous loop closure analysis.

RTK-Rapid Static GPS Adjustment

Upon completion of all field data processing, Woolpert constrained to CORS stations *HAMP* and *NHUN*, and KeyNetGPS stations *ABL1*, *CP01*, *KP10*, *KP16*, *KP18*, *KPI6*, *KPI9*, *NHCK* and *PTCS* using *Trimble Navigation's* Trimble Business Center (TBC) version 3.1. Geoid 12A was used to model the elevations.

Conventional Survey

Where obstructions precluded Woolpert crews from using GPS conventional survey methods were utilized. All conventional survey observations were referenced to control established from Static and RTK GPS methods.

Accuracy Specifications

The final analysis of the GPS network indicates that the GPS and conventional survey observations used for ground-truthing and sensor calibration meet or exceed the accuracy criteria set forth in the statement of work.

SECTION 2: GROUND CONTROL COORDINATE LISTING

This section contains a complete listing of the Final UTM 19 Coordinates, Orthometric Heights, Latitude, Longitude, Station Descriptions and Locations for the USGS/NGTOC New England CMGP Sandy Lidar Project:

USGS/NGTOC

New England CMGP Sandy Lidar

Horizontal Datum: NAD 83 (2011), Vertical Datum: NAVD 1988
 Units: Meters, Coordinate Zone: UTM 19, Geoid Model: Geoid 12A
 Date: December 2013

Lidar Quality Control Check Points

Point No.	Northing	Easting	Elev.	Latitude	Longitude	Surface Desc.	Location
2000	4729756.684	238808.593	314.177	42°40'33.36714" N	72°11'15.49279" W	Bare Earth	Worcester County, Massachusetts
2001	4729893.198	252759.177	326.803	42°40'54.38101" N	72°01'03.63691" W	Short Grass	Worcester County, Massachusetts
2002	4708622.584	237618.673	323.724	42°29'07.79587" N	72°11'32.70364" W	Bare Earth	Worcester County, Massachusetts
2003	4712370.364	253465.281	314.215	42°31'27.87923" N	72°00'05.36118" W	Bare Earth	Worcester County, Massachusetts
2004	4696601.057	243974.963	176.453	42°22'46.27325" N	72°06'35.41724" W	Bare Earth	Worcester County, Massachusetts
2005	4689464.520	235652.093	166.569	42°18'45.22862" N	72°12'27.05068" W	Bare Earth	Worcester County, Massachusetts
2006	4682504.737	255894.516	305.138	42°15'23.65534" N	71°57'33.46771" W	Short Grass	Worcester County, Massachusetts
2007	4678704.569	246531.315	188.785	42°13'09.88064" N	72°04'15.57323" W	Short Grass	Worcester County, Massachusetts
2008	4678344.342	236426.370	184.663	42°12'46.19046" N	72°11'35.08319" W	Bare Earth	Worcester County, Massachusetts
2009	4666949.275	244533.427	176.465	42°06'46.95309" N	72°05'24.03856" W	Bare Earth	Worcester County, Massachusetts
2010	4670174.208	254643.417	273.566	42°08'42.99117" N	71°58'09.27255" W	Short Grass	Worcester County, Massachusetts
2011	4661671.384	262845.434	158.891	42°04'16.73654" N	71°51'59.95899" W	Short Grass	Worcester County, Massachusetts
2012	4690653.403	266140.096	217.429	42°19'58.82078" N	71°50'18.71641" W	Short Grass	Worcester County, Massachusetts
2013	4683276.298	269551.403	145.680	42°16'03.58507" N	71°47'39.25326" W	Short Grass	Worcester County, Massachusetts
2014	4663356.124	331635.343	52.514	42°06'15.25678" N	71°02'10.46229" W	Short Grass	Plymouth County, Massachusetts
2015	4680766.150	272371.509	147.716	42°14'45.27398" N	71°45'32.74587" W	Short Grass	Worcester County, Massachusetts
2016	4772155.384	354345.284	14.902	43°05'17.25862" N	70°47'22.31187" W	Short Grass	Rockingham County, New Hampshire
2017	4747615.689	348903.617	10.194	42°51'58.30290" N	70°50'58.99273" W	Short Grass	Rockingham County, New Hampshire
2018	4727425.284	348765.111	12.327	42°41'03.98071" N	70°50'45.62711" W	Bare Earth	Essex County, Massachusetts
2019	4715570.539	355666.190	5.358	42°34'44.60155" N	70°45'31.69086" W	Bare Earth	Essex County, Massachusetts
2020	4710788.537	346321.445	5.728	42°32'03.15301" N	70°52'16.79028" W	Bare Earth	Essex County, Massachusetts
2021	4696641.591	334260.606	2.641	42°24'15.80404" N	71°00'50.47747" W	Short Grass	Suffolk County, Massachusetts
2022	4682896.277	332048.784	4.998	42°16'48.72447" N	71°02'12.78166" W	Short Grass	Norfolk County, Massachusetts
2023	4674808.346	313582.502	88.894	42°12'11.59460" N	71°15'29.09208" W	Short Grass	Norfolk County, Massachusetts

Point No.	Northing	Easting	Elev.	Latitude	Longitude	Surface Desc.	Location
2024	4653578.747	359291.041	22.262	42°01'17.98891" N	70°41'58.46004" W	Short Grass	Plymouth County, Massachusetts
2025	4656352.653	401506.667	12.315	42°03'11.01281" N	70°11'24.93691" W	Short Grass	Barnstable County, Massachusetts
2026	4606304.672	375010.975	15.202	41°35'55.20829" N	70°29'59.28126" W	Short Grass	Barnstable County, Massachusetts
2027	4567325.331	418525.474	4.033	41°15'11.65288" N	69°58'20.96166" W	Short Grass	Nantucket County, Massachusetts
2027A	4568379.525	417360.834	6.273	41°15'45.40769" N	69°59'11.51355" W	Short Grass	Nantucket County, Massachusetts
2028	4581313.943	376950.144	6.302	41°22'26.18896" N	70°28'17.17576" W	Short Grass	Dukes County, Massachusetts
2028A	4582995.290	369525.441	10.963	41°23'16.48097" N	70°33'37.99456" W	Short Grass	Dukes County, Massachusetts
2029	4560128.137	285229.732	32.607	41°09'50.59660" N	71°33'35.80247" W	Short Grass	Washington County, Rhode Island
2030	4580419.341	268325.483	9.952	41°20'31.08852" N	71°46'08.12083" W	Short Grass	Washington County, Rhode Island
2031	4696458.637	196027.548	126.289	42°21'39.52310" N	72°41'27.89226" W	Bare Earth	Hampshire County, Massachusetts
2032	4691688.981	195575.274	86.679	42°19'04.56660" N	72°41'38.57482" W	Bare Earth	Hampshire County, Massachusetts
3000	4720616.776	234962.073	165.333	42°35'32.78503" N	72°13'48.90373" W	Asphalt	Worcester County, Massachusetts
3001	4730454.835	250520.367	301.223	42°41'09.96155" N	72°02'42.76320" W	Urban	Worcester County, Massachusetts
3002	4716169.511	254527.833	303.399	42°33'32.09973" N	71°59'24.72563" W	Urban	Worcester County, Massachusetts
3003	4707627.623	252207.457	311.807	42°28'52.88056" N	72°00'53.02967" W	Urban	Worcester County, Massachusetts
3004	4701342.542	244579.866	275.322	42°25'20.49079" N	72°06'16.57616" W	Urban	Worcester County, Massachusetts
3005	4689492.950	235615.322	168.722	42°18'46.10403" N	72°12'28.70121" W	Urban	Worcester County, Massachusetts
3006	4681177.525	259662.283	280.270	42°14'44.88782" N	71°54'47.25978" W	Urban	Worcester County, Massachusetts
3007	4679136.532	247446.386	191.786	42°13'24.93218" N	72°03'36.39164" W	Urban	Worcester County, Massachusetts
3008	4678321.435	236384.139	184.639	42°12'45.39764" N	72°11'36.88482" W	Urban	Worcester County, Massachusetts
3009	4662666.915	248887.338	154.780	42°04'33.35918" N	72°02'08.09168" W	Urban	Worcester County, Massachusetts
3010	4670334.432	253893.341	264.787	42°08'47.33249" N	71°58'42.15131" W	Urban	Worcester County, Massachusetts
3011	4660510.531	263075.189	142.435	42°03'39.39406" N	71°51'48.28231" W	Urban	Worcester County, Massachusetts
3012	4691362.992	265332.983	226.329	42°20'20.92447" N	71°50'54.97953" W	Urban	Worcester County, Massachusetts
3013	4683256.102	269455.365	144.597	42°16'02.82890" N	71°47'43.41164" W	Urban	Worcester County, Massachusetts
3014	4662531.222	330473.031	51.625	42°05'47.62690" N	71°03'00.17584" W	Urban	Plymouth County, Massachusetts
3015	4680831.624	272375.124	147.279	42°14'47.39814" N	71°45'32.68076" W	Urban	Worcester County, Massachusetts
3016	4772130.534	354396.316	14.629	43°05'16.48872" N	70°47'20.03236" W	Urban	Rockingham County, New Hampshire
3017	4741321.474	346652.013	18.636	42°48'32.74405" N	70°52'31.99902" W	Urban	Essex County, Massachusetts

Point No.	Northing	Easting	Elev.	Latitude	Longitude	Surface Desc.	Location
3018	4726896.414	349250.596	4.362	42°40'47.18670" N	70°50'23.79859" W	Urban	Essex County, Massachusetts
3019	4719622.130	363306.846	14.794	42°37'00.90917" N	70°40'00.14857" W	Urban	Essex County, Massachusetts
3020	4710753.598	346346.676	5.657	42°32'02.03895" N	70°52'15.65098" W	Urban	Essex County, Massachusetts
3021	4696519.915	334020.685	3.483	42°24'11.67706" N	71°01'00.84049" W	Urban	Suffolk County, Massachusetts
3022	4682886.051	332131.620	3.259	42°16'48.45731" N	71°02'09.15661" W	Urban	Norfolk County, Massachusetts
3023	4673872.131	318584.559	42.198	42°11'45.49732" N	71°11'50.07394" W	Urban	Norfolk County, Massachusetts
3024	4646249.882	361875.600	29.588	41°57'22.10667" N	70°39'59.92113" W	Urban	Plymouth County, Massachusetts
3024A	4646260.955	361880.557	29.737	41°57'22.46867" N	70°39'59.71525" W	Urban	Plymouth County, Massachusetts
3025	4656049.563	401916.825	2.849	42°03'01.37224" N	70°11'06.91405" W	Urban	Barnstable County, Massachusetts
3026	4601719.152	366665.258	4.882	41°33'21.71504" N	70°35'56.00108" W	Urban	Barnstable County, Massachusetts
3027	4569130.472	408097.046	7.545	41°16'06.15284" N	70°05'49.97670" W	Urban	Nantucket County, Massachusetts
3028	4583072.608	372661.015	6.041	41°23'20.79614" N	70°31'23.08738" W	Urban	Dukes County, Massachusetts
3029	4560723.93	285561.929	18.259	41°10'10.21460" N	71°33'22.31206" W	Urban	Washington County, Rhode Island
3030	4580434.056	268355.197	10.348	41°20'31.59590" N	71°46'06.86398" W	Urban	Washington County, Rhode Island
3031	4693640.105	197694.609	82.415	42°20'10.66637" N	72°40'09.85123" W	Urban	Hampshire County, Massachusetts
3032	4691666.238	195571.531	86.241	42°19'03.82547" N	72°41'38.69489" W	Urban	Hampshire County, Massachusetts
4000	4729721.466	238723.992	313.153	42°40'32.12374" N	72°11'19.14581" W	Weeds	Worcester County, Massachusetts
4001	4730491.118	250459.313	301.232	42°41'11.06486" N	72°02'45.49979" W	Tall Grass	Worcester County, Massachusetts
4002	4708663.508	237679.481	321.975	42°29'09.19479" N	72°11'30.11156" W	Weeds	Worcester County, Massachusetts
4003	4711947.695	253336.833	318.973	42°31'14.04727" N	72°00'10.32742" W	Tall Grass	Worcester County, Massachusetts
4004	4698561.629	243867.582	261.603	42°23'49.61730" N	72°06'43.24382" W	Weeds	Worcester County, Massachusetts
4005	4689435.696	236684.257	193.251	42°18'45.55359" N	72°11'41.98539" W	Weeds	Worcester County, Massachusetts
4006	4682601.761	255819.676	306.748	42°15'26.71264" N	71°57'36.87682" W	Tall Grass	Worcester County, Massachusetts
4007	4679132.207	247469.866	192.070	42°13'24.81949" N	72°03'35.36206" W	Tall Grass	Worcester County, Massachusetts
4008	4678817.960	234830.924	173.868	42°12'59.58050" N	72°12'45.33661" W	Weeds	Worcester County, Massachusetts
4009	4666836.576	244358.441	173.068	42°06'43.09916" N	72°05'31.46995" W	Tall Grass	Worcester County, Massachusetts
4010	4670163.681	253545.004	251.094	42°08'41.40968" N	71°58'57.04767" W	Tall Grass	Worcester County, Massachusetts
4011	4661327.512	263527.355	161.800	42°04'06.34073" N	71°51'29.82045" W	Tall Grass	Worcester County, Massachusetts

Point No.	Northing	Easting	Elev.	Latitude	Longitude	Surface Desc.	Location
4012	4690687.861	266142.502	217.482	42°19'59.93921" N	71°50'18.66161" W	Tall Grass	Worcester County, Massachusetts
4013	4683593.849	270215.164	224.646	42°16'14.57327" N	71°47'10.76609" W	Tall Grass	Worcester County, Massachusetts
4014	4663911.847	329971.020	74.031	42°06'31.97167" N	71°03'23.46285" W	Tall Grass	Norfolk County, Massachusetts
4015	4680798.618	272504.744	146.006	42°14'46.46522" N	71°45'26.98442" W	Tall Grass	Worcester County, Massachusetts
4016	4771859.156	354062.334	13.178	43°05'07.46440" N	70°47'34.54076" W	Tall Grass	Rockingham County, New Hampshire
4017	4747930.714	349772.904	1.466	42°52'09.12751" N	70°50'21.00469" W	Tall Grass	Rockingham County, New Hampshire
4018	4728314.725	350509.038	5.720	42°41'34.02948" N	70°49'29.87676" W	Tall Grass	Essex County, Massachusetts
4019	4715324.584	357505.699	2.920	42°34'37.86179" N	70°44'10.80967" W	Tall Grass	Essex County, Massachusetts
4020	4709902.099	345366.941	2.939	42°31'33.74409" N	70°52'57.74781" W	Tall Grass	Essex County, Massachusetts
4021	4695058.727	336017.987	3.190	42°23'25.85912" N	70°59'32.02086" W	Tall Grass	Suffolk County, Massachusetts
4022	4678825.325	332177.118	53.304	42°14'36.91678" N	71°02'02.93906" W	Tall Weeds	Norfolk County, Massachusetts
4023	4674812.681	313536.222	89.573	42°12'11.69533" N	71°15'31.11372" W	Tall Grass	Norfolk County, Massachusetts
4024	4651526.885	357796.157	4.040	42°00'10.52198" N	70°43'01.64473" W	Tall Grass	Plymouth County, Massachusetts
4025	4656635.371	401244.682	3.699	42°03'20.05921" N	70°11'36.50373" W	Tall Grass	Barnstable County, Massachusetts
4026	4601992.273	367203.481	2.165	41°33'30.89033" N	70°35'32.99226" W	Tall Grass	Barnstable County, Massachusetts
4027	4568399.593	417390.024	4.736	41°15'46.06913" N	69°59'10.26905" W	Tall Grass	Nantucket County, Massachusetts
4028	4582434.587	374666.068	0.218	41°23'01.24744" N	70°29'56.30525" W	Short Grass	Dukes County, Massachusetts
4028A	4582722.953	371618.162	7.120	41°23'08.86509" N	70°32'07.70938" W	Tall Grass	Dukes County, Massachusetts
4029	4559504.572	284738.546	41.680	41°09'29.92665" N	71°33'56.07073" W	Tall Grass	Washington County, Rhode Island
4030	4580126.098	268391.122	3.044	41°20'21.65834" N	71°46'04.89734" W	Crops	Washington County, Rhode Island
4031	4693394.108	196903.762	71.921	42°20'01.60062" N	72°40'43.87550" W	Weeds	Hampshire County, Massachusetts
4032	4691584.482	193686.868	102.755	42°18'58.52168" N	72°43'00.70138" W	Weeds	Hampshire County, Massachusetts
5000	4729712.805	238741.054	313.477	42°40'31.86425" N	72°11'18.38294" W	Brush	Worcester County, Massachusetts
5002	4708638.370	237662.504	322.604	42°29'08.36033" N	72°11'30.81264" W	Brush	Worcester County, Massachusetts
5003	4715591.329	254316.201	305.833	42°33'13.13803" N	71°59'33.09876" W	Brush	Worcester County, Massachusetts
5004	4698526.936	243890.881	259.698	42°23'48.52179" N	72°06'42.17064" W	Brush	Worcester County, Massachusetts
5005	4689461.304	236724.105	194.318	42°18'46.43106" N	72°11'40.28933" W	Brush	Worcester County, Massachusetts
5006	4682616.680	255808.631	305.092	42°15'27.18328" N	71°57'37.38081" W	Tall Grass	Worcester County, Massachusetts
5007	4678663.058	246563.261	188.733	42°13'08.57395" N	72°04'14.11660" W	Brush	Worcester County, Massachusetts

Point No.	Northing	Easting	Elev.	Latitude	Longitude	Surface Desc.	Location
5008	4678830.941	234848.955	174.06	42°13'00.02272" N	72°12'44.57268" W	Brush	Worcester County, Massachusetts
5010	4671319.996	254298.897	259.262	42°09'19.70257" N	71°58'26.00047" W	Brush	Worcester County, Massachusetts
5011	4661388.022	263576.874	164.551	42°04'08.35386" N	71°51'27.75625" W	Brush	Worcester County, Massachusetts
5013	4683647.545	270200.462	222.011	42°16'16.29660" N	71°47'11.48377" W	Brush	Worcester County, Massachusetts
5013A	4690692.919	266134.279	217.109	42°20'00.09412" N	71°50'19.02785" W	Brush	Worcester County, Massachusetts
5014	4663570.709	329961.347	70.886	42°06'20.91043" N	71°03'23.52637" W	Brush	Norfolk County, Massachusetts
5016	4771823.554	354082.810	13.108	43°05'06.32499" N	70°47'33.60190" W	Brush	Rockingham County, New Hampshire
5018	4728385.472	350490.588	3.160	42°41'36.30901" N	70°49'30.75434" W	Brush	Essex County, Massachusetts
5020	4709910.754	345337.418	2.781	42°31'34.00326" N	70°52'59.04961" W	Brush	Essex County, Massachusetts
5020A	4710631.192	346166.375	4.713	42°31'57.94344" N	70°52'23.43210" W	Brush	Essex County, Massachusetts
5021	4695100.172	335996.154	3.035	42°23'27.18544" N	70°59'33.01770" W	Brush	Suffolk County, Massachusetts
5022	4678831.404	332189.868	53.018	42°14'37.12361" N	71°02'02.38942" W	Brush	Norfolk County, Massachusetts
5023	4674809.804	313515.349	89.636	42°12'11.58419" N	71°15'32.01989" W	Brush	Norfolk County, Massachusetts
5024	4651610.213	357559.550	3.020	42°00'13.06863" N	70°43'11.99837" W	Brush	Plymouth County, Massachusetts
5025	4656637.305	401264.123	3.897	42°03'20.13069" N	70°11'35.65927" W	Brush	Barnstable County, Massachusetts
5026	4602030.601	367202.022	1.396	41°33'32.13185" N	70°35'33.08573" W	Brush	Barnstable County, Massachusetts
5027	4568456.290	415204.015	21.660	41°15'47.09213" N	70°00'44.23008" W	Brush	Nantucket County, Massachusetts
5027A	4570292.988	400824.181	1.524	41°16'40.74635" N	70°11'03.18303" W	Brush	Nantucket County, Massachusetts
5028	4582813.325	370017.754	4.519	41°23'10.86940" N	70°33'16.66345" W	Brush	Dukes County, Massachusetts
5028A	4583071.973	368146.555	12.166	41°23'18.15732" N	70°34'37.40548" W	Brush	Dukes County, Massachusetts
5030	4580110.127	268387.719	2.102	41°20'21.13757" N	71°46'05.02168" W	Brush	Washington County, Rhode Island
5031	4693965.995	198839.963	76.17	42°20'22.80863" N	72°39'20.51339" W	Brush	Hampshire County, Massachusetts
5032	4691618.982	193627.894	104.348	42°18'59.55444" N	72°43'03.33805" W	Brush	Hampshire County, Massachusetts
6000	4729764.491	238742.091	313.071	42°40'33.53859" N	72°11'18.42311" W	Trees	Worcester County, Massachusetts
6001	4729861.049	252726.388	326.309	42°40'53.30225" N	72°01'05.02526" W	Trees	Worcester County, Massachusetts
6002	4708678.244	237694.839	321.342	42°29'09.69051" N	72°11'29.46413" W	Trees	Worcester County, Massachusetts
6003	4712405.245	253520.654	313.664	42°31'29.07208" N	72°00'02.99154" W	Trees	Worcester County, Massachusetts
6004	4698474.383	243898.393	257.839	42°23'46.82935" N	72°06'41.75842" W	Trees	Worcester County, Massachusetts
6005	4689433.755	236723.033	192.709	42°18'45.53793" N	72°11'40.29096" W	Trees	Worcester County, Massachusetts

Point No.	Northing	Easting	Elev.	Latitude	Longitude	Surface Desc.	Location
6006	4682660.412	255845.987	304.318	42°15'28.64133" N	71°57'35.81888" W	Trees	Worcester County, Massachusetts
6006A	4682661.619	255854.135	304.164	42°15'28.68961" N	71°57'35.46555" W	Trees	Worcester County, Massachusetts
6007	4678618.124	246556.723	187.262	42°13'07.11151" N	72°04'14.33080" W	Trees	Worcester County, Massachusetts
6007A	4678621.578	246547.805	187.001	42°13'07.21293" N	72°04'14.72467" W	Trees	Worcester County, Massachusetts
6008	4678785.776	234834.853	173.702	42°12'58.54344" N	72°12'45.11263" W	Trees	Worcester County, Massachusetts
6009	4666819.685	244323.527	174.822	42°06'42.51136" N	72°05'32.96147" W	Trees	Worcester County, Massachusetts
6009A	4666835.866	244323.505	173.692	42°06'43.03519" N	72°05'32.98786" W	Trees	Worcester County, Massachusetts
6010	4671360.279	254317.833	260.228	42°09'21.02829" N	71°58'25.23756" W	Trees	Worcester County, Massachusetts
6010A	4671340.715	254292.26	259.845	42°09'20.36594" N	71°58'26.32076" W	Trees	Worcester County, Massachusetts
6011	4661326.903	263599.408	162.924	42°04'06.39906" N	71°51'26.68804" W	Trees	Worcester County, Massachusetts
6011A	4661296.481	263607.371	161.951	42°04'05.42251" N	71°51'26.29776" W	Trees	Worcester County, Massachusetts
6012	4690660.81	266104.481	217.34	42°19'59.02212" N	71°50'20.28154" W	Trees	Worcester County, Massachusetts
6013	4683749.093	270266.778	209.159	42°16'19.65542" N	71°47'08.73712" W	Trees	Worcester County, Massachusetts
6013A	4683734.874	270253.071	212.479	42°16'19.18042" N	71°47'09.31449" W	Trees	Worcester County, Massachusetts
6014	4663480.088	329966.803	71.765	42°06'17.97833" N	71°03'23.19399" W	Trees	Plymouth County, Massachusetts
6014A	4663474.980	329929.882	72.690	42°06'17.78400" N	71°03'24.79519" W	Trees	Plymouth County, Massachusetts
6015	4680737.587	272450.957	145.199	42°14'44.43233" N	71°45'29.24269" W	Trees	Worcester County, Massachusetts
6015A	4680736.940	272459.274	145.144	42°14'44.42011" N	71°45'28.87923" W	Trees	Worcester County, Massachusetts
6016	4771989.720	354206.167	13.758	43°05'11.79454" N	70°47'28.30566" W	Trees	Rockingham County, New Hampshire
6017	4747894.696	349783.635	2.104	42°52'07.96803" N	70°50'20.49731" W	Trees	Rockingham County, New Hampshire
6018	4728315.389	350444.718	6.835	42°41'34.00596" N	70°49'32.70275" W	Trees	Essex County, Massachusetts
6019	4715312.223	357583.905	4.003	42°34'37.51319" N	70°44'07.36941" W	Trees	Essex County, Massachusetts
6020	4710454.603	346155.551	8.212	42°31'52.21355" N	70°52'23.73525" W	Trees	Essex County, Massachusetts
6020A	4710473.634	346124.719	8.888	42°31'52.80816" N	70°52'25.10454" W	Trees	Essex County, Massachusetts
6021	4695161.956	335919.132	3.782	42°23'29.12881" N	70°59'36.44780" W	Trees	Suffolk County, Massachusetts
6021A	4695161.760	335941.799	3.751	42°23'29.13968" N	70°59'35.45676" W	Trees	Suffolk County, Massachusetts
6024	4651322.514	357634.708	4.341	42°00'03.79343" N	70°43'08.48156" W	Trees	Plymouth County, Massachusetts
6024A	4651344.290	357643.728	4.757	42°00'04.50504" N	70°43'08.10866" W	Trees	Plymouth County, Massachusetts
6025	4656683.011	401264.094	5.635	42°03'21.61231" N	70°11'35.68827" W	Trees	Barnstable County, Massachusetts

Point No.	Northing	Easting	Elev.	Latitude	Longitude	Surface Desc.	Location
6025A	4656672.119	401270.322	5.774	42°03'21.26208" N	70°11'35.41075" W	Trees	Barnstable County, Massachusetts
6026	4602068.719	367214.471	0.645	41°33'33.37486" N	70°35'32.57881" W	Trees	Barnstable County, Massachusetts
6026A	4602068.581	367222.678	0.214	41°33'33.37527" N	70°35'32.22455" W	Trees	Barnstable County, Massachusetts
6027	4568367.474	415067.026	21.479	41°15'44.16063" N	70°00'50.07194" W	Trees	Nantucket County, Massachusetts
6027A	4568375.816	415034.416	21.465	41°15'44.41874" N	70°00'51.47739" W	Trees	Nantucket County, Massachusetts
6028	4582875.073	370138.131	6.524	41°23'12.94099" N	70°33'11.52980" W	Trees	Dukes County, Massachusetts
6028A	4582872.686	370170.643	6.698	41°23'12.88249" N	70°33'10.12858" W	Trees	Dukes County, Massachusetts
6029	4559374.558	284782.199	44.933	41°09'25.75640" N	71°33'54.03526" W	Trees	Washington County, Rhode Island
6029A	4559369.883	284775.286	44.818	41°09'25.59834" N	71°33'54.32564" W	Trees	Washington County, Rhode Island
6030	4580035.748	268397.164	1.769	41°20'18.73817" N	71°46'04.51364" W	Trees	Washington County, Rhode Island
6030A	4580037.999	268410.843	1.199	41°20'18.82524" N	71°46'03.92883" W	Trees	Washington County, Rhode Island
6031	4694035.977	198988.543	73.585	42°20'25.27980" N	72°39'14.16465" W	Trees	Hampshire County, Massachusetts
6032	4691649.357	193649.434	102.983	42°19'00.56765" N	72°43'02.45695" W	Trees	Hampshire County, Massachusetts

LIDAR Control Points

Site ID	Point No.	Northing	Easting	Elev.	Latitude	Longitude	Surface Desc.	Location
1	1001	4718540.805	231865.976	167.814	42°34'21.73997" N	72°16'01.02299" W	Asphalt	Worcester County, Massachusetts
2	1002	4729705.780	238839.159	314.975	42°40'31.75673" N	72°11'14.06761" W	Asphalt	Worcester County, Massachusetts
3	1003	4729894.736	252731.052	326.437	42°40'54.39829" N	72°01'04.87348" W	Asphalt	Worcester County, Massachusetts
4	1004	4719343.164	256920.196	365.385	42°35'17.57752" N	71°57'44.81638" W	Asphalt	Worcester County, Massachusetts
5	1005	4721152.155	247355.934	284.201	42°36'05.08396" N	72°04'46.74353" W	Asphalt	Worcester County, Massachusetts
6	1006	4708613.763	237705.732	321.209	42°29'07.61647" N	72°11'28.88154" W	Asphalt	Worcester County, Massachusetts
7	1007	4712406.335	253442.989	317.289	42°31'29.01827" N	72°00'06.39268" W	Asphalt	Worcester County, Massachusetts
8	1008	4703857.981	254433.476	282.801	42°26'53.38188" N	71°59'09.85491" W	Asphalt	Worcester County, Massachusetts
9	1009	4692876.034	254203.423	299.298	42°20'57.55022" N	71°59'03.03588" W	Asphalt	Worcester County, Massachusetts
10	1010	4696607.985	244001.465	176.735	42°22'46.52896" N	72°06'34.27106" W	Asphalt	Worcester County, Massachusetts
11	1011	4689446.387	235636.427	165.979	42°18'44.62251" N	72°12'27.70415" W	Asphalt	Worcester County, Massachusetts
12	1012	4678358.539	236406.247	184.448	42°12'46.62561" N	72°11'35.98263" W	Asphalt	Worcester County, Massachusetts
13	1013	4678766.898	246666.158	188.753	42°13'12.05594" N	72°04'09.79774" W	Asphalt	Worcester County, Massachusetts
14	1014	4682604.786	255838.450	305.761	42°15'26.83191" N	71°57'36.06287" W	Asphalt	Worcester County, Massachusetts

Site ID	Point No.	Northing	Easting	Elev.	Latitude	Longitude	Surface Desc.	Location
15	1015	4666888.366	244477.063	176.089	42°06'44.91502" N	72°05'26.39356" W	Asphalt	Worcester County, Massachusetts
16	1016	4670189.003	253569.981	252.380	42°08'42.25783" N	71°58'55.99950" W	Asphalt	Worcester County, Massachusetts
17	1017	4661601.061	262894.794	160.742	42°04'14.51289" N	71°51'57.71111" W	Asphalt	Worcester County, Massachusetts
18	1018	4691087.399	265292.612	230.913	42°20'11.95641" N	71°50'56.33845" W	Asphalt	Worcester County, Massachusetts
19	1019	4683210.306	269579.244	145.508	42°16'01.47758" N	71°47'37.94493" W	Asphalt	Worcester County, Massachusetts
20	1020	4680820.988	272335.266	147.901	42°14'47.01189" N	71°45'34.40304" W	Asphalt	Worcester County, Massachusetts
21	1021	4663906.097	288037.199	129.556	42°05'55.04357" N	71°33'47.75944" W	Asphalt	Worcester County, Massachusetts
22	1022	4659184.064	293440.320	72.770	42°03'27.26992" N	71°29'46.75400" W	Asphalt	Norfolk County, Massachusetts
23	1023	4655555.173	299969.92	116.325	42°01'35.79224" N	71°24'58.46269" W	Asphalt	Norfolk County, Massachusetts
24	1024	4663309.989	310638.172	73.618	42°05'56.53383" N	71°17'23.94106" W	Asphalt	Norfolk County, Massachusetts
25	1025	4660637.019	313293.569	88.071	42°04'32.22440" N	71°15'25.35289" W	Asphalt	Norfolk County, Massachusetts
26	1026	4663199.732	326743.754	68.184	42°06'06.35620" N	71°05'43.13537" W	Asphalt	Norfolk County, Massachusetts
27	1027	4662945.210	338154.438	38.885	42°06'06.87958" N	70°57'26.37994" W	Asphalt	Plymouth County, Massachusetts
28	1028	4650805.792	337506.108	15.536	41°59'33.02355" N	70°57'42.47283" W	Asphalt	Plymouth County, Massachusetts
29	1029	4649938.193	328445.605	29.293	41°58'57.99515" N	71°04'15.11594" W	Asphalt	Bristol County, Massachusetts
30	1030	4771785.843	354372.540	22.754	43°05'05.30359" N	70°47'20.75836" W	Asphalt	Rockingham County, New Hampshire
31	1031	4757540.421	354796.151	3.596	42°57'24.00877" N	70°46'48.67828" W	Asphalt	Rockingham County, New Hampshire
32	1032	4747641.358	348902.172	10.313	42°51'59.13363" N	70°50'59.08124" W	Asphalt	Rockingham County, New Hampshire
33	1033	4731928.456	347327.513	14.658	42°43'28.87345" N	70°51'53.13343" W	Asphalt	Essex County, Massachusetts
34	1034	4723127.675	369166.176	9.077	42°38'58.17715" N	70°35'45.95537" W	Asphalt	Essex County, Massachusetts
35	1035	4715584.283	355623.065	5.571	42°34'45.01791" N	70°45'33.59433" W	Asphalt	Essex County, Massachusetts
36	1036	4714632.740	339752.534	27.862	42°34'02.91118" N	70°57'08.47419" W	Asphalt	Essex County, Massachusetts
37	1037	4710745.018	346317.169	5.349	42°32'01.73981" N	70°52'16.93551" W	Asphalt	Essex County, Massachusetts
38	1038	4699215.774	340984.143	1.302	42°25'44.27735" N	70°55'59.07618" W	Asphalt	Essex County, Massachusetts
39	1039	4711800.010	328484.023	28.906	42°32'22.41782" N	71°05'19.34093" W	Asphalt	Middlesex County, Massachusetts
40	1040	4705065.466	313258.258	38.632	42°28'31.54558" N	71°16'18.44773" W	Asphalt	Middlesex County, Massachusetts
41	1041	4682749.605	311036.372	35.966	42°16'26.66532" N	71°17'29.34337" W	Asphalt	Norfolk County, Massachusetts
42	1042	4703589.692	323941.470	21.971	42°27'52.73927" N	71°08'29.26768" W	Asphalt	Middlesex County, Massachusetts
43	1043	4696647.123	334252.621	2.826	42°24'15.97718" N	71°00'50.83231" W	Asphalt	Suffolk County, Massachusetts

Site ID	Point No.	Northing	Easting	Elev.	Latitude	Longitude	Surface Desc.	Location
44	1044	4674828.462	313591.710	89.583	42°12'12.25422" N	71°15'28.71404" W	Asphalt	Norfolk County, Massachusetts
45	1045	4692507.724	319463.623	5.473	42°21'49.99843" N	71°11'32.68491" W	Asphalt	Middlesex County, Massachusetts
46	1046	4681909.850	320348.820	33.860	42°16'07.37914" N	71°10'42.15670" W	Asphalt	Norfolk County, Massachusetts
47	1047	4682893.116	331991.057	2.466	42°16'48.57726" N	71°02'15.29724" W	Asphalt	Norfolk County, Massachusetts
48	1048	4676094.937	336784.741	15.431	42°13'11.95914" N	70°58'39.24012" W	Asphalt	Norfolk County, Massachusetts
49	1049	4680744.370	347536.361	12.560	42°15'50.44514" N	70°50'54.91114" W	Asphalt	Plymouth County, Massachusetts
50	1050	4669770.054	356054.176	4.917	42°10'00.61690" N	70°44'33.49933" W	Asphalt	Plymouth County, Massachusetts
51	1051	4653578.741	359333.588	22.374	42°01'18.01608" N	70°41'56.61070" W	Asphalt	Plymouth County, Massachusetts
52	1052	4635745.759	372243.165	16.490	41°51'47.93045" N	70°32'21.54545" W	Asphalt	Plymouth County, Massachusetts
53	1053	4621599.356	381130.422	4.795	41°44'14.36133" N	70°25'45.97160" W	Asphalt	Barnstable County, Massachusetts
54	1054	4656409.505	401577.185	12.785	42°03'12.88754" N	70°11'21.90406" W	Asphalt	Barnstable County, Massachusetts
55	1055	4640971.476	418063.492	5.426	41°54'59.20856" N	69°59'17.03019" W	Asphalt	Barnstable County, Massachusetts
56	1056	4625259.459	416926.562	26.146	41°46'29.39856" N	69°59'58.44121" W	Asphalt	Barnstable County, Massachusetts
57	1057	4615245.948	419632.942	13.524	41°41'05.75468" N	69°57'56.36123" W	Asphalt	Barnstable County, Massachusetts
58	1058	4611513.498	398099.426	1.219	41°38'55.88059" N	70°13'25.34081" W	Asphalt	Barnstable County, Massachusetts
59	1059	4606269.494	375028.369	14.257	41°35'54.07775" N	70°29'58.50375" W	Asphalt	Barnstable County, Massachusetts
60	1060	4622671.745	365751.826	2.669	41°44'40.30389" N	70°36'52.35576" W	Asphalt	Barnstable County, Massachusetts
61	1061	4624402.768	356238.357	5.440	41°45'30.41574" N	70°43'45.57845" W	Asphalt	Plymouth County, Massachusetts
62	1062	4606454.085	341496.742	2.968	41°35'38.63765" N	70°54'06.48672" W	Steel Plate	Bristol County, Massachusetts
63	1063	4592726.479	318485.688	10.572	41°27'56.18868" N	71°10'24.88441" W	Asphalt	Newport County, Rhode Island
64	1064	4611054.388	327903.487	24.693	41°37'57.58445" N	71°03'58.04724" W	Asphalt	Bristol County, Massachusetts
65	1065	4596251.543	312268.925	14.082	41°29'45.25823" N	71°14'56.63753" W	Asphalt	Newport County, Rhode Island
66	1066	4591392.141	303374.083	4.722	41°27'00.13886" N	71°21'14.25724" W	Asphalt	Newport County, Rhode Island
67	1067	4592310.366	296232.325	14.911	41°27'23.47655" N	71°26'22.90740" W	Asphalt	Washington County, Rhode Island
68	1068	4584878.289	292239.39	14.294	41°23'19.01717" N	71°29'05.66985" W	Asphalt	Washington County, Rhode Island
69	1069	4581780.131	273832.081	7.793	41°21'20.79715" N	71°42'13.27246" W	Asphalt	Washington County, Rhode Island
70	1070	4577159.715	260519.891	0.598	41°18'37.30543" N	71°51'38.94985" W	Asphalt	Washington County, Rhode Island
71	1071	4591360.65	274613.467	21.567	41°26'31.91226" N	71°41'52.51544" W	Asphalt	Washington County, Rhode Island
72	1072	4566718.275	284945.742	1.954	41°13'23.81991" N	71°33'56.31417" W	Asphalt	Washington County, Rhode Island

Site ID	Point No.	Northing	Easting	Elev.	Latitude	Longitude	Surface Desc.	Location
73	1073	4560113.957	285212.180	32.670	41°09'50.12046" N	71°33'36.53706" W	Asphalt	Washington County, Rhode Island
74	1074	4575655.528	352268.345	3.007	41°19'07.84135" N	70°45'54.30297" W	Asphalt	Dukes County, Massachusetts
75	1075	4593371.483	365954.514	9.283	41°28'50.70632" N	70°36'19.97911" W	Asphalt	Dukes County, Massachusetts
76	1076	4581323.474	376960.325	6.482	41°22'26.50353" N	70°28'16.74460" W	Asphalt	Dukes County, Massachusetts
77	1077	4570300.583	400567.462	2.818	41°16'40.87893" N	70°11'14.22056" W	Asphalt	Dukes County, Massachusetts
78	1078	4567776.368	419009.891	11.005	41°15'26.45238" N	69°58'00.36477" W	Asphalt	Dukes County, Massachusetts
79	1079	4696467.957	196017.973	125.913	42°21'39.81120" N	72°41'28.32765" W	Asphalt	Hampshire County, Massachusetts
80	1080	4688474.114	200799.92	34.846	42°17'27.82782" N	72°37'44.80436" W	Asphalt	Hampshire County, Massachusetts

Survey Control Points

Point No.	Northing	Easting	Elev.	Latitude	Longitude	Surface Desc.	Location
201	4580029.876	268380.167	2.532	41°20'18.53042" N	71°46'05.23605" W	Short Grass	Washington County, Rhode Island
202	4579936.335	268401.865	2.561	41°20'15.52307" N	71°46'04.17521" W	Short Grass	Washington County, Rhode Island
203	4602063.105	367209.170	0.935	41°33'33.18970" N	70°35'32.80314" W	Asphalt	Barnstable County, Massachusetts
204	4602041.004	367148.741	1.929	41°33'32.43719" N	70°35'35.39339" W	Short Grass	Barnstable County, Massachusetts
205	4656605.931	401212.517	3.691	42°03'19.09032" N	70°11'37.88498" W	Short Grass	Barnstable County, Massachusetts
206	4661338.219	263565.496	162.820	42°04'06.72878" N	71°51'28.17833" W	Asphalt	Worcester County, Massachusetts
207	4661288.868	263592.480	161.283	42°04'05.15986" N	71°51'26.93383" W	Asphalt	Worcester County, Massachusetts
208	4666829.098	244343.899	173.828	42°06'42.84000" N	72°05'32.09047" W	Bare Earth	Worcester County, Massachusetts
209	4666785.977	244333.578	175.667	42°06'41.43179" N	72°05'32.47130" W	Short Grass	Worcester County, Massachusetts
210	4671354.662	254279.056	261.379	42°09'20.80263" N	71°58'26.91648" W	Asphalt	Worcester County, Massachusetts
211	4671393.020	254357.961	262.750	42°09'22.13372" N	71°58'23.54101" W	Gravel	Worcester County, Massachusetts
212	4680763.582	272434.491	146.037	42°14'45.25691" N	71°45'29.99708" W	Short Grass	Worcester County, Massachusetts
213	4680765.701	272385.490	147.106	42°14'45.27410" N	71°45'32.13588" W	Short Grass	Worcester County, Massachusetts
214	4683772.875	270258.256	205.971	42°16'20.41654" N	71°47'09.14267" W	Short Grass	Worcester County, Massachusetts
215	4683774.501	270308.121	204.941	42°16'20.52205" N	71°47'06.97066" W	Short Grass	Worcester County, Massachusetts
216	4682639.761	255845.295	304.985	42°15'27.97189" N	71°57'35.81774" W	Short Grass	Worcester County, Massachusetts
217	4678639.694	246546.099	188.246	42°13'07.79748" N	72°04'14.82740" W	Asphalt	Worcester County, Massachusetts
218	4678708.663	246521.690	187.967	42°13'10.00195" N	72°04'15.99889" W	Asphalt	Worcester County, Massachusetts

Point No.	Northing	Easting	Elev.	Latitude	Longitude	Surface Desc.	Location
251	4559389.446	284762.829	45.244	41°09'26.22022" N	71°33'54.88434" W	Short Grass	Washington County, Rhode Island
252	4559458.901	284769.342	42.628	41°09'28.47651" N	71°33'54.69295" W	Short Grass	Washington County, Rhode Island
253	4582841.391	370132.294	5.906	41°23'11.84579" N	70°33'11.75507" W	Bare Earth	Dukes County, Massachusetts
254	4582852.709	370030.976	5.611	41°23'12.15375" N	70°33'16.12473" W	Asphalt	Dukes County, Massachusetts
255	4651361.611	357615.891	4.792	42°00'05.04827" N	70°43'09.33331" W	Short Grass	Plymouth County, Massachusetts
256	4651454.153	357620.084	3.677	42°00'08.05024" N	70°43'09.23187" W	Asphalt	Plymouth County, Massachusetts
257	4663511.106	329946.926	71.824	42°06'18.96787" N	71°03'24.09142" W	Asphalt	Plymouth County, Massachusetts
258	4663586.364	329945.114	70.923	42°06'21.40500" N	71°03'24.24912" W	Asphalt	Norfolk County, Massachusetts
259	4568394.955	415062.401	21.974	41°15'45.04990" N	70°00'50.28447" W	Asphalt	Nantucket County, Massachusetts
260	4568385.492	415170.088	21.36	41°15'44.78381" N	70°00'45.65247" W	Asphalt	Nantucket County, Massachusetts
261	4675053.271	319320.515	16.462	42°12'24.37849" N	71°11'19.32874" W	Asphalt	Norfolk County, Massachusetts
262	4675136.658	319379.109	16.936	42°12'27.12891" N	71°11'16.86857" W	Asphalt	Norfolk County, Massachusetts
263	4681889.125	329918.431	4.376	42°16'14.42923" N	71°03'44.67068" W	Short Grass	Suffolk County, Massachusetts
264	4681811.558	329906.687	3.476	42°16'11.90676" N	71°03'45.10105" W	Short Grass	Suffolk County, Massachusetts
265	4695166.552	335879.302	3.184	42°23'29.24746" N	70°59'38.19356" W	Asphalt	Suffolk County, Massachusetts
266	4695248.129	335900.765	2.682	42°23'31.90705" N	70°59'37.33903" W	Asphalt	Suffolk County, Massachusetts
267	4710484.373	346176.849	6.976	42°31'53.19348" N	70°52'22.83098" W	Bare Earth	Essex County, Massachusetts
268	4710563.588	346213.234	4.089	42°31'55.78639" N	70°52'21.31360" W	Bare Earth	Essex County, Massachusetts
MVBASE	4583890.941	365983.790	16.942	41°23'43.41739" N	70°36'11.14841" W	Short Grass	Dukes County, Massachusetts
NANBASE	4568697.600	411329.004	15.398	41°15'53.41847" N	70°03'30.86404" W	Short Grass	Nantucket County, Massachusetts

NGS Stations

Station Name	Northing	Easting	Elev.	Latitude	Longitude	Location
844 6493 TIDAL 10	4646613.784	362231.993	3.042	41°57'34.12534" N	70°39'44.75286" W	Plymouth County, Massachusetts
CHAGUM	4565729.458	284816.138	30.699	41°12'51.66235" N	71°34'00.62185" W	Washington County, Rhode Island
E 28	4607449.135	311391.833	57.097	41°35'47.33321" N	71°15'47.08558" W	Newport County, Rhode Island
G 22	4583453.321	276520.218	9.085	41°22'17.69635" N	71°40'19.92684" W	Hampshire County, Massachusetts
KELLY	4704518.414	315439.621	45.379	42°28'15.70516" N	71°14'42.35177" W	Middlesex County, Massachusetts
PORTSMOUTH USCG	4770110.909	360494.945	7.297	43°04'15.17397" N	70°42'48.58710" W	Rockingham County, New Hampshire
STACH AZ MK	4560532.367	283365.766	33.461	41°10'01.90716" N	71°34'56.22238" W	Washington County, Rhode Island
W 56	4611871.058	393430.631	4.571	41°39'05.27417" N	70°16'47.36309" W	Barnstable County, Massachusetts
WE 002	4581516.520	268780.631	22.173	41°21'07.09656" N	71°45'50.06326" W	Washington County, Rhode Island
Z 39	4673321.153	223787.625	101.987	42°09'47.89973" N	72°20'36.81944" W	Hampden County, Massachusetts

NGS CORS Stations

Station Name	Northing	Easting	Elev.	Latitude	Longitude	Location
HAMP	4691473.801	200065.598	71.051	42°19'03.87276" N	72°38'22.40327" W	Hampshire County, Massachusetts
NHUN	4778494.145	341269.573	35.977	43°08'33.17927" N	70°57'06.86280" W	Strafford County, New Hampshire

KeyNetGPS Stations

Station Name	Northing	Easting	Elev.	Latitude	Longitude	Location
ABL1	4596515.381	320325.568	23.857	41°30'00.45508" N	71°09'09.68735" W	Newport County, Rhode Island
CP01	4744162.859	302462.393	78.477	42°49'28.33318" N	71°24'59.77889" W	Rockingham County, New Hampshire
KP10	4611811.009	396111.412	15.183	41°39'04.60160" N	70°14'51.45282" W	Barnstable County, Massachusetts
KP16	4662421.458	249004.166	170.577	42°04'25.54613" N	72°02'02.63552" W	Worcester County, Massachusetts
KP18	4588215.773	278757.628	54.17	41°24'54.18994" N	71°38'49.97523" W	Washington County, Rhode Island
KPI6	4669926.375	294045.912	98.816	42°09'15.81452" N	71°29'34.06084" W	Worcester County, Massachusetts
KPI9	4669760.739	344086.154	55.510	42°09'52.06473" N	70°53'14.82150" W	Plymouth County, Massachusetts
NHCK	4757708.567	233537.276	154.220	42°55'31.57803" N	72°15'54.25355" W	Cheshire County, New Hampshire
PTCS	4656119.200	401370.371	13.038	42°03'03.38348" N	70°11'30.72371" W	Barnstable County, Massachusetts

SECTION 3: GROUND CONTROL STATION INFORMATION SHEETS

This section contains the station information sheets for each of the new quality control check points to support the USGS/NGTOC New England CMGP Sandy Lidar Project.

Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 2000	
Date of Survey 4/12/2014				Ground Type Bare Earth	
Established by WOOLPERT, INC.	Latitude 42°40'33.36714" N	Longitude 72°11'15.49279" W	Ellipsoid Ht. 286.364 (Meters)	Geoid Ht. -27.813 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000208796	Northing (UTM 19) 4729756.684 (Meters)	Easting (UTM 19) 238808.593 (Meters)	Elevation 314.177 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 2001	
Date of Survey 4/14/2014				Ground Type Short Grass	
Established by WOOLPERT, INC.	Latitude 42°40'54.38101" N	Longitude 72°01'03.63691" W	Ellipsoid Ht. 299.119 (Meters)	Geoid Ht. -27.684 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000288098	Northing (UTM 19) 4729893.198 (Meters)	Easting (UTM 19) 252759.177 (Meters)	Elevation 326.803 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 2002	
Date of Survey 4/14/2014				Ground Type Bare Earth	
Established by WOOLPERT, INC.	Latitude 42°29'07.79587" N	Longitude 72°11'32.70364" W	Ellipsoid Ht. 295.740 (Meters)	Geoid Ht. -27.984 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000209120	Northing (UTM 19) 4708622.584 (Meters)	Easting (UTM 19) 237618.673 (Meters)	Elevation 323.724 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 2003	
Date of Survey 4/14/2014				Ground Type Bare Earth	
Established by WOOLPERT, INC.	Latitude 42°31'27.87923" N	Longitude 72°00'05.36118" W	Ellipsoid Ht. 286.276 (Meters)	Geoid Ht. -27.939 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000301899	Northing (UTM 19) 4712370.364 (Meters)	Easting (UTM 19) 253465.281 (Meters)	Elevation 314.215 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 2004	
Date of Survey 4/15/2014				Ground Type Bare Earth	
Established by WOOLPERT, INC.	Latitude 42°22'46.27325" N	Longitude 72°06'35.41724" W	Ellipsoid Ht. 148.313 (Meters)	Geoid Ht. -28.139 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000273717	Northing (UTM 19) 4696601.057 (Meters)	Easting (UTM 19) 243974.963 (Meters)	Elevation 176.453 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 2005	
Date of Survey 4/13/2014				Ground Type Bare Earth	
Established by WOOLPERT, INC.	Latitude 42°18'45.22862" N	Longitude 72°12'27.05068" W	Ellipsoid Ht. 138.380 (Meters)	Geoid Ht. -28.189 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000230330	Northing (UTM 19) 4689464.520 (Meters)	Easting (UTM 19) 235652.093 (Meters)	Elevation 166.569 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 2006	
Date of Survey 4/17/2014				Ground Type Short Grass	
Established by WOOLPERT, INC.	Latitude 42°15'23.65534" N	Longitude 71°57'33.46771" W	Ellipsoid Ht. 276.612 (Meters)	Geoid Ht. -28.527 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000331210	Northing (UTM 19) 4682504.737 (Meters)	Easting (UTM 19) 255894.516 (Meters)	Elevation 305.138 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



NEW ENGLAND
CMGP SANDY LIDAR PROJECT



County, State				Station Description	
Worcester County, Massachusetts				QA/QC # 2007	
Date of Survey				Ground Type	
4/17/2014				Short Grass	
Established by WOOLPERT, INC.	Latitude 42°13'09.88064" N	Longitude 72°04'15.57323" W	Ellipsoid Ht. 160.309 (Meters)	Geoid Ht. -28.477 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000294382	Northing (UTM 19) 4678704.569 (Meters)	Easting (UTM 19) 246531.315 (Meters)	Elevation 188.785 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



Photogrammetric Ground Control Information Sheet

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 2008	
Date of Survey 4/15/2014				Ground Type Bare Earth	
Established by WOOLPERT, INC.	Latitude 42°12'46.19046" N	Longitude 72°11'35.08319" W	Ellipsoid Ht. 156.327 (Meters)	Geoid Ht. -28.336 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000236381	Northing (UTM 19) 4678344.342 (Meters)	Easting (UTM 19) 236426.370 (Meters)	Elevation 184.663 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 2009	
Date of Survey 4/16/2014				Ground Type Bare Earth	
Established by WOOLPERT, INC.	Latitude 42°06'46.95309" N	Longitude 72°05'24.03856" W	Ellipsoid Ht. 147.782 (Meters)	Geoid Ht. -28.683 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000289431	Northing (UTM 19) 4666949.275 (Meters)	Easting (UTM 19) 244533.427 (Meters)	Elevation 176.465 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 2010	
Date of Survey 4/16/2014				Ground Type Short Grass	
Established by WOOLPERT, INC.	Latitude 42°08'42.99117" N	Longitude 71°58'09.27255" W	Ellipsoid Ht. 244.754 (Meters)	Geoid Ht. -28.812 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000333869	Northing (UTM 19) 4670174.208 (Meters)	Easting (UTM 19) 254643.417 (Meters)	Elevation 273.566 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 2011	
Date of Survey 4/16/2014				Ground Type Short Grass	
Established by WOOLPERT, INC.	Latitude 42°04'16.73654" N	Longitude 71°51'59.95899" W	Ellipsoid Ht. 129.731 (Meters)	Geoid Ht. -29.160 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000407021	Northing (UTM 19) 4661671.384 (Meters)	Easting (UTM 19) 262845.434 (Meters)	Elevation 158.891 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 2012	
Date of Survey 4/14/2014				Ground Type Short Grass	
Established by WOOLPERT, INC.	Latitude 42°19'58.82078" N	Longitude 71°50'18.71641" W	Ellipsoid Ht. 188.976 (Meters)	Geoid Ht. -28.454 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000405681	Northing (UTM 19) 4690653.403 (Meters)	Easting (UTM 19) 266140.096 (Meters)	Elevation 217.429 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 2013	
Date of Survey 4/17/2014				Ground Type Short Grass	
Established by WOOLPERT, INC.	Latitude 42°16'03.58507" N	Longitude 71°47'39.25326" W	Ellipsoid Ht. 117.028 (Meters)	Geoid Ht. -28.652 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000442332	Northing (UTM 19) 4683276.298 (Meters)	Easting (UTM 19) 269551.403 (Meters)	Elevation 145.680 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Plymouth County, Massachusetts				Station Description QA/QC # 2014	
Date of Survey 12/16/2013				Ground Type Short Grass	
Established by WOOLPERT, INC.	Latitude 42°06'15.25678" N	Longitude 71°02'10.46229" W	Ellipsoid Ht. 24.166 (Meters)	Geoid Ht. -28.348 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000919420	Northing (UTM 19) 4663356.124 (Meters)	Easting (UTM 19) 331635.343 (Meters)	Elevation 52.514 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 2015	
Date of Survey 12/16/2013				Ground Type Short Grass	
Established by WOOLPERT, INC.	Latitude 42°14'45.27398" N	Longitude 71°45'32.74587" W	Ellipsoid Ht. 118.993 (Meters)	Geoid Ht. -28.723 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000461622	Northing (UTM 19) 4680766.150 (Meters)	Easting (UTM 19) 272371.509 (Meters)	Elevation 147.716 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Rockingham County, New Hampshire				Station Description QA/QC # 2016	
Date of Survey 4/13/2014				Ground Type Short Grass	
Established by WOOLPERT, INC.	Latitude 43°05'17.25862" N	Longitude 70°47'22.31187" W	Ellipsoid Ht. -11.775 (Meters)	Geoid Ht. -26.677 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001048318	Northing (UTM 19) 4772155.384 (Meters)	Easting (UTM 19) 354345.284 (Meters)	Elevation 14.902 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Rockingham County, New Hampshire				Station Description QA/QC # 2017	
Date of Survey 4/13/2014				Ground Type Short Grass	
Established by WOOLPERT, INC.	Latitude 42°51'58.30290" N	Longitude 70°50'58.99273" W	Ellipsoid Ht. -16.692 (Meters)	Geoid Ht. -26.887 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001018249	Northing (UTM 19) 4747615.689 (Meters)	Easting (UTM 19) 348903.617 (Meters)	Elevation 10.194 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Essex County, Massachusetts				Station Description QA/QC # 2018	
Date of Survey 4/12/2014				Ground Type Bare Earth	
Established by WOOLPERT, INC.	Latitude 42°41'03.98071" N	Longitude 70°50'45.62711" W	Ellipsoid Ht. -14.577 (Meters)	Geoid Ht. -26.904 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001028875	Northing (UTM 19) 4727425.284 (Meters)	Easting (UTM 19) 348765.111 (Meters)	Elevation 12.327 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Essex County, Massachusetts				Station Description QA/QC # 2019	
Date of Survey 4/12/2014				Ground Type Bare Earth	
Established by WOOLPERT, INC.	Latitude 42°34'44.60155" N	Longitude 70°45'31.69086" W	Ellipsoid Ht. -21.535 (Meters)	Geoid Ht. -26.893 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001095659	Northing (UTM 19) 4715570.539 (Meters)	Easting (UTM 19) 355666.190 (Meters)	Elevation 5.358 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Essex County, Massachusetts				Station Description QA/QC # 2020	
Date of Survey 12/19/2013				Ground Type Bare Earth	
Established by WOOLPERT, INC.	Latitude 42°32'03.15301" N	Longitude 70°52'16.79028" W	Ellipsoid Ht. -21.272 (Meters)	Geoid Ht. -27.000 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001019434	Northing (UTM 19) 4710788.537 (Meters)	Easting (UTM 19) 346321.445 (Meters)	Elevation 5.728 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Suffolk County, Massachusetts				Station Description QA/QC # 2021	
Date of Survey 12/19/2013				Ground Type Short Grass	
Established by WOOLPERT, INC.	Latitude 42°24'15.80404" N	Longitude 71°00'50.47747" W	Ellipsoid Ht. -24.904 (Meters)	Geoid Ht. -27.546 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000929227	Northing (UTM 19) 4696641.591 (Meters)	Easting (UTM 19) 334260.606 (Meters)	Elevation 2.641 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Norfolk County, Massachusetts				Station Description QA/QC # 2022	
Date of Survey 12/18/2013				Ground Type Short Grass	
Established by WOOLPERT, INC.	Latitude 42°16'48.72447" N	Longitude 71°02'12.78166" W	Ellipsoid Ht. -22.945 (Meters)	Geoid Ht. -27.944 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000918969	Northing (UTM 19) 4682896.277 (Meters)	Easting (UTM 19) 332048.784 (Meters)	Elevation 4.998 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Norfolk County, Massachusetts				Station Description QA/QC # 2023	
Date of Survey 12/18/2013				Ground Type Short Grass	
Established by WOOLPERT, INC.	Latitude 42°12'11.59460" N	Longitude 71°15'29.09208" W	Ellipsoid Ht. 60.511 (Meters)	Geoid Ht. -28.383 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000765892	Northing (UTM 19) 4674808.346 (Meters)	Easting (UTM 19) 313582.502 (Meters)	Elevation 88.894 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Plymouth County, Massachusetts				Station Description QA/QC # 2024	
Date of Survey 12/16/2013				Ground Type Short Grass	
Established by WOOLPERT, INC.	Latitude 42°01'17.98891" N	Longitude 70°41'58.46004" W	Ellipsoid Ht. -5.931 (Meters)	Geoid Ht. -28.194 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001162888	Northing (UTM 19) 4653578.747 (Meters)	Easting (UTM 19) 359291.041 (Meters)	Elevation 22.262 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



NEW ENGLAND
CMGP SANDY LIDAR PROJECT



County, State Barnstable County, Massachusetts				Station Description QA/QC # 2025	
Date of Survey 12/15/2013				Ground Type Short Grass	
Established by WOOLPERT, INC.	Latitude 42°03'11.01281" N	Longitude 70°11'24.93691" W	Ellipsoid Ht. -15.293 (Meters)	Geoid Ht. -27.608 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001555002	Northing (UTM 19) 4656352.653 (Meters)	Easting (UTM 19) 401506.667 (Meters)	Elevation 12.315 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Barnstable County, Massachusetts				Station Description QA/QC # 2026	
Date of Survey 12/14/2013				Ground Type Short Grass	
Established by WOOLPERT, INC.	Latitude 41°35'55.20829" N	Longitude 70°29'59.28126" W	Ellipsoid Ht. -13.138 (Meters)	Geoid Ht. -28.340 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001335688	Northing (UTM 19) 4606304.672 (Meters)	Easting (UTM 19) 375010.975 (Meters)	Elevation 15.202 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Nantucket County, Massachusetts				Station Description QA/QC # 2027	
Date of Survey 12/17/2013				Ground Type Short Grass	
Established by WOOLPERT, INC.	Latitude 41°15'11.65288" N	Longitude 69°58'20.96166" W	Ellipsoid Ht. -24.793 (Meters)	Geoid Ht. -28.826 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001791872	Northing (UTM 19) 4567325.331 (Meters)	Easting (UTM 19) 418525.474 (Meters)	Elevation 4.033 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



Photogrammetric Ground Control Information Sheet

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Nantucket County, Massachusetts				Station Description QA/QC # 2027A	
Date of Survey 12/17/2013				Ground Type Short Grass	
Established by WOOLPERT, INC.	Latitude 41°15'45.40769" N	Longitude 69°59'11.51355" W	Ellipsoid Ht. -22.524 (Meters)	Geoid Ht. -28.797 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001778654	Northing (UTM 19) 4568379.525 (Meters)	Easting (UTM 19) 417360.834 (Meters)	Elevation 6.273 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

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NEW ENGLAND
CMGP SANDY LIDAR PROJECT



County, State Dukes County, Massachusetts				Station Description QA/QC # 2028	
Date of Survey 12/14/2013				Ground Type Short Grass	
Established by WOOLPERT, INC.	Latitude 41°22'26.18896" N	Longitude 70°28'17.17576" W	Ellipsoid Ht. -22.485 (Meters)	Geoid Ht. -28.787 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001371441	Northing (UTM 19) 4581313.943 (Meters)	Easting (UTM 19) 376950.144 (Meters)	Elevation 6.302 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Dukes County, Massachusetts				Station Description QA/QC # 2028A	
Date of Survey 12/14/2013				Ground Type Short Grass	
Established by WOOLPERT, INC.	Latitude 41°23'16.48097" N	Longitude 70°33'37.99456" W	Ellipsoid Ht. -17.874 (Meters)	Geoid Ht. -28.837 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001300972	Northing (UTM 19) 4582995.290 (Meters)	Easting (UTM 19) 369525.441 (Meters)	Elevation 10.963 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Washington County, Rhode Island				Station Description QA/QC # 2029	
Date of Survey 12/13/2013				Ground Type Short Grass	
Established by WOOLPERT, INC.	Latitude 41°09'50.59660" N	Longitude 71°33'35.80247" W	Ellipsoid Ht. 1.852 (Meters)	Geoid Ht. -30.755 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000625757	Northing (UTM 19) 4560128.137 (Meters)	Easting (UTM 19) 285229.732 (Meters)	Elevation 32.607 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Washington County, Rhode Island				Station Description QA/QC # 2030	
Date of Survey 12/12/2013				Ground Type Short Grass	
Established by WOOLPERT, INC.	Latitude 41°20'31.08852" N	Longitude 71°46'08.12083" W	Ellipsoid Ht. -20.645 (Meters)	Geoid Ht. -30.597 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000503351	Northing (UTM 19) 4580419.341 (Meters)	Easting (UTM 19) 268325.483 (Meters)	Elevation 9.952 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Hampshire County, Massachusetts				Station Description QA/QC # 2031	
Date of Survey 4/13/2014				Ground Type Bare Earth	
Established by WOOLPERT, INC.	Latitude 42°21'39.52310" N	Longitude 72°41'27.89226" W	Ellipsoid Ht. 97.703 (Meters)	Geoid Ht. -28.586 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000029671	Northing (UTM 19) 4696458.637 (Meters)	Easting (UTM 19) 196027.548 (Meters)	Elevation 126.289 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Hampshire County, Massachusetts				Station Description QA/QC # 2032	
Date of Survey 4/12/2014				Ground Type Bare Earth	
Established by WOOLPERT, INC.	Latitude 42°19'04.56660" N	Longitude 72°41'38.57482" W	Ellipsoid Ht. 58.005 (Meters)	Geoid Ht. -28.674 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000035354	Northing (UTM 19) 4691688.981 (Meters)	Easting (UTM 19) 195575.274 (Meters)	Elevation 86.679 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 3000	
Date of Survey 4/14/2014				Ground Type Asphalt	
Established by WOOLPERT, INC.	Latitude 42°35'32.78503" N	Longitude 72°13'48.90373" W	Ellipsoid Ht. 137.372 (Meters)	Geoid Ht. -27.961 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000214168	Northing (UTM 19) 4720616.776 (Meters)	Easting (UTM 19) 234962.073 (Meters)	Elevation 165.333 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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NEW ENGLAND
CMGP SANDY LIDAR PROJECT



County, State Worcester County, Massachusetts				Station Description QA/QC # 3001	
Date of Survey 4/14/2014				Ground Type Urban	
Established by WOOLPERT, INC.	Latitude 42°41'09.96155" N	Longitude 72°02'42.76320" W	Ellipsoid Ht. 273.534 (Meters)	Geoid Ht. -27.690 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000278487	Northing (UTM 19) 4730454.835 (Meters)	Easting (UTM 19) 250520.367 (Meters)	Elevation 301.223 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 3002	
Date of Survey 4/14/2014				Ground Type Urban	
Established by WOOLPERT, INC.	Latitude 42°33'32.09973" N	Longitude 71°59'24.72563" W	Ellipsoid Ht. 275.511 (Meters)	Geoid Ht. -27.888 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000308385	Northing (UTM 19) 4716169.511 (Meters)	Easting (UTM 19) 254527.833 (Meters)	Elevation 303.399 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 3003	
Date of Survey 4/14/2014				Ground Type Urban	
Established by WOOLPERT, INC.	Latitude 42°28'52.88056" N	Longitude 72°00'53.02967" W	Ellipsoid Ht. 283.793 (Meters)	Geoid Ht. -28.014 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000296729	Northing (UTM 19) 4707627.623 (Meters)	Easting (UTM 19) 252207.457 (Meters)	Elevation 311.807 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 3004	
Date of Survey 4/14/2014				Ground Type Urban	
Established by WOOLPERT, INC.	Latitude 42°25'20.49079" N	Longitude 72°06'16.57616" W	Ellipsoid Ht. 247.256 (Meters)	Geoid Ht. -28.066 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000259792	Northing (UTM 19) 4701342.542 (Meters)	Easting (UTM 19) 244579.866 (Meters)	Elevation 275.322 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 3005	
Date of Survey 4/13/2014				Ground Type Urban	
Established by WOOLPERT, INC.	Latitude 42°18'46.10403" N	Longitude 72°12'28.70121" W	Ellipsoid Ht. 140.533 (Meters)	Geoid Ht. -28.189 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000229773	Northing (UTM 19) 4689492.950 (Meters)	Easting (UTM 19) 235615.322 (Meters)	Elevation 168.722 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 3006	
Date of Survey 12/17/2013				Ground Type Urban	
Established by WOOLPERT, INC.	Latitude 42°14'44.88782" N	Longitude 71°54'47.25978" W	Ellipsoid Ht. 251.660 (Meters)	Geoid Ht. -28.610 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000359107	Northing (UTM 19) 4681177.525 (Meters)	Easting (UTM 19) 259662.283 (Meters)	Elevation 280.270 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 3007	
Date of Survey 12/17/2013				Ground Type Urban	
Established by WOOLPERT, INC.	Latitude 42°13'24.93218" N	Longitude 72°03'36.39164" W	Ellipsoid Ht. 163.301 (Meters)	Geoid Ht. -28.485 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000299177	Northing (UTM 19) 4679136.532 (Meters)	Easting (UTM 19) 247446.386 (Meters)	Elevation 191.786 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Worcester County, Massachusetts				QA/QC # 3008	
Date of Survey				Ground Type	
4/15/2014				Urban	
Established by WOOLPERT, INC.	Latitude 42°12'45.39764" N	Longitude 72°11'36.88482" W	Ellipsoid Ht. 156.302 (Meters)	Geoid Ht. -28.336 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000236154	Northing (UTM 19) 4678321.435 (Meters)	Easting (UTM 19) 236384.139 (Meters)	Elevation 184.639 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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NEW ENGLAND
CMGP SANDY LIDAR PROJECT



County, State Worcester County, Massachusetts				Station Description QA/QC # 3009	
Date of Survey 12/16/2013				Ground Type Urban	
Established by WOOLPERT, INC.	Latitude 42°04'33.35918" N	Longitude 72°02'08.09168" W	Ellipsoid Ht. 125.877 (Meters)	Geoid Ht. -28.903 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000320656	Northing (UTM 19) 4662666.915 (Meters)	Easting (UTM 19) 248887.338 (Meters)	Elevation 154.780 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 3010	
Date of Survey 12/16/2013				Ground Type Urban	
Established by WOOLPERT, INC.	Latitude 42°08'47.33249" N	Longitude 71°58'42.15131" W	Ellipsoid Ht. 235.992 (Meters)	Geoid Ht. -28.795 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000330561	Northing (UTM 19) 4670334.432 (Meters)	Easting (UTM 19) 253893.341 (Meters)	Elevation 264.787 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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NEW ENGLAND
CMGP SANDY LIDAR PROJECT



County, State Worcester County, Massachusetts				Station Description QA/QC # 3011	
Date of Survey 12/16/2013				Ground Type Urban	
Established by WOOLPERT, INC.	Latitude 42°03'39.39406" N	Longitude 71°51'48.28231" W	Ellipsoid Ht. 113.245 (Meters)	Geoid Ht. -29.190 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000411591	Northing (UTM 19) 4660510.531 (Meters)	Easting (UTM 19) 263075.189 (Meters)	Elevation 142.435 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 3012	
Date of Survey 4/14/2014				Ground Type Urban	
Established by WOOLPERT, INC.	Latitude 42°20'20.92447" N	Longitude 71°50'54.97953" W	Ellipsoid Ht. 197.898 (Meters)	Geoid Ht. -28.431 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000398802	Northing (UTM 19) 4691362.992 (Meters)	Easting (UTM 19) 265332.983 (Meters)	Elevation 226.329 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 3013	
Date of Survey 12/17/2013				Ground Type Urban	
Established by WOOLPERT, INC.	Latitude 42°16'02.82890" N	Longitude 71°47'43.41164" W	Ellipsoid Ht. 115.944 (Meters)	Geoid Ht. -28.653 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000441887	Northing (UTM 19) 4683256.102 (Meters)	Easting (UTM 19) 269455.365 (Meters)	Elevation 144.597 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 3014	
Date of Survey 12/16/2013				Ground Type Urban	
Established by WOOLPERT, INC.	Latitude 42°05'47.62690" N	Longitude 71°03'00.17584" W	Ellipsoid Ht. 23.243 (Meters)	Geoid Ht. -28.382 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000910670	Northing (UTM 19) 4662531.222 (Meters)	Easting (UTM 19) 330473.031 (Meters)	Elevation 51.625 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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NEW ENGLAND
CMGP SANDY LIDAR PROJECT



County, State Worcester County, Massachusetts				Station Description QA/QC # 3015	
Date of Survey 12/17/2013				Ground Type Urban	
Established by WOOLPERT, INC.	Latitude 42°14'47.39814" N	Longitude 71°45'32.68076" W	Ellipsoid Ht. 118.558 (Meters)	Geoid Ht. -28.721 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000461684	Northing (UTM 19) 4680831.624 (Meters)	Easting (UTM 19) 272375.124 (Meters)	Elevation 147.279 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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NEW ENGLAND
CMGP SANDY LIDAR PROJECT



County, State Rockingham County, New Hampshire				Station Description QA/QC # 3016	
Date of Survey 12/16/2013				Ground Type Urban	
Established by WOOLPERT, INC.	Latitude 43°05'16.48872" N	Longitude 70°47'20.03236" W	Ellipsoid Ht. -12.047 (Meters)	Geoid Ht. -26.676 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001048807	Northing (UTM 19) 4772130.534 (Meters)	Easting (UTM 19) 354396.316 (Meters)	Elevation 14.629 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Essex County, Massachusetts				Station Description QA/QC # 3017	
Date of Survey 4/13/2014				Ground Type Urban	
Established by WOOLPERT, INC.	Latitude 42°48'32.74405" N	Longitude 70°52'31.99902" W	Ellipsoid Ht. -8.309 (Meters)	Geoid Ht. -26.945 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001001953	Northing (UTM 19) 4741321.474 (Meters)	Easting (UTM 19) 346652.013 (Meters)	Elevation 18.636 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Essex County, Massachusetts				Station Description QA/QC # 3018	
Date of Survey 4/12/2014				Ground Type Urban	
Established by WOOLPERT, INC.	Latitude 42°40'47.18670" N	Longitude 70°50'23.79859" W	Ellipsoid Ht. -22.535 (Meters)	Geoid Ht. -26.897 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001034512	Northing (UTM 19) 4726896.414 (Meters)	Easting (UTM 19) 349250.596 (Meters)	Elevation 4.362 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Essex County, Massachusetts				Station Description QA/QC # 3019	
Date of Survey 4/12/2014				Ground Type Urban	
Established by WOOLPERT, INC.	Latitude 42°37'00.90917" N	Longitude 70°40'00.14857" W	Ellipsoid Ht. -12.007 (Meters)	Geoid Ht. -26.801 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001157859	Northing (UTM 19) 4719622.130 (Meters)	Easting (UTM 19) 363306.846 (Meters)	Elevation 14.794 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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NEW ENGLAND
CMGP SANDY LIDAR PROJECT



County, State Essex County, Massachusetts				Station Description QA/QC # 3020	
Date of Survey 12/19/2013				Ground Type Urban	
Established by WOOLPERT, INC.	Latitude 42°32'02.03895" N	Longitude 70°52'15.65098" W	Ellipsoid Ht. -21.344 (Meters)	Geoid Ht. -27.001 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001019677	Northing (UTM 19) 4710753.598 (Meters)	Easting (UTM 19) 346346.676 (Meters)	Elevation 5.657 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Suffolk County, Massachusetts				Station Description QA/QC # 3021	
Date of Survey 12/19/2013				Ground Type Urban	
Established by WOOLPERT, INC.	Latitude 42°24'11.67706" N	Longitude 71°01'00.84049" W	Ellipsoid Ht. -24.070 (Meters)	Geoid Ht. -27.553 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000927229	Northing (UTM 19) 4696519.915 (Meters)	Easting (UTM 19) 334020.685 (Meters)	Elevation 3.483 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Norfolk County, Massachusetts				Station Description QA/QC # 3022	
Date of Survey 12/18/2013				Ground Type Urban	
Established by WOOLPERT, INC.	Latitude 42°16'48.45731" N	Longitude 71°02'09.15661" W	Ellipsoid Ht. -24.684 (Meters)	Geoid Ht. -27.943 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000919914	Northing (UTM 19) 4682886.051 (Meters)	Easting (UTM 19) 332131.620 (Meters)	Elevation 3.259 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Norfolk County, Massachusetts				Station Description QA/QC # 3023	
Date of Survey 12/18/2013				Ground Type Urban	
Established by WOOLPERT, INC.	Latitude 42°11'45.49732" N	Longitude 71°11'50.07394" W	Ellipsoid Ht. 13.855 (Meters)	Geoid Ht. -28.343 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000812055	Northing (UTM 19) 4673872.131 (Meters)	Easting (UTM 19) 318584.559 (Meters)	Elevation 42.198 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Plymouth County, Massachusetts				Station Description QA/QC # 3024	
Date of Survey 12/13/2013				Ground Type Urban	
Established by WOOLPERT, INC.	Latitude 41°57'22.10667" N	Longitude 70°39'59.92113" W	Ellipsoid Ht. 1.314 (Meters)	Geoid Ht. -28.274 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001189095	Northing (UTM 19) 4646249.882 (Meters)	Easting (UTM 19) 361875.600 (Meters)	Elevation 29.588 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



Photogrammetric Ground Control Information Sheet

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Plymouth County, Massachusetts				Station Description QA/QC # 3024A	
Date of Survey 12/16/2013				Ground Type Urban	
Established by WOOLPERT, INC.	Latitude 41°57'22.46867" N	Longitude 70°39'59.71525" W	Ellipsoid Ht. 1.464 (Meters)	Geoid Ht. -28.273 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001189095	Northing (UTM 19) 4646260.955 (Meters)	Easting (UTM 19) 361880.557 (Meters)	Elevation 29.737 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Barnstable County, Massachusetts				Station Description QA/QC # 3025	
Date of Survey 12/15/2013				Ground Type Urban	
Established by WOOLPERT, INC.	Latitude 42°03'01.37224" N	Longitude 70°11'06.91405" W	Ellipsoid Ht. -24.763 (Meters)	Geoid Ht. -27.613 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001560728	Northing (UTM 19) 4656049.563 (Meters)	Easting (UTM 19) 401916.825 (Meters)	Elevation 2.849 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Barnstable County, Massachusetts				Station Description QA/QC # 3026	
Date of Survey 12/14/2013				Ground Type Urban	
Established by WOOLPERT, INC.	Latitude 41°33'21.71504" N	Longitude 70°35'56.00108" W	Ellipsoid Ht. -23.743 (Meters)	Geoid Ht. -28.625 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001263936	Northing (UTM 19) 4601719.152 (Meters)	Easting (UTM 19) 366665.258 (Meters)	Elevation 4.882 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Nantucket County, Massachusetts				Station Description QA/QC # 3027	
Date of Survey 12/17/2013				Ground Type Urban	
Established by WOOLPERT, INC.	Latitude 41°16'06.15284" N	Longitude 70°05'49.97670" W	Ellipsoid Ht. -21.235 (Meters)	Geoid Ht. -28.780 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001682906	Northing (UTM 19) 4569130.472 (Meters)	Easting (UTM 19) 408097.046 (Meters)	Elevation 7.545 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Dukes County, Massachusetts				Station Description QA/QC # 3028	
Date of Survey 12/14/2013				Ground Type Urban	
Established by WOOLPERT, INC.	Latitude 41°23'20.79614" N	Longitude 70°31'23.08738" W	Ellipsoid Ht. -22.745 (Meters)	Geoid Ht. -28.785 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001330510	Northing (UTM 19) 4583072.608 (Meters)	Easting (UTM 19) 372661.015 (Meters)	Elevation 6.041 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Washington County, Rhode Island				Station Description QA/QC # 3029	
Date of Survey 12/13/2013				Ground Type Urban	
Established by WOOLPERT, INC.	Latitude 41°10'10.21460" N	Longitude 71°33'22.31206" W	Ellipsoid Ht. -12.486 (Meters)	Geoid Ht. -30.745 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000630070	Northing (UTM 19) 4560723.930 (Meters)	Easting (UTM 19) 285561.929 (Meters)	Elevation 18.259 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

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NEW ENGLAND
CMGP SANDY LIDAR PROJECT



County, State Washington County, Rhode Island				Station Description QA/QC # 3030	
Date of Survey 12/12/2013				Ground Type Urban	
Established by WOOLPERT, INC.	Latitude 41°20'31.59590" N	Longitude 71°46'06.86398" W	Ellipsoid Ht. -20.249 (Meters)	Geoid Ht. -30.596 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000503480	Northing (UTM 19) 4580434.056 (Meters)	Easting (UTM 19) 268355.197 (Meters)	Elevation 10.348 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Hampshire County, Massachusetts				Station Description QA/QC # 3031	
Date of Survey 4/12/2014				Ground Type Urban	
Established by WOOLPERT, INC.	Latitude 42°20'10.66637" N	Longitude 72°40'09.85123" W	Ellipsoid Ht. 53.759 (Meters)	Geoid Ht. -28.656 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000045307	Northing (UTM 19) 4693640.105 (Meters)	Easting (UTM 19) 197694.609 (Meters)	Elevation 82.415 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Hampshire County, Massachusetts				Station Description QA/QC # 3032	
Date of Survey 4/12/2014				Ground Type Urban	
Established by WOOLPERT, INC.	Latitude 42°19'03.82547" N	Longitude 72°41'38.69489" W	Ellipsoid Ht. 57.566 (Meters)	Geoid Ht. -28.675 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000035412	Northing (UTM 19) 4691666.238 (Meters)	Easting (UTM 19) 195571.531 (Meters)	Elevation 86.241 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



Photogrammetric Ground Control Information Sheet

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 4000	
Date of Survey 4/15/2014				Ground Type Weeds	
Established by WOOLPERT, INC.	Latitude 42°40'32.12374" N	Longitude 72°11'19.14581" W	Ellipsoid Ht. 285.340 (Meters)	Geoid Ht. -27.814 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000208491	Northing (UTM 19) 4729721.466 (Meters)	Easting (UTM 19) 238723.992 (Meters)	Elevation 313.153 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



Photogrammetric Ground Control Information Sheet

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 4001	
Date of Survey 4/15/2014				Ground Type Tall Grass	
Established by WOOLPERT, INC.	Latitude 42°41'11.06486" N	Longitude 72°02'45.49979" W	Ellipsoid Ht. 273.543 (Meters)	Geoid Ht. -27.690 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000278107	Northing (UTM 19) 4730491.118 (Meters)	Easting (UTM 19) 250459.313 (Meters)	Elevation 301.232 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 4002	
Date of Survey 4/14/2014				Ground Type Weeds	
Established by WOOLPERT, INC.	Latitude 42°29'09.19479" N	Longitude 72°11'30.11156" W	Ellipsoid Ht. 293.992 (Meters)	Geoid Ht. -27.983 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000209722	Northing (UTM 19) 4708663.508 (Meters)	Easting (UTM 19) 237679.481 (Meters)	Elevation 321.975 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 4003	
Date of Survey 4/14/2014				Ground Type Tall Grass	
Established by WOOLPERT, INC.	Latitude 42°31'14.04727" N	Longitude 72°00'10.32742" W	Ellipsoid Ht. 291.029 (Meters)	Geoid Ht. -27.944 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000300560	Northing (UTM 19) 4711947.695 (Meters)	Easting (UTM 19) 253336.833 (Meters)	Elevation 318.973 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 4004	
Date of Survey 4/14/2014				Ground Type Weeds	
Established by WOOLPERT, INC.	Latitude 42°23'49.61730" N	Longitude 72°06'43.24382" W	Ellipsoid Ht. 233.498 (Meters)	Geoid Ht. -28.105 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000258937	Northing (UTM 19) 4698561.629 (Meters)	Easting (UTM 19) 243867.582 (Meters)	Elevation 261.603 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 4005	
Date of Survey 4/13/2014				Ground Type Weeds	
Established by WOOLPERT, INC.	Latitude 42°18'45.55359" N	Longitude 72°11'41.98539" W	Ellipsoid Ht. 165.064 (Meters)	Geoid Ht. -28.188 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000232012	Northing (UTM 19) 4689435.696 (Meters)	Easting (UTM 19) 236684.257 (Meters)	Elevation 193.251 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 4006	
Date of Survey 12/17/2013				Ground Type Tall Grass	
Established by WOOLPERT, INC.	Latitude 42°15'26.71264" N	Longitude 71°57'36.87682" W	Ellipsoid Ht. 278.224 (Meters)	Geoid Ht. -28.523 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000330454	Northing (UTM 19) 4682601.761 (Meters)	Easting (UTM 19) 255819.676 (Meters)	Elevation 306.748 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 4007	
Date of Survey 12/17/2013				Ground Type Tall Grass	
Established by WOOLPERT, INC.	Latitude 42°13'24.81949" N	Longitude 72°03'35.36206" W	Ellipsoid Ht. 163.585 (Meters)	Geoid Ht. -28.485 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000299274	Northing (UTM 19) 4679132.207 (Meters)	Easting (UTM 19) 247469.866 (Meters)	Elevation 192.070 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 4008	
Date of Survey 4/15/2014				Ground Type Weeds	
Established by WOOLPERT, INC.	Latitude 42°12'59.58050" N	Longitude 72°12'45.33661" W	Ellipsoid Ht. 145.538 (Meters)	Geoid Ht. -28.330 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000228831	Northing (UTM 19) 4678817.960 (Meters)	Easting (UTM 19) 234830.924 (Meters)	Elevation 173.868 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 4009	
Date of Survey 12/16/2013				Ground Type Tall Grass	
Established by WOOLPERT, INC.	Latitude 42°06'43.09916" N	Longitude 72°05'31.46995" W	Ellipsoid Ht. 144.386 (Meters)	Geoid Ht. -28.681 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000288975	Northing (UTM 19) 4666836.576 (Meters)	Easting (UTM 19) 244358.441 (Meters)	Elevation 173.068 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 4010	
Date of Survey 12/16/2013				Ground Type Tall Grass	
Established by WOOLPERT, INC.	Latitude 42°08'41.40968" N	Longitude 71°58'57.04767" W	Ellipsoid Ht. 222.300 (Meters)	Geoid Ht. -28.793 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000330643	Northing (UTM 19) 4670163.681 (Meters)	Easting (UTM 19) 253545.004 (Meters)	Elevation 251.094 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 4011	
Date of Survey 12/16/2013				Ground Type Tall Grass	
Established by WOOLPERT, INC.	Latitude 42°04'06.34073" N	Longitude 71°51'29.82045" W	Ellipsoid Ht. 132.626 (Meters)	Geoid Ht. -29.174 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000411074	Northing (UTM 19) 4661327.512 (Meters)	Easting (UTM 19) 263527.355 (Meters)	Elevation 161.800 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 4012	
Date of Survey 4/14/2014				Ground Type Tall Grass	
Established by WOOLPERT, INC.	Latitude 42°19'59.93921" N	Longitude 71°50'18.66161" W	Ellipsoid Ht. 189.029 (Meters)	Geoid Ht. -28.453 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000405672	Northing (UTM 19) 4690687.861 (Meters)	Easting (UTM 19) 266142.502 (Meters)	Elevation 217.482 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 4013	
Date of Survey 12/17/2013				Ground Type Tall Grass	
Established by WOOLPERT, INC.	Latitude 42°16'14.57327" N	Longitude 71°47'10.76609" W	Ellipsoid Ht. 196.003 (Meters)	Geoid Ht. -28.643 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000434137	Northing (UTM 19) 4683593.849 (Meters)	Easting (UTM 19) 270215.164 (Meters)	Elevation 224.646 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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USGS/NGTOC



NEW ENGLAND
CMGP SANDY LIDAR PROJECT



County, State Norfolk County, Massachusetts				Station Description QA/QC # 4014	
Date of Survey 12/16/2013				Ground Type Tall Grass	
Established by WOOLPERT, INC.	Latitude 42°06'31.97167" N	Longitude 71°03'23.46285" W	Ellipsoid Ht. 45.677 (Meters)	Geoid Ht. -28.354 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000902336	Northing (UTM 19) 4663911.847 (Meters)	Easting (UTM 19) 329971.020 (Meters)	Elevation 74.031 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 4015	
Date of Survey 12/16/2013				Ground Type Tall Grass	
Established by WOOLPERT, INC.	Latitude 42°14'46.46522" N	Longitude 71°45'26.98442" W	Ellipsoid Ht. -28.723 (Meters)	Geoid Ht. -28.354 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000462751	Northing (UTM 19) 4680798.618 (Meters)	Easting (UTM 19) 272504.744 (Meters)	Elevation 146.006 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Rockingham County, New Hampshire				Station Description QA/QC # 4016	
Date of Survey 4/13/2014				Ground Type Tall Grass	
Established by WOOLPERT, INC.	Latitude 43°05'07.46440" N	Longitude 70°47'34.54076" W	Ellipsoid Ht. -13.504 (Meters)	Geoid Ht. -26.682 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001046383	Northing (UTM 19) 4771859.156 (Meters)	Easting (UTM 19) 354062.334 (Meters)	Elevation 13.178 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Rockingham County, New Hampshire				Station Description QA/QC # 4017	
Date of Survey 4/13/2014				Ground Type Tall Grass	
Established by WOOLPERT, INC.	Latitude 42°52'09.12751" N	Longitude 70°50'21.00469" W	Ellipsoid Ht. -25.408 (Meters)	Geoid Ht. -26.874 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001026692	Northing (UTM 19) 4747930.714 (Meters)	Easting (UTM 19) 349772.904 (Meters)	Elevation 1.466 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Essex County, Massachusetts				Station Description QA/QC # 4018	
Date of Survey 4/12/2014				Ground Type Tall Grass	
Established by WOOLPERT, INC.	Latitude 42°41'34.02948" N	Longitude 70°49'29.87676" W	Ellipsoid Ht. -21.162 (Meters)	Geoid Ht. -26.882 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001044024	Northing (UTM 19) 4728314.725 (Meters)	Easting (UTM 19) 350509.038 (Meters)	Elevation 5.720 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Essex County, Massachusetts				Station Description QA/QC # 4019	
Date of Survey 4/12/2014				Ground Type Tall Grass	
Established by WOOLPERT, INC.	Latitude 42°34'37.86179" N	Longitude 70°44'10.80967" W	Ellipsoid Ht. -23.968 (Meters)	Geoid Ht. -26.888 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001112005	Northing (UTM 19) 4715324.584 (Meters)	Easting (UTM 19) 357505.699 (Meters)	Elevation 2.920 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Essex County, Massachusetts				Station Description QA/QC # 4020	
Date of Survey 12/19/2013				Ground Type Tall Grass	
Established by WOOLPERT, INC.	Latitude 42°31'33.74409" N	Longitude 70°52'57.74781" W	Ellipsoid Ht. -24.084 (Meters)	Geoid Ht. -27.023 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001012442	Northing (UTM 19) 4709902.099 (Meters)	Easting (UTM 19) 345366.941 (Meters)	Elevation 2.939 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Suffolk County, Massachusetts				Station Description QA/QC # 4021	
Date of Survey 12/19/2013				Ground Type Tall Grass	
Established by WOOLPERT, INC.	Latitude 42°23'25.85912" N	Longitude 70°59'32.02086" W	Ellipsoid Ht. -24.359 (Meters)	Geoid Ht. -27.549 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000944289	Northing (UTM 19) 4695058.727 (Meters)	Easting (UTM 19) 336017.987 (Meters)	Elevation 3.190 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Norfolk County, Massachusetts				Station Description QA/QC # 4022	
Date of Survey 12/19/2013				Ground Type Tall Grass	
Established by WOOLPERT, INC.	Latitude 42°14'36.91678" N	Longitude 71°02'02.93906" W	Ellipsoid Ht. 25.269 (Meters)	Geoid Ht. -28.036 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000914775	Northing (UTM 19) 4678825.325 (Meters)	Easting (UTM 19) 332177.118 (Meters)	Elevation 53.304 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Norfolk County, Massachusetts				Station Description QA/QC # 4023	
Date of Survey 12/16/2013				Ground Type Tall Grass	
Established by WOOLPERT, INC.	Latitude 42°12'11.69533" N	Longitude 71°15'31.11372" W	Ellipsoid Ht. 61.190 (Meters)	Geoid Ht. -28.383 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000765431	Northing (UTM 19) 4674812.681 (Meters)	Easting (UTM 19) 313536.222 (Meters)	Elevation 89.573 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Plymouth County, Massachusetts				Station Description QA/QC # 4024	
Date of Survey 12/16/2013				Ground Type Tall Grass	
Established by WOOLPERT, INC.	Latitude 42°00'10.52198" N	Longitude 70°43'01.64473" W	Ellipsoid Ht. -24.224 (Meters)	Geoid Ht. -28.264 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001153934	Northing (UTM 19) 4651526.885 (Meters)	Easting (UTM 19) 357796.157 (Meters)	Elevation 4.040 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Barnstable County, Massachusetts				Station Description QA/QC # 4025	
Date of Survey 12/15/2013				Ground Type Tall Grass	
Established by WOOLPERT, INC.	Latitude 42°03'20.05921" N	Longitude 70°11'36.50373" W	Ellipsoid Ht. -23.904 (Meters)	Geoid Ht. -27.603 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001553584	Northing (UTM 19) 4656635.371 (Meters)	Easting (UTM 19) 401244.682 (Meters)	Elevation 3.699 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Barnstable County, Massachusetts				Station Description QA/QC # 4026	
Date of Survey 12/14/2013				Ground Type Tall Grass	
Established by WOOLPERT, INC.	Latitude 41°33'30.89033" N	Longitude 70°35'32.99226" W	Ellipsoid Ht. -26.441 (Meters)	Geoid Ht. -28.606 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001269060	Northing (UTM 19) 4601992.273 (Meters)	Easting (UTM 19) 367203.481 (Meters)	Elevation 2.165 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Nantucket County, Massachusetts				Station Description QA/QC # 4027	
Date of Survey 12/17/2013				Ground Type Tall Grass	
Established by WOOLPERT, INC.	Latitude 41°15'46.06913" N	Longitude 69°59'10.26905" W	Ellipsoid Ht. -24.061 (Meters)	Geoid Ht. -28.797 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001779183	Northing (UTM 19) 4568399.593 (Meters)	Easting (UTM 19) 417390.024 (Meters)	Elevation 4.736 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Dukes County, Massachusetts				Station Description QA/QC # 4028	
Date of Survey 12/14/2013				Ground Type Short Grass	
Established by WOOLPERT, INC.	Latitude 41°23'01.24744" N	Longitude 70°29'56.30525" W	Ellipsoid Ht. -28.560 (Meters)	Geoid Ht. -28.778 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001350395	Northing (UTM 19) 4582434.587 (Meters)	Easting (UTM 19) 374666.068 (Meters)	Elevation 0.218 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Dukes County, Massachusetts				Station Description QA/QC # 4028A	
Date of Survey 12/14/2013				Ground Type Tall Grass	
Established by WOOLPERT, INC.	Latitude 41°23'08.86509" N	Longitude 70°32'07.70938" W	Ellipsoid Ht. -21.690 (Meters)	Geoid Ht. -28.809 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001320956	Northing (UTM 19) 4582722.953 (Meters)	Easting (UTM 19) 371618.162 (Meters)	Elevation 7.120 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Washington County, Rhode Island				Station Description QA/QC # 4029	
Date of Survey 12/13/2013				Ground Type Tall Grass	
Established by WOOLPERT, INC.	Latitude 41°09'29.92665" N	Longitude 71°33'56.07073" W	Ellipsoid Ht. 10.913 (Meters)	Geoid Ht. -30.767 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000621159	Northing (UTM 19) 4559504.572 (Meters)	Easting (UTM 19) 284738.546 (Meters)	Elevation 41.680 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Washington County, Rhode Island				Station Description QA/QC # 4030	
Date of Survey 12/12/2013				Ground Type Crops	
Established by WOOLPERT, INC.	Latitude 41°20'21.65834" N	Longitude 71°46'04.89734" W	Ellipsoid Ht. -27.557 (Meters)	Geoid Ht. -30.602 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000505006	Northing (UTM 19) 4580126.098 (Meters)	Easting (UTM 19) 268391.122 (Meters)	Elevation 3.044 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Hampshire County, Massachusetts				Station Description QA/QC # 4031	
Date of Survey 4/12/2014				Ground Type Weeds	
Established by WOOLPERT, INC.	Latitude 42°20'01.60062" N	Longitude 72°40'43.87550" W	Ellipsoid Ht. 43.263 (Meters)	Geoid Ht. -28.657 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000043312	Northing (UTM 19) 4693394.108 (Meters)	Easting (UTM 19) 196903.762 (Meters)	Elevation 71.921 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Hampshire County, Massachusetts				Station Description QA/QC # 4032	
Date of Survey 4/12/2014				Ground Type Weeds	
Established by WOOLPERT, INC.	Latitude 42°18'58.52168" N	Longitude 72°43'00.70138" W	Ellipsoid Ht. 74.100 (Meters)	Geoid Ht. -28.655 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000024104	Northing (UTM 19) 4691584.482 (Meters)	Easting (UTM 19) 193686.868 (Meters)	Elevation 102.755 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 5000	
Date of Survey 4/15/2014				Ground Type Brush	
Established by WOOLPERT, INC.	Latitude 42°40'31.86425" N	Longitude 72°11'18.38294" W	Ellipsoid Ht. 285.663 (Meters)	Geoid Ht. -27.814 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000208541	Northing (UTM 19) 4729712.805 (Meters)	Easting (UTM 19) 238741.054 (Meters)	Elevation 313.477 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 5002	
Date of Survey 4/14/2014				Ground Type Brush	
Established by WOOLPERT, INC.	Latitude 42°29'08.36033" N	Longitude 72°11'30.81264" W	Ellipsoid Ht. 294.620 (Meters)	Geoid Ht. -27.984 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000209537	Northing (UTM 19) 4708638.370 (Meters)	Easting (UTM 19) 237662.504 (Meters)	Elevation 322.604 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 5003	
Date of Survey 4/14/2014				Ground Type Brush	
Established by WOOLPERT, INC.	Latitude 42°33'13.13803" N	Longitude 71°59'33.09876" W	Ellipsoid Ht. 277.936 (Meters)	Geoid Ht. -27.897 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000306971	Northing (UTM 19) 4715591.329 (Meters)	Easting (UTM 19) 254316.201 (Meters)	Elevation 305.833 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 5004	
Date of Survey 4/14/2014				Ground Type Brush	
Established by WOOLPERT, INC.	Latitude 42°23'48.52179" N	Longitude 72°06'42.17064" W	Ellipsoid Ht. 231.592 (Meters)	Geoid Ht. -28.106 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000259386	Northing (UTM 19) 4698526.936 (Meters)	Easting (UTM 19) 243890.881 (Meters)	Elevation 259.698 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Worcester County, Massachusetts				QA/QC # 5005	
Date of Survey				Ground Type	
4/13/2014				Brush	
Established by	Latitude	Longitude	Ellipsoid Ht.	Geoid Ht.	Horizontal Datum
WOOLPERT, INC.	42°18'46.43106" N	72°11'40.28933" W	166.131 (Meters)	-28.188 (Meters)	NAD 83 (2011)
Combined Scale Factor	Northing (UTM 19) 4689461.304 (Meters)	Easting (UTM 19) 236724.105 (Meters)	Elevation 194.318 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 5006	
Date of Survey 12/17/2013				Ground Type Tall Grass	
Established by WOOLPERT, INC.	Latitude 42°15'27.18328" N	Longitude 71°57'37.38081" W	Ellipsoid Ht. 276.569 (Meters)	Geoid Ht. -28.523 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000330638	Northing (UTM 19) 4682616.680 (Meters)	Easting (UTM 19) 255808.631 (Meters)	Elevation 305.092 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 5007	
Date of Survey 12/17/2013				Ground Type Brush	
Established by WOOLPERT, INC.	Latitude 42°13'08.57395" N	Longitude 72°04'14.11660" W	Ellipsoid Ht. 160.255 (Meters)	Geoid Ht. -28.478 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000294597	Northing (UTM 19) 4678663.058 (Meters)	Easting (UTM 19) 246563.261 (Meters)	Elevation 188.733 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 5008	
Date of Survey 4/15/2014				Ground Type Brush	
Established by WOOLPERT, INC.	Latitude 42°13'00.02272" N	Longitude 72°12'44.57268" W	Ellipsoid Ht. 145.731 (Meters)	Geoid Ht. -28.330 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000228897	Northing (UTM 19) 4678830.941 (Meters)	Easting (UTM 19) 234848.955 (Meters)	Elevation 174.060 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 5010	
Date of Survey 12/16/2013				Ground Type Brush	
Established by WOOLPERT, INC.	Latitude 42°09'19.70257" N	Longitude 71°58'26.00047" W	Ellipsoid Ht. 230.485 (Meters)	Geoid Ht. -28.777 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000333486	Northing (UTM 19) 4671319.996 (Meters)	Easting (UTM 19) 254298.897 (Meters)	Elevation 259.262 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 5011	
Date of Survey 12/16/2013				Ground Type Brush	
Established by WOOLPERT, INC.	Latitude 42°04'08.35386" N	Longitude 71°51'27.75625" W	Ellipsoid Ht. 135.379 (Meters)	Geoid Ht. -29.173 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000410932	Northing (UTM 19) 4661388.022 (Meters)	Easting (UTM 19) 263576.874 (Meters)	Elevation 164.551 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 5013	
Date of Survey 12/17/2013				Ground Type Brush	
Established by WOOLPERT, INC.	Latitude 42°16'16.29660" N	Longitude 71°47'11.48377" W	Ellipsoid Ht. 193.370 (Meters)	Geoid Ht. -28.642 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000434429	Northing (UTM 19) 4683647.545 (Meters)	Easting (UTM 19) 270200.462 (Meters)	Elevation 222.011 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 5013A	
Date of Survey 12/17/2013				Ground Type Brush	
Established by WOOLPERT, INC.	Latitude 42°20'00.09412" N	Longitude 71°50'19.02785" W	Ellipsoid Ht. 188.656 (Meters)	Geoid Ht. -28.453 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000405676	Northing (UTM 19) 4690692.919 (Meters)	Easting (UTM 19) 266134.279 (Meters)	Elevation 217.109 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Norfolk County, Massachusetts				Station Description QA/QC # 5014	
Date of Survey 12/16/2013				Ground Type Brush	
Established by WOOLPERT, INC.	Latitude 42°06'20.91043" N	Longitude 71°03'23.52637" W	Ellipsoid Ht. 42.523 (Meters)	Geoid Ht. -28.363 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000902946	Northing (UTM 19) 4663570.709 (Meters)	Easting (UTM 19) 329961.347 (Meters)	Elevation 70.886 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Rockingham County, New Hampshire				Station Description QA/QC # 5016	
Date of Survey 4/13/2014				Ground Type Brush	
Established by WOOLPERT, INC.	Latitude 43°05'06.32499" N	Longitude 70°47'33.60190" W	Ellipsoid Ht. -13.574 (Meters)	Geoid Ht. -26.682 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001046588	Northing (UTM 19) 4771823.554 (Meters)	Easting (UTM 19) 354082.810 (Meters)	Elevation 13.108 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Essex County, Massachusetts				Station Description QA/QC # 5018	
Date of Survey 4/12/2014				Ground Type Brush	
Established by WOOLPERT, INC.	Latitude 42°41'36.30901" N	Longitude 70°49'30.75434" W	Ellipsoid Ht. -23.722 (Meters)	Geoid Ht. -26.882 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001044227	Northing (UTM 19) 4728385.472 (Meters)	Easting (UTM 19) 350490.588 (Meters)	Elevation 3.160 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Essex County, Massachusetts				Station Description QA/QC # 5020	
Date of Survey 12/19/2013				Ground Type Brush	
Established by WOOLPERT, INC.	Latitude 42°31'34.00326" N	Longitude 70°52'59.04961" W	Ellipsoid Ht. -24.242 (Meters)	Geoid Ht. -27.023 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001012216	Northing (UTM 19) 4709910.754 (Meters)	Easting (UTM 19) 345337.418 (Meters)	Elevation 2.781 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Essex County, Massachusetts				Station Description QA/QC # 5020A	
Date of Survey 12/19/2013				Ground Type Brush	
Established by WOOLPERT, INC.	Latitude 42°31'57.94344" N	Longitude 70°52'23.43210" W	Ellipsoid Ht. -22.291 (Meters)	Geoid Ht. -27.004 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001018393	Northing (UTM 19) 4710631.192 (Meters)	Easting (UTM 19) 346166.375 (Meters)	Elevation 4.713 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Suffolk County, Massachusetts				Station Description QA/QC # 5021	
Date of Survey 12/19/2013				Ground Type Brush	
Established by WOOLPERT, INC.	Latitude 42°23'27.18544" N	Longitude 70°59'33.01770" W	Ellipsoid Ht. -24.513 (Meters)	Geoid Ht. -27.548 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000944111	Northing (UTM 19) 4695100.172 (Meters)	Easting (UTM 19) 335996.154 (Meters)	Elevation 3.035 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Norfolk County, Massachusetts				Station Description QA/QC # 5022	
Date of Survey 12/19/2013				Ground Type Brush	
Established by WOOLPERT, INC.	Latitude 42°14'37.12361" N	Longitude 71°02'02.38942" W	Ellipsoid Ht. 24.983 (Meters)	Geoid Ht. -28.035 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000914919	Northing (UTM 19) 4678831.404 (Meters)	Easting (UTM 19) 332189.868 (Meters)	Elevation 53.018 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Norfolk County, Massachusetts				Station Description QA/QC # 5023	
Date of Survey 12/18/2013				Ground Type Brush	
Established by WOOLPERT, INC.	Latitude 42°12'11.58419" N	Longitude 71°15'32.01989" W	Ellipsoid Ht. 61.252 (Meters)	Geoid Ht. -28.384 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000765264	Northing (UTM 19) 4674809.804 (Meters)	Easting (UTM 19) 313515.349 (Meters)	Elevation 89.636 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Plymouth County, Massachusetts				Station Description QA/QC # 5024	
Date of Survey 12/16/2013				Ground Type Brush	
Established by WOOLPERT, INC.	Latitude 42°00'13.06863" N	Longitude 70°43'11.99837" W	Ellipsoid Ht. -25.246 (Meters)	Geoid Ht. -28.266 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001151976	Northing (UTM 19) 4651610.213 (Meters)	Easting (UTM 19) 357559.550 (Meters)	Elevation 3.020 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Barnstable County, Massachusetts				Station Description QA/QC # 5025	
Date of Survey 12/15/2013				Ground Type Brush	
Established by WOOLPERT, INC.	Latitude 42°03'20.13069" N	Longitude 70°11'35.65927" W	Ellipsoid Ht. -23.706 (Meters)	Geoid Ht. -27.603 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001553742	Northing (UTM 19) 4656637.305 (Meters)	Easting (UTM 19) 401264.123 (Meters)	Elevation 3.897 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Barnstable County, Massachusetts				Station Description QA/QC # 5026	
Date of Survey 12/14/2013				Ground Type Brush	
Established by WOOLPERT, INC.	Latitude 41°33'32.13185" N	Longitude 70°35'33.08573" W	Ellipsoid Ht. -27.210 (Meters)	Geoid Ht. -28.605 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001269143	Northing (UTM 19) 4602030.601 (Meters)	Easting (UTM 19) 367202.022 (Meters)	Elevation 1.396 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Nantucket County, Massachusetts				Station Description QA/QC # 5027	
Date of Survey 12/17/2013				Ground Type Brush	
Established by WOOLPERT, INC.	Latitude 41°15'47.09213" N	Longitude 70°00'44.23008" W	Ellipsoid Ht. -7.127 (Meters)	Geoid Ht. -28.786 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001753871	Northing (UTM 19) 4568456.290 (Meters)	Easting (UTM 19) 415204.015 (Meters)	Elevation 21.660 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Nantucket County, Massachusetts				Station Description QA/QC # 5027A	
Date of Survey 12/17/2013				Ground Type Brush	
Established by WOOLPERT, INC.	Latitude 41°16'40.74635" N	Longitude 70°11'03.18303" W	Ellipsoid Ht. -27.307 (Meters)	Geoid Ht. -28.830 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001609968	Northing (UTM 19) 4570292.988 (Meters)	Easting (UTM 19) 400824.181 (Meters)	Elevation 1.524 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Dukes County, Massachusetts				Station Description QA/QC # 5028	
Date of Survey 12/14/2013				Ground Type Brush	
Established by WOOLPERT, INC.	Latitude 41°23'10.86940" N	Longitude 70°33'16.66345" W	Ellipsoid Ht. -24.313 (Meters)	Geoid Ht. -28.833 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001306607	Northing (UTM 19) 4582813.325 (Meters)	Easting (UTM 19) 370017.754 (Meters)	Elevation 4.519 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Dukes County, Massachusetts				Station Description QA/QC # 5028A	
Date of Survey 12/14/2013				Ground Type Brush	
Established by WOOLPERT, INC.	Latitude 41°23'18.15732" N	Longitude 70°34'37.40548" W	Ellipsoid Ht. -16.695 (Meters)	Geoid Ht. -28.861 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001288140	Northing (UTM 19) 4583071.973 (Meters)	Easting (UTM 19) 368146.555 (Meters)	Elevation 12.166 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Washington County, Rhode Island				Station Description QA/QC # 5030	
Date of Survey 12/12/2013				Ground Type Brush	
Established by WOOLPERT, INC.	Latitude 41°20'21.13757" N	Longitude 71°46'05.02168" W	Ellipsoid Ht. -28.500 (Meters)	Geoid Ht. -30.602 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000505139	Northing (UTM 19) 4580110.127 (Meters)	Easting (UTM 19) 268387.719 (Meters)	Elevation 2.102 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Hampshire County, Massachusetts				Station Description QA/QC # 5031	
Date of Survey 4/12/2014				Ground Type Brush	
Established by WOOLPERT, INC.	Latitude 42°20'22.80863" N	Longitude 72°39'20.51339" W	Ellipsoid Ht. 47.515 (Meters)	Geoid Ht. -28.655 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000051589	Northing (UTM 19) 4693965.995 (Meters)	Easting (UTM 19) 198839.963 (Meters)	Elevation 76.170 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Hampshire County, Massachusetts				Station Description QA/QC # 5032	
Date of Survey 4/12/2014				Ground Type Brush	
Established by WOOLPERT, INC.	Latitude 42°18'59.55444" N	Longitude 72°43'03.33805" W	Ellipsoid Ht. 75.694 (Meters)	Geoid Ht. -28.654 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000023571	Northing (UTM 19) 4691618.982 (Meters)	Easting (UTM 19) 193627.894 (Meters)	Elevation 104.348 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 6000	
Date of Survey 4/15/2014				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 42°40'33.53859" N	Longitude 72°11'18.42311" W	Ellipsoid Ht. 285.258 (Meters)	Geoid Ht. -27.813 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000208589	Northing (UTM 19) 4729764.491 (Meters)	Easting (UTM 19) 238742.091 (Meters)	Elevation 313.071 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 6001	
Date of Survey 4/15/2014				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 42°40'53.30225" N	Longitude 72°01'05.02526" W	Ellipsoid Ht. 298.625 (Meters)	Geoid Ht. -27.684 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000287992	Northing (UTM 19) 4729861.049 (Meters)	Easting (UTM 19) 252726.388 (Meters)	Elevation 326.309 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 6002	
Date of Survey 4/14/2014				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 42°29'09.69051" N	Longitude 72°11'29.46413" W	Ellipsoid Ht. 293.359 (Meters)	Geoid Ht. -27.983 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000209902	Northing (UTM 19) 4708678.244 (Meters)	Easting (UTM 19) 237694.839 (Meters)	Elevation 321.342 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 6003	
Date of Survey 4/14/2014				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 42°31'29.07208" N	Longitude 72°00'02.99154" W	Ellipsoid Ht. 285.726 (Meters)	Geoid Ht. -27.939 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000302305	Northing (UTM 19) 4712405.245 (Meters)	Easting (UTM 19) 253520.654 (Meters)	Elevation 313.664 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 6004	
Date of Survey 4/14/2014				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 42°23'46.82935" N	Longitude 72°06'41.75842" W	Ellipsoid Ht. 229.732 (Meters)	Geoid Ht. -28.107 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000259743	Northing (UTM 19) 4698474.383 (Meters)	Easting (UTM 19) 243898.393 (Meters)	Elevation 257.839 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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NEW ENGLAND
CMGP SANDY LIDAR PROJECT



County, State Worcester County, Massachusetts				Station Description QA/QC # 6005	
Date of Survey 4/13/2014				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 42°18'45.53793" N	Longitude 72°11'40.29096" W	Ellipsoid Ht. 164.522 (Meters)	Geoid Ht. -28.188 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000232317	Northing (UTM 19) 4689433.755 (Meters)	Easting (UTM 19) 236723.033 (Meters)	Elevation 192.709 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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NEW ENGLAND
CMGP SANDY LIDAR PROJECT



County, State Worcester County, Massachusetts				Station Description QA/QC # 6006	
Date of Survey 12/20/2013				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 42°15'28.64133" N	Longitude 71°57'35.81888" W	Ellipsoid Ht. 275.795 (Meters)	Geoid Ht. -28.522 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000330971	Northing (UTM 19) 4682660.412 (Meters)	Easting (UTM 19) 255845.987 (Meters)	Elevation 304.318 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 6006A	
Date of Survey 12/20/2013				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 42°15'28.68961" N	Longitude 71°57'35.46555" W	Ellipsoid Ht. 275.642 (Meters)	Geoid Ht. -28.522 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000331044	Northing (UTM 19) 4682661.619 (Meters)	Easting (UTM 19) 255854.135 (Meters)	Elevation 304.164 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 6007	
Date of Survey 12/20/2013				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 42°13'07.11151" N	Longitude 72°04'14.33080" W	Ellipsoid Ht. 158.783 (Meters)	Geoid Ht. -28.479 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000294808	Northing (UTM 19) 4678618.124 (Meters)	Easting (UTM 19) 246556.723 (Meters)	Elevation 187.262 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 6007A	
Date of Survey 12/20/2013				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 42°13'07.21293" N	Longitude 72°04'14.72467" W	Ellipsoid Ht. 158.522 (Meters)	Geoid Ht. -28.479 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000294794	Northing (UTM 19) 4678621.578 (Meters)	Easting (UTM 19) 246547.805 (Meters)	Elevation 187.001 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 6008	
Date of Survey 4/15/2014				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 42°12'58.54344" N	Longitude 72°12'45.11263" W	Ellipsoid Ht. 145.372 (Meters)	Geoid Ht. -28.330 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000228892	Northing (UTM 19) 4678785.776 (Meters)	Easting (UTM 19) 234834.853 (Meters)	Elevation 173.702 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 6009	
Date of Survey 12/20/2013				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 42°06'42.51136" N	Longitude 72°05'32.96147" W	Ellipsoid Ht. 146.141 (Meters)	Geoid Ht. -28.681 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000288501	Northing (UTM 19) 4666819.685 (Meters)	Easting (UTM 19) 244323.527 (Meters)	Elevation 174.822 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 6009A	
Date of Survey 12/20/2013				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 42°06'43.03519" N	Longitude 72°05'32.98786" W	Ellipsoid Ht. 145.011 (Meters)	Geoid Ht. -28.680 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000288671	Northing (UTM 19) 4666835.866 (Meters)	Easting (UTM 19) 244323.505 (Meters)	Elevation 173.692 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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NEW ENGLAND
CMGP SANDY LIDAR PROJECT



County, State Worcester County, Massachusetts				Station Description QA/QC # 6010	
Date of Survey 12/20/2013				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 42°09'21.02829" N	Longitude 71°58'25.23756" W	Ellipsoid Ht. 231.451 (Meters)	Geoid Ht. -28.777 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000333434	Northing (UTM 19) 4671360.279 (Meters)	Easting (UTM 19) 254317.833 (Meters)	Elevation 260.228 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 6010A	
Date of Survey 12/20/2013				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 42°09'20.36594" N	Longitude 71°58'26.32076" W	Ellipsoid Ht. 231.068 (Meters)	Geoid Ht. -28.777 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000333345	Northing (UTM 19) 4671340.715 (Meters)	Easting (UTM 19) 254292.260 (Meters)	Elevation 259.845 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 6011	
Date of Survey 12/20/2013				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 42°04'06.39906" N	Longitude 71°51'26.68804" W	Ellipsoid Ht. 133.749 (Meters)	Geoid Ht. -29.175 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000411359	Northing (UTM 19) 4661326.903 (Meters)	Easting (UTM 19) 263599.408 (Meters)	Elevation 162.924 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 6011A	
Date of Survey 12/20/2013				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 42°04'05.42251" N	Longitude 71°51'26.29776" W	Ellipsoid Ht. 132.776 (Meters)	Geoid Ht. -29.175 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000411576	Northing (UTM 19) 4661296.481 (Meters)	Easting (UTM 19) 263607.371 (Meters)	Elevation 161.951 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 6012	
Date of Survey 4/14/2014				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 42°19'59.02212" N	Longitude 71°50'20.28154" W	Ellipsoid Ht. 188.887 (Meters)	Geoid Ht. -28.453 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000405463	Northing (UTM 19) 4690660.810 (Meters)	Easting (UTM 19) 266104.481 (Meters)	Elevation 217.340 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 6013	
Date of Survey 12/20/2013				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 42°16'19.65542" N	Longitude 71°47'08.73712" W	Ellipsoid Ht. 180.520 (Meters)	Geoid Ht. -28.639 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000436826	Northing (UTM 19) 4683749.093 (Meters)	Easting (UTM 19) 270266.778 (Meters)	Elevation 209.159 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description QA/QC # 6013A	
Date of Survey 12/20/2013				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 42°16'19.18042" N	Longitude 71°47'09.31449" W	Ellipsoid Ht. 183.839 (Meters)	Geoid Ht. -28.639 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000436224	Northing (UTM 19) 4683734.874 (Meters)	Easting (UTM 19) 270253.071 (Meters)	Elevation 212.479 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Plymouth County, Massachusetts				Station Description QA/QC # 6014	
Date of Survey 12/16/2013				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 42°06'17.97833" N	Longitude 71°03'23.19399" W	Ellipsoid Ht. 43.400 (Meters)	Geoid Ht. -28.365 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000902904	Northing (UTM 19) 4663480.088 (Meters)	Easting (UTM 19) 329966.803 (Meters)	Elevation 71.765 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Plymouth County, Massachusetts				Station Description QA/QC # 6014A	
Date of Survey 12/16/2013				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 42°06'17.78400" N	Longitude 71°03'24.79519" W	Ellipsoid Ht. 44.325 (Meters)	Geoid Ht. -28.366 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000902466	Northing (UTM 19) 4663474.980 (Meters)	Easting (UTM 19) 329929.882 (Meters)	Elevation 72.690 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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NEW ENGLAND
CMGP SANDY LIDAR PROJECT



County, State Worcester County, Massachusetts				Station Description QA/QC # 6015	
Date of Survey 12/20/2013				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 42°14'44.43233" N	Longitude 71°45'29.24269" W	Ellipsoid Ht. 116.475 (Meters)	Geoid Ht. -28.724 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000462553	Northing (UTM 19) 4680737.587 (Meters)	Easting (UTM 19) 272450.957 (Meters)	Elevation 145.199 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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NEW ENGLAND
CMGP SANDY LIDAR PROJECT



County, State Worcester County, Massachusetts				Station Description QA/QC # 6015A	
Date of Survey 12/20/2013				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 42°14'44.42011" N	Longitude 71°45'28.87923" W	Ellipsoid Ht. 116.420 (Meters)	Geoid Ht. -28.724 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000462616	Northing (UTM 19) 4680736.940 (Meters)	Easting (UTM 19) 272459.274 (Meters)	Elevation 145.144 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Rockingham County, New Hampshire				Station Description QA/QC # 6016	
Date of Survey 4/13/2014				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 43°05'11.79454" N	Longitude 70°47'28.30566" W	Ellipsoid Ht. -12.922 (Meters)	Geoid Ht. -26.680 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001047425	Northing (UTM 19) 4771989.720 (Meters)	Easting (UTM 19) 354206.167 (Meters)	Elevation 13.758 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Rockingham County, New Hampshire				Station Description QA/QC # 6017	
Date of Survey 4/13/2014				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 42°52'07.96803" N	Longitude 70°50'20.49731" W	Ellipsoid Ht. -24.771 (Meters)	Geoid Ht. -26.874 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001026703	Northing (UTM 19) 4747894.696 (Meters)	Easting (UTM 19) 349783.635 (Meters)	Elevation 2.104 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Essex County, Massachusetts				Station Description QA/QC # 6018	
Date of Survey 4/12/2014				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 42°41'34.00596" N	Longitude 70°49'32.70275" W	Ellipsoid Ht. -20.048 (Meters)	Geoid Ht. -26.883 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001043307	Northing (UTM 19) 4728315.389 (Meters)	Easting (UTM 19) 350444.718 (Meters)	Elevation 6.835 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Essex County, Massachusetts				Station Description QA/QC # 6019	
Date of Survey 4/12/2014				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 42°34'37.51319" N	Longitude 70°44'07.36941" W	Ellipsoid Ht. -22.885 (Meters)	Geoid Ht. -26.887 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001112517	Northing (UTM 19) 4715312.223 (Meters)	Easting (UTM 19) 357583.905 (Meters)	Elevation 4.003 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Essex County, Massachusetts				Station Description QA/QC # 6020	
Date of Survey 12/19/2013				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 42°31'52.21355" N	Longitude 70°52'23.73525" W	Ellipsoid Ht. -18.795 (Meters)	Geoid Ht. -27.007 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001017860	Northing (UTM 19) 4710454.603 (Meters)	Easting (UTM 19) 346155.551 (Meters)	Elevation 8.212 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Essex County, Massachusetts				Station Description QA/QC # 6020A	
Date of Survey 12/19/2013				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 42°31'52.80816" N	Longitude 70°52'25.10454" W	Ellipsoid Ht. -18.119 (Meters)	Geoid Ht. -27.007 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001017485	Northing (UTM 19) 4710473.634 (Meters)	Easting (UTM 19) 346124.719 (Meters)	Elevation 8.888 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Suffolk County, Massachusetts				Station Description QA/QC # 6021	
Date of Survey 12/19/2013				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 42°23'29.12881" N	Longitude 70°59'36.44780" W	Ellipsoid Ht. -23.766 (Meters)	Geoid Ht. -27.548 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000943333	Northing (UTM 19) 4695161.956 (Meters)	Easting (UTM 19) 335919.132 (Meters)	Elevation 3.782 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Suffolk County, Massachusetts				Station Description QA/QC # 6021A	
Date of Survey 12/19/2013				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 42°23'29.13968" N	Longitude 70°59'35.45676" W	Ellipsoid Ht. -23.797 (Meters)	Geoid Ht. -27.548 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000943522	Northing (UTM 19) 4695161.760 (Meters)	Easting (UTM 19) 335941.799 (Meters)	Elevation 3.751 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Plymouth County, Massachusetts				Station Description QA/QC # 6024	
Date of Survey 12/16/2013				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 42°00'03.79343" N	Longitude 70°43'08.48156" W	Ellipsoid Ht. -23.930 (Meters)	Geoid Ht. -28.271 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001152604	Northing (UTM 19) 4651322.514 (Meters)	Easting (UTM 19) 357634.708 (Meters)	Elevation 4.341 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Plymouth County, Massachusetts				Station Description QA/QC # 6024A	
Date of Survey 12/16/2013				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 42°00'04.50504" N	Longitude 70°43'08.10866" W	Ellipsoid Ht. -23.513 (Meters)	Geoid Ht. -28.270 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001152604	Northing (UTM 19) 4651344.290 (Meters)	Easting (UTM 19) 357643.728 (Meters)	Elevation 4.757 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Barnstable County, Massachusetts				Station Description QA/QC # 6025	
Date of Survey 12/15/2013				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 42°03'21.61231" N	Longitude 70°11'35.68827" W	Ellipsoid Ht. -21.968 (Meters)	Geoid Ht. -27.602 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001553438	Northing (UTM 19) 4656683.011 (Meters)	Easting (UTM 19) 401264.094 (Meters)	Elevation 5.635 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Barnstable County, Massachusetts				Station Description QA/QC # 6025A	
Date of Survey 12/15/2013				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 42°03'21.26208" N	Longitude 70°11'35.41075" W	Ellipsoid Ht. -21.829 (Meters)	Geoid Ht. -27.602 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001553485	Northing (UTM 19) 4656672.119 (Meters)	Easting (UTM 19) 401270.322 (Meters)	Elevation 5.774 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Barnstable County, Massachusetts				Station Description QA/QC # 6026	
Date of Survey 12/15/2013				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 41°33'33.37486" N	Longitude 70°35'32.57881" W	Ellipsoid Ht. -27.960 (Meters)	Geoid Ht. -28.605 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001269349	Northing (UTM 19) 4602068.719 (Meters)	Easting (UTM 19) 367214.471 (Meters)	Elevation 0.645 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Barnstable County, Massachusetts				Station Description QA/QC # 6026A	
Date of Survey 12/15/2013				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 41°33'33.37527" N	Longitude 70°35'32.22455" W	Ellipsoid Ht. -28.390 (Meters)	Geoid Ht. -28.604 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001269491	Northing (UTM 19) 4602068.581 (Meters)	Easting (UTM 19) 367222.678 (Meters)	Elevation 0.214 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Nantucket County, Massachusetts				Station Description QA/QC # 6027	
Date of Survey 12/17/2013				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 41°15'44.16063" N	Longitude 70°00'50.07194" W	Ellipsoid Ht. -7.309 (Meters)	Geoid Ht. -28.787 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001752550	Northing (UTM 19) 4568367.474 (Meters)	Easting (UTM 19) 415067.026 (Meters)	Elevation 21.479 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Nantucket County, Massachusetts				Station Description QA/QC # 6027A	
Date of Survey 12/17/2013				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 41°15'44.41874" N	Longitude 70°00'51.47739" W	Ellipsoid Ht. -7.322 (Meters)	Geoid Ht. -28.787 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001752210	Northing (UTM 19) 4568375.816 (Meters)	Easting (UTM 19) 415034.416 (Meters)	Elevation 21.465 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



Photogrammetric Ground Control Information Sheet

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Dukes County, Massachusetts				Station Description QA/QC # 6028	
Date of Survey 12/14/2013				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 41°23'12.94099" N	Longitude 70°33'11.52980" W	Ellipsoid Ht. -22.305 (Meters)	Geoid Ht. -28.829 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001307357	Northing (UTM 19) 4582875.073 (Meters)	Easting (UTM 19) 370138.131 (Meters)	Elevation 6.524 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Dukes County, Massachusetts				Station Description QA/QC # 6028A	
Date of Survey 12/14/2013				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 41°23'12.88249" N	Longitude 70°33'10.12858" W	Ellipsoid Ht. -22.131 (Meters)	Geoid Ht. -28.829 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001307629	Northing (UTM 19) 4582872.686 (Meters)	Easting (UTM 19) 370170.643 (Meters)	Elevation 6.698 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Washington County, Rhode Island				Station Description QA/QC # 6029	
Date of Survey 12/13/2013				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 41°09'25.75640" N	Longitude 71°33'54.03526" W	Ellipsoid Ht. 14.164 (Meters)	Geoid Ht. -30.769 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000621023	Northing (UTM 19) 4559374.558 (Meters)	Easting (UTM 19) 284782.199 (Meters)	Elevation 44.933 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



NEW ENGLAND
CMGP SANDY LIDAR PROJECT



County, State Washington County, Rhode Island				Station Description QA/QC # 6029A	
Date of Survey 12/12/2013				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 41°09'25.59834" N	Longitude 71°33'54.32564" W	Ellipsoid Ht. 14.049 (Meters)	Geoid Ht. -30.769 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000620994	Northing (UTM 19) 4559369.883 (Meters)	Easting (UTM 19) 284775.286 (Meters)	Elevation 44.818 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Washington County, Rhode Island				Station Description QA/QC # 6030	
Date of Survey 12/12/2013				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 41°20'18.73817" N	Longitude 71°46'04.51364" W	Ellipsoid Ht. -28.834 (Meters)	Geoid Ht. -30.603 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000505289	Northing (UTM 19) 4580035.748 (Meters)	Easting (UTM 19) 268397.164 (Meters)	Elevation 1.769 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Washington County, Rhode Island				Station Description QA/QC # 6030A	
Date of Survey 12/12/2013				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 41°20'18.82524" N	Longitude 71°46'03.92883" W	Ellipsoid Ht. -29.404 (Meters)	Geoid Ht. -30.603 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000505468	Northing (UTM 19) 4580037.999 (Meters)	Easting (UTM 19) 268410.843 (Meters)	Elevation 1.199 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Hampshire County, Massachusetts				Station Description QA/QC # 6031	
Date of Survey 4/12/2014				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 42°20'25.27980" N	Longitude 72°39'14.16465" W	Ellipsoid Ht. 44.931 (Meters)	Geoid Ht. -28.654 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000052674	Northing (UTM 19) 4694035.977 (Meters)	Easting (UTM 19) 198988.543 (Meters)	Elevation 73.585 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Hampshire County, Massachusetts				Station Description QA/QC # 6032	
Date of Survey 4/12/2014				Ground Type Trees	
Established by WOOLPERT, INC.	Latitude 42°19'00.56765" N	Longitude 72°43'02.45695" W	Ellipsoid Ht. 74.330 (Meters)	Geoid Ht. -28.653 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000023874	Northing (UTM 19) 4691649.357 (Meters)	Easting (UTM 19) 193649.434 (Meters)	Elevation 102.983 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description	
Date of Survey 4/14/2014				Site ID 1 Lidar Control Point # 1001	
Established by WOOLPERT, INC.	Latitude 42°34'21.73997" N	Longitude 72°16'01.02299" W	Ellipsoid Ht. 139.795 (Meters)	Geoid Ht. -28.019 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.00019744	Northing (UTM 19) 4718540.805 (Meters)	Easting (UTM 19) 231865.976 (Meters)	Elevation 167.814 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Worcester County, Massachusetts				Site ID 2 Lidar Control Point # 1002	
Date of Survey				Ground Type	
4/14/2014				Asphalt	
Established by WOOLPERT, INC.	Latitude 42°40'31.75673" N	Longitude 72°11'14.06761" W	Ellipsoid Ht. 287.162 (Meters)	Geoid Ht. -27.813 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000208864	Northing (UTM 19) 4729705.780 (Meters)	Easting (UTM 19) 238839.159 (Meters)	Elevation 314.975 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Worcester County, Massachusetts				Site ID 3 Lidar Control Point # 1003	
Date of Survey				Ground Type	
4/14/2014				Asphalt	
Established by	Latitude	Longitude	Ellipsoid Ht.	Geoid Ht.	Horizontal Datum
WOOLPERT, INC.	42°40'54.39829" N	72°01'04.87348" W	298.753 (Meters)	-27.684 (Meters)	NAD 83 (2011)
Combined Scale Factor	Northing (UTM 19) 4729894.736 (Meters)	Easting (UTM 19) 252731.052 (Meters)	Elevation 326.437 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A
1.000287986					

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Worcester County, Massachusetts				Site ID 4 Lidar Control Point # 1004	
Date of Survey				Ground Type	
4/14/2014				Asphalt	
Established by	Latitude	Longitude	Ellipsoid Ht.	Geoid Ht.	Horizontal Datum
WOOLPERT, INC.	42°35'17.57752" N	71°57'44.81638" W	337.543 (Meters)	-27.842 (Meters)	NAD 83 (2011)
Combined Scale Factor	Northing (UTM 19) 4719343.164 (Meters)	Easting (UTM 19) 256920.196 (Meters)	Elevation 365.385 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A
1.00031188					

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Worcester County, Massachusetts				Site ID 5 Lidar Control Point # 1005	
Date of Survey				Ground Type	
4/14/2014				Asphalt	
Established by	Latitude	Longitude	Ellipsoid Ht.	Geoid Ht.	Horizontal Datum
WOOLPERT, INC.	42°36'05.08396" N	72°04'46.74353" W	256.382 (Meters)	-27.819 (Meters)	NAD 83 (2011)
Combined Scale Factor	Northing (UTM 19) 4721152.155 (Meters)	Easting (UTM 19) 247355.934 (Meters)	Elevation 284.201 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A
1.000266379					

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description	
Date of Survey 4/14/2014				Site ID 6 Lidar Control Point # 1006	
Established by WOOLPERT, INC.	Latitude 42°29'07.61647" N	Longitude 72°11'28.88154" W	Ellipsoid Ht. 293.226 (Meters)	Geoid Ht. -27.983 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000210011	Northing (UTM 19) 4708613.763 (Meters)	Easting (UTM 19) 237705.732 (Meters)	Elevation 321.209 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Worcester County, Massachusetts				Site ID 7 Lidar Control Point # 1007	
Date of Survey				Ground Type	
4/14/2014				Asphalt	
Established by	Latitude	Longitude	Ellipsoid Ht.	Geoid Ht.	Horizontal Datum
WOOLPERT, INC.	42°31'29.01827" N	72°00'06.39268" W	289.351 (Meters)	-27.938 (Meters)	NAD 83 (2011)
Combined Scale Factor	Northing (UTM 19) 4712406.335 (Meters)	Easting (UTM 19) 253442.989 (Meters)	Elevation 317.289 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A
1.000301267					

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description	
Date of Survey 4/14/2014				Site ID 8 Lidar Control Point # 1008	
Established by WOOLPERT, INC.				Ground Type Asphalt	
Combined Scale Factor 1.000316398	Latitude 42°26'53.38188" N	Longitude 71°59'09.85491" W	Ellipsoid Ht. 254.709 (Meters)	Geoid Ht. -28.091 (Meters)	Horizontal Datum NAD 83 (2011)
	Northing (UTM 19) 4703857.981 (Meters)	Easting (UTM 19) 254433.476 (Meters)	Elevation 282.801 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Worcester County, Massachusetts				Site ID 9 Lidar Control Point # 1009	
Date of Survey				Ground Type	
4/14/2014				Asphalt	
Established by	Latitude	Longitude	Ellipsoid Ht.	Geoid Ht.	Horizontal Datum
WOOLPERT, INC.	42°20'57.55022" N	71°59'03.03588" W	271.021 (Meters)	-28.277 (Meters)	NAD 83 (2011)
Combined Scale Factor	Northing (UTM 19) 4692876.034 (Meters)	Easting (UTM 19) 254203.423 (Meters)	Elevation 299.298 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A
1.000317199					

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Worcester County, Massachusetts				Site ID 10 Lidar Control Point # 1010	
Date of Survey				Ground Type	
4/15/2014				Asphalt	
Established by WOOLPERT, INC.	Latitude 42°22'46.52896" N	Longitude 72°06'34.27106" W	Ellipsoid Ht. 148.596 (Meters)	Geoid Ht. -28.140 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000273825	Northing (UTM 19) 4696607.985 (Meters)	Easting (UTM 19) 244001.465 (Meters)	Elevation 176.735 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Worcester County, Massachusetts				Site ID 11 Lidar Control Point # 1011	
Date of Survey				Ground Type	
4/13/2014				Asphalt	
Established by WOOLPERT, INC.	Latitude 42°18'44.62251" N	Longitude 72°12'27.70415" W	Ellipsoid Ht. 137.790 (Meters)	Geoid Ht. -28.189 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000230341	Northing (UTM 19) 4689446.387 (Meters)	Easting (UTM 19) 235636.427 (Meters)	Elevation 165.979 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description	
Date of Survey 4/15/2014				Site ID 12 Lidar Control Point # 1012	
Established by WOOLPERT, INC.	Latitude 42°12'46.62561" N	Longitude 72°11'35.98263" W	Ellipsoid Ht. 156.112 (Meters)	Ground Type Asphalt	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000236294	Northing (UTM 19) 4678358.539 (Meters)	Easting (UTM 19) 236406.247 (Meters)	Elevation 184.448 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description	
Date of Survey 12/17/2013				Site ID 13 Lidar Control Point # 1013	
Established by WOOLPERT, INC.	Latitude 42°13'12.05594" N	Longitude 72°04'09.79774" W	Ellipsoid Ht. 160.275 (Meters)	Ground Type Asphalt	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000295162	Northing (UTM 19) 4678766.898 (Meters)	Easting (UTM 19) 246666.158 (Meters)	Elevation 188.753 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description	
Date of Survey 12/17/2013				Site ID 14 Lidar Control Point # 1014	
Established by WOOLPERT, INC.	Latitude 42°15'26.83191" N	Longitude 71°57'36.06287" W	Ellipsoid Ht. 277.237 (Meters)	Ground Type Asphalt	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000330723	Northing (UTM 19) 4682604.786 (Meters)	Easting (UTM 19) 255838.450 (Meters)	Elevation 305.761 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Worcester County, Massachusetts				Site ID 15 Lidar Control Point # 1015	
Date of Survey				Ground Type	
12/16/2013				Asphalt	
Established by	Latitude	Longitude	Ellipsoid Ht.	Geoid Ht.	Horizontal Datum
WOOLPERT, INC.	42°06'44.91502" N	72°05'26.39356" W	147.406 (Meters)	-28.683 (Meters)	NAD 83 (2011)
Combined Scale Factor	Northing (UTM 19) 4666888.366 (Meters)	Easting (UTM 19) 244477.063 (Meters)	Elevation 176.089 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A
1.000289182					

Picture:



Photogrammetric Ground Control Information Sheet

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Worcester County, Massachusetts				Site ID 16 Lidar Control Point # 1016	
Date of Survey				Ground Type	
12/16/2013				Asphalt	
Established by WOOLPERT, INC.	Latitude 42°08'42.25783" N	Longitude 71°58'55.99950" W	Ellipsoid Ht. 223.586 (Meters)	Geoid Ht. -28.793 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000330584	Northing (UTM 19) 4670189.003 (Meters)	Easting (UTM 19) 253569.981 (Meters)	Elevation 252.380 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Worcester County, Massachusetts				Site ID 17 Lidar Control Point # 1017	
Date of Survey				Ground Type	
12/16/2013				Asphalt	
Established by WOOLPERT, INC.	Latitude 42°04'14.51289" N	Longitude 71°51'57.71111" W	Ellipsoid Ht. 131.580 (Meters)	Geoid Ht. -29.162 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000407078	Northing (UTM 19) 4661601.061 (Meters)	Easting (UTM 19) 262894.794 (Meters)	Elevation 160.742 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description	
Date of Survey 4/14/2014				Site ID 18 Lidar Control Point # 1018	
Established by WOOLPERT, INC.	Latitude 42°20'11.95641" N	Longitude 71°50'56.33845" W	Ellipsoid Ht. 202.476 (Meters)	Ground Type Asphalt	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000397953	Northing (UTM 19) 4691087.399 (Meters)	Easting (UTM 19) 265292.612 (Meters)	Elevation 230.913 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Worcester County, Massachusetts				Site ID 19 Lidar Control Point # 1019	
Date of Survey				Ground Type	
12/17/2013				Asphalt	
Established by	Latitude	Longitude	Ellipsoid Ht.	Geoid Ht.	Horizontal Datum
WOOLPERT, INC.	42°16'01.47758" N	71°47'37.94493" W	116.854 (Meters)	-28.654 (Meters)	NAD 83 (2011)
Combined Scale Factor	Northing (UTM 19) 4683210.306 (Meters)	Easting (UTM 19) 269579.244 (Meters)	Elevation 145.508 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A
1.000442571					

Picture:



Photogrammetric Ground Control Information Sheet

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description	
Date of Survey 12/16/2013				Site ID 20 Lidar Control Point # 1020	
Established by WOOLPERT, INC.	Latitude 42°14'47.01189" N	Longitude 71°45'34.40304" W	Ellipsoid Ht. 119.180 (Meters)	Ground Type Asphalt	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.00046133	Northing (UTM 19) 4680820.988 (Meters)	Easting (UTM 19) 272335.266 (Meters)	Elevation 147.901 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Worcester County, Massachusetts				Site ID 21 Lidar Control Point # 1021	
Date of Survey				Ground Type	
12/13/2013				Asphalt	
Established by	Latitude	Longitude	Ellipsoid Ht.	Geoid Ht.	Horizontal Datum
WOOLPERT, INC.	42°05'55.04357" N	71°33'47.75944" W	100.453 (Meters)	-29.103 (Meters)	NAD 83 (2011)
Combined Scale Factor	Northing (UTM 19) 4663906.097 (Meters)	Easting (UTM 19) 288037.199 (Meters)	Elevation 129.556 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A
1.000578869					

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Norfolk County, Massachusetts				Site ID 22 Lidar Control Point # 1022	
Date of Survey				Ground Type	
12/13/2013				Asphalt	
Established by	Latitude	Longitude	Ellipsoid Ht.	Geoid Ht.	Horizontal Datum
WOOLPERT, INC.	42°03'27.26992" N	71°29'46.75400" W	43.638 (Meters)	-29.132 (Meters)	NAD 83 (2011)
Combined Scale Factor	Northing (UTM 19) 4659184.064 (Meters)	Easting (UTM 19) 293440.320 (Meters)	Elevation 72.770 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A
1.000628279					

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Norfolk County, Massachusetts				Station Description Site ID 23 Lidar Control Point # 1023	
Date of Survey 12/13/2013				Ground Type Asphalt	
Established by WOOLPERT, INC.	Latitude 42°01'35.79224" N	Longitude 71°24'58.46269" W	Ellipsoid Ht. 87.277 (Meters)	Geoid Ht. -29.048 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000670413	Northing (UTM 19) 4655555.173 (Meters)	Easting (UTM 19) 299969.920 (Meters)	Elevation 116.325 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Norfolk County, Massachusetts				Site ID 24 Lidar Control Point # 1024	
Date of Survey				Ground Type	
12/13/2013				Asphalt	
Established by	Latitude	Longitude	Ellipsoid Ht.	Geoid Ht.	Horizontal Datum
WOOLPERT, INC.	42°05'56.53383" N	71°17'23.94106" W	44.921 (Meters)	-28.696 (Meters)	NAD 83 (2011)
Combined Scale Factor	Northing (UTM 19) 4663309.989 (Meters)	Easting (UTM 19) 310638.172 (Meters)	Elevation 73.618 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A
1.000752194					

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Norfolk County, Massachusetts				Station Description	
Date of Survey 12/13/2013				Site ID 25 Lidar Control Point # 1025	
Established by WOOLPERT, INC.	Latitude 42°04'32.22440" N	Longitude 71°15'25.35289" W	Ellipsoid Ht. 59.375 (Meters)	Geoid Ht. -28.695 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000771507	Northing (UTM 19) 4660637.019 (Meters)	Easting (UTM 19) 313293.569 (Meters)	Elevation 88.071 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



Photogrammetric Ground Control Information Sheet

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Norfolk County, Massachusetts				Station Description	
Date of Survey 12/16/2013				Site ID 26 Lidar Control Point # 1026	
Established by WOOLPERT, INC.	Latitude 42°06'06.35620" N	Longitude 71°05'43.13537" W	Ellipsoid Ht. 39.764 (Meters)	Ground Type Asphalt	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000877882	Northing (UTM 19) 4663199.732 (Meters)	Easting (UTM 19) 326743.754 (Meters)	Elevation 68.184 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Plymouth County, Massachusetts				Site ID 27 Lidar Control Point # 1027	
Date of Survey				Ground Type	
12/16/2013				Asphalt	
Established by	Latitude	Longitude	Ellipsoid Ht.	Geoid Ht.	Horizontal Datum
WOOLPERT, INC.	42°06'06.87958" N	70°57'26.37994" W	10.593 (Meters)	-28.293 (Meters)	NAD 83 (2011)
Combined Scale Factor	Northing (UTM 19) 4662945.210 (Meters)	Easting (UTM 19) 338154.438 (Meters)	Elevation 38.885 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A
1.000974926					

Picture:



Photogrammetric Ground Control Information Sheet

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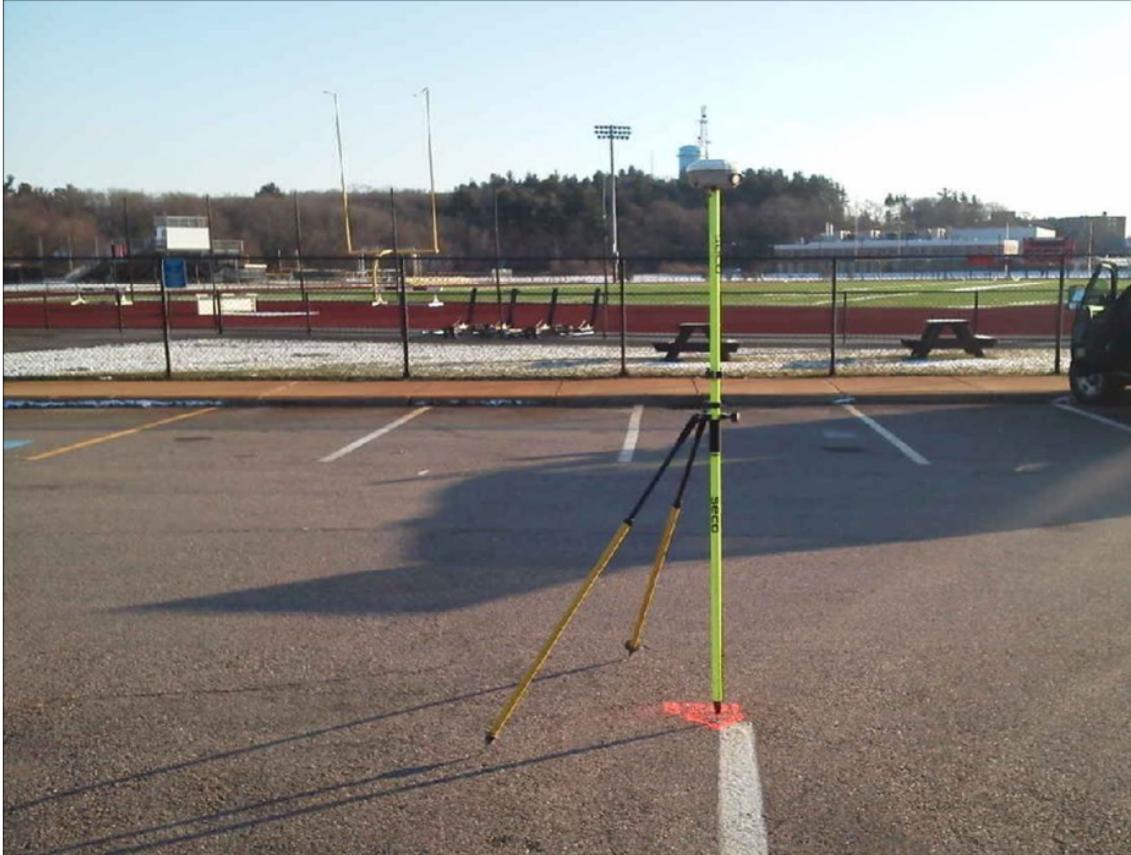


**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Plymouth County, Massachusetts				Site ID 28 Lidar Control Point # 1028	
Date of Survey				Ground Type	
12/13/2013				Asphalt	
Established by	Latitude	Longitude	Ellipsoid Ht.	Geoid Ht.	Horizontal Datum
WOOLPERT, INC.	41°59'33.02355" N	70°57'42.47283" W	-13.061 (Meters)	-28.597 (Meters)	NAD 83 (2011)
Combined Scale Factor	Northing (UTM 19) 4650805.792 (Meters)	Easting (UTM 19) 337506.108 (Meters)	Elevation 15.536 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A
1.000980363					

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Bristol County, Massachusetts				Site ID 29 Lidar Control Point # 1029	
Date of Survey				Ground Type	
12/13/2013				Asphalt	
Established by WOOLPERT, INC.	Latitude 41°58'57.99515" N	Longitude 71°04'15.11594" W	Ellipsoid Ht. 0.558 (Meters)	Geoid Ht. -28.735 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000905093	Northing (UTM 19) 4649938.193 (Meters)	Easting (UTM 19) 328445.605 (Meters)	Elevation 29.293 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Rockingham County, New Hampshire				Site ID 30 Lidar Control Point # 1030	
Date of Survey				Ground Type	
4/13/2014				Asphalt	
Established by WOOLPERT, INC.	Latitude 43°05'05.30359" N	Longitude 70°47'20.75836" W	Ellipsoid Ht. -3.924 (Meters)	Geoid Ht. -26.677 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001047543	Northing (UTM 19) 4771785.843 (Meters)	Easting (UTM 19) 354372.540 (Meters)	Elevation 22.754 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Rockingham County, New Hampshire				Station Description	
Date of Survey 4/13/2014				Site ID 31 Lidar Control Point # 1031	
Established by WOOLPERT, INC.	Latitude 42°57'24.00877" N	Longitude 70°46'48.67828" W	Ellipsoid Ht. -23.155 (Meters)	Ground Type Asphalt	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001062826	Northing (UTM 19) 4757540.421 (Meters)	Easting (UTM 19) 354796.151 (Meters)	Elevation 3.596 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Rockingham County, New Hampshire				Site ID 32 Lidar Control Point # 1032	
Date of Survey				Ground Type	
4/13/2014				Asphalt	
Established by WOOLPERT, INC.	Latitude 42°51'59.13363" N	Longitude 70°50'59.08124" W	Ellipsoid Ht. -16.573 (Meters)	Geoid Ht. -26.887 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001018203	Northing (UTM 19) 4747641.358 (Meters)	Easting (UTM 19) 348902.172 (Meters)	Elevation 10.313 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Essex County, Massachusetts				Station Description	
Date of Survey 4/12/2014				Site ID 33 Lidar Control Point # 1033	
Established by WOOLPERT, INC.	Latitude 42°43'28.87345" N	Longitude 70°51'53.13343" W	Ellipsoid Ht. -12.274 (Meters)	Ground Type Asphalt	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.0010138	Northing (UTM 19) 4731928.456 (Meters)	Easting (UTM 19) 347327.513 (Meters)	Elevation 14.658 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Essex County, Massachusetts				Site ID 34 Lidar Control Point # 1034	
Date of Survey				Ground Type	
4/12/2014				Asphalt	
Established by WOOLPERT, INC.	Latitude 42°38'58.17715" N	Longitude 70°35'45.95537" W	Ellipsoid Ht. -12.274 (Meters)	Geoid Ht. -17.675 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001208245	Northing (UTM 19) 4723127.675 (Meters)	Easting (UTM 19) 369166.176 (Meters)	Elevation 9.077 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Essex County, Massachusetts				Station Description	
Date of Survey 4/12/2014				Site ID 35 Lidar Control Point # 1035	
Established by WOOLPERT, INC.	Latitude 42°34'45.01791" N	Longitude 70°45'33.59433" W	Ellipsoid Ht. -21.322 (Meters)	Geoid Ht. -26.893 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001095247	Northing (UTM 19) 4715584.283 (Meters)	Easting (UTM 19) 355623.065 (Meters)	Elevation 5.571 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Essex County, Massachusetts				Station Description	
Date of Survey 4/12/2014				Site ID 36 Lidar Control Point # 1036	
Established by WOOLPERT, INC.	Latitude 42°34'02.91118" N	Longitude 70°57'08.47419" W	Ellipsoid Ht. 0.790 (Meters)	Ground Type Asphalt	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000959412	Northing (UTM 19) 4714632.740 (Meters)	Easting (UTM 19) 339752.534 (Meters)	Elevation 27.862 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Essex County, Massachusetts				Station Description	
Date of Survey 12/19/2013				Site ID 37 Lidar Control Point # 1037	
Established by WOOLPERT, INC.	Latitude 42°32'01.73981" N	Longitude 70°52'16.93551" W	Ellipsoid Ht. -21.652 (Meters)	Geoid Ht. -27.001 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001019483	Northing (UTM 19) 4710745.018 (Meters)	Easting (UTM 19) 346317.169 (Meters)	Elevation 5.349 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Essex County, Massachusetts				Station Description	
Date of Survey 12/19/2013				Site ID 38 Lidar Control Point # 1038	
Established by WOOLPERT, INC.	Latitude 42°25'44.27735" N	Longitude 70°55'59.07618" W	Ellipsoid Ht. -26.049 (Meters)	Geoid Ht. -27.351 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000982759	Northing (UTM 19) 4699215.774 (Meters)	Easting (UTM 19) 340984.143 (Meters)	Elevation 1.302 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Middlesex County, Massachusetts				Site ID 39 Lidar Control Point # 1039	
Date of Survey				Ground Type	
12/19/2013				Asphalt	
Established by	Latitude	Longitude	Ellipsoid Ht.	Geoid Ht.	Horizontal Datum
WOOLPERT, INC.	42°32'22.41782" N	71°05'19.34093" W	1.524 (Meters)	-27.382 (Meters)	NAD 83 (2011)
Combined Scale Factor	Northing (UTM 19) 4711800.010 (Meters)	Easting (UTM 19) 328484.023 (Meters)	Elevation 28.906 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A
Picture:					

Photogrammetric Ground Control Information Sheet

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NEW ENGLAND
CMGP SANDY LIDAR PROJECT



County, State Middlesex County, Massachusetts				Station Description Site ID 40 Lidar Control Point # 1040	
Date of Survey 12/19/2013				Ground Type Asphalt	
Established by WOOLPERT, INC.	Latitude 42°28'31.54558" N	Longitude 71°16'18.44773" W	Ellipsoid Ht. 10.869 (Meters)	Geoid Ht. -27.763 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.00075493	Northing (UTM 19) 4705065.466 (Meters)	Easting (UTM 19) 313258.258 (Meters)	Elevation 38.632 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Norfolk County, Massachusetts				Station Description Site ID 41 Lidar Control Point # 1041	
Date of Survey 12/19/2013				Ground Type Asphalt	
Established by WOOLPERT, INC.	Latitude 42°16'26.66532" N	Longitude 71°17'29.34337" W	Ellipsoid Ht. 7.734 (Meters)	Geoid Ht. -28.232 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000750639	Northing (UTM 19) 4682749.605 (Meters)	Easting (UTM 19) 311036.372 (Meters)	Elevation 35.966 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Middlesex County, Massachusetts				Station Description	
Date of Survey 12/19/2013				Site ID 42 Lidar Control Point # 1042	
Established by WOOLPERT, INC.	Latitude 42°27'52.73927" N	Longitude 71°08'29.26768" W	Ellipsoid Ht. -5.599 (Meters)	Geoid Ht. -27.570 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000840311	Northing (UTM 19) 4703589.692 (Meters)	Easting (UTM 19) 323941.470 (Meters)	Elevation 21.971 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Suffolk County, Massachusetts				Site ID 43 Lidar Control Point # 1043	
Date of Survey				Ground Type	
12/19/2013				Asphalt	
Established by WOOLPERT, INC.	Latitude 42°24'15.97718" N	Longitude 71°00'50.83231" W	Ellipsoid Ht. -24.720 (Meters)	Geoid Ht. -27.546 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.00092913	Northing (UTM 19) 4696647.123 (Meters)	Easting (UTM 19) 334252.621 (Meters)	Elevation 2.826 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Norfolk County, Massachusetts				Station Description	
Date of Survey 12/18/2013				Site ID 44 Lidar Control Point # 1044	
Established by WOOLPERT, INC.	Latitude 42°12'12.25422" N	Longitude 71°15'28.71404" W	Ellipsoid Ht. 61.201 (Meters)	Ground Type Asphalt	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000765843	Northing (UTM 19) 4674828.462 (Meters)	Easting (UTM 19) 313591.710 (Meters)	Elevation 89.583 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



Photogrammetric Ground Control Information Sheet

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NEW ENGLAND
CMGP SANDY LIDAR PROJECT



County, State Middlesex County, Massachusetts				Station Description Site ID 45 Lidar Control Point # 1045	
Date of Survey 12/19/2013				Ground Type Asphalt	
Established by WOOLPERT, INC.	Latitude 42°21'49.99843" N	Longitude 71°11'32.68491" W	Ellipsoid Ht. -22.395 (Meters)	Geoid Ht. -27.869 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000814305	Northing (UTM 19) 4692507.724 (Meters)	Easting (UTM 19) 319463.623 (Meters)	Elevation 5.473 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Norfolk County, Massachusetts				Station Description Site ID 46 Lidar Control Point # 1046	
Date of Survey 12/18/2013				Ground Type Asphalt	
Established by WOOLPERT, INC.	Latitude 42°16'07.37914" N	Longitude 71°10'42.15670" W	Ellipsoid Ht. 5.726 (Meters)	Geoid Ht. -28.134 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000822575	Northing (UTM 19) 4681909.850 (Meters)	Easting (UTM 19) 320348.820 (Meters)	Elevation 33.860 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Norfolk County, Massachusetts				Station Description Site ID 47 Lidar Control Point # 1047	
Date of Survey 12/18/2013				Ground Type Asphalt	
Established by WOOLPERT, INC.	Latitude 42°16'48.57726" N	Longitude 71°02'15.29724" W	Ellipsoid Ht. -25.479 (Meters)	Geoid Ht. -27.945 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000918903	Northing (UTM 19) 4682893.116 (Meters)	Easting (UTM 19) 331991.057 (Meters)	Elevation 2.466 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Norfolk County, Massachusetts				Station Description Site ID 48 Lidar Control Point # 1048	
Date of Survey 12/16/2013				Ground Type Asphalt	
Established by WOOLPERT, INC.	Latitude 42°13'11.95914" N	Longitude 70°58'39.24012" W	Ellipsoid Ht. -12.585 (Meters)	Geoid Ht. -28.017 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000959675	Northing (UTM 19) 4676094.937 (Meters)	Easting (UTM 19) 336784.741 (Meters)	Elevation 15.431 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Plymouth County, Massachusetts				Station Description Site ID 49 Lidar Control Point # 1049	
Date of Survey 12/16/2013				Ground Type Asphalt	
Established by WOOLPERT, INC.	Latitude 42°15'50.44514" N	Longitude 70°50'54.91114" W	Ellipsoid Ht. -15.175 (Meters)	Geoid Ht. -27.734 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001046631	Northing (UTM 19) 4680744.370 (Meters)	Easting (UTM 19) 347536.361 (Meters)	Elevation 12.560 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Plymouth County, Massachusetts				Site ID 50 Lidar Control Point # 1050	
Date of Survey				Ground Type	
12/16/2013				Asphalt	
Established by WOOLPERT, INC.	Latitude 42°10'00.61690" N	Longitude 70°44'33.49933" W	Ellipsoid Ht. -22.982 (Meters)	Geoid Ht. -27.900 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001127338	Northing (UTM 19) 4669770.054 (Meters)	Easting (UTM 19) 356054.176 (Meters)	Elevation 4.917 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Plymouth County, Massachusetts				Station Description	
Date of Survey 12/16/2013				Site ID 51 Lidar Control Point # 1051	
Established by WOOLPERT, INC.	Latitude 42°01'18.01608" N	Longitude 70°41'56.61070" W	Ellipsoid Ht. -5.819 (Meters)	Geoid Ht. -28.193 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001163244	Northing (UTM 19) 4653578.741 (Meters)	Easting (UTM 19) 359333.588 (Meters)	Elevation 22.374 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Plymouth County, Massachusetts				Station Description	
Date of Survey 12/13/2013				Site ID 52 Lidar Control Point # 1052	
Established by WOOLPERT, INC.	Latitude 41°51'47.93045" N	Longitude 70°32'21.54545" W	Ellipsoid Ht. -11.723 (Meters)	Geoid Ht. -28.213 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001291005	Northing (UTM 19) 4635745.759 (Meters)	Easting (UTM 19) 372243.165 (Meters)	Elevation 16.490 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Barnstable County, Massachusetts				Site ID 53 Lidar Control Point # 1053	
Date of Survey				Ground Type	
12/14/2013				Asphalt	
Established by WOOLPERT, INC.	Latitude 41°44'14.36133" N	Longitude 70°25'45.97160" W	Ellipsoid Ht. -23.299 (Meters)	Geoid Ht. -28.094 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001384256	Northing (UTM 19) 4621599.356 (Meters)	Easting (UTM 19) 381130.422 (Meters)	Elevation 4.795 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Barnstable County, Massachusetts				Station Description	
Date of Survey 12/15/2013				Site ID 54 Lidar Control Point # 1054	
Established by WOOLPERT, INC.	Latitude 42°03'12.88754" N	Longitude 70°11'21.90406" W	Ellipsoid Ht. -14.821 (Meters)	Ground Type Asphalt	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001555581	Northing (UTM 19) 4656409.505 (Meters)	Easting (UTM 19) 401577.185 (Meters)	Elevation 12.785 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Barnstable County, Massachusetts				Site ID 55 Lidar Control Point # 1055	
Date of Survey				Ground Type	
12/15/2013				Asphalt	
Established by WOOLPERT, INC.	Latitude 41°54'59.20856" N	Longitude 69°59'17.03019" W	Ellipsoid Ht. -22.335 (Meters)	Geoid Ht. -27.762 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001733271	Northing (UTM 19) 4640971.476 (Meters)	Easting (UTM 19) 418063.492 (Meters)	Elevation 5.426 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Barnstable County, Massachusetts				Station Description Site ID 56 Lidar Control Point # 1056	
Date of Survey 12/15/2013				Ground Type Asphalt	
Established by WOOLPERT, INC.	Latitude 41°46'29.39856" N	Longitude 69°59'58.44121" W	Ellipsoid Ht. -1.796 (Meters)	Geoid Ht. -27.941 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001729767	Northing (UTM 19) 4625259.459 (Meters)	Easting (UTM 19) 416926.562 (Meters)	Elevation 26.146 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Barnstable County, Massachusetts				Station Description	
Date of Survey 12/15/2013				Site ID 57 Lidar Control Point # 1057	
Established by WOOLPERT, INC.	Latitude 41°41'05.75468" N	Longitude 69°57'56.36123" W	Ellipsoid Ht. -14.547 (Meters)	Geoid Ht. -28.072 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001766918	Northing (UTM 19) 4615245.948 (Meters)	Easting (UTM 19) 419632.942 (Meters)	Elevation 13.524 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Barnstable County, Massachusetts				Station Description	
Date of Survey 12/15/2013				Site ID 58 Lidar Control Point # 1058	
Established by WOOLPERT, INC.	Latitude 41°38'55.88059" N	Longitude 70°13'25.34081" W	Ellipsoid Ht. -26.968 (Meters)	Ground Type Asphalt	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001554447	Northing (UTM 19) 4611513.498 (Meters)	Easting (UTM 19) 398099.426 (Meters)	Elevation 1.219 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Barnstable County, Massachusetts				Station Description Site ID 59 Lidar Control Point # 1059	
Date of Survey 12/14/2013				Ground Type Asphalt	
Established by WOOLPERT, INC.	Latitude 41°35'54.07775" N	Longitude 70°29'58.50375" W	Ellipsoid Ht. -14.083 (Meters)	Geoid Ht. -28.340 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.00133602	Northing (UTM 19) 4606269.494 (Meters)	Easting (UTM 19) 375028.369 (Meters)	Elevation 14.257 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Barnstable County, Massachusetts				Station Description Site ID 60 Lidar Control Point # 1060	
Date of Survey 12/13/2013				Ground Type Asphalt	
Established by WOOLPERT, INC.	Latitude 41°44'40.30389" N	Longitude 70°36'52.35576" W	Ellipsoid Ht. -25.836 (Meters)	Geoid Ht. -28.505 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001242756	Northing (UTM 19) 4622671.745 (Meters)	Easting (UTM 19) 365751.826 (Meters)	Elevation 2.669 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Plymouth County, Massachusetts				Site ID 61 Lidar Control Point # 1061	
Date of Survey				Ground Type	
12/13/2013				Asphalt	
Established by WOOLPERT, INC.	Latitude 41°45'30.41574" N	Longitude 70°43'45.57845" W	Ellipsoid Ht. -23.253 (Meters)	Geoid Ht. -28.693 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001156887	Northing (UTM 19) 4624402.768 (Meters)	Easting (UTM 19) 356238.357 (Meters)	Elevation 5.440 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Bristol County, Massachusetts				Site ID 62 Lidar Control Point # 1062	
Date of Survey				Ground Type	
12/13/2013				Steel Plate	
Established by WOOLPERT, INC.	Latitude 41°35'38.63765" N	Longitude 70°54'06.48672" W	Ellipsoid Ht. -26.300 (Meters)	Geoid Ht. -29.268 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001041655	Northing (UTM 19) 4606454.085 (Meters)	Easting (UTM 19) 341496.742 (Meters)	Elevation 2.968 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Newport County, Rhode Island				Station Description Site ID 63 Lidar Control Point # 1063	
Date of Survey 12/13/2013				Ground Type Asphalt	
Established by WOOLPERT, INC.	Latitude 41°27'56.18868" N	Longitude 71°10'24.88441" W	Ellipsoid Ht. -19.345 (Meters)	Geoid Ht. -29.917 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000861025	Northing (UTM 19) 4592726.479 (Meters)	Easting (UTM 19) 318485.688 (Meters)	Elevation 10.572 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Bristol County, Massachusetts				Station Description Site ID 64 Lidar Control Point # 1064	
Date of Survey 12/13/2013				Ground Type Asphalt	
Established by WOOLPERT, INC.	Latitude 41°37'57.58445" N	Longitude 71°03'58.04724" W	Ellipsoid Ht. -4.768 (Meters)	Geoid Ht. -29.461 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000923573	Northing (UTM 19) 4611054.388 (Meters)	Easting (UTM 19) 327903.487 (Meters)	Elevation 24.693 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Newport County, Rhode Island				Site ID 65 Lidar Control Point # 1065	
Date of Survey				Ground Type	
12/13/2013				Asphalt	
Established by	Latitude	Longitude	Ellipsoid Ht.	Geoid Ht.	Horizontal Datum
WOOLPERT, INC.	41°29'45.25823" N	71°14'56.63753" W	-15.850 (Meters)	-29.932 (Meters)	NAD 83 (2011)
Combined Scale Factor	Northing (UTM 19) 4596251.543 (Meters)	Easting (UTM 19) 312268.925 (Meters)	Elevation 14.082 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A
1.000810136					

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Newport County, Rhode Island				Station Description Site ID 66 Lidar Control Point # 1066	
Date of Survey 12/13/2013				Ground Type Asphalt	
Established by WOOLPERT, INC.	Latitude 41°27'00.13886" N	Longitude 71°21'14.25724" W	Ellipsoid Ht. -25.414 (Meters)	Geoid Ht. -30.136 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000746589	Northing (UTM 19) 4591392.141 (Meters)	Easting (UTM 19) 303374.083 (Meters)	Elevation 4.722 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Washington County, Rhode Island				Site ID 67 Lidar Control Point # 1067	
Date of Survey				Ground Type	
12/12/2013				Asphalt	
Established by	Latitude	Longitude	Ellipsoid Ht.	Geoid Ht.	Horizontal Datum
WOOLPERT, INC.	41°27'23.47655" N	71°26'22.90740" W	-15.305 (Meters)	-30.216 (Meters)	NAD 83 (2011)
Combined Scale Factor	Northing (UTM 19) 4592310.366 (Meters)	Easting (UTM 19) 296232.325 (Meters)	Elevation 14.911 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A
1.000691625					

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Washington County, Rhode Island				Site ID 68 Lidar Control Point # 1068	
Date of Survey				Ground Type	
12/12/2013				Asphalt	
Established by	Latitude	Longitude	Ellipsoid Ht.	Geoid Ht.	Horizontal Datum
WOOLPERT, INC.	41°23'19.01717" N	71°29'05.66985" W	-16.066 (Meters)	-30.360 (Meters)	NAD 83 (2011)
Combined Scale Factor	Northing (UTM 19) 4584878.289 (Meters)	Easting (UTM 19) 292239.390 (Meters)	Elevation 14.294 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A
1.000666466					

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Washington County, Rhode Island				Site ID 69 Lidar Control Point # 1069	
Date of Survey				Ground Type	
12/12/2013				Asphalt	
Established by	Latitude	Longitude	Ellipsoid Ht.	Geoid Ht.	Horizontal Datum
WOOLPERT, INC.	41°21'20.79715" N	71°42'13.27246" W	-22.758 (Meters)	-30.551 (Meters)	NAD 83 (2011)
Combined Scale Factor	Northing (UTM 19) 4581780.131 (Meters)	Easting (UTM 19) 273832.081 (Meters)	Elevation 7.793 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A
1.00054003					

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Washington County, Rhode Island				Station Description	
Date of Survey 12/12/2013				Site ID 70 Lidar Control Point # 1070	
Established by WOOLPERT, INC.	Latitude 41°18'37.30543" N	Longitude 71°51'38.94985" W	Ellipsoid Ht. -30.081 (Meters)	Ground Type Asphalt	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000455144	Northing (UTM 19) 4577159.715 (Meters)	Easting (UTM 19) 260519.891 (Meters)	Elevation 0.598 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Washington County, Rhode Island				Site ID 71 Lidar Control Point # 1071	
Date of Survey				Ground Type	
12/12/2013				Asphalt	
Established by	Latitude	Longitude	Ellipsoid Ht.	Geoid Ht.	Horizontal Datum
WOOLPERT, INC.	41°26'31.91226" N	71°41'52.51544" W	-8.858 (Meters)	-30.425 (Meters)	NAD 83 (2011)
Combined Scale Factor	Northing (UTM 19) 4591360.650 (Meters)	Easting (UTM 19) 274613.467 (Meters)	Elevation 21.567 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A
1.000538623					

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Washington County, Rhode Island				Site ID 72 Lidar Control Point # 1072	
Date of Survey				Ground Type	
12/13/2013				Asphalt	
Established by	Latitude	Longitude	Ellipsoid Ht.	Geoid Ht.	Horizontal Datum
WOOLPERT, INC.	41°13'23.81991" N	71°33'56.31417" W	-28.701 (Meters)	-30.655 (Meters)	NAD 83 (2011)
Combined Scale Factor	Northing (UTM 19) 4566718.275 (Meters)	Easting (UTM 19) 284945.742 (Meters)	Elevation 1.954 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A
1.000625283					

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Washington County, Rhode Island				Site ID 73 Lidar Control Point # 1073	
Date of Survey				Ground Type	
12/13/2013				Asphalt	
Established by	Latitude	Longitude	Ellipsoid Ht.	Geoid Ht.	Horizontal Datum
WOOLPERT, INC.	41°09'50.12046" N	71°33'36.53706" W	1.914 (Meters)	-30.755 (Meters)	NAD 83 (2011)
Combined Scale Factor	Northing (UTM 19) 4560113.957 (Meters)	Easting (UTM 19) 285212.180 (Meters)	Elevation 32.670 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Dukes County, Massachusetts				Site ID 74 Lidar Control Point # 1074	
Date of Survey				Ground Type	
12/14/2013				Asphalt	
Established by	Latitude	Longitude	Ellipsoid Ht.	Geoid Ht.	Horizontal Datum
WOOLPERT, INC.	41°19'07.84135" N	70°45'54.30297" W	-26.345 (Meters)	-29.352 (Meters)	NAD 83 (2011)
Combined Scale Factor	Northing (UTM 19) 4575655.528 (Meters)	Easting (UTM 19) 352268.345 (Meters)	Elevation 3.007 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A
1.001152511					

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Dukes County, Massachusetts				Station Description Site ID 75 Lidar Control Point # 1075	
Date of Survey 12/14/2013				Ground Type Asphalt	
Established by WOOLPERT, INC.	Latitude 41°28'50.70632" N	Longitude 70°36'19.97911" W	Ellipsoid Ht. -19.449 (Meters)	Geoid Ht. -28.732 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001262122	Northing (UTM 19) 4593371.483 (Meters)	Easting (UTM 19) 365954.514 (Meters)	Elevation 9.283 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Dukes County, Massachusetts				Site ID 76 Lidar Control Point # 1076	
Date of Survey				Ground Type	
12/14/2013				Asphalt	
Established by WOOLPERT, INC.	Latitude 41°22'26.50353" N	Longitude 70°28'16.74460" W	Ellipsoid Ht. -22.305 (Meters)	Geoid Ht. -28.787 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001371501	Northing (UTM 19) 4581323.474 (Meters)	Easting (UTM 19) 376960.325 (Meters)	Elevation 6.482 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Dukes County, Massachusetts				Station Description Site ID 77 Lidar Control Point # 1077	
Date of Survey 12/17/2013				Ground Type Asphalt	
Established by WOOLPERT, INC.	Latitude 41°16'40.87893" N	Longitude 70°11'14.22056" W	Ellipsoid Ht. -26.015 (Meters)	Geoid Ht. -28.833 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001607205	Northing (UTM 19) 4570300.583 (Meters)	Easting (UTM 19) 400567.462 (Meters)	Elevation 2.818 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Dukes County, Massachusetts				Station Description Site ID 78 Lidar Control Point # 1078	
Date of Survey 12/17/2013				Ground Type Asphalt	
Established by WOOLPERT, INC.	Latitude 41°15'26.45238" N	Longitude 69°58'00.36477" W	Ellipsoid Ht. -17.815 (Meters)	Geoid Ht. -28.819 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001795492	Northing (UTM 19) 4567776.368 (Meters)	Easting (UTM 19) 419009.891 (Meters)	Elevation 11.005 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Hampshire County, Massachusetts				Site ID 79 Lidar Control Point # 1079	
Date of Survey				Ground Type	
4/13/2014				Asphalt	
Established by WOOLPERT, INC.	Latitude 42°21'39.81120" N	Longitude 72°41'28.32765" W	Ellipsoid Ht. 97.327 (Meters)	Geoid Ht. -28.586 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000029682	Northing (UTM 19) 4696467.957 (Meters)	Easting (UTM 19) 196017.973 (Meters)	Elevation 125.913 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Hampshire County, Massachusetts				Station Description Site ID 80 Lidar Control Point # 1080	
Date of Survey 4/12/2014				Ground Type Asphalt	
Established by WOOLPERT, INC.	Latitude 42°17'27.82782" N	Longitude 72°37'44.80436" W	Ellipsoid Ht. 6.111 (Meters)	Geoid Ht. -28.735 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000069275	Northing (UTM 19) 4688474.114 (Meters)	Easting (UTM 19) 200799.920 (Meters)	Elevation 34.846 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Washington County, Rhode Island				Survey Control Point # 201	
Date of Survey				Ground Type	Short Grass
Established by WOOLPERT, INC.	Latitude 41°20'18.53042" N	Longitude 71°46'05.23605" W	Ellipsoid Ht. -28.071 (Meters)	Geoid Ht. -30.603 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000505059	Northing (UTM 19) 4580029.876 (Meters)	Easting (UTM 19) 268380.167 (Meters)	Elevation 2.532 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



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USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Washington County, Rhode Island				Survey Control Point # 202	
Date of Survey				Ground Type	
12/12/2013				Short Grass	
Established by	Latitude	Longitude	Ellipsoid Ht.	Geoid Ht.	Horizontal Datum
WOOLPERT, INC.	41°20'15.52307" N	71°46'04.17521" W	-28.043 (Meters)	-30.605 (Meters)	NAD 83 (2011)
Combined Scale Factor	Northing (UTM 19) 4579936.335 (Meters)	Easting (UTM 19) 268401.865 (Meters)	Elevation 2.561 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A
1.000505242					

Picture:



Photogrammetric Ground Control Information Sheet

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Barnstable County, Massachusetts				Survey Control Point # 203	
Date of Survey				Ground Type	
12/14/2013				Asphalt	
Established by WOOLPERT, INC.	Latitude 41°33'33.18970" N	Longitude 70°35'32.80314" W	Ellipsoid Ht. -27.670 (Meters)	Geoid Ht. -28.605 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001269259	Northing (UTM 19) 4602063.105 (Meters)	Easting (UTM 19) 367209.170 (Meters)	Elevation 0.935 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Barnstable County, Massachusetts				Survey Control Point # 204	
Date of Survey				Ground Type	
12/14/2013				Short Grass	
Established by	Latitude	Longitude	Ellipsoid Ht.	Geoid Ht.	Horizontal Datum
WOOLPERT, INC.	41°33'32.43719" N	70°35'35.39339" W	-26.678 (Meters)	-28.607 (Meters)	NAD 83 (2011)
Combined Scale Factor	Northing (UTM 19) 4602041.004 (Meters)	Easting (UTM 19) 367148.741 (Meters)	Elevation 1.929 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A
Picture:					

Photogrammetric Ground Control Information Sheet

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Barnstable County, Massachusetts				Survey Control Point # 205	
Date of Survey				Ground Type	
12/15/2013				Short Grass	
Established by	Latitude	Longitude	Ellipsoid Ht.	Geoid Ht.	Horizontal Datum
WOOLPERT, INC.	42°03'19.09032" N	70°11'37.88498" W	-23.912 (Meters)	-27.604 (Meters)	NAD 83 (2011)
Combined Scale Factor	Northing (UTM 19) 4656605.931 (Meters)	Easting (UTM 19) 401212.517 (Meters)	Elevation 3.691 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A
Picture:					

Photogrammetric Ground Control Information Sheet

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Worcester County, Massachusetts				Survey Control Point # 206	
Date of Survey				Ground Type	
12/16/2013				Asphalt	
Established by	Latitude	Longitude	Ellipsoid Ht.	Geoid Ht.	Horizontal Datum
WOOLPERT, INC.	42°04'06.72878" N	71°51'28.17833" W	133.646 (Meters)	-29.174 (Meters)	NAD 83 (2011)
Combined Scale Factor	Northing (UTM 19) 4661338.219 (Meters)	Easting (UTM 19) 263565.496 (Meters)	Elevation 162.820 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A
1.000411153					

Picture:



Photogrammetric Ground Control Information Sheet

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**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description	
			Survey Control Point # 207		
Date of Survey 12/16/2013				Ground Type	
			Asphalt		
Established by WOOLPERT, INC.	Latitude 42°04'05.15986" N	Longitude 71°51'26.93383" W	Ellipsoid Ht. 132.108 (Meters)	Geoid Ht. -29.175 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000411589	Northing (UTM 19) 4661288.868 (Meters)	Easting (UTM 19) 263592.480 (Meters)	Elevation 161.283 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description Survey Control Point # 208	
Date of Survey 12/16/2013				Ground Type Bare Earth	
Established by WOOLPERT, INC.	Latitude 42°06'42.84000" N	Longitude 72°05'32.09047" W	Ellipsoid Ht. 145.147 (Meters)	Geoid Ht. -28.681 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000288773	Northing (UTM 19) 4666829.098 (Meters)	Easting (UTM 19) 244343.899 (Meters)	Elevation 173.828 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Worcester County, Massachusetts				Survey Control Point # 209	
Date of Survey				Ground Type	
12/16/2013				Short Grass	
Established by WOOLPERT, INC.	Latitude 42°06'41.43179" N	Longitude 72°05'32.47130" W	Ellipsoid Ht. 146.986 (Meters)	Geoid Ht. -28.682 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000288443	Northing (UTM 19) 4666785.977 (Meters)	Easting (UTM 19) 244333.578 (Meters)	Elevation 175.667 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description Survey Control Point # 210	
Date of Survey 12/16/2013				Ground Type Asphalt	
Established by WOOLPERT, INC.	Latitude 42°09'20.80263" N	Longitude 71°58'26.91648" W	Ellipsoid Ht. 232.603 (Meters)	Geoid Ht. -28.776 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000333017	Northing (UTM 19) 4671354.662 (Meters)	Easting (UTM 19) 254279.056 (Meters)	Elevation 261.379 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description	
				Survey Control Point # 211	
Date of Survey 12/16/2013				Ground Type	
Established by WOOLPERT, INC.	Latitude 42°09'22.13372" N	Longitude 71°58'23.54101" W	Ellipsoid Ht. 233.974 (Meters)	Geoid Ht. -28.777 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000333271	Northing (UTM 19) 4671393.020 (Meters)	Easting (UTM 19) 254357.961 (Meters)	Elevation 262.750 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



NEW ENGLAND
CMGP SANDY LIDAR PROJECT



County, State Worcester County, Massachusetts				Station Description	
			Survey Control Point # 212		
Date of Survey 12/17/2013				Ground Type	
			Short Grass		
Established by WOOLPERT, INC.	Latitude 42°14'45.25691" N	Longitude 71°45'29.99708" W	Ellipsoid Ht. 117.313 (Meters)	Geoid Ht. -28.724 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000462301	Northing (UTM 19) 4680763.582 (Meters)	Easting (UTM 19) 272434.491 (Meters)	Elevation 146.037 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description	
			Survey Control Point # 213		
Date of Survey 12/17/2013				Ground Type	
			Short Grass		
Established by WOOLPERT, INC.	Latitude 42°14'45.27410" N	Longitude 71°45'32.13588" W	Ellipsoid Ht. 118.384 (Meters)	Geoid Ht. -28.723 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.00046181	Northing (UTM 19) 4680765.701 (Meters)	Easting (UTM 19) 272385.490 (Meters)	Elevation 147.106 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description	
			Survey Control Point # 214		
Date of Survey 12/17/2013				Ground Type	
			Short Grass		
Established by WOOLPERT, INC.	Latitude 42°16'20.41654" N	Longitude 71°47'09.14267" W	Ellipsoid Ht. 177.333 (Meters)	Geoid Ht. -28.638 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000437259	Northing (UTM 19) 4683772.875 (Meters)	Easting (UTM 19) 270258.256 (Meters)	Elevation 205.971 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Worcester County, Massachusetts				Survey Control Point # 215	
Date of Survey				Ground Type	
12/17/2013				Short Grass	
Established by WOOLPERT, INC.	Latitude 42°16'20.52205" N	Longitude 71°47'06.97066" W	Ellipsoid Ht. 176.302 (Meters)	Geoid Ht. -28.638 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000437744	Northing (UTM 19) 4683774.501 (Meters)	Easting (UTM 19) 270308.121 (Meters)	Elevation 204.941 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Worcester County, Massachusetts				Survey Control Point # 216	
Date of Survey				Ground Type	
12/17/2013				Short Grass	
Established by	Latitude	Longitude	Ellipsoid Ht.	Geoid Ht.	Horizontal Datum
WOOLPERT, INC.	42°15'27.97189" N	71°57'35.81774" W	276.462 (Meters)	-28.523 (Meters)	NAD 83 (2011)
Combined Scale Factor	Northing (UTM 19) 4682639.761 (Meters)	Easting (UTM 19) 255845.295 (Meters)	Elevation 304.985 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A
1.000330871					

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Worcester County, Massachusetts				Survey Control Point # 217	
Date of Survey				Ground Type	
12/17/2013				Asphalt	
Established by WOOLPERT, INC.	Latitude 42°13'07.79748" N	Longitude 72°04'14.82740" W	Ellipsoid Ht. 159.768 (Meters)	Geoid Ht. -28.478 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000294582	Northing (UTM 19) 4678639.694 (Meters)	Easting (UTM 19) 246546.099 (Meters)	Elevation 188.246 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Worcester County, Massachusetts				Station Description	
			Survey Control Point # 218		
Date of Survey 12/20/2013				Ground Type	
			Asphalt		
Established by WOOLPERT, INC.	Latitude 42°13'10.00195" N	Longitude 72°04'15.99889" W	Ellipsoid Ht. 159.490 (Meters)	Geoid Ht. -28.476 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000294451	Northing (UTM 19) 4678708.663 (Meters)	Easting (UTM 19) 246521.690 (Meters)	Elevation 187.967 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Washington County, Rhode Island				Station Description Survey Control Point # 251	
Date of Survey 12/13/2013				Ground Type Short Grass	
Established by WOOLPERT, INC.	Latitude 41°09'26.22022" N	Longitude 71°33'54.88434" W	Ellipsoid Ht. 14.475 (Meters)	Geoid Ht. -30.769 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.00062083	Northing (UTM 19) 4559389.446 (Meters)	Easting (UTM 19) 284762.829 (Meters)	Elevation 45.244 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Washington County, Rhode Island				Station Description Survey Control Point # 252	
Date of Survey 12/13/2013				Ground Type Short Grass	
Established by WOOLPERT, INC.	Latitude 41°09'28.47651" N	Longitude 71°33'54.69295" W	Ellipsoid Ht. 11.860 (Meters)	Geoid Ht. -30.768 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000621251	Northing (UTM 19) 4559458.901 (Meters)	Easting (UTM 19) 284769.342 (Meters)	Elevation 42.628 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Dukes County, Massachusetts				Survey Control Point # 253	
Date of Survey				Ground Type	
12/14/2013				Bare Earth	
Established by WOOLPERT, INC.	Latitude 41°23'11.84579" N	Longitude 70°33'11.75507" W	Ellipsoid Ht. -22.924 (Meters)	Geoid Ht. -28.830 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001307422	Northing (UTM 19) 4582841.391 (Meters)	Easting (UTM 19) 370132.294 (Meters)	Elevation 5.906 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Dukes County, Massachusetts				Station Description Survey Control Point # 254	
Date of Survey 12/14/2013				Ground Type Asphalt	
Established by WOOLPERT, INC.	Latitude 41°23'12.15375" N	Longitude 70°33'16.12473" W	Ellipsoid Ht. -23.220 (Meters)	Geoid Ht. -28.831 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001306532	Northing (UTM 19) 4582852.709 (Meters)	Easting (UTM 19) 370030.976 (Meters)	Elevation 5.611 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Plymouth County, Massachusetts				Survey Control Point # 255	
Date of Survey				Ground Type	
12/16/2013				Short Grass	
Established by WOOLPERT, INC.	Latitude 42°00'05.04827" N	Longitude 70°43'09.33331" W	Ellipsoid Ht. -23.479 (Meters)	Geoid Ht. -28.270 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001152344	Northing (UTM 19) 4651361.611 (Meters)	Easting (UTM 19) 357615.891 (Meters)	Elevation 4.792 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Plymouth County, Massachusetts				Station Description Survey Control Point # 256	
Date of Survey 12/16/2013				Ground Type Asphalt	
Established by WOOLPERT, INC.	Latitude 42°00'08.05024" N	Longitude 70°43'09.23187" W	Ellipsoid Ht. -24.592 (Meters)	Geoid Ht. -28.268 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001152498	Northing (UTM 19) 4651454.153 (Meters)	Easting (UTM 19) 357620.084 (Meters)	Elevation 3.677 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Plymouth County, Massachusetts				Station Description Survey Control Point # 257	
Date of Survey 12/16/2013				Ground Type Asphalt	
Established by WOOLPERT, INC.	Latitude 42°06'18.96787" N	Longitude 71°03'24.09142" W	Ellipsoid Ht. 43.459 (Meters)	Geoid Ht. -28.365 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000902718	Northing (UTM 19) 4663511.106 (Meters)	Easting (UTM 19) 329946.926 (Meters)	Elevation 71.824 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Norfolk County, Massachusetts				Survey Control Point # 258	
Date of Survey				Ground Type	
12/16/2013				Asphalt	
Established by	Latitude	Longitude	Ellipsoid Ht.	Geoid Ht.	Horizontal Datum
WOOLPERT, INC.	42°06'21.40500" N	71°03'24.24912" W	42.560 (Meters)	-28.363 (Meters)	NAD 83 (2011)
Combined Scale Factor	Northing (UTM 19) 4663586.364 (Meters)	Easting (UTM 19) 329945.114 (Meters)	Elevation 70.923 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A
1.000902801					

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Nantucket County, Massachusetts				Station Description Survey Control Point # 259	
Date of Survey 12/17/2013				Ground Type Asphalt	
Established by WOOLPERT, INC.	Latitude 41°15'45.04990" N	Longitude 70°00'50.28447" W	Ellipsoid Ht. -6.813 (Meters)	Geoid Ht. -28.787 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001752405	Northing (UTM 19) 4568394.955 (Meters)	Easting (UTM 19) 415062.401 (Meters)	Elevation 21.974 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Nantucket County, Massachusetts				Station Description Survey Control Point # 260	
Date of Survey 12/17/2013				Ground Type Asphalt	
Established by WOOLPERT, INC.	Latitude 41°15'44.78381" N	Longitude 70°00'45.65247" W	Ellipsoid Ht. -7.428 (Meters)	Geoid Ht. -28.787 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001753619	Northing (UTM 19) 4568385.492 (Meters)	Easting (UTM 19) 415170.088 (Meters)	Elevation 21.360 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Norfolk County, Massachusetts				Station Description Survey Control Point # 261	
Date of Survey 12/18/2013				Ground Type Asphalt	
Established by WOOLPERT, INC.	Latitude 42°12'24.37849" N	Longitude 71°11'19.32874" W	Ellipsoid Ht. -11.846 (Meters)	Geoid Ht. -28.308 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000821128	Northing (UTM 19) 4675053.271 (Meters)	Easting (UTM 19) 319320.515 (Meters)	Elevation 16.462 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Norfolk County, Massachusetts				Survey Control Point # 262	
Date of Survey				Ground Type	
12/18/2013				Asphalt	
Established by WOOLPERT, INC.	Latitude 42°12'27.12891" N	Longitude 71°11'16.86857" W	Ellipsoid Ht. -11.370 (Meters)	Geoid Ht. -28.306 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000821462	Northing (UTM 19) 4675136.658 (Meters)	Easting (UTM 19) 319379.109 (Meters)	Elevation 16.936 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Suffolk County, Massachusetts				Station Description Survey Control Point # 263	
Date of Survey 12/18/2013				Ground Type Short Grass	
Established by WOOLPERT, INC.	Latitude 42°16'14.42923" N	Longitude 71°03'44.67068" W	Ellipsoid Ht. -23.630 (Meters)	Geoid Ht. -28.006 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000902563	Northing (UTM 19) 4681889.125 (Meters)	Easting (UTM 19) 329918.431 (Meters)	Elevation 4.376 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Suffolk County, Massachusetts				Survey Control Point # 264	
Date of Survey				Ground Type	
12/18/2013				Short Grass	
Established by WOOLPERT, INC.	Latitude 42°16'11.90676" N	Longitude 71°03'45.10105" W	Ellipsoid Ht. -24.532 (Meters)	Geoid Ht. -28.008 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000902655	Northing (UTM 19) 4681811.558 (Meters)	Easting (UTM 19) 329906.687 (Meters)	Elevation 3.476 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Suffolk County, Massachusetts				Survey Control Point # 265	
Date of Survey				Ground Type	
12/19/2013				Asphalt	
Established by	Latitude	Longitude	Ellipsoid Ht.	Geoid Ht.	Horizontal Datum
WOOLPERT, INC.	42°23'29.24746" N	70°59'38.19356" W	-24.365 (Meters)	-27.549 (Meters)	NAD 83 (2011)
Combined Scale Factor	Northing (UTM 19) 4695166.552 (Meters)	Easting (UTM 19) 335879.302 (Meters)	Elevation 3.184 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOD 12A
Picture:					

Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Suffolk County, Massachusetts				Survey Control Point # 266	
Date of Survey				Ground Type	
12/19/2013				Asphalt	
Established by WOOLPERT, INC.	Latitude 42°23'31.90705" N	Longitude 70°59'37.33903" W	Ellipsoid Ht. -24.864 (Meters)	Geoid Ht. -27.546 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.000943306	Northing (UTM 19) 4695248.129 (Meters)	Easting (UTM 19) 335900.765 (Meters)	Elevation 2.682 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Essex County, Massachusetts				Station Description Survey Control Point # 267	
Date of Survey 12/19/2013				Ground Type Bare Earth	
Established by WOOLPERT, INC.	Latitude 42°31'53.19348" N	Longitude 70°52'22.83098" W	Ellipsoid Ht. -20.030 (Meters)	Geoid Ht. -27.006 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001018213	Northing (UTM 19) 4710484.373 (Meters)	Easting (UTM 19) 346176.849 (Meters)	Elevation 6.976 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State Essex County, Massachusetts				Station Description Survey Control Point # 268	
Date of Survey 12/19/2013				Ground Type Bare Earth	
Established by WOOLPERT, INC.	Latitude 42°31'55.78639" N	Longitude 70°52'21.31360" W	Ellipsoid Ht. -22.916 (Meters)	Geoid Ht. -27.005 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001018922	Northing (UTM 19) 4710563.588 (Meters)	Easting (UTM 19) 346213.234 (Meters)	Elevation 4.089 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Dukes County, Massachusetts				Survey Control Point # MVBASE	
Date of Survey				Ground Type	
12/14/2013				Short Grass	
Established by WOOLPERT, INC.	Latitude 41°23'43.41739" N	Longitude 70°36'11.14841" W	Ellipsoid Ht. -11.947 (Meters)	Geoid Ht. -28.889 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001267213	Northing (UTM 19) 4583890.941 (Meters)	Easting (UTM 19) 365983.790 (Meters)	Elevation 16.942 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



Photogrammetric Ground Control Information Sheet

USGS/NGTOC



**NEW ENGLAND
CMGP SANDY LIDAR PROJECT**



County, State				Station Description	
Dukes County, Massachusetts				Survey Control Point # NANBASE	
Date of Survey				Ground Type	
12/17/2013				Short Grass	
Established by WOOLPERT, INC.	Latitude 41°15'53.41847" N	Longitude 70°03'30.86404" W	Ellipsoid Ht. -13.379 (Meters)	Geoid Ht. -28.777 (Meters)	Horizontal Datum NAD 83 (2011)
Combined Scale Factor 1.001714884	Northing (UTM 19) 4568697.600 (Meters)	Easting (UTM 19) 411329.004 (Meters)	Elevation 15.398 (Meters)	Vertical Datum NAVD 88	Geoid Model GEOID 12A

Picture:



SECTION 4: EXISTING CONTROL STATION INFORMATION SHEETS

This contains the published Survey Control information sheets used in the final control network for the USGS/NGTOC, Task Order: New England CMGP Sandy Lidar project.

The NGS Data Sheet

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

```
PROGRAM = datasheet95, VERSION = 8.4
1      National Geodetic Survey,   Retrieval Date = JANUARY 7, 2014
AJ4075 ****
AJ4075 CBN      - This is a Cooperative Base Network Control Station.
AJ4075 DESIGNATION - 31 D
AJ4075 PID       - AJ4075
AJ4075 STATE/COUNTY- MA/NANTUCKET
AJ4075 COUNTRY   - US
AJ4075 USGS QUAD - 

AJ4075
AJ4075                               *CURRENT SURVEY CONTROL
AJ4075
AJ4075* NAD 83(2011) POSITION- 41 16 16.47449(N) 070 05 17.92368(W)    ADJUSTED
AJ4075* NAD 83(2011) ELLIP HT-    -22.384 (meters)                  (06/27/12)    ADJUSTED
AJ4075* NAD 83(2011) EPOCH -    2010.00
AJ4075* NAVD 88 ORTHO HEIGHT -    6.4      (meters)          21.      (feet) GPS OBS
AJ4075
AJ4075      NAVD 88 orthometric height was determined with geoid model      GEOID99
AJ4075      GEOID HEIGHT      -      -28.74 (meters)                  GEOID99
AJ4075      GEOID HEIGHT      -      -28.77 (meters)                  GEOID12A
AJ4075      NAD 83(2011) X - 1,635,000.582 (meters)                      COMP
AJ4075      NAD 83(2011) Y - -4,513,762.119 (meters)                      COMP
AJ4075      NAD 83(2011) Z - 4,185,095.912 (meters)                      COMP
AJ4075      LAPLACE CORR     -      0.79 (seconds)                   DEFLEC12A
AJ4075
AJ4075      FGDC Geospatial Positioning Accuracy Standards (95% confidence, cm)
AJ4075      Type                           Horiz   Ellip   Dist(km)
AJ4075      -----
AJ4075      NETWORK                         0.74    1.41
AJ4075      -----
AJ4075      MEDIAN LOCAL ACCURACY AND DIST (001 points)  0.60    1.04    2.03
AJ4075      -----
AJ4075      NOTE: Click here for information on individual local accuracy
AJ4075      values and other accuracy information.
AJ4075
AJ4075
AJ4075.The horizontal coordinates were established by GPS observations
AJ4075.and adjusted by the National Geodetic Survey in June 2012.
AJ4075
AJ4075.NAD 83(2011) refers to NAD 83 coordinates where the reference
AJ4075.frame has been affixed to the stable North American tectonic plate. See
AJ4075.NA2011 for more information. for more information.
AJ4075
AJ4075.The horizontal coordinates are valid at the epoch date displayed above
AJ4075.which is a decimal equivalence of Year/Month/Day.
AJ4075
AJ4075.The orthometric height was determined by GPS observations and a
AJ4075.high-resolution geoid model.
AJ4075
AJ4075.The X, Y, and Z were computed from the position and the ellipsoidal ht.
AJ4075
AJ4075.The Laplace correction was computed from DEFLEC12A derived deflections.
AJ4075
AJ4075.The ellipsoidal height was determined by GPS observations
AJ4075.and is referenced to NAD 83.
```

AJ4075

AJ4075. The following values were computed from the NAD 83(2011) position.

AJ4075

AJ4075;	North	East	Units	Scale Factor	Converg.
AJ4075;SPC MA I	- 30,205.488	534,494.932	MT	1.00000039	+0 16 19.8
AJ4075;SPC MA I	- 99,099.17	1,753,588.79	sFT	1.00000039	+0 16 19.8
AJ4075;UTM 19	- 4,569,439.390	408,846.815	MT	0.99970226	-0 43 04.5

AJ4075

AJ4075!	- Elev Factor	x Scale Factor	= Combined Factor
AJ4075!SPC MA I	- 1.00000351	x 1.00000039	= 1.00000390
AJ4075!UTM 19	- 1.00000351	x 0.99970226	= 0.99970577

AJ4075

AJ4075 SUPERSEDED SURVEY CONTROL

AJ4075

AJ4075 NAD 83(2007)-	41 16 16.47491 (N)	070 05 17.92447 (W)	AD(2002.00)	0
AJ4075 ELLIP H (02/10/07)	-22.364 (m)		GP(2002.00)	
AJ4075 NAD 83(1996)-	41 16 16.47496 (N)	070 05 17.92470 (W)	AD() A	
AJ4075 ELLIP H (06/22/01)	-22.371 (m)		GP() 4 1	

AJ4075

AJ4075. Superseded values are not recommended for survey control.

AJ4075

AJ4075.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

AJ4075.[See file dsdata.txt](#) to determine how the superseded data were derived.

AJ4075

AJ4075_U.S. NATIONAL GRID SPATIAL ADDRESS: 19TDF0884669439(NAD 83)

AJ4075

AJ4075_MARKER: DD = SURVEY DISK

AJ4075_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

AJ4075_STAMPING: NO 31 D

AJ4075_MARK LOGO: CGS+SS

AJ4075_MAGNETIC: N = NO MAGNETIC MATERIAL

AJ4075_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

AJ4075+STABILITY: SURFACE MOTION

AJ4075_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

AJ4075+SATELLITE: SATELLITE OBSERVATIONS - 1935

AJ4075

AJ4075 HISTORY	- Date	Condition	Report By
AJ4075 HISTORY	- 1935	MONUMENTED	MAGS
AJ4075 HISTORY	- 20050519	GOOD	GEOCAC

AJ4075

AJ4075 STATION DESCRIPTION

AJ4075

AJ4075'DESCRIBED BY MASSACHUSETTS GEODETIC SURVEY 1935 (WFR)

AJ4075'THE STATION IS LOCATED ON NANTUCKET ISLAND, IN THE ROUND TRAFFIC

AJ4075'ROTARY AT THE INTERSECTION OF MILESTONE ROAD, SPARKS AVENUE,

AJ4075'ORANGE STREET AND OLD SOUTH ROAD. THE STATION IS A STANDARD

AJ4075'USCGS AND STATE SURVEY DISK SET IN A CONCRETE MONUMENT NEAR THE

AJ4075'NORTH EDGE OF THE ROTARY, FLUSH WITH THE GROUND. 98.9 FT (30.1 M)

AJ4075'SOUTHEAST FROM THE FIRST MILEPOST WHICH IS NORTHWEST FROM THE

AJ4075'ROTARY ALONG ORANGE STREET, AND 15.75 FT (4.80 M) NORTH FROM THE

AJ4075'BASE OF A FLAGPOLE IN THE CENTER OF THE ROTARY.

AJ4075'

AJ4075

AJ4075 STATION RECOVERY (2005)

AJ4075

AJ4075'RECOVERY NOTE BY GEOCACHING 2005 (HMT)

AJ4075'VERIFIED DISTANCE OF 15.75 FEET FROM BASE OF FLAGPOLE (AT ITS SURFACE,

AJ4075'NOT ON CENTER)

AJ4075'NORTHERLY TO CENTER OF MARK.

```
*** retrieval complete.  
Elapsed Time = 00:00:02
```

The NGS Data Sheet

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

```
PROGRAM = datasheet95, VERSION = 8.4
1          National Geodetic Survey,   Retrieval Date = JANUARY 7, 2014
LW1544 ****
LW1544 TIDAL BM - This is a Tidal Bench Mark.
LW1544 DESIGNATION - 844 6493 TIDAL 10
LW1544 PID - LW1544
LW1544 STATE/COUNTY- MA/PLYMOUTH
LW1544 COUNTRY - US
LW1544 USGS QUAD -
LW1544
LW1544           *CURRENT SURVEY CONTROL
LW1544
LW1544* NAD 83(2011) POSITION- 41 57 34.12534(N) 070 39 44.75286(W)   ADJUSTED
LW1544* NAD 83(2011) ELLIP HT- -25.221 (meters)           (06/27/12)   ADJUSTED
LW1544* NAD 83(2011) EPOCH - 2010.00
LW1544* NAVD 88 ORTHO HEIGHT -      3.042 (meters)           9.98 (feet)   ADJUSTED
LW1544
LW1544 NAD 83(2011) X - 1,572,879.447 (meters)           COMP
LW1544 NAD 83(2011) Y - -4,482,015.303 (meters)           COMP
LW1544 NAD 83(2011) Z - 4,242,241.195 (meters)           COMP
LW1544 LAPLACE CORR -      3.45 (seconds)           DEFLEC12A
LW1544 GEOID HEIGHT -      -28.26 (meters)           GEOID12A
LW1544 DYNAMIC HEIGHT -      3.041 (meters)           9.98 (feet)   COMP
LW1544 MODELED GRAVITY - 980,335.1 (mgal)           NAVD 88
LW1544
LW1544 VERT ORDER - FIRST CLASS II
LW1544
LW1544 FGDC Geospatial Positioning Accuracy Standards (95% confidence, cm)
LW1544 Type           Horiz Ellip Dist(km)
LW1544 -----
LW1544 NETWORK           1.37 2.57
LW1544 -----
LW1544 MEDIAN LOCAL ACCURACY AND DIST (005 points) 1.48 2.88 7.68
LW1544 -----
LW1544 NOTE: Click here for information on individual local accuracy
LW1544 values and other accuracy information.
LW1544
LW1544
LW1544 The horizontal coordinates were established by GPS observations
LW1544 and adjusted by the National Geodetic Survey in June 2012.
LW1544
LW1544 NAD 83(2011) refers to NAD 83 coordinates where the reference
LW1544 frame has been affixed to the stable North American tectonic plate. See
LW1544 NA2011 for more information. for more information.
LW1544
LW1544 The horizontal coordinates are valid at the epoch date displayed above
LW1544 which is a decimal equivalence of Year/Month/Day.
LW1544
LW1544 The orthometric height was determined by differential leveling and
LW1544 adjusted by the NATIONAL GEODETIC SURVEY
LW1544 in June 1991.
LW1544
LW1544 This Tidal Bench Mark is designated as VM 1496
LW1544 by the CENTER FOR OPERATIONAL OCEANOGRAPHIC PRODUCTS AND SERVICES.
LW1544
```

LW1544. Photographs are available for this station.

LW1544

LW1544.The X, Y, and Z were computed from the position and the ellipsoidal ht.

LW1544

LW1544.The Laplace correction was computed from DEFLEC12A derived deflections.

LW1544

LW1544.The ellipsoidal height was determined by GPS observations

LW1544.and is referenced to NAD 83.

LW1544

LW1544.The dynamic height is computed by dividing the NAVD 88

LW1544.geopotential number by the normal gravity value computed on the

LW1544.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

LW1544.degrees latitude ($g = 980.6199$ gals.).

LW1544

LW1544.The modeled gravity was interpolated from observed gravity values.

LW1544

LW1544. The following values were computed from the NAD 83(2011) position.

LW1544

	North	East	Units	Scale Factor	Converg.
LW1544;SPC MA M	- 856,909.563	269,434.242	MT	0.99997336	+0 33 45.4
LW1544;SPC MA M	- 2,811,377.46	883,968.84	sFT	0.99997336	+0 33 45.4
LW1544;UTM 19	- 4,646,613.784	362,231.993	MT	0.99983355	-1 06 42.1

LW1544

LW1544! - Elev Factor \times Scale Factor = Combined Factor

LW1544!SPC MA M	- 1.00000396	\times	0.99997336	=	0.99997732
LW1544!UTM 19	- 1.00000396	\times	0.99983355	=	0.99983751

LW1544

LW1544 SUPERSEDED SURVEY CONTROL

LW1544

LW1544 NAD 83(2007)- 41 57 34.12578(N)	070 39 44.75362(W)	AD(2002.00)	0
LW1544 ELLIP H (02/10/07) -25.200 (m)		GP(2002.00)	
LW1544 ELLIP H (06/04/02) -25.199 (m)		GP()	4 1
LW1544 NAD 83(1996)- 41 57 34.12569(N)	070 39 44.75394(W)	AD()	1
LW1544 ELLIP H (05/22/00) -25.214 (m)		GP()	4 1
LW1544 NAD 83(1996)- 41 57 34.12601(N)	070 39 44.75259(W)	AD()	1
LW1544 ELLIP H (06/29/98) -25.242 (m)		GP()	4 1
LW1544 NAD 83(1992)- 41 57 34.12438(N)	070 39 44.75164(W)	AD()	1
LW1544 ELLIP H (10/08/95) -25.278 (m)		GP()	4 2
LW1544 NAD 83(1986)- 41 57 34.12335(N)	070 39 44.74713(W)	AD()	1
LW1544 NAD 27 - 41 57 33.75613(N)	070 39 46.62835(W)	AD()	1
LW1544 NAVD 88 (05/22/00) 3.04 (m)	10.0 (f)	LEVELING	3
LW1544 NGVD 29 (07/20/87) 3.9 (m)	RAPOU78 model used	GPS OBS	

LW1544

LW1544.Superseeded values are not recommended for survey control.

LW1544

LW1544.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

LW1544.See file dsdata.txt to determine how the superseded data were derived.

LW1544

LW1544 U.S. NATIONAL GRID SPATIAL ADDRESS: 19TCG6223146613(NAD 83)

LW1544

LW1544 MARKER: DB = BENCH MARK DISK

LW1544 SETTING: 38 = SET IN THE ABUTMENT OR PIER OF A LARGE BRIDGE

LW1544 SP_SET: ABUTMENT OF PIER

LW1544 STAMPING: B.M. NO. 10 1954

LW1544 MARK LOGO: CGS

LW1544 MAGNETIC: N = NO MAGNETIC MATERIAL

LW1544 STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL

LW1544 SATELLITE: THE SITE LOCATION WAS REPORTED AS NOT SUITABLE FOR

LW1544+SATELLITE: SATELLITE OBSERVATIONS - March 19, 2007

LW1544

	HISTORY	- Date	Condition	Report By
LW1544	HISTORY	- 1954	MONUMENTED	CGS
LW1544	HISTORY	- 1978	GOOD	NGS
LW1544	HISTORY	- 1985	GOOD	NGS
LW1544	HISTORY	- 19880526	GOOD	NGS
LW1544	HISTORY	- 19991206	GOOD	WOOLPT
LW1544	HISTORY	- 20050927	GOOD	CHANCE
LW1544	HISTORY	- 20070319	GOOD	USPSQD

LW1544

STATION DESCRIPTION

LW1544

LW1544'DESCRIBED BY NATIONAL GEODETIC SURVEY 1978

LW1544'IN PLYMOUTH.

LW1544'IN PLYMOUTH, NEAR PLYMOUTH ROCK, SET IN THE TOP OF THE EAST END OF
LW1544'THE SOUTH CONCRETE ABUTMENT OF THE PIER, 76 FEET SOUTHEAST OF THE
LW1544'FLAGPOLE AT THE ENTRANCE TO THE STATE PIER.

LW1544

STATION RECOVERY (1985)

LW1544

LW1544'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1985 (MRM)

LW1544'THE STATION WAS RECOVERED AT THIS DATE.

LW1544'

LW1544'THE STATION IS LOCATED IN PLYMOUTH, AT THE MAYFLOWER II HISTORIC
LW1544'SITE.

LW1544'OWNERSHIP--CITY OF PLYMOUTH.

LW1544'

LW1544'TO REACH THE STATION FROM THE JUNCTION OF STATE HIGHWAY 44, COUNTY
LW1544'ROAD 3-A AND SAMOSET ST IN PLYMOUTH, GO EAST FOR 0.2 KM (0.15 MI)
LW1544'ON SAMOSET ST TO WATER ST. TURN RIGHT AND GO SOUTHEAST FOR 0.5 KM
LW1544'(0.3 MI) ON WATER ST TO THE MAYFLOWER II HISTORIC SITE ON LEFT.
LW1544'TURN LEFT AND GO EASTERLY FOR 0.1 KM (0.05 MI) ON THE PAVED ROAD TO
LW1544'THE FLAGPOLE IN MIDDLE OF ROAD AND THE STATION ON THE RIGHT, IN A
LW1544'CONCRETE SLAB AT END OF SEAWALL.

LW1544'

LW1544'THE STATION IS A STANDARD CGS BENCH MARK DISK

LW1544'STAMPED---B.M. NO. 10 1954---,

LW1544'SET INTO A DRILL HOLE IN THE TOP OF A 0.6 METERS BY 4.1 METERS

LW1544'CONCRETE SLAB. LOCATED

LW1544'74.80 METERS (245.4 FT) NORTHEAST FROM THE APPROXIMATE CENTER OF
LW1544'WATER STREET,

LW1544'31.15 METERS (102.2 FT) SOUTHWEST FROM THE MAYFLOWER II TICKET

LW1544'BOOTH,

LW1544'20.94 METERS (68.7 FT) SOUTHEAST FROM THE FLAGPOLE,

LW1544'1.89 METERS (6.2 FT) EAST FROM A UTILITY POLE WITH LIGHT AND

LW1544'0.21 METERS (0.7 FT) NORTH FROM THE SOUTH EDGE OF CONCRETE SLAB.

LW1544'

LW1544'TI4100 GPS SURVEY OF FAA AIRPORT SITES IN MASSACHUSETTS - OCTOBER,
LW1544'NOVEMBER 1985.

LW1544'

LW1544'THIS STATION SUITABLE FOR GPS SURVEYS.

LW1544'

LW1544'DESCRIBED BY R.W. MCALLISTER.

LW1544

STATION RECOVERY (1988)

LW1544

LW1544'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1988

LW1544'THE STATION IS LOCATED IN PLYMOUTH, 0.2 KM (0.10 MI) NORTH OF PLYMOUT
LW1544'ROCK, IN THE SOUTH CONCRETE ABUTMENT OF THE STATE PIER.

LW1544'OWNERSHIP--MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL MANAGEMENT,

LW1544'DIVISION OF FORESTS AND PARKS.

LW1544' TO REACH THE STATION FORM THE JUNCTION OF U.S. HIGHWAY 44 AND STATE
LW1544' HIGHWAY 3 AT THE NORTHWEST SIDE OF PLYMOUTH, GO NORTHEAST FOR 1.15 KM
LW1544' (0.70 MI) ON HIGHWAY 44, SAMOSET STREET, TO THE JUNCTION OF STATE
LW1544' HIGHWAY 3A, COURT STREET, WHERE HIGHWAY 44 ENDS. CONTINUE STRAIGHT
LW1544'AHEAD AND TO NORTHEAST FOR 0.3 KM (0.20 MI) ON SAMOSET STREET TO ITS
LW1544'END AT WATER STREET. TURN RIGHT AND GO SOUTHEAST FOR 0.5 KM
LW1544' (0.30 MI) ON WATER STREET TO A PAVED DRIVE ON THE LEFT, LEADING TO THE
LW1544' STATE PIER. TURN LEFT AND GO NORTHEAST FOR 0.1 KM (0.05 MI) ON THE
LW1544'PAVED DRIVE TO THE STATION ON THE RIGHT, JUST SOUTHEAST OF THE
LW1544'FLAGPOLE.

LW1544'THE STATION IS A STANDARD CGS DISK STAMPED---B.M. NO. 10 1954, SET
LW1544'INTO A DRILL HOLE IN THE TOP OF THE SOUTHEAST END OF THE SOUTH
LW1544'CONCRETE ABUTMENT OF THE PIER, FLUSH WITH THE SIDEWALK. LOCATED 24.4
LW1544'M (80.1 FT) SOUTHWEST FROM THE SOUTH CORNER OF THE WOODEN PORTION OF
LW1544'THE PEIR, 20.9 M (68.6 FT) SOUTHEAST FROM THE FLAGPOLE IN THE CENTER
LW1544'OF THE PAVED DIRVE, 1.9 M (6.2 FT) EAST FROM A POWER POLE WITH A GUY
LW1544'WIRE AND A STREET LIGHT, 0.2 M (0.7 FT) NORTHWEST FROM THE SOUTHEAST
LW1544'EDGE OF THE ABUTMENT, AND 0.18 M (0.6 FT) NORTHEAST FROM THE SOUTHWEST
LW1544'EDGE OF THE ABUTMENT.

LW1544'DESCRIBED BY C.L. SMITH, TYPED BY R.L. ZURFLUH.

LW1544

STATION RECOVERY (1999)

LW1544

LW1544'RECOVERY NOTE BY WOOLPERT CONSULTANTS 1999 (ARL)

LW1544'RECOVERED AS DESCRIBED.

LW1544

STATION RECOVERY (2005)

LW1544

LW1544'RECOVERY NOTE BY JE CHANCE AND ASSOCIATES 2005 (JWC)

LW1544'RECOVERED FOR THE USACE REGIONAL COASTAL MAPPING PROJECT. PROXIMITY

LW1544'TO UTILITY POLES MAY MASK SATELLITES. MAY NOT BE SUITABLE FOR KGPS

LW1544'OPERATIONS.

LW1544

STATION RECOVERY (2007)

LW1544

LW1544'RECOVERY NOTE BY US POWER SQUADRON 2007 (MBT)

LW1544'RECOVERED IN GOOD CONDITION.

*** retrieval complete.

Elapsed Time = 00:00:03

The NGS Data Sheet

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

```
PROGRAM = datasheet95, VERSION = 8.4
1      National Geodetic Survey,   Retrieval Date = JANUARY 7, 2014
LW0939 ****
LW0939 DESIGNATION - CHAGUM
LW0939 PID      - LW0939
LW0939 STATE/COUNTY- RI/WASHINGTON
LW0939 COUNTRY - US
LW0939 USGS QUAD - BLOCK ISLAND (1975)
LW0939
LW0939          *CURRENT SURVEY CONTROL
LW0939
LW0939* NAD 83(1996) POSITION- 41 12 51.66235(N) 071 34 00.62185(W) ADJUSTED
LW0939* NAD 83(1996) ELLIP HT-      0.028 (meters)          (08/17/98) ADJUSTED
LW0939* LMSL    ORTHO HEIGHT -     30.993 (meters)        101.68 (feet) ADJ UNCH
LW0939
LW0939 NAD 83(1996) X - 1,519,313.183 (meters) COMP
LW0939 NAD 83(1996) Y - -4,558,413.778 (meters) COMP
LW0939 NAD 83(1996) Z - 4,180,359.766 (meters) COMP
LW0939 LAPLACE CORR - 1.42 (seconds) DEFLEC12A
LW0939 GEOID HEIGHT - -30.67 (meters) GEOID12A
LW0939 HORIZ ORDER - THIRD
LW0939 VERT ORDER - SECOND CLASS 0
LW0939 ELLP ORDER - FOURTH CLASS I
LW0939
LW0939.The horizontal coordinates were established by classical geodetic methods
LW0939.and adjusted by the National Geodetic Survey in August 1998.
LW0939.
LW0939.The orthometric height was key entered from printed documents
LW0939.and not key verified.
LW0939
LW0939.The X, Y, and Z were computed from the position and the ellipsoidal ht.
LW0939
LW0939.The Laplace correction was computed from DEFLEC12A derived deflections.
LW0939
LW0939.The ellipsoidal height was determined by GPS observations
LW0939.and is referenced to NAD 83.
LW0939
LW0939. The following values were computed from the NAD 83(1996) position.
LW0939
LW0939; SPC RI      North       East       Units Scale Factor Converg.
LW0939; SPC RI      - 14,552.426   94,394.747   MT  0.99999414  -0 02 38.5
LW0939; UTM 19      - 47,744.08    309,693.43   sFT  0.99999414  -0 02 38.5
LW0939; UTM 19      - 4,565,729.458  284,816.138   MT  1.00016991  -1 41 30.8
LW0939
LW0939!           - Elev Factor x Scale Factor = Combined Factor
LW0939! SPC RI      - 1.00000000 x 0.99999414 = 0.99999414
LW0939! UTM 19      - 1.00000000 x 1.00016991 = 1.00016991
LW0939
LW0939:           Primary Azimuth Mark          Grid Az
LW0939: SPC RI      - BLOCK ISLAND ECC          205 35 46.7
LW0939: UTM 19      - BLOCK ISLAND ECC          207 14 39.0
LW0939
LW0939|-----|-----|
LW0939| PID      Reference Object             Distance   Geod. Az |
LW0939|-----|-----|-----|-----|-----|
```

LW0939| LW3157 B 5/12 S 5/12 1943 |
LW0939| LW0940 4 C |
LW0939| LW3162 BLOCK ISLAND ECC |
LW0939|-----|
LW0939
LW0939 SUPERSEDED SURVEY CONTROL
LW0939
LW0939 NAD 83(1996)- 41 12 51.66056(N) 071 34 00.62061(W) AD() 3
LW0939 NAD 83(1992)- 41 12 51.66054(N) 071 34 00.62067(W) AD() 3
LW0939 ELLIP H (01/17/96) -0.040 (m) GP() 4 2
LW0939 NAD 83(1992)- 41 12 51.65982(N) 071 34 00.62128(W) AD() 3
LW0939 NAD 83(1986)- 41 12 51.66343(N) 071 34 00.61660(W) AD() 3
LW0939 NAD 27 - 41 12 51.29200(N) 071 34 02.41400(W) AD() 3
LW0939
LW0939.Superseeded values are not recommended for survey control.
LW0939
LW0939.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
LW0939.See file dsdata.txt to determine how the superseded data were derived.
LW0939
LW0939_U.S. NATIONAL GRID SPATIAL ADDRESS: 19TBF8481665729(NAD 83)
LW0939
LW0939_MARKER: DS = TRIANGULATION STATION DISK
LW0939_SETTING: 80 = SET IN A BOULDER
LW0939_SP_SET: IN DRILL HOLE IN A BOULDER
LW0939_STAMPING: CHAGUM 1943
LW0939_MARK LOGO: CGS
LW0939_MAGNETIC: N = NO MAGNETIC MATERIAL
LW0939_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO
LW0939+STABILITY: SURFACE MOTION
LW0939_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
LW0939+SATELLITE: SATELLITE OBSERVATIONS - June 01, 1988
LW0939
LW0939 HISTORY - Date Condition Report By
LW0939 HISTORY - 1943 MONUMENTED CGS
LW0939 HISTORY - 1943 GOOD CGS
LW0939 HISTORY - 1965 GOOD CGS
LW0939 HISTORY - 19880601 GOOD NGS
LW0939
LW0939 STATION DESCRIPTION
LW0939
LW0939'DESCRIBED BY COAST AND GEODETIC SURVEY 1943 (FN)
LW0939'THE STATION IS ABOUT 1 MI. S-SE OF BLOCK ISLAND NORTH LIGHTHOUSE,
LW0939'ABOUT 400 YDS. W-NW OF THE SUMMIT OF BUSH HILL WHICH IS THE HIGHEST
LW0939'IN THE VICINITY, ABOUT 50 YDS. W OF THE MAIN PAVED ROAD TO THE N
LW0939'END OF THE ISLAND, AND IN THE DOORYARD OF A FIRE CONTROL BUILDING.
LW0939'IT IS 20.1 FT. ABOUT SW OF THE SW CORNER OF THE OBSERVATION ROOM
LW0939'OF THE SAID BUILDING, AND 8.5 FT. ABOUT W OF THE PROJECTED
LW0939'PLANE OF THE W WALL OF THE SAME ROOM. SURFACE STATION MARK IS
LW0939'A STANDARD STATION DISK, STAMPED CHAGUM 1943 AND SET FLUSH.
LW0939'
LW0939'THE UNDERGROUND MARK IS A STANDARD DISK, SET IN THE TOP OF A
LW0939'CONCRETE POST.
LW0939'
LW0939'4C (U.S.E.) IS MARKED BY A COPPER BOLT IN THE CENTER OF A CONCRETE
LW0939'POST THAT PROJECTS ABOUT 2 IN. AND BEARS THE IMPRESSED LETTERING
LW0939'USED 1943.
LW0939'
LW0939'B 5 OVER 12 S 5 OVER 12 IS THE PROPOSED PINTLE CENTER OF THE
LW0939'INSTRUMENT IN THE FIRE CONTROL BUILDING. THE POINT LOCATED IS 3.5
LW0939'FT. OF THE INSIDE W WALL, 6 FT. N OF THE INSIDE S WALL, AND 5 FT. S

LW0939' OF THE INSIDE N WALL OF THE SAID OBSERVATION ROOM.

LW0939'

LW0939' HEIGHT OF LIGHT ABOVE STATION MARK 3 METERS.

LW0939

STATION RECOVERY (1943)

LW0939

LW0939' RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1943

LW0939' AT BLOCK ISLAND.

LW0939' ON BLOCK ISLAND, NEWPORT COUNTY, ABOUT 1 MILE SOUTH-SOUTHEAST OF LW0939' BLOCK ISLAND NORTH LIGHTHOUSE, 400 YARDS WEST-NORTHWEST OF THE LW0939' SUMMIT OF BUSH HILL (THE HIGHEST POINT IN THE VICINITY), 50 YARDS LW0939' WEST OF THE MAIN PAVED ROAD, IN THE DOORYARD TO THE FIRE-CONTROL LW0939' BUILDING, 20.1 FEET SOUTHWEST OF THE SOUTHWEST CORNER OF THE LW0939' OBSERVATION ROOM, 8.5 FEET WEST OF THE PROJECTED PLANE OF THE LW0939' ROOM, AND IN THE TOP OF A BOULDER FLUSH WITH THE GROUND. A LW0939' STANDARD TRIANGULATION-STATION DISK, STAMPED CHAGUM 1943.

LW0939

STATION RECOVERY (1965)

LW0939

LW0939' RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1965 (JKW)

LW0939' THE STATION AND REFERENCE MARKS 1 AND 2 WERE RECOVERED IN GOOD LW0939' CONDITION. THE COUNTY NAME HAS BEEN CHANGED FROM NEWPORT TO LW0939' WASHINGTON COUNTY.

LW0939

STATION RECOVERY (1988)

LW0939

LW0939' RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1988

LW0939' THE STATION WAS RECOVERED IN GOOD CONDITION. A NEW COMPLETE LW0939' DESCRIPTION FOLLOWS.

LW0939' THE STATION IS LOCATED ABOUT 4.8 KM (3.00 MI) NORTH OF THE CENTER OF LW0939' TOWN, 1.6 KM (1.00 MI) SOUTH-SOUTHEAST OF THE BLOCK ISLAND NORTH LW0939' LIGHTHOUSE, 365 M (1197.5 FT) WEST-NORTHWEST OF THE SUMMIT OF A BUSH LW0939' LINE HILL WHICH IS THE HIGHEST IN THE VICINITY, AND IN THE YARD OF A LW0939' TWO STORY T-SHAPED HOUSE THAT USED TO BE AN OBSERVATION BUNKER LW0939' DESIGNED BY FIRE NUMBER 739.

LW0939' OWNERSHIP--ALBERT G. GARDINER, JR., 152 WILSON AVENUE, RUMFORD RI LW0939' 02916. PHONE 401-434-9058.

LW0939' TO REACH THE STATION FROM THE POST OFFICE AT THE JUNCTION OF DODGE LW0939' STREET AND CORN NECK ROAD IN THE TOWN OF BLOCK ISLAND, GO NORTH FOR LW0939' 0.6 KM (0.35 MI) ON CORN NECK ROAD TO THE JUNCTION OF BEACH ROAD ON LW0939' THE LEFT. CONTINUE STRAIGHT AHEAD AND GO NORTH FOR 4.1 KM (2.55 MI) LW0939' ON CORN NECK ROAD TO A GRASS DRIVE AT A BREAK IN THE STONE FENCE AT LW0939' THE CREST OF THE HILL AND THE STATION ON THE LEFT. ALSO, THE STATION LW0939' MAY BE REACHED BY GOING SOUTH FOR 1.3 KM (0.80 MI) ON CORN NECK ROAD LW0939' FROM THE END OF THE PAVEMENT AT THE NORTH END OF THE ISLAND.

LW0939' THE STATION IS A STANDARD CGS DISK STAMPED---CHAGUM 1943---, SET INTO LW0939' A DRILL HOLE IN THE TOP OF A 0.2 BY 0.3 METER BOULDER RECESSED 10 CM LW0939' BELOW GROUND. LOCATED 46.9 M (153.9 FT) NORTHWEST FROM THE CENTER OF LW0939' THE ROAD, 33.1 M (108.6 FT) NORTHWEST FROM STATION 4C USE WHICH IS A LW0939' COPPER BOLT IN THE CENTER OF A CONCRETE POST FLUSH WITH THE GROUND AND LW0939' NEAR THE NORTH WOODEN POST AT THE BREAK IN THE STONE FENCE, 7.2 M LW0939' (23.6 FT) WEST-SOUTHWEST FROM THE SOUTHWEST CORNER OF THE FOUNDATION LW0939' OF THE MAIN PART OF THE SHINGLE SIDED HOUSE, 6.1 M (20.0 FT) SOUTHWEST LW0939' FROM THE SOUTHWEST CORNER OF THE CONCRETE WING OF THE HOUSE, AND 5.8 M LW0939' (19.0 FT) NORTHWEST FROM THE CENTER OF A STONE FENCE.

LW0939' DESCRIBED BY C.L. SMITH, TYPED BY R.L. ZURFLUH.

*** retrieval complete.

Elapsed Time = 00:00:01

The NGS Data Sheet

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

```
PROGRAM = datasheet95, VERSION = 8.4
1      National Geodetic Survey, Retrieval Date = JANUARY 7, 2014
LW0235 ****
LW0235 CBN      - This is a Cooperative Base Network Control Station.
LW0235 DESIGNATION - E 28
LW0235 PID      - LW0235
LW0235 STATE/COUNTY- RI/NEWPORT
LW0235 COUNTRY   - US
LW0235 USGS QUAD - PRUDENCE ISLAND (1975)
LW0235
LW0235          *CURRENT SURVEY CONTROL
LW0235
LW0235* NAD 83(2011) POSITION- 41 35 47.33321(N) 071 15 47.08558(W)    ADJUSTED
LW0235* NAD 83(2011) ELLIP HT-    27.346 (meters)           (06/27/12)    ADJUSTED
LW0235* NAD 83(2011) EPOCH - 2010.00
LW0235* NAVD 88 ORTHO HEIGHT - 57.097 (meters)        187.33 (feet) ADJUSTED
LW0235
LW0235 NAD 83(2011) X - 1,534,448.776 (meters)           COMP
LW0235 NAD 83(2011) Y - -4,523,732.744 (meters)           COMP
LW0235 NAD 83(2011) Z - 4,212,209.990 (meters)           COMP
LW0235 LAPLACE CORR - 2.43 (seconds)                   DEFLEC12A
LW0235 GEOID HEIGHT - -29.78 (meters)                  GEOID12A
LW0235 DYNAMIC HEIGHT - 57.079 (meters)        187.27 (feet) COMP
LW0235 MODELED GRAVITY - 980,298.5 (mgal)            NAVD 88
LW0235
LW0235 VERT ORDER - SECOND CLASS 0
LW0235
LW0235 FGDC Geospatial Positioning Accuracy Standards (95% confidence, cm)
LW0235 Type                      Horiz Ellip Dist(km)
LW0235 -----
LW0235 NETWORK                  1.14   2.41
LW0235 -----
LW0235 MEDIAN LOCAL ACCURACY AND DIST (045 points) 1.34   2.84   63.05
LW0235 -----
LW0235 NOTE: Click here for information on individual local accuracy
LW0235 values and other accuracy information.
LW0235
LW0235
LW0235 The horizontal coordinates were established by GPS observations
LW0235 and adjusted by the National Geodetic Survey in June 2012.
LW0235
LW0235 NAD 83(2011) refers to NAD 83 coordinates where the reference
LW0235 frame has been affixed to the stable North American tectonic plate. See
LW0235 NA2011 for more information. for more information.
LW0235
LW0235 The horizontal coordinates are valid at the epoch date displayed above
LW0235 which is a decimal equivalence of Year/Month/Day.
LW0235
LW0235 The orthometric height was determined by differential leveling and
LW0235 adjusted by the NATIONAL GEODETIC SURVEY
LW0235 in June 1991.
LW0235
LW0235 The X, Y, and Z were computed from the position and the ellipsoidal ht.
LW0235
LW0235 The Laplace correction was computed from DEFLEC12A derived deflections.
```

LW0235

LW0235.The ellipsoidal height was determined by GPS observations
LW0235.and is referenced to NAD 83.

LW0235

LW0235.The dynamic height is computed by dividing the NAVD 88
LW0235.geopotential number by the normal gravity value computed on the
LW0235.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
LW0235.degrees latitude (g = 980.6199 gals.).

LW0235

LW0235.The modeled gravity was interpolated from observed gravity values.

LW0235

LW0235. The following values were computed from the NAD 83(2011) position.

LW0235

LW0235;	North	East	Units	Scale Factor	Converg.
LW0235;SPC RI	- 57,017.234	119,752.463	MT	0.99999855	+0 09 26.2
LW0235;SPC RI	- 187,064.04	392,887.87	sFT	0.99999855	+0 09 26.2
LW0235;UTM 19	- 4,607,449.136	311,391.833	MT	1.00003778	-1 30 10.3

LW0235

LW0235! - Elev Factor x Scale Factor = Combined Factor

LW0235!SPC RI	- 0.99999571	x 0.99999855	= 0.99999426
LW0235!UTM 19	- 0.99999571	x 1.00003778	= 1.00003349

LW0235

LW0235 SUPERSEDED SURVEY CONTROL

LW0235

LW0235 NAD 83(2007)- 41 35 47.33360 (N)	071 15 47.08632 (W)	AD(2002.00) 0
LW0235 ELLIP H (02/10/07) 27.367 (m)		GP(2002.00)
LW0235 NAD 83(1996)- 41 35 47.33366 (N)	071 15 47.08670 (W)	AD() A
LW0235 ELLIP H (06/22/01) 27.357 (m)		GP() 4 1
LW0235 NAVD 88 (06/22/01) 57.10 (m)	187.3 (f)	LEVELING 3
LW0235 NGVD 29 (??/??/92) 57.359 (m)	188.19 (f)	ADJ UNCH 2 0

LW0235

LW0235.Superseeded values are not recommended for survey control.

LW0235

LW0235.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

LW0235.See file dsdata.txt to determine how the superseded data were derived.

LW0235

LW0235_U.S. NATIONAL GRID SPATIAL ADDRESS: 19TCG1139107449 (NAD 83)

LW0235

LW0235_MARKER: DB = BENCH MARK DISK

LW0235_SETTING: 66 = SET IN ROCK OUTCROP

LW0235_SP_SET: IN DRILL HOLE IN ROCK OUTCROP

LW0235_STAMPING: E 28 1969

LW0235_MARK LOGO: CGS

LW0235_MAGNETIC: N = NO MAGNETIC MATERIAL

LW0235_STABILITY: A = MOST RELIABLE AND EXPECTED TO HOLD

LW0235+STABILITY: POSITION/ELEVATION WELL

LW0235_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

LW0235+SATELLITE: SATELLITE OBSERVATIONS - April 04, 2011

LW0235

LW0235 HISTORY	- Date	Condition	Report By
LW0235 HISTORY	- 1969	MONUMENTED	CGS
LW0235 HISTORY	- 19871201	GOOD	RIGS
LW0235 HISTORY	- 20000726	GOOD	RIDT
LW0235 HISTORY	- 20031022	GOOD	EASTOP
LW0235 HISTORY	- 20060705	GOOD	USPSQD
LW0235 HISTORY	- 20110404	GOOD	INDIV

LW0235

LW0235 STATION DESCRIPTION

LW0235

LW0235'DESCRIBED BY COAST AND GEODETIC SURVEY 1969

LW0235' 8.6 MI N FROM NEWPORT.
LW0235' ABOUT 8.65 MILES NORTH ALONG BROADWAY AND STATE HIGHWAY 114 FROM
LW0235' THE BROADWAY BRANCH POST OFFICE BUILDING AT NEWPORT, 0.45
LW0235' MILE SOUTH OF THE JUNCTION OF STATE HIGHWAY 24, 0.2 MILE
LW0235' NORTH OF THE JUNCTION OF HEDLEY STREET LEADING EAST, SET IN THE
LW0235' TOP OF A 6-BY-1 1/2 FEET EXPOSED PORTION OF A MASS OF BEDROCK
LW0235' WHICH IS FLUSH WITH THE GROUND, 90 FEET WEST OF AND ACROSS THE
LW0235' HIGHWAY FROM THE NORTHEAST END OF A LARGE SLATE ROCK CUT ALONG
LW0235' THE SOUTHEAST SIDE OF THE HIGHWAY, 229 FEET NORTHEAST OF A FIRE
LW0235' HYDRANT, 47 FEET SOUTHEAST OF THE CENTER LINE OF THE OLD HIGHWAY,
LW0235' 37 FEET NORTHWEST OF THE CENTER LINE OF STATE HIGHWAY 114 AND
LW0235' 1 FOOT ABOVE THE LEVEL OF THE HIGHWAY. NOTE-- MARK MAY BE REACHED
LW0235' BY GOING 3.65 MILES SOUTHWEST ALONG STATE HIGHWAY 24 FROM
LW0235' THE WEST END OF THE HIGHWAY BRIDGE OVER THE SAKONNET RIVER AT
LW0235' PORTSMOUTH, THENCE 0.45 MILE SOUTH ALONG STATE HIGHWAY 114.

LW0235

STATION RECOVERY (1987)

LW0235

LW0235' RECOVERY NOTE BY RHODE ISLAND GEODETIC SURVEY 1987
LW0235' THE STATION IS LOCATED ABOUT 1.04 KM (0.65 MI) WEST OF PORTSMOUTH
LW0235' CENTER. OWNERSHIP-- STATE RIGHT OF WAY. TO REACH THE STATION FROM
LW0235' THE NEWPORT WATER WORKS BUILDING, GO NORTH FOR 4.1 KM (2.55 MI) ON
LW0235' STATE HIGHWAY 114 TO THE STATION ON THE LEFT. IT IS 22.6 M (74.1 FT)
LW0235' SOUTHWEST FROM A UTILITY POLE NET+T CO 58, 14.2 M (46.6 FT) NORTH
LW0235' NORTHEAST FROM UTILITY POLE NET+T CO 59, 7.2 M (23.6 FT) NORTHWEST
LW0235' FROM THE CENTERLINE OF TWO TRAVEL LANES OF STATE HIGHWAY 114
LW0235' SOUTHBOUND, 1.75 M (5.7 FT) SOUTHEAST FROM A FIBERGLASS WITNESS POST.
LW0235' THE MARK IS SET INTO A DRILL HOLE IN ROCK OUTCROP OF 1.5 M (4.9 FT)
LW0235' LARGEST DIMENSION.

LW0235

STATION RECOVERY (2000)

LW0235

LW0235' RECOVERY NOTE BY RI DEPT OF TRANSP 2000 (CSM)
LW0235' THE STATION IS LOCATED IN PORTSMOUTH, RI ABOUT 0.8 MI (1.3 KM)
LW0235' SOUTHWEST OF PORTSMOUTH CENTER, 5.3 MI (8.5 KM) SOUTH OF BRISTOL
LW0235' CENTER, 7.7 MI (12.4 KM) NORTH-NORTHEAST OF NEWPORT CENTER AND 0.2
LW0235' MI (0.3 KM) NORTH OF THE JUNCTION OF STATE HIGHWAY 114 AND HEDLEY
LW0235' STREET ON STATE HIGHWAY RIGHT-OF-WAY. TO REACH THE STATION FROM
LW0235' THE WEST END OF THE BRIDGE OVER THE SAKONNET RIVER (STATE
LW0235' HIGHWAY 24), GO SOUTHWEST ALONG STATE HIGHWAY 24 FOR 3.8 MI (6.1
LW0235' KM) TO THE STATE HIGHWAY 114 MERGER, THEN GO SOUTH ON STATE
LW0235' HIGHWAY 114 FOR 0.3 MI (0.5 KM) TO THE STATION ON THE RIGHT. IT IS A
LW0235' CGS BENCH MARK DISK SET IN A DRILL HOLE IN A 6 FT (1.8 M) BY 1.5 FT
LW0235' (0.5 M)
LW0235' SECTION OF EXPOSED BEDROCK FLUSH WITH GROUND LEVEL. IT IS 69.4 M
LW0235' (227.7 FT) NORTHEAST OF A FIRE HYDRANT, 27 M (88.6 FT) WEST OF AND
LW0235' ACROSS THE HIGHWAY FROM THE NORTH END OF A LARGE ROCK CUT, 14.2
LW0235' M (46.6 FT) SOUTHEAST FROM THE CENTER OF A PAVED ROAD (OLD ROUTE
LW0235' 114), 14.2 M (46.6 FT) NORTH-NORTHEAST FROM UTILITY POLE NUMBER 59
LW0235' AND 11.2 M (36.7 FT) NORTHWEST OF THE CENTER OF HIGHWAY 114.
LW0235' DESCRIBED BY TOM TAIT.

LW0235'

LW0235

STATION RECOVERY (2003)

LW0235

LW0235' RECOVERY NOTE BY EASTERN TOPOGRAPHICS 2003 (DJ)

LW0235' RECOVERED IN GOOD CONDITION.

LW0235

STATION RECOVERY (2006)

LW0235

LW0235'RECOVERY NOTE BY US POWER SQUADRON 2006 (TLG)
LW0235'RECOVERED IN GOOD CONDITION.
LW0235
LW0235 STATION RECOVERY (2011)
LW0235
LW0235'RECOVERY NOTE BY INDIVIDUAL CONTRIBUTORS 2011 (MST)
LW0235'RECOVERED IN GOOD CONDITION.

*** retrieval complete.
Elapsed Time = 00:00:03

The NGS Data Sheet

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

```
PROGRAM = datasheet95, VERSION = 8.5
1      National Geodetic Survey,   Retrieval Date = NOVEMBER 17, 2014
MZ0151 ****
MZ0151 DESIGNATION - G 22
MZ0151 PID       - MZ0151
MZ0151 STATE/COUNTY- MA/HAMPSHIRE
MZ0151 COUNTRY   - US
MZ0151 USGS QUAD - WEST GRANVILLE (1971)
MZ0151
MZ0151          *CURRENT SURVEY CONTROL
MZ0151
MZ0151* NAD 83(1986) POSITION- 42 14 03.      (N) 072 52 37.      (W)      SCALED
MZ0151* NAVD 88 ORTHO HEIGHT -    115.191 (meters)            377.92 (feet) ADJUSTED
MZ0151
MZ0151 GEOID HEIGHT -        -28.61 (meters)                  GEOID12A
MZ0151 DYNAMIC HEIGHT -      115.159 (meters)            377.82 (feet) COMP
MZ0151 MODELED GRAVITY -     980,345.1 (mgal)                 NAVD 88
MZ0151
MZ0151 VERT ORDER -        FIRST      CLASS II
MZ0151
MZ0151.The horizontal coordinates were scaled from a topographic map and have
MZ0151.an estimated accuracy of +/- 6 seconds.
MZ0151.
MZ0151.The orthometric height was determined by differential leveling and
MZ0151.adjusted by the NATIONAL GEODETIC SURVEY
MZ0151.in June 1991.
MZ0151
MZ0151.The dynamic height is computed by dividing the NAVD 88
MZ0151.geopotential number by the normal gravity value computed on the
MZ0151.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
MZ0151.degrees latitude (g = 980.6199 gals.).
MZ0151
MZ0151.The modeled gravity was interpolated from observed gravity values.
MZ0151
MZ0151;          North          East      Units  Estimated Accuracy
MZ0151;SPC MA M -  888,000.      86,350.      MT  (+/- 180 meters Scaled)
MZ0151
MZ0151          SUPERSEDED SURVEY CONTROL
MZ0151
MZ0151 NGVD 29 (??/??/92)  115.395 (m)           378.59 (f)  ADJ UNCH   1 2
MZ0151
MZ0151.Superseeded values are not recommended for survey control.
MZ0151
MZ0151.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
MZ0151.See file dsdata.txt to determine how the superseded data were derived.
MZ0151
MZ0151_U.S. NATIONAL GRID SPATIAL ADDRESS: 18TXM751779(NAD 83)
MZ0151
MZ0151_MARKER: DB = BENCH MARK DISK
MZ0151_SETTING: 66 = SET IN ROCK OUTCROP
MZ0151_SP_SET: ROCK LEDGE
MZ0151_STAMPING: B
```

MZ0151_STABILITY: A = MOST RELIABLE AND EXPECTED TO HOLD
MZ0151+STABILITY: POSITION/ELEVATION WELL

MZ0151

MZ0151	HISTORY	- Date	Condition	Report By
MZ0151	HISTORY	- UNK	MONUMENTED	MADPW
MZ0151	HISTORY	- 1934	GOOD	CGS
MZ0151	HISTORY	- 1934	GOOD	CGS

MZ0151

MZ0151 STATION DESCRIPTION

MZ0151

MZ0151'DESCRIBED BY COAST AND GEODETIC SURVEY 1934

MZ0151'AT HUNTINGTON.

MZ0151'AT HUNTINGTON, HAMPSHIRE COUNTY, IN THE BOSTON AND ALBANY RAILROAD

MZ0151'YARDS, 94 FEET SOUTH OF THE SOUTH SIDE OF THE STATION, 87 FEET EAST OF

MZ0151'THE CENTER LINE OF THE EAST BOUND TRACK, AND IN THE TOP OF A ROCK

MZ0151'LEDGE OUTCROP SOUTHEAST OF THE STATION. A DRILL HOLE, MARKED B

MZ0151'ELEVATION NOT CHECKED.

MZ0151

MZ0151 STATION RECOVERY (1934)

MZ0151

MZ0151'RECOVERY NOTE BY COAST AND GEODETIC SURVEY 1934

MZ0151'RECOVERED IN GOOD CONDITION.

*** retrieval complete.

Elapsed Time = 00:00:03

The NGS Data Sheet

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

```
PROGRAM = datasheet95, VERSION = 8.5
1          National Geodetic Survey,   Retrieval Date = NOVEMBER 17, 2014
DE8093 ****
DE8093 CORS      - This is a GPS Continuously Operating Reference Station.
DE8093 DESIGNATION - NORTHAMPTON CORS ARP
DE8093 CORS_ID   - HAMP
DE8093 PID       - DE8093
DE8093 STATE/COUNTY- MA/HAMPSHIRE
DE8093 COUNTRY   - US
DE8093 USGS QUAD - 

DE8093
DE8093           *CURRENT SURVEY CONTROL
DE8093
DE8093* NAD 83(2011) POSITION- 42 19 03.87277(N) 072 38 22.40329(W) ADJUSTED
DE8093* NAD 83(2011) ELLIP HT-    42.355 (meters)          (08/??/11) ADJUSTED
DE8093* NAD 83(2011) EPOCH - 2010.00
DE8093* NAVD 88 ORTHO HEIGHT -          ** (meters)          ** (feet)
DE8093
DE8093 NAD 83(2011) X - 1,409,359.747 (meters) COMP
DE8093 NAD 83(2011) Y - -4,508,177.125 (meters) COMP
DE8093 NAD 83(2011) Z - 4,271,795.046 (meters) COMP
DE8093 GEOID HEIGHT -          -28.70 (meters) GEOID12A
DE8093
DE8093 Formal positional accuracy estimates are not available for this CORS
DE8093 because its coordinates were determined in part using modeled
DE8093 velocities. Approximate one-sigma accuracies for latitude, longitude,
DE8093 and ellipsoid height can be obtained from the short-term time series.
DE8093 Additional information regarding modeled velocities is available on
DE8093 the CORS Coordinates and Multi-Year CORS Solution FAQ web pages.
DE8093
DE8093 The coordinates were established by GPS observations
DE8093 and adjusted by the National Geodetic Survey in August 2011.
DE8093
DE8093 NAD 83(2011) refers to NAD 83 coordinates where the reference
DE8093 frame has been affixed to the stable North American Tectonic Plate.
DE8093
DE8093 The coordinates are valid at the epoch date displayed above
DE8093 which is a decimal equivalence of Year/Month/Day.
DE8093
DE8093 The PID for the CORS L1 Phase Center is DP2648.
DE8093
DE8093 The XYZ, and position/ellipsoidal ht. are equivalent.
DE8093
DE8093 The ellipsoidal height was determined by GPS observations
DE8093 and is referenced to NAD 83.
DE8093
DE8093 The following values were computed from the NAD 83(2011) position.
DE8093
DE8093;          North        East       Units Scale Factor Converg.
DE8093;SPC MA M - 896,989.265 106,063.952 MT 0.99996663 -0 45 55.7
DE8093;SPC MA M - 2,942,872.28 347,978.15 SFT 0.99996663 -0 45 55.7
DE8093;UTM 18     - 4,687,754.124 694,516.036 MT 1.00006556 +1 35 22.7
```

```
DE8093
DE8093!          -   Elev Factor  x  Scale Factor =  Combined Factor
DE8093!SPC MA M  -   0.99999336  x   0.99996663 =  0.99995999
DE8093!UTM 18    -   0.99999336  x   1.00006556 =  1.00005892
DE8093
DE8093           SUPERSEDED SURVEY CONTROL
DE8093
DE8093 ELLIP H (06/27/12)  42.363 (m)           GP(2010.00)
DE8093 NAD 83(2011)- 42 19 03.87279(N) 072 38 22.40336(W) AD(2010.00) c
DE8093 ELLIP H (02/10/07)  42.368 (m)           GP(2002.00)
DE8093 NAD 83(2007)- 42 19 03.87329(N) 072 38 22.40438(W) AD(2002.00) c
DE8093 NAD 83(CORS)- 42 19 03.87329(N) 072 38 22.40438(W) AD(2002.00) c
DE8093 ELLIP H (10/??/02)  42.368 (m)           GP(2002.00) c c
DE8093
DE8093.Superseeded values are not recommended for survey control.
DE8093
DE8093.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
DE8093.See file dsdata.txt to determine how the superseded data were derived.
DE8093
DE8093_U.S. NATIONAL GRID SPATIAL ADDRESS: 18TXM9451687754 (NAD 83)
DE8093
DE8093_MARKER: STATION IS THE ANTENNA REFERENCE POINT OF THE GPS ANTENNA
DE8093
DE8093           STATION DESCRIPTION
DE8093
DE8093'DESCRIBED BY NATIONAL GEODETIC SURVEY 2011
DE8093'STATION IS A GPS CORS. LATEST INFORMATION INCLUDING POSITIONS AND
DE8093'VELOCITIES ARE AVAILABLE IN THE COORDINATE AND LOG FILES ACCESSIBLE
DE8093'BY ANONYMOUS FTP OR THE WORLDWIDE WEB.
DE8093'  ftp://cors.ngs.noaa.gov/cors/README.txt
DE8093'  ftp://cors.ngs.noaa.gov/cors/coord/coord_08
DE8093'  ftp://cors.ngs.noaa.gov/cors/station_log
DE8093'  http://geodesy.noaa.gov/CORS

*** retrieval complete.
Elapsed Time = 00:00:03
```

The NGS Data Sheet

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

```
PROGRAM = datasheet95, VERSION = 8.4
1      National Geodetic Survey, Retrieval Date = JANUARY 7, 2014
MY6363 ****
MY6363 FBN      - This is a Federal Base Network Control Station.
MY6363 DESIGNATION - KELLY
MY6363 PID      - MY6363
MY6363 STATE/COUNTY- MA/MIDDLESEX
MY6363 COUNTRY   - US
MY6363 USGS QUAD - 

MY6363
MY6363          *CURRENT SURVEY CONTROL
MY6363
MY6363* NAD 83(2011) POSITION- 42 28 15.70516(N) 071 14 42.35177(W) ADJUSTED
MY6363* NAD 83(2011) ELLIP HT-    17.658 (meters)           (06/27/12) ADJUSTED
MY6363* NAD 83(2011) EPOCH - 2010.00
MY6363* NAVD 88 ORTHO HEIGHT - 45.5     (meters)    149.     (feet) GPS OBS
MY6363
MY6363 NAVD 88 orthometric height was determined with geoid model      GEOID93
MY6363 GEOID HEIGHT      -      -28.10 (meters)           GEOID93
MY6363 GEOID HEIGHT      -      -27.72 (meters)           GEOID12A
MY6363 NAD 83(2011) X - 1,514,954.055 (meters)           COMP
MY6363 NAD 83(2011) Y - -4,461,656.530 (meters)           COMP
MY6363 NAD 83(2011) Z - 4,284,353.431 (meters)           COMP
MY6363 LAPLACE CORR      -      4.23 (seconds)           DEFLEC12A
MY6363
MY6363 FGDC Geospatial Positioning Accuracy Standards (95% confidence, cm)
MY6363 Type                      Horiz   Ellip   Dist(km)
MY6363 -----
MY6363 NETWORK                  0.66    1.35
MY6363 -----
MY6363 MEDIAN LOCAL ACCURACY AND DIST (070 points)  0.97    2.07    65.02
MY6363 -----
MY6363 NOTE: Click here for information on individual local accuracy
MY6363 values and other accuracy information.
MY6363
MY6363
MY6363.The horizontal coordinates were established by GPS observations
MY6363.and adjusted by the National Geodetic Survey in June 2012.
MY6363
MY6363.NAD 83(2011) refers to NAD 83 coordinates where the reference
MY6363.frame has been affixed to the stable North American tectonic plate. See
MY6363.NA2011 for more information. for more information.
MY6363
MY6363.The horizontal coordinates are valid at the epoch date displayed above
MY6363.which is a decimal equivalence of Year/Month/Day.
MY6363
MY6363.The orthometric height was determined by GPS observations and a
MY6363.high-resolution geoid model.
MY6363
MY6363.The X, Y, and Z were computed from the position and the ellipsoidal ht.
MY6363
MY6363.The Laplace correction was computed from DEFLEC12A derived deflections.
MY6363
MY6363.The ellipsoidal height was determined by GPS observations
MY6363.and is referenced to NAD 83.
```

MY6363

MY6363. The following values were computed from the NAD 83(2011) position.

MY6363

	North	East	Units	Scale Factor	Converg.
MY6363;SPC MA M	- 913,419.823	220,961.845	MT	0.99997566	+0 10 16.4
MY6363;SPC MA M	- 2,996,778.20	724,938.99	sFT	0.99997566	+0 10 16.4
MY6363;UTM 19	- 4,704,518.414	315,439.621	MT	1.00001911	-1 30 58.9
MY6363					
MY6363!	- Elev Factor	x Scale Factor	=	Combined Factor	
MY6363!SPC MA M	- 0.99999723	x 0.99997566	=	0.99997289	
MY6363!UTM 19	- 0.99999723	x 1.00001911	=	1.00001634	

MY6363

SUPERSEDED SURVEY CONTROL

MY6363

MY6363	NAD 83(2007)- 42 28 15.70548(N)	071 14 42.35234(W)	AD(2002.00)	0
MY6363	ELLIP H (02/10/07)	17.681 (m)	GP(2002.00)	
MY6363	ELLIP H (06/22/01)	17.668 (m)	GP()	4 1
MY6363	NAD 83(1996)- 42 28 15.70561(N)	071 14 42.35310(W)	AD()	A
MY6363	ELLIP H (07/24/97)	17.666 (m)	GP()	2 1
MY6363	NAD 83(1996)- 42 28 15.70657(N)	071 14 42.34937(W)	AD()	A
MY6363	NAD 83(1992)- 42 28 15.70382(N)	071 14 42.35260(W)	AD()	A
MY6363	ELLIP H (04/16/93)	17.720 (m)	GP()	3 1
MY6363	NAVD 88 (06/22/01)	45.3 (m)	GEOID99 model used	GPS OBS
MY6363	NAVD 88 (07/24/97)	45. (m)	G96SSS model used	GPS OBS
MY6363	NGVD 29 (08/04/95)	45.6 (m)	GEOID93 model used	GPS OBS

MY6363

MY6363. Superseded values are not recommended for survey control.

MY6363

MY6363.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

MY6363.[See file dsdata.txt](#) to determine how the superseded data were derived.

MY6363

MY6363_U.S. NATIONAL GRID SPATIAL ADDRESS: 19TCH1543904518(NAD 83)

MY6363

MY6363_MARKER: I = METAL ROD

MY6363_SETTING: 59 = STAINLESS STEEL ROD IN SLEEVE (10 FT.+)

MY6363_SP_SET: STAINLESS STEEL ROD IN SLEEVE

MY6363_STAMPING: KELLY 1992

MY6363_MARK LOGO: NGS

MY6363_PROJECTION: RECESSED 9 CENTIMETERS

MY6363_MAGNETIC: N = NO MAGNETIC MATERIAL

MY6363_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL

MY6363_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

MY6363+SATELLITE: SATELLITE OBSERVATIONS - November 26, 2004

MY6363_ROD/PIPE-DEPTH: 6.7 meters

MY6363_SLEEVE-DEPTH : 0.91 meters

MY6363

MY6363	HISTORY	- Date	Condition	Report By
MY6363	HISTORY	- 1992	MONUMENTED	NGS
MY6363	HISTORY	- 19940623	GOOD	NGS
MY6363	HISTORY	- 19941110	GOOD	NOS
MY6363	HISTORY	- 20000526	GOOD	NGS
MY6363	HISTORY	- 20010517	GOOD	MAGS
MY6363	HISTORY	- 20041126	GOOD	INDIV

MY6363

STATION DESCRIPTION

MY6363

MY6363'DESCRIBED BY NATIONAL GEODETIC SURVEY 1992

MY6363'STATION IS LOCATED ABOUT 19.3 KM (12.00 MI) NORTHWEST OF BOSTON, 2.1

MY6363'KM (1.30 MI) WEST-SOUTHWEST OF THE JUNCTION OF U.S. HIGHWAY 3 AND

MY6363'INTERSTATE 95, IN THE NORTHEAST CLOVERLEAF AT THE JUNCTION OF

MY6363' INTERSTATE 95 AND STATE ROUTE 225 (ALSO STATE ROUTE 4), IN A GRASSY
MY6363' AREA. OWNERSHIP--MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS.
MY6363' TO REACH THE STATION FROM THE JUNCTION OF STATE ROUTE 225 (STATE ROUTE
MY6363' 4) AND INTERSTATE 95 (EXIT 31) IN NORTH LEXINGTON, GO NORTH ALONG
MY6363' STATE ROUTE 225 FOR 0.08 KM (0.05 MI) TO THE STATION ON THE RIGHT,
MY6363' JUST AFTER CROSSING BRIDGE.
MY6363' STATION IS 35.3 M (115.8 FT) NORTH-NORTHEAST OF THE NORTHEAST END OF
MY6363' BRIDGE ABUTMENT, 28.8 M (94.5 FT) NORTHEAST OF POWERLINE POLE NUMBER
MY6363' 76 WITH LIGHT ATTACHED, 23.2 M (76.1 FT) WEST OF A TREE WITH 60-INCH
MY6363' DIAMETER TRUNK, 22.7 M (74.5 FT) EAST OF POWERLINE POLE NUMBER 77
MY6363' WITH LIGHT AND GUY WIRE ATTACHED AND 0.7 M (2.3 FT) WEST-SOUTHWEST OF
MY6363' A FIBERGLASS WITNESS POST.

MY6363

STATION RECOVERY (1994)

MY6363

MY6363' RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1994

MY6363' RECOVERED AS DESCRIBED.

MY6363

STATION RECOVERY (1994)

MY6363

MY6363' RECOVERY NOTE BY NATIONAL OCEAN SERVICE 1994 (RPB)

MY6363' RECOVERED AS DESCRIBED.

MY6363

STATION RECOVERY (2000)

MY6363

MY6363' RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 2000 (CSM)

MY6363' THE STATION IS LOCATED ABOUT 6.44 KM (4.00 MI) SOUTHEAST OF BEDFORD

MY6363' AT THE JUNCTION OF INTERSTATE HIGHWAY 95 (EXIT 31-B) AND COMBINED

MY6363' STATE HIGHWAYS 4 AND 225, IN THE GRASSY AREA NORTH OF THE

MY6363' NORTHWEST END OF THE STATE HIGHWAY 4/225 BRIDGE OVER INTERSTATE

MY6363' HIGHWAY 95. OWNERSHIP--MASSACHUSETTS DEPARTMENT OF

MY6363' TRANSPORTATION. TO REACH THE STATION FROM THE NORTH BOUND LANE

MY6363' OF INTERSTATE HIGHWAY 95 AND THE EXIT RAMP OF EXIT 31-B LOCATED

MY6363' ABOUT 6.44 KM (4.00 MI) SOUTHEAST OF BEDFORD, GO NORTHEASTERLY

MY6363' ALONG THE EXIT RAMP TO THE JUNCTION OF STATE HIGHWAY 4/225, TURN

MY6363' LEFT, NORTHWEST ON THE HIGHWAY FOR 0.08 KM TO THE NORTHWEST END

MY6363' OF THE HIGHWAY BRIDGE OVER INTERSTATE HIGHWAY 95 (DAVIDSON G.

MY6363' WHITING MEMORIAL BRIDGE), BEAR RIGHT HOPPING THE CURB AND ONTO

MY6363' THE GRASS AND TO THE STATION ON THE RIGHT. THE STATION IS A PUNCH

MY6363' MARK ON THE TOP OF A STAINLESS STEEL ROD IN A GREASE-FILLED SLEEVE,

MY6363' ENCASED IN A 13 CM PVC PIPE WITH AN NGS LOGO CAP SURROUNDED BY

MY6363' CONCRETE ABOUT 2 CM BELOW THE LEVEL OF THE GROUND. LOCATED 35.36

MY6363' M (116.01 FT) NORTH-NORTHEAST OF THE NORTH CORNER OF THE BRIDGE,

MY6363' 22.7 M (74.5 FT) EAST OF POWER POLE NUMBER 533/144-6/77, 19.97 M

MY6363' (65.52

MY6363' FT) NORTHEAST OF THE NORTHEAST GRANITE CURB OF THE HIGHWAY, 19.82

MY6363' M (65.03 FT) NORTHEAST OF A 92 CM METAL MANHOLE COVER

MY6363' INSCRIBED-METRO MEDIA-FIBER NETWORK AND 0.7 M (2.3 FT) SOUTHWEST

MY6363' OF A MASSACHUSETTS GEODETIC SURVEY WITNESS POST.

MY6363'

MY6363

STATION RECOVERY (2001)

MY6363

MY6363' RECOVERY NOTE BY MASSACHUSETTS GEODETIC SURVEY 2001 (DCA)

MY6363' RECOVERED IN GOOD CONDITION.

MY6363

STATION RECOVERY (2004)

MY6363

MY6363' RECOVERY NOTE BY INDIVIDUAL CONTRIBUTORS 2004 (CV)

MY6363' RECOVERED AS DESCRIBED IN 2000 REMARKS.

```
*** retrieval complete.  
Elapsed Time = 00:00:06
```

The NGS Data Sheet

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

```
PROGRAM = datasheet95, VERSION = 8.5
1          National Geodetic Survey,   Retrieval Date = NOVEMBER 17, 2014
DI1075 ****
DI1075 CORS      - This is a GPS Continuously Operating Reference Station.
DI1075 DESIGNATION - U NEW HAMPSHIRE CORS ARP
DI1075 CORS_ID   - NHUN
DI1075 PID       - DI1075
DI1075 STATE/COUNTY- NH/STRAFFORD
DI1075 COUNTRY   - US
DI1075 USGS QUAD - DOVER WEST (1993)
DI1075
DI1075           *CURRENT SURVEY CONTROL
DI1075
DI1075* NAD 83(2011) POSITION- 43 08 33.17927(N) 070 57 06.86279(W) ADJUSTED
DI1075* NAD 83(2011) ELLIP HT-    9.116 (meters)          (08/??/11) ADJUSTED
DI1075* NAD 83(2011) EPOCH     - 2010.00
DI1075* NAVD 88 ORTHO HEIGHT -          ** (meters)          ** (feet)
DI1075
DI1075 NAD 83(2011) X - 1,521,219.256 (meters) COMP
DI1075 NAD 83(2011) Y - -4,405,923.961 (meters) COMP
DI1075 NAD 83(2011) Z - 4,339,076.588 (meters) COMP
DI1075 GEOID HEIGHT -          -26.86 (meters) GEOID12A
DI1075
DI1075.Formal positional accuracy estimates are not available for this CORS
DI1075.because its coordinates were determined in part using modeled
DI1075.velocities. Approximate one-sigma accuracies for latitude, longitude,
DI1075.and ellipsoid height can be obtained from the short-term time series.
DI1075.Additional information regarding modeled velocities is available on
DI1075.the CORS Coordinates and Multi-Year CORS Solution FAQ web pages.
DI1075
DI1075.The coordinates were established by GPS observations
DI1075.and adjusted by the National Geodetic Survey in August 2011.
DI1075
DI1075.NAD 83(2011) refers to NAD 83 coordinates where the reference
DI1075.frame has been affixed to the stable North American Tectonic Plate.
DI1075
DI1075.The coordinates are valid at the epoch date displayed above
DI1075.which is a decimal equivalence of Year/Month/Day.
DI1075
DI1075.The PID for the CORS L1 Phase Center is D07248.
DI1075
DI1075.The XYZ, and position/ellipsoidal ht. are equivalent.
DI1075
DI1075.The ellipsoidal height was determined by GPS observations
DI1075.and is referenced to NAD 83.
DI1075
DI1075.The following values were computed from the NAD 83(2011) position.
DI1075
DI1075;          North        East        Units Scale Factor Converg.
DI1075;SPC NH   - 71,626.013  358,145.498  MT 1.000000824 +0 29 19.6
DI1075;SPC NH   - 234,993.01   1,175,015.69   SFT 1.000000824 +0 29 19.6
DI1075;UTM 19   - 4,778,494.145  341,269.574  MT 0.99990995  -1 20 06.1
```

```
DI1075
DI1075! - Elev Factor x Scale Factor = Combined Factor
DI1075!SPC NH - 0.99999857 x 1.00000824 = 1.00000681
DI1075!UTM 19 - 0.99999857 x 0.99990995 = 0.99990852
DI1075
DI1075 SUPERSEDED SURVEY CONTROL
DI1075
DI1075 NAD 83(CORS)- 43 08 33.17949(N) 070 57 06.86330(W) AD(2002.00) c
DI1075 ELLIP H (08/??/06) 9.109 (m) GP(2002.00) c c
DI1075
DI1075.Superseded values are not recommended for survey control.
DI1075
DI1075.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.
DI1075.See file dsdata.txt to determine how the superseded data were derived.
DI1075
DI1075_U.S. NATIONAL GRID SPATIAL ADDRESS: 19TCH4126978494(NAD 83)
DI1075
DI1075_MARKER: STATION IS THE ANTENNA REFERENCE POINT OF THE GPS ANTENNA
DI1075
DI1075 STATION DESCRIPTION
DI1075
DI1075'DESCRIBED BY NATIONAL GEODETIC SURVEY 2011
DI1075'STATION IS A GPS CORS. LATEST INFORMATION INCLUDING POSITIONS AND
DI1075'VELOCITIES ARE AVAILABLE IN THE COORDINATE AND LOG FILES ACCESSIBLE
DI1075'BY ANONYMOUS FTP OR THE WORLDWIDE WEB.
DI1075' ftp://cors.ngs.noaa.gov/cors/README.txt
DI1075' ftp://cors.ngs.noaa.gov/cors/coord/coord_08
DI1075' ftp://cors.ngs.noaa.gov/cors/station_log
DI1075' http://geodesy.noaa.gov/CORS

*** retrieval complete.
Elapsed Time = 00:00:02
```

The NGS Data Sheet

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

```
PROGRAM = datasheet95, VERSION = 8.5
1      National Geodetic Survey,   Retrieval Date = NOVEMBER 17, 2014
AB2631 ****
AB2631 FBN      - This is a Federal Base Network Control Station.
AB2631 TIDAL BM - This is a Tidal Bench Mark.
AB2631 DESIGNATION - PORTSMOUTH USCG
AB2631 PID      - AB2631
AB2631 STATE/COUNTY- NH/ROCKINGHAM
AB2631 COUNTRY  - US
AB2631 USGS QUAD - KITTERY (1989)
AB2631
AB2631          *CURRENT SURVEY CONTROL
AB2631
AB2631* NAD 83(2011) POSITION- 43 04 15.17378(N) 070 42 48.58715(W)    ADJUSTED
AB2631* NAD 83(2011) ELLIP HT-    -19.252 (meters)           (06/27/12)    ADJUSTED
AB2631* NAD 83(2011) EPOCH   - 2010.00
AB2631* NAVD 88 ORTHO HEIGHT -    7.346 (meters)           24.10 (feet)    ADJUSTED
AB2631
AB2631 NAD 83(2011) X - 1,541,329.488 (meters)                  COMP
AB2631 NAD 83(2011) Y - -4,404,671.966 (meters)                  COMP
AB2631 NAD 83(2011) Z - 4,333,244.319 (meters)                  COMP
AB2631 LAPLACE CORR - 2.77 (seconds)                         DEFLEC12A
AB2631 GEOID HEIGHT - -26.59 (meters)                         GEOID12A
AB2631 DYNAMIC HEIGHT - 7.345 (meters)           24.10 (feet)    COMP
AB2631 MODELED GRAVITY - 980,461.1 (mgal)                   NAVD 88
AB2631
AB2631 VERT ORDER - SECOND CLASS I
AB2631
AB2631 FGDC Geospatial Positioning Accuracy Standards (95% confidence, cm)
AB2631 Type                      Horiz Ellip Dist(km)
AB2631 -----
AB2631 NETWORK                  0.30  0.39
AB2631 -----
AB2631 MEDIAN LOCAL ACCURACY AND DIST (002 points) 0.15  0.38  0.26
AB2631 -----
AB2631 NOTE: Click here for information on individual local accuracy
AB2631 values and other accuracy information.
AB2631
AB2631
AB2631.This is a reference station for the PORTSMOUTH 2
AB2631.National Continuously Operating Reference Station (POR2).
AB2631
AB2631.The horizontal coordinates were established by GPS observations
AB2631.and adjusted by the National Geodetic Survey in June 2012.
AB2631
AB2631.NAD 83(2011) refers to NAD 83 coordinates where the reference
AB2631.frame has been affixed to the stable North American tectonic plate. See
AB2631.NA2011 for more information.
AB2631
AB2631.The horizontal coordinates are valid at the epoch date displayed above
AB2631.which is a decimal equivalence of Year/Month/Day.
AB2631
```

AB2631.The orthometric height was determined by differential leveling and
AB2631.adjusted by the NATIONAL GEODETIC SURVEY
AB2631.in July 2002.

AB2631

AB2631.This Tidal Bench Mark is designated as VM 17349
AB2631.by the [CENTER FOR OPERATIONAL OCEANOGRAPHIC PRODUCTS AND SERVICES](#).

AB2631

AB2631.[Photographs](#) are available for this station.

AB2631

AB2631.The X, Y, and Z were computed from the position and the ellipsoidal ht.

AB2631

AB2631.The Laplace correction was computed from DEFLEC12A derived deflections.

AB2631

AB2631.The ellipsoidal height was determined by GPS observations
AB2631.and is referenced to NAD 83.

AB2631

AB2631.The dynamic height is computed by dividing the NAVD 88
AB2631.geopotential number by the normal gravity value computed on the
AB2631.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
AB2631.degrees latitude ($g = 980.6199$ gals.).

AB2631

AB2631.The modeled gravity was interpolated from observed gravity values.

AB2631

AB2631. The following values were computed from the NAD 83(2011) position.

AB2631

AB2631;	North	East	Units	Scale Factor	Converg.
AB2631;SPC NH	- 63,857.293	377,630.683	MT	1.00004078	+0 39 03.4
AB2631;SPC NH	- 209,505.14	1,238,943.33	sFT	1.00004078	+0 39 03.4
AB2631;UTM 19	- 4,770,110.903	360,494.944	MT	0.99983942	-1 10 13.2

AB2631

AB2631!	- Elev Factor	x	Scale Factor	=	Combined Factor
AB2631!SPC NH	- 1.00000302	x	1.00004078	=	1.00004380
AB2631!UTM 19	- 1.00000302	x	0.99983942	=	0.99984244

AB2631

AB2631|-----|

AB2631 PID	Reference Object	Distance	Geod. Az	
AB2631		ddmmss.s		
AB2631 AB2685 PORTSMOUTH 2 CORS L1 PHASE CENTER	297.058	METERS	08834	
AB2631 OC0429 CONSTITUTION 147 RM 1	222.799	METERS	10608	

AB2631|-----|

AB2631

AB2631 SUPERSEDED SURVEY CONTROL

AB2631

AB2631 NAD 83(2007)- 43 04 15.17400(N)	070 42 48.58788(W)	AD(2002.00)	0
AB2631 ELLIP H (02/10/07) -19.239 (m)		GP(2002.00)	
AB2631 ELLIP H (07/01/02) -19.234 (m)		GP()	3 1
AB2631 NAD 83(1996)- 43 04 15.17437(N)	070 42 48.58831(W)	AD()	A
AB2631 ELLIP H (07/24/97) -19.254 (m)		GP()	2 1
AB2631 NAD 83(1992)- 43 04 15.17442(N)	070 42 48.58787(W)	AD(1995.00)	A
AB2631 ELLIP H (04/02/96) -19.249 (m)		GP(1995.00)	4 2
AB2631 NAVD 88 (04/02/96) 7.3 (m)	GEOID93 model used	GPS OBS	

AB2631

AB2631.Superseeded values are not recommended for survey control.

AB2631

AB2631.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

AB2631.[See file dsdata.txt](#) to determine how the superseded data were derived.

AB2631

AB2631_U.S. NATIONAL GRID SPATIAL ADDRESS: 19TCH6049470110(NAD 83)

AB2631

AB2631_MARKER: DH = HORIZONTAL CONTROL DISK

AB2631_SETTING: 66 = SET IN ROCK OUTCROP
AB2631_STAMPING: PORTSMOUTH USCG 1994
AB2631_MARK LOGO: NGS
AB2631_MAGNETIC: N = NO MAGNETIC MATERIAL
AB2631_STABILITY: A = MOST RELIABLE AND EXPECTED TO HOLD
AB2631+STABILITY: POSITION/ELEVATION WELL
AB2631_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
AB2631+SATELLITE: SATELLITE OBSERVATIONS - March 03, 2014
AB2631
AB2631 HISTORY - Date Condition Report By
AB2631 HISTORY - 1994 MONUMENTED NGS
AB2631 HISTORY - 19951021 GOOD NGS
AB2631 HISTORY - 20050927 GOOD CHANCE
AB2631 HISTORY - 20140303 GOOD NOAA
AB2631
AB2631 STATION DESCRIPTION
AB2631
AB2631'DESCRIBED BY NATIONAL GEODETIC SURVEY 1994 (RAH)
AB2631'THE STATION IS LOCATED JUST EAST OF PORTSMOUTH, NH AT THE USCG STATION
AB2631'FOR PORTSMOUTH HARBOUR IN NEW CASTLE, NH.\$TO REACH THE STATION FROM
AB2631'HIGHWAY 95/1 ROTARY IN PORTSMOUTH, PROCEED SOUTHEAST ON BY-PASS 1 FOR
AB2631'1.6 MI (2.6 KM) TO HIGHWAY 1. CONTINUE SOUTH ON HIGHWAY 1 FOR 0.5 MI
AB2631'(0.8 KM) TO INTERSECTION OF HIGHWAY 1 AND ELWIN ROAD. TURN LEFT (EAST)
AB2631'ON ELWIN ROAD AND CONTINUE FOR 1.45 MI (2.33 KM) TO INTERSECTION OF
AB2631'ELWIN ROAD AND ROUTE 1A. TURN LEFT (NORTHWEST) ON ROUTE 1A AND
AB2631'PROCEED 0.45 MI (0.72 KM) TO INTERSECTION OF ROUTE 1A AND 1B. TURN
AB2631'RIGHT (NORTHEAST) ON ROUTE 1B FOR 2.6 MI (4.2 KM) TO ENTRANCE ROAD TO
AB2631'FORT CONSTITUTION AND USCG STATION PORTSMOUTH HARBOR (WHERE ROUTE 1B
AB2631'CHANGES FROM MAIN STREET TO WENTWORTH ROAD). TURN RIGHT (EAST) ON TO
AB2631'ACCESS ROAD AND PROCEED EAST FOR 0.03 MI (0.05 KM) TO FORT
AB2631'CONSTITUTION TURN OFF. TURN RIGHT (EAST) CONTINUING 162 FT (49.4 M)
AB2631'TO ROCK OUTCROP ON THE RIGHT AND THE STATION.\$THE STATION IS LOCATED
AB2631'195.5 FT (59.6 M) NORTH NORTHWEST OF A POWER POLE, 189.3 FT (57.7 M)
AB2631'EAST OF A BLACK FIRE HYDRANT, 73.5 FT (22.4 M) SOUTHEAST OF A FIRE
AB2631'HYDRANT, 73.5 FT (22.4 M) SOUTH OF THE SOUTHEAST CORNER OF A CONCRETE
AB2631'BUILDING FOUNDATION, AND 16.8 FT (5.1 M) NORTH OF THE ROAD CURB.\$FOR
AB2631'ACCESS CONTACT CWO-4 MICHAEL E. PENDLETON, COMMANDING OFFICER, USCG
AB2631'STATION PORTSMOUTH HARBOR, NEW CASTLE, NH 03854-0600, PHONE
AB2631'(603) 436-4415.
AB2631
AB2631 STATION RECOVERY (1995)
AB2631
AB2631'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1995 (ALG)
AB2631'RECOVERED AS DESCRIBED.
AB2631
AB2631 STATION RECOVERY (2005)
AB2631
AB2631'RECOVERY NOTE BY JE CHANCE AND ASSOCIATES 2005 (JWC)
AB2631'RECOVERED FOR THE USACE REGIONAL COASTAL MAPPING PROJECT. EXCELLENT
AB2631'FOR AIRBORNE KGPS.
AB2631
AB2631 STATION RECOVERY (2014)
AB2631
AB2631'RECOVERY NOTE BY NATNL OCEANIC AND ATMOSPHERIC ADMIN 2014 (DTM)
AB2631'STATION IS LOCATED BETWEEN TOWN OF NEW CASTLE PARKING LOT AND UNH JUDD
AB2631'GREGG MARINE COMPLEX PARKING LOT, ON THE SOUTH SIDE OF SULLIVAN LANE.

*** retrieval complete.
Elapsed Time = 00:00:07

The NGS Data Sheet

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

```
PROGRAM = datasheet95, VERSION = 8.4
1      National Geodetic Survey, Retrieval Date = JANUARY 7, 2014
LW1760 ****
LW1760 PACS      - This is a Primary Airport Control Station.
LW1760 DESIGNATION - STACH AZ MK
LW1760 PID        - LW1760
LW1760 STATE/COUNTY- RI/WASHINGTON
LW1760 COUNTRY    - US
LW1760 USGS QUAD - BLOCK ISLAND (1975)
LW1760
LW1760          *CURRENT SURVEY CONTROL
LW1760
LW1760* NAD 83(2011) POSITION- 41 10 01.90716(N) 071 34 56.22238(W)   ADJUSTED
LW1760* NAD 83(2011) ELLIP HT-      2.704 (meters)           (06/27/12)   ADJUSTED
LW1760* NAD 83(2011) EPOCH - 2010.00
LW1760* NAVD 88 ORTHO HEIGHT - 33.48 (meters)      109.8 (feet) GPS OBS
LW1760
LW1760 NAVD 88 orthometric height was determined with geoid model      GEOID99
LW1760 GEOID HEIGHT -      -30.74 (meters)           GEOID99
LW1760 GEOID HEIGHT -      -30.76 (meters)           GEOID12A
LW1760 NAD 83(2011) X - 1,519,174.629 (meters)           COMP
LW1760 NAD 83(2011) Y - -4,562,097.227 (meters)           COMP
LW1760 NAD 83(2011) Z - 4,176,420.700 (meters)           COMP
LW1760 LAPLACE CORR -      0.72 (seconds)           DEFLEC12A
LW1760
LW1760 FGDC Geospatial Positioning Accuracy Standards (95% confidence, cm)
LW1760 Type                      Horiz Ellip Dist(km)
LW1760 -----
LW1760 NETWORK                  0.92  1.86
LW1760 -----
LW1760 MEDIAN LOCAL ACCURACY AND DIST (006 points) 0.92  1.86  35.54
LW1760 -----
LW1760 NOTE: Click here for information on individual local accuracy
LW1760 values and other accuracy information.
LW1760
LW1760
LW1760.This mark is at Block Island State Airport (BID)
LW1760
LW1760.The horizontal coordinates were established by GPS observations
LW1760.and adjusted by the National Geodetic Survey in June 2012.
LW1760
LW1760.NAD 83(2011) refers to NAD 83 coordinates where the reference
LW1760.frame has been affixed to the stable North American tectonic plate. See
LW1760.NA2011 for more information. for more information.
LW1760
LW1760.The horizontal coordinates are valid at the epoch date displayed above
LW1760.which is a decimal equivalence of Year/Month/Day.
LW1760
LW1760.The orthometric height was determined by GPS observations and a
LW1760.high-resolution geoid model.
LW1760
LW1760.GPS derived orthometric heights for airport stations designated as
LW1760.PACS or SACS are published to 2 decimal places. This maintains
LW1760.centimeter relative accuracy between the PACS and SACS. It does
LW1760.not indicate centimeter accuracy relative to other marks which are
```

LW1760.part of the NAVD 88 network.

LW1760

LW1760.Photographs are available for this station.

LW1760

LW1760.The X, Y, and Z were computed from the position and the ellipsoidal ht.

LW1760

LW1760.The Laplace correction was computed from DEFLEC12A derived deflections.

LW1760

LW1760.The ellipsoidal height was determined by GPS observations

LW1760.and is referenced to NAD 83.

LW1760

LW1760. The following values were computed from the NAD 83(2011) position.

LW1760

	North	East	Units	Scale Factor	Converg.
LW1760;SPC RI	- 9,316.734	93,094.588	MT	0.99999434	-0 03 15.0
LW1760;SPC RI	- 30,566.65	305,427.83	sFT	0.99999434	-0 03 15.0
LW1760;UTM 19	- 4,560,532.367	283,365.766	MT	1.00017762	-1 42 01.7

LW1760

LW1760! - Elev Factor x Scale Factor = Combined Factor

LW1760!SPC RI - 0.99999958 x 0.99999434 = 0.99999392

LW1760!UTM 19 - 0.99999958 x 1.00017762 = 1.00017720

LW1760

	Primary Azimuth Mark	Grid Az
--	----------------------	---------

LW1760:SPC RI	- STACH	081 33 41.0
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LW1760:UTM 19	- STACH	083 12 27.7
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LW1760

PID	Reference Object	Distance	Geod. Az
LW1760 LW1761	STACH	APPROX. 0.8 KM	0813026.0
LW1760 AI5561	BID A	396.862 METERS	08607

LW1760|-----|

LW1760

SUPERSEDED SURVEY CONTROL

LW1760

LW1760 NAD 83(2007)- 41 10 01.90754 (N)	071 34 56.22312 (W)	AD(2002.00) 0
LW1760 ELLIP H (02/10/07) 2.731 (m)		GP(2002.00)
LW1760 ELLIP H (06/04/02) 2.714 (m)		GP() 4 1
LW1760 NAD 83(1996)- 41 10 01.90749 (N)	071 34 56.22355 (W)	AD() B
LW1760 ELLIP H (05/22/00) 2.711 (m)		GP() 4 1
LW1760 NAD 83(1996)- 41 10 01.90623 (N)	071 34 56.22206 (W)	AD() 3
LW1760 ELLIP H (08/17/98) 2.742 (m)		GP() 4 1
LW1760 NAD 83(1996)- 41 10 01.90468 (N)	071 34 56.22099 (W)	AD() 3
LW1760 NAD 83(1992)- 41 10 01.90441 (N)	071 34 56.22088 (W)	AD() 3
LW1760 ELLIP H (01/17/96) 2.672 (m)		GP() 4 2
LW1760 NAD 83(1992)- 41 10 01.90367 (N)	071 34 56.22146 (W)	AD() 3
LW1760 NAD 83(1986)- 41 10 01.90905 (N)	071 34 56.22211 (W)	AD() 3
LW1760 NAD 27 - 41 10 01.53359 (N)	071 34 58.01164 (W)	AD() 3

LW1760

LW1760.Superseeded values are not recommended for survey control.

LW1760

LW1760.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

LW1760.See file dsdata.txt to determine how the superseded data were derived.

LW1760

LW1760_U.S. NATIONAL GRID SPATIAL ADDRESS: 19TBF8336560532 (NAD 83)

LW1760

LW1760_MARKER: DZ = AZIMUTH MARK DISK

LW1760_SETTING: 80 = SET IN A BOULDER

LW1760_SP_SET: IN DRILL HOLE IN P. E. BOULDER

LW1760_STAMPING: STACH 1985

LW1760_MARK LOGO: NGS
LW1760_MAGNETIC: N = NO MAGNETIC MATERIAL
LW1760_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL
LW1760_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR
LW1760+SATELLITE: SATELLITE OBSERVATIONS - April 19, 2010

LW1760

LW1760	HISTORY	- Date	Condition	Report By
LW1760	HISTORY	- 1985	MONUMENTED	NGS
LW1760	HISTORY	- 1988	GOOD	NGS
LW1760	HISTORY	- 19900604	GOOD	RIGS
LW1760	HISTORY	- 19990921	GOOD	WOOLPT
LW1760	HISTORY	- 20030904	GOOD	NGS
LW1760	HISTORY	- 20100419	GOOD	INDIV

LW1760

STATION DESCRIPTION

LW1760

LW1760'DESCRIBED BY NATIONAL GEODETIC SURVEY 1985

LW1760'19.3 KM (12 MI) SSW FROM POINT JUDITH.

LW1760'THE STATION IS LOCATED ABOUT 1.6 KM (1.0 MI) WEST OF THE FERRY
LW1760'LANDING, AT BLOCK ISLAND AND AT THE WEST END OF THE BLOCK ISLAND STATE
LW1760'AIRPORT. OWNERSHIP--STATE OF RHODE ISLAND, MR JOHN BRAIN AIRPORT
LW1760'MANAGER, BLOCK ISLAND, RHODE ISLAND 02804, PHONE 401-466-5511. TO
LW1760'REACH THE STATION FROM THE BLOCK ISLAND POST OFFICE, GO SOUTHWEST ON
LW1760'OLD TOWN ROAD FOR 1.6 KM (1.0 MI) TO A T-ROAD. TURN LEFT AND GO
LW1760'SOUTHWEST ON CENTER ROAD FOR 0.3 KM (0.2 MI) TO THE ENTRANCE ROAD TO
LW1760'THE AIRPORT ON THE LEFT. TURN LEFT AND GO SOUTHEAST ON THE PAVED ROAD
LW1760'FOR 0.1 KM (0.05 MI) TO A GATE AT THE WEST END OF THE TERMINAL
LW1760'BUILDING, GO SOUTHWEST FOR 0.3 KM (0.2 MI) TO THE STATION, AT THE
LW1760'SOUTHWEST CORNER OF THE RUNWAY. SET INTO A DRILL HOLE IN A PARTIALLY
LW1760'EXPOSED BOULDER, 0.6 METER (2.0 FT) LARGEST DIMENSION. LOCATED
LW1760'53.3 METERS (175.0 FT) SOUTHWEST FROM THE FIRST LIGHT EAST OF THE WEST
LW1760'END OF RUNWAY, 48.8 METERS (160.0 FT) SOUTHWEST FROM THE SOUTH LIGHT
LW1760'OF TWO LIGHTS MOUNTED ON GALVANIZED LEGS, 46.0 METERS (151.0 FT) SOUTH
LW1760'FROM THE SOUTHWEST CORNER OF THE RUNWAY AND 13.6 METERS (44.5 FT)
LW1760'SOUTH FROM A DRAINAGE DITCH AND IRON GATE.

LW1760

STATION RECOVERY (1988)

LW1760

LW1760'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1988

LW1760'THE STATION IS LOCATED ABOUT 1.6 KM (1.00 MI) WEST OF THE FERRY
LW1760'LANDING AT BLOCK ISLAND, ON THE BLOCK ISLAND STATE AIRPORT, AT THE
LW1760'SOUTHWEST CORNER AND IN LINE WITH THE NORTHWEST END OF THE SINGLE
LW1760'RUNWAY.

LW1760'OWNERSHIP--STATE OF RHODE ISLAND, C/O AIRPORT MANAGER JOHN BRAIN,
LW1760'BLOCK ISLAND STATE AIRPORT, BLOCK ISLAND RI 02807. PHONE 401
LW1760'466-5511.

LW1760'TO REACH THE STATION FROM THE BLOCK ISLAND POST OFFICE, GO SOUTHWEST
LW1760'FOR 1.6 KM (1.00 MI) ON OLD TOWN ROAD TO A T-JUNCTION. TURN LEFT AND
LW1760'GO SOUTHWEST FOR 0.27 KM (0.15 MI) ON CENTER ROAD TO THE ENTRANCE ROAD
LW1760'FOR THE AIRPORT ON THE LEFT. TURN LEFT AND GO SOUTHEAST FOR 0.1 KM
LW1760'(0.05 MI) ON THE PAVED ROAD TO THE GATE AT THE WEST END OF THE
LW1760'TERMINAL BUILDING. PASS THROUGH THE GATE AND GO SOUTHWEST ACROSS THE
LW1760'PARKING PAD AND RAMP TO THE RUNWAY. TURN RIGHT AND GO WEST FOR 0.2 KM
LW1760'(0.10 MI) TO THE END OF THE RUNWAY AND THE STATION ON THE LEFT.
LW1760'THE STATION IS A STANDARD NGS DISK SET INTO A DRILL HOLE IN THE TOP OF
LW1760'A 0.5 BY 0.6 METER PARTIALLY EXPOSED BOULDER PROJECTING 5 CM ABOVE THE
LW1760'GROUND. LOCATED 53.3 M (174.9 FT) SOUTHWEST FROM THE FIRST LGHT EAST
LW1760'OF THE WEST END OF THE RUNWAY, 48.8 M (160.1 FT) SOUTHWEST FROM THE
LW1760'SOUTH LIGHT OF TWO LIGHTS MOUNTED ON GALVANIZED LEGS, 46.0 M
LW1760'(150.9 FT) SOUTH FROM THE SOUTHWEST CORNER OF THE RUNWAY AND IN LINE

LW1760' WITH THE NORTHWEST END, AND 13.6 M (44.6 FT) SOUTH FROM THE SOUTHEAST
LW1760' CORNER OF AN IRON GRATE IN A DRAINAGE DITCH.

LW1760' DESCRIBED BY A.L. BAUGH, TYPED BY R.L. ZURFLUH.

LW1760

LW1760 STATION RECOVERY (1990)

LW1760

LW1760' RECOVERY NOTE BY RHODE ISLAND GEODETIC SURVEY 1990

LW1760' RECOVERED IN GOOD CONDITION.

LW1760

LW1760 STATION RECOVERY (1999)

LW1760

LW1760' RECOVERY NOTE BY WOOLPERT CONSULTANTS 1999 (ARL)

LW1760' RECOVERED AS DESCRIBED. ADDITIONAL TIE-- STATION IS LOCATED 62.4 M

LW1760' (204.7 FT) FROM A 10-FOOT CHAIN LINK FENCE ON A MAGNETIC COMPASS

LW1760' AZIMUTH OF 275 DEGREES. THIS STATION IS DESIGNATED AS THE PRIMARY

LW1760' AIRPORT CONTROL STATION.

LW1760' TO REACH THE STATION FROM THE BLOCK ISLAND FERRY WHARF, TURN RIGHT AND
LW1760' PROCEED NORTHEASTERLY 0.25 MI (0.40 KM) ALONG OCEAN STREET TO THE

LW1760' JUNCTION OF OLD TOWN ROAD. GO SOUTHWEST ON OLD TOWN ROAD FOR 0.3 MI

LW1760' (0.5 KM) TO A STOP SIGN AT AN OFFSET 4-WAY INTERSECTION. CONTINUE

LW1760' THROUGH THE INTERSECTION, FOR AN ADDITIONAL 0.7 MI (1.1 KM) TO A

LW1760' T-INTERSECTION. TURN LEFT AND PROCEED 0.2 MI (0.3 KM) TO THE AIRPORT

LW1760' ENTRANCE AND A GATE. TURN LEFT AND PROCEED THROUGH THE GATE, THEN

LW1760' BETWEEN THE TERMINAL ON THE LEFT AND THE MAINTENANCE GARAGE ON THE

LW1760' RIGHT. GO THROUGH THE GATE AND ONTO THE TARMAC. CONTINUE STRAIGHT

LW1760' AND RIGHT ACROSS THE TARMAC, ALONG A SHORT TAXIWAY AND TO THE APPROACH

LW1760' END OF RUNWAY 10 AND THE STATION ON THE LEFT.

LW1760

LW1760 STATION RECOVERY (2003)

LW1760

LW1760' RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 2003 (AJL)

LW1760' RECOVERED AS DESCRIBED. THIS IS THE PRIMARAY AIRPORT CONTROL STATION

LW1760' STATION (PACS)

LW1760'

LW1760

LW1760 STATION RECOVERY (2010)

LW1760

LW1760' RECOVERY NOTE BY INDIVIDUAL CONTRIBUTORS 2010 (KK)

LW1760' RECOVERED IN GOOD CONDITION.

*** retrieval complete.

Elapsed Time = 00:00:04

The NGS Data Sheet

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

```
PROGRAM = datasheet95, VERSION = 8.4
1      National Geodetic Survey, Retrieval Date = JANUARY 7, 2014
AB7938 ****
AB7938 DESIGNATION - W 56
AB7938 PID - AB7938
AB7938 STATE/COUNTY- MA/BARNSTABLE
AB7938 COUNTRY - US
AB7938 USGS QUAD -
AB7938
AB7938          *CURRENT SURVEY CONTROL
AB7938
AB7938* NAD 83(2011) POSITION- 41 39 05.27459(N) 070 16 47.36264(W)    NO CHECK
AB7938* NAD 83(2011) ELLIP HT-   -23.582 (meters)           (06/27/12)    NO CHECK
AB7938* NAD 83(2011) EPOCH - 2010.00
AB7938* NAVD 88 ORTHO HEIGHT -     4.571 (meters)        15.00 (feet) ADJUSTED
AB7938
AB7938 NAD 83(2011) X - 1,610,469.496 (meters)             COMP
AB7938 NAD 83(2011) Y - -4,492,880.833 (meters)             COMP
AB7938 NAD 83(2011) Z - 4,216,741.135 (meters)             COMP
AB7938 LAPLACE CORR - -0.23 (seconds)                      DEFLEC12A
AB7938 GEOID HEIGHT - -28.19 (meters)                      GEOID12A
AB7938 DYNAMIC HEIGHT - 4.570 (meters)        14.99 (feet) COMP
AB7938 MODELED GRAVITY - 980,325.6 (mgal)                 NAVD 88
AB7938
AB7938 VERT ORDER - FIRST CLASS II
AB7938
AB7938 FGDC Geospatial Positioning Accuracy Standards (95% confidence, cm)
AB7938 Type                                Horiz Ellip Dist(km)
AB7938 -----
AB7938 NETWORK                           1.33  2.23
AB7938 -----
AB7938 MEDIAN LOCAL ACCURACY AND DIST (003 points) 0.60  0.37  2.18
AB7938 -----
AB7938 NOTE: Click here for information on individual local accuracy
AB7938 values and other accuracy information.
AB7938
AB7938 AB7938.The horizontal coordinates were established by GPS observations
AB7938.and adjusted by the National Geodetic Survey in June 2012.
AB7938
AB7938.NAD 83(2011) refers to NAD 83 coordinates where the reference
AB7938.frame has been affixed to the stable North American tectonic plate. See
AB7938.NA2011 for more information. for more information.
AB7938
AB7938.The horizontal coordinates are valid at the epoch date displayed above
AB7938.which is a decimal equivalence of Year/Month/Day.
AB7938
AB7938.No horizontal observational check was made to the station.
AB7938
AB7938.The orthometric height was determined by differential leveling and
AB7938.adjusted by the NATIONAL GEODETIC SURVEY
AB7938.in July 2002.
AB7938
AB7938.The X, Y, and Z were computed from the position and the ellipsoidal ht.
AB7938
```

AB7938.The Laplace correction was computed from DEFLEC12A derived deflections.

AB7938

AB7938.The ellipsoidal height was determined by GPS observations

AB7938.and is referenced to NAD 83.

AB7938

AB7938.The dynamic height is computed by dividing the NAVD 88

AB7938.geopotential number by the normal gravity value computed on the

AB7938.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

AB7938.degrees latitude ($g = 980.6199$ gals.).

AB7938

AB7938.The modeled gravity was interpolated from observed gravity values.

AB7938

AB7938. The following values were computed from the NAD 83(2011) position.

AB7938

	North	East	Units	Scale Factor	Converg.
AB7938;SPC MA M	- 823,085.045	301,639.936	MT	1.00001018	+0 49 10.7
AB7938;SPC MA M	- 2,700,404.85	989,630.36	sFT	1.00001018	+0 49 10.7
AB7938;UTM 19	- 4,611,871.071	393,430.641	MT	0.99973976	-0 51 02.3

AB7938

AB7938! - Elev Factor \times Scale Factor = Combined Factor

AB7938!SPC MA M - 1.00000370 \times 1.00001018 = 1.00001388

AB7938!UTM 19 - 1.00000370 \times 0.99973976 = 0.99974346

AB7938

SUPERSEDED SURVEY CONTROL

AB7938

AB7938 NAD 83(2007)- 41 39 05.27490(N)	070 16 47.36381(W)	AD(2002.00)	0
AB7938 ELLIP H (02/10/07) -23.563 (m)		GP(2002.00)	
AB7938 ELLIP H (06/04/02) -23.564 (m)		GP()	4 1
AB7938 NAD 83(1996)- 41 39 05.27518(N)	070 16 47.36361(W)	AD()	1
AB7938 ELLIP H (05/22/00) -23.570 (m)		GP()	4 1
AB7938 NAVD 88 (05/22/00) 4.58 (m)	15.0 (f)	LEVELING	3

AB7938

AB7938.Superseeded values are not recommended for survey control.

AB7938

AB7938.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

AB7938.[See file dsdata.txt](#) to determine how the superseded data were derived.

AB7938

AB7938_U.S. NATIONAL GRID SPATIAL ADDRESS: 19TCG9343011871(NAD 83)

AB7938

AB7938_MARKER: I = METAL ROD

AB7938_SETTING: 59 = STAINLESS STEEL ROD IN SLEEVE (10 FT.+)

AB7938_STAMPING: W 56 1996

AB7938_MARK LOGO: NGS

AB7938_PROJECTION: FLUSH

AB7938_MAGNETIC: N = NO MAGNETIC MATERIAL

AB7938_STABILITY: A = MOST RELIABLE AND EXPECTED TO HOLD

AB7938+STABILITY: POSITION/ELEVATION WELL

AB7938_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

AB7938+SATELLITE: SATELLITE OBSERVATIONS - February 07, 2013

AB7938_ROD/PIPE-DEPTH: 36.0 meters

AB7938_SLEEVE-DEPTH : 0.90 meters

AB7938

AB7938 HISTORY	- Date	Condition	Report By
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AB7938 HISTORY	- 1996	MONUMENTED	NGS
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AB7938 HISTORY	- 19991206	GOOD	WOOLPT
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AB7938 HISTORY	- 20070502	GOOD	PELA
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AB7938 HISTORY	- 20130207	GOOD	DEWDAV
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AB7938

STATION DESCRIPTION

AB7938

AB7938'DESCRIBED BY NATIONAL GEODETIC SURVEY 1996 (GAS)
AB7938'IN HYANNIS, AT 135 SOUTH STREET, 32.6 M (107.0 FT) SOUTH OF THE STREET
AB7938'CENTER, 13.8 M (45.3 FT) WEST OF THE SOUTHWEST CORNER OF THE
AB7938'BARNSTABLE YOUTH CENTER AT 135 SOUTH STREET, 9.2 M (30.2 FT) SOUTH OF
AB7938'THE CENTER OF A SIDEWALK, 8.0 M (26.2 FT) WEST OF THE CENTER OF A
AB7938'DRIVEWAY LEADING TO A BOAT DOCK AND PARKING LOT, 1.0 M (3.3 FT) BELOW
AB7938'THE LEVEL OF THE STREET, AND 0.5 M (1.6 FT) NORTH OF A WITNESS POST.
AB7938'NOTE--ACCESS TO THE DATUM POINT IS THROUGH A 5-INCH LOGO CAP. THE
AB7938'SLEEVE DEPTH DOES NOT MEET THE SPECIFICATIONS FOR A CLASS A MARK.

AB7938

STATION RECOVERY (1999)

AB7938

AB7938'RECOVERY NOTE BY WOOLPERT CONSULTANTS 1999 (ARL)

AB7938'RECOVERED AS DESCRIBED.

AB7938

STATION RECOVERY (2007)

AB7938

AB7938'RECOVERY NOTE BY FUGRO PELAGOS INC 2007 (STM)

AB7938'RECOVERED AS DESCRIBED, SOME GROUND VEGETATION GROWING AROUND MONUMENT

AB7938'

AB7938

STATION RECOVERY (2013)

AB7938

AB7938'RECOVERY NOTE BY DEWBERRY DAVIS 2013 (GDS)

AB7938'RECOVERED IN GOOD CONDITION.

*** retrieval complete.

Elapsed Time = 00:00:02

The NGS Data Sheet

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

```
PROGRAM = datasheet95, VERSION = 8.4
1      National Geodetic Survey, Retrieval Date = JANUARY 7, 2014
LW5273 ****
LW5273 CBN      - This is a Cooperative Base Network Control Station.
LW5273 DESIGNATION - WE 002
LW5273 PID       - LW5273
LW5273 STATE/COUNTY- RI/WASHINGTON
LW5273 COUNTRY   - US
LW5273 USGS QUAD - WATCH HILL (1984)

LW5273
LW5273          *CURRENT SURVEY CONTROL
LW5273
LW5273* NAD 83(2011) POSITION- 41 21 07.09656(N) 071 45 50.06326(W)    ADJUSTED
LW5273* NAD 83(2011) ELLIP HT-     -8.402 (meters)           (06/27/12)    ADJUSTED
LW5273* NAD 83(2011) EPOCH - 2010.00
LW5273* NAVD 88 ORTHO HEIGHT - 22.173 (meters)      72.75 (feet)    ADJUSTED
LW5273
LW5273 NAD 83(2011) X - 1,500,468.065 (meters)           COMP
LW5273 NAD 83(2011) Y - -4,554,028.771 (meters)           COMP
LW5273 NAD 83(2011) Z - 4,191,839.525 (meters)           COMP
LW5273 LAPLACE CORR - 0.84 (seconds)                   DEFLEC12A
LW5273 GEOID HEIGHT - -30.58 (meters)                  GEOID12A
LW5273 DYNAMIC HEIGHT - 22.166 (meters)      72.72 (feet)    COMP
LW5273 MODELED GRAVITY - 980,275.5 (mgal)             NAVD 88
LW5273
LW5273 VERT ORDER - SECOND CLASS II
LW5273
LW5273 FGDC Geospatial Positioning Accuracy Standards (95% confidence, cm)
LW5273 Type          Horiz Ellip Dist(km)
LW5273 -----
LW5273 NETWORK        0.35  0.55
LW5273 -----
LW5273 MEDIAN LOCAL ACCURACY AND DIST (089 points)  0.46  0.73  125.64
LW5273 -----
LW5273 NOTE: Click here for information on individual local accuracy
LW5273 values and other accuracy information.
LW5273
LW5273
LW5273.The horizontal coordinates were established by GPS observations
LW5273.and adjusted by the National Geodetic Survey in June 2012.
LW5273
LW5273.NAD 83(2011) refers to NAD 83 coordinates where the reference
LW5273.frame has been affixed to the stable North American tectonic plate. See
LW5273.NA2011 for more information. for more information.
LW5273
LW5273.The horizontal coordinates are valid at the epoch date displayed above
LW5273.which is a decimal equivalence of Year/Month/Day.
LW5273
LW5273.The orthometric height was determined by differential leveling and
LW5273.adjusted by the NATIONAL GEODETIC SURVEY
LW5273.in June 1991.
LW5273
LW5273.The X, Y, and Z were computed from the position and the ellipsoidal ht.
LW5273
LW5273.The Laplace correction was computed from DEFLEC12A derived deflections.
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LW5273

LW5273.The ellipsoidal height was determined by GPS observations
LW5273.and is referenced to NAD 83.

LW5273

LW5273.The dynamic height is computed by dividing the NAVD 88
LW5273.geopotential number by the normal gravity value computed on the
LW5273.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45
LW5273.degrees latitude ($g = 980.6199$ gals.).

LW5273

LW5273.The modeled gravity was interpolated from observed gravity values.

LW5273

LW5273. The following values were computed from the NAD 83(2011) position.

LW5273

LW5273;	North	East	Units	Scale Factor	Converg.
LW5273;SPC CT	- 210,469.769	387,320.086	MT	0.99998814	+0 39 13.8
LW5273;SPC CT	- 690,516.23	1,270,732.65	sFT	0.99998814	+0 39 13.8
LW5273;SPC RI	- 29,867.841	77,914.846	MT	0.99999975	-0 10 27.7
LW5273;SPC RI	- 97,991.41	255,625.62	sFT	0.99999975	-0 10 27.7
LW5273;UTM 19	- 4,581,516.520	268,780.631	MT	1.00025800	-1 49 36.7

LW5273

LW5273!	Elev Factor	x	Scale Factor	=	Combined Factor
LW5273!SPC CT	- 1.00000132	x	0.99998814	=	0.99998946
LW5273!SPC RI	- 1.00000132	x	0.99999975	=	1.00000107
LW5273!UTM 19	- 1.00000132	x	1.00025800	=	1.00025932

LW5273

LW5273 SUPERSEDED SURVEY CONTROL

LW5273

LW5273 NAD 83(2007)- 41 21 07.09668(N)	071 45 50.06333(W)	AD(2002.00)	A
LW5273 ELLIP H (11/06/07) -8.421 (m)		GP(2002.00)	4 1
LW5273 NAD 83(2007)- 41 21 07.09691(N)	071 45 50.06394(W)	AD(2002.00)	0
LW5273 ELLIP H (02/10/07) -8.384 (m)		GP(2002.00)	
LW5273 ELLIP H (09/18/02) -8.379 (m)		GP()	4 2
LW5273 NAD 83(1996)- 41 21 07.09707(N)	071 45 50.06433(W)	AD()	A
LW5273 ELLIP H (06/22/01) -8.045 (m)		GP()	4 1
LW5273 NAD 83(1996)- 41 21 07.09654(N)	071 45 50.06206(W)	AD()	2
LW5273 NAD 83(1992)- 41 21 07.09520(N)	071 45 50.06125(W)	AD()	2
LW5273 NAD 83(1986)- 41 21 07.09385(N)	071 45 50.06308(W)	AD()	2
LW5273 NAVD 88 (09/18/02) 22.17 (m)	72.7 (f)	LEVELING	3
LW5273 NAVD 88 (06/22/01) 22.5 (m)	GEOID99 model used	GPS OBS	
LW5273 NGVD 29 (05/30/90) 22.46 (m)	73.7 (f)	LEVELING	3

LW5273

LW5273.Superseeded values are not recommended for survey control.

LW5273

LW5273.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

LW5273.See file dsdata.txt to determine how the superseded data were derived.

LW5273

LW5273_U.S. NATIONAL GRID SPATIAL ADDRESS: 19TBF6878081516 (NAD 83)

LW5273

LW5273_MARKER: DD = SURVEY DISK

LW5273_SETTING: 7 = SET IN TOP OF CONCRETE MONUMENT

LW5273_SP_SET: CONCRETE POST

LW5273_STAMPING: WE 002 1987

LW5273_MARK LOGO: RIGS

LW5273_MAGNETIC: N = NO MAGNETIC MATERIAL

LW5273_STABILITY: C = MAY HOLD, BUT OF TYPE COMMONLY SUBJECT TO

LW5273+STABILITY: SURFACE MOTION

LW5273_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

LW5273+SATELLITE: SATELLITE OBSERVATIONS - July 28, 2011

LW5273

LW5273 HISTORY	- Date	Condition	Report By
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LW5273 HISTORY - 1987 MONUMENTED RIGS
LW5273 HISTORY - 1987 GOOD RIGS
LW5273 HISTORY - 19941001 GOOD USPSQD
LW5273 HISTORY - 20000831 GOOD RIDT
LW5273 HISTORY - 20010829 GOOD RIDT
LW5273 HISTORY - 20050410 GOOD CTGS
LW5273 HISTORY - 20110728 GOOD INDIV

LW5273 STATION DESCRIPTION

LW5273
LW5273 DESCRIBED BY RHODE ISLAND GEODETIC SURVEY 1987 (GEC)
LW5273 THE STATION IS LOCATED ABOUT 6.3 KM (3.9 MI)
LW5273 SOUTHEAST OF WESTERLY.
LW5273 OWNERSHIP--STATE RIGHT OF WAY.
LW5273
LW5273 TO REACH THE STATION FROM THE JUNCTION OF STATE HIGHWAY 78 AND U S
LW5273 HIGHWAY 1, WHICH IS ABOUT 2.9 KM (1.8 MI) SOUTHEAST OF WESTERLY, GO
LW5273 EAST FOR 3.8 KM (2.35 MI) ON U S 1 TO THE STATION ON THE LEFT.
LW5273
LW5273 THE STATION IS A STANDARD RIGS DISK
LW5273 STAMPED---WE 002 1987---
LW5273 SET INTO THE TOP OF A ROUND CONCRETE MONUMENT
LW5273 30 CM IN DIAMETER PROJECTING 5 CM ABOVE GROUND. LOCATED
LW5273 37.8 METERS (124.0 FT) EAST FROM THE CENTERLINE OF WOODYHILL ROAD,
LW5273 31.0 METERS (101.0 FT) WEST FROM A SQUARE CONCRETE STATE HIGHWAY
LW5273 BOUND,
LW5273 12.1 METERS (39.7 FT) NORTH FROM THE CENTERLINE OF TWO TRAVEL LANES
LW5273 OF U S 1 SOUTH,
LW5273 0.85 METERS (2.8 FT) SOUTH FROM A FIBERGLASS WITNESS POST.
LW5273
LW5273 DESCRIBED BY RHODE ISLAND GEODETIC SURVEY.
LW5273
LW5273 STATION RECOVERY (1987)

LW5273
LW5273 RECOVERY NOTE BY RHODE ISLAND GEODETIC SURVEY 1987
LW5273 2.4 KM (1.5 MI) NORTH FROM WEEKAPAUG.
LW5273 THE STATION IS LOCATED ABOUT 6.3 KM (3.9 MI) SOUTHEAST OF WESTERLY.
LW5273 OWNERSHIP--STATE RIGHT OF WAY. TO REACH THE STATION FROM THE
LW5273 JUNCTION OF STATE HIGHWAY 78 AND U S HIGHWAY 1, WHICH IS ABOUT 2.9 KM
LW5273 (1.8 MI) SOUTHEAST OF WESTERLY, GO EAST FOR 3.8 KM (2.35 MI) ON U S 1
LW5273 TO THE STATION ON THE LEFT. THE STATION IS A STANDARD RIGS DISK SET
LW5273 INTO THE TOP OF A ROUND CONCRETE MONUMENT 30 CM IN DIAMETER
LW5273 PROJECTING 5 CM ABOVE GROUND. LOCATED 37.8 METERS (124.0 FT) EAST
LW5273 FROM THE CENTERLINE OF WOODYHILL ROAD, 31.0 METERS (101.0 FT) WEST
LW5273 FROM A SQUARE CONCRETE STATE HIGHWAY BOUND, 12.1 METERS (39.7 FT)
LW5273 NORTH FROM THE CENTERLINE OF TWO TRAVEL LANES OF U S 1 SOUTH, 0.85
LW5273 METERS (2.8 FT) SOUTH FROM A FIBERGLASS WITNESS POST.
LW5273
LW5273 STATION RECOVERY (1994)

LW5273
LW5273 RECOVERY NOTE BY US POWER SQUADRON 1994
LW5273 RECOVERED IN GOOD CONDITION.

LW5273
LW5273 STATION RECOVERY (2000)

LW5273
LW5273 RECOVERY NOTE BY RI DEPT OF TRANSP 2000 (CSM)
LW5273 THE STATION IS LOCATED IN WESTERLY, RI ABOUT 3.9 MI (6.3 KM)
LW5273 SOUTHEAST OF WESTERLY CENTER, 3.4 MI (5.5 KM) SOUTHWEST OF
LW5273 BRADFORD CENTER AND 1.5 MI (2.4 KM) NORTH OF WEEKAPAUG CENTER ON
LW5273 STATE RIGHT-OF-WAY. TO REACH FROM A POINT ABOUT 1.8 MI (2.9 KM)

LW5273'SOUTHEAST OF WESTERLY CENTER AT THE JUNCTION OF U.S. HIGHWAY 1
LW5273'AND STATE ROUTE 78, GO EASTERLY ON U.S. HIGHWAY 1 FOR 2.4 MI (3.9 KM)
LW5273'TO THE STATION ON THE LEFT. A STANDARD RIGS DISK SET IN THE TOP OF
LW5273'A 30 CM DIAMETER CONCRETE MONUMENT PROJECTING 2 CM ABOVE
LW5273'GROUND LEVEL. IT IS, 37.8 M (124.0 FT) EAST FROM THE CENTERLINE OF
LW5273'WOODY HILL ROAD, 31.0 M (101.7 FT) WEST FROM A SQUARE CONCRETE
LW5273'STATE HIGHWAY BOUNDARY AND 12.1 M (39.7 FT) NORTH FROM THE
LW5273'CENTERLINE OF 2 TRAVEL LANES OF U.S. HIGHWAY 1 SOUTH. DESCRIBED BY
LW5273'JOHN F. OLIVER.

LW5273'

LW5273

LW5273

STATION RECOVERY (2001)

LW5273

LW5273'RECOVERY NOTE BY RI DEPT OF TRANSP 2001 (JFO)

LW5273'RECOVERED AS DESCRIBED.

LW5273'

LW5273

LW5273

STATION RECOVERY (2005)

LW5273

LW5273'RECOVERY NOTE BY CONNECTICUT GEODETIC SURVEY 2005

LW5273'RECOVERED AS DESCRIBED IN NGS DATABASE

LW5273

LW5273

STATION RECOVERY (2011)

LW5273

LW5273'RECOVERY NOTE BY INDIVIDUAL CONTRIBUTORS 2011 (NDL)

LW5273'RECOVERED IN GOOD CONDITION.

*** retrieval complete.

Elapsed Time = 00:00:05

The NGS Data Sheet

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

```
PROGRAM = datasheet95, VERSION = 8.5
1          National Geodetic Survey,   Retrieval Date = NOVEMBER 17, 2014
MZ1129 ****
MZ1129 CBN      - This is a Cooperative Base Network Control Station.
MZ1129 DESIGNATION - Z 39
MZ1129 PID      - MZ1129
MZ1129 STATE/COUNTY- MA/HAMPDEN
MZ1129 COUNTRY   - US
MZ1129 USGS QUAD - MONSON (1979)
MZ1129
MZ1129          *CURRENT SURVEY CONTROL
MZ1129
MZ1129* NAD 83(2011) POSITION- 42 09 47.89935(N) 072 20 36.81970(W)    ADJUSTED
MZ1129* NAD 83(2011) ELLIP HT-    73.409 (meters)           (06/27/12)    ADJUSTED
MZ1129* NAD 83(2011) EPOCH -    2010.00
MZ1129* NAVD 88 ORTHO HEIGHT - 102.010 (meters)       334.68 (feet) ADJUSTED
MZ1129
MZ1129 NAD 83(2011) X - 1,436,135.284 (meters)           COMP
MZ1129 NAD 83(2011) Y - -4,511,846.920 (meters)           COMP
MZ1129 NAD 83(2011) Z - 4,259,115.792 (meters)           COMP
MZ1129 LAPLACE CORR - 4.35 (seconds)                   DEFLEC12A
MZ1129 GEOID HEIGHT - -28.60 (meters)                  GEOID12A
MZ1129 DYNAMIC HEIGHT - 101.980 (meters)       334.58 (feet) COMP
MZ1129 MODELED GRAVITY - 980,332.4 (mgal)             NAVD 88
MZ1129
MZ1129 VERT ORDER - FIRST CLASS II
MZ1129
MZ1129 FGDC Geospatial Positioning Accuracy Standards (95% confidence, cm)
MZ1129 Type           Horiz Ellip Dist(km)
MZ1129 -----
MZ1129 NETWORK           1.09   2.14
MZ1129 -----
MZ1129 MEDIAN LOCAL ACCURACY AND DIST (056 points) 1.21   2.41   75.91
MZ1129 -----
MZ1129 NOTE: Click here for information on individual local accuracy
MZ1129 values and other accuracy information.
MZ1129
MZ1129
MZ1129.The horizontal coordinates were established by GPS observations
MZ1129.and adjusted by the National Geodetic Survey in June 2012.
MZ1129
MZ1129.NAD 83(2011) refers to NAD 83 coordinates where the reference
MZ1129.frame has been affixed to the stable North American tectonic plate. See
MZ1129.NA2011 for more information.
MZ1129
MZ1129.The horizontal coordinates are valid at the epoch date displayed above
MZ1129.which is a decimal equivalence of Year/Month/Day.
MZ1129
MZ1129.The orthometric height was determined by differential leveling and
MZ1129.adjusted by the NATIONAL GEODETIC SURVEY
MZ1129.in June 1991.
MZ1129
```

MZ1129.The X, Y, and Z were computed from the position and the ellipsoidal ht.

MZ1129

MZ1129.The Laplace correction was computed from DEFLEC12A derived deflections.

MZ1129

MZ1129.The ellipsoidal height was determined by GPS observations

MZ1129.and is referenced to NAD 83.

MZ1129

MZ1129.The dynamic height is computed by dividing the NAVD 88

MZ1129.geopotential number by the normal gravity value computed on the

MZ1129.Geodetic Reference System of 1980 (GRS 80) ellipsoid at 45

MZ1129.degrees latitude ($g = 980.6199$ gals.).

MZ1129

MZ1129.The modeled gravity was interpolated from observed gravity values.

MZ1129

MZ1129. The following values were computed from the NAD 83(2011) position.

MZ1129

	North	East	Units	Scale Factor	Converg.
MZ1129;SPC MA M	- 879,552.506	130,292.900	MT	0.99996476	-0 33 59.9
MZ1129;SPC MA M	- 2,885,665.18	427,469.29	sFT	0.99996476	-0 33 59.9
MZ1129;UTM 18	- 4,671,324.093	719,444.465	MT	1.00019257	+1 47 01.8

MZ1129

MZ1129! - Elev Factor x Scale Factor = Combined Factor

MZ1129!SPC MA M - 0.99998849 x 0.99996476 = 0.99995325

MZ1129!UTM 18 - 0.99998849 x 1.00019257 = 1.00018105

MZ1129

SUPERSEDED SURVEY CONTROL

MZ1129

MZ1129 NAD 83(2007)- 42 09 47.89968(N)	072 20 36.82040(W)	AD(2002.00)	0
MZ1129 ELLIP H (02/10/07) 73.427 (m)		GP(2002.00)	
MZ1129 NAD 83(1996)- 42 09 47.89976(N)	072 20 36.82090(W)	AD()	A
MZ1129 ELLIP H (06/22/01) 73.416 (m)		GP()	4 1
MZ1129 NAD 83(1996)- 42 09 47.89939(N)	072 20 36.81657(W)	AD()	3
MZ1129 ELLIP H (06/29/98) 73.431 (m)		GP()	4 1
MZ1129 NAD 83(1992)- 42 09 47.89821(N)	072 20 36.81636(W)	AD()	3
MZ1129 ELLIP H (10/08/95) 73.358 (m)		GP()	4 2
MZ1129 NAD 83(1986)- 42 09 47.89980(N)	072 20 36.81181(W)	AD()	3
MZ1129 NAD 27 - 42 09 47.55552(N)	072 20 38.52489(W)	AD()	3
MZ1129 NAVD 88 (06/22/01) 102.01 (m)	334.7 (f)	LEVELING	3
MZ1129 NGVD 29 (03/22/89) 102.22 (m)	335.4 (f)	LEVELING	3

MZ1129

MZ1129.Superseeded values are not recommended for survey control.

MZ1129

MZ1129.NGS no longer adjusts projects to the NAD 27 or NGVD 29 datums.

MZ1129.See file dsdata.txt to determine how the superseded data were derived.

MZ1129

MZ1129_U.S. NATIONAL GRID SPATIAL ADDRESS: 18TYM1944471324 (NAD 83)

MZ1129

MZ1129_MARKER: DV = VERTICAL CONTROL DISK

MZ1129_SETTING: 49 = STAINLESS STEEL ROD W/O SLEEVE (10 FT.+)

MZ1129_SP_SET: COPPER-CLAD STEEL ROD

MZ1129_STAMPING: Z 39 1978

MZ1129_MARK LOGO: NGS

MZ1129_PROJECTION: FLUSH

MZ1129_MAGNETIC: N = NO MAGNETIC MATERIAL

MZ1129_STABILITY: B = PROBABLY HOLD POSITION/ELEVATION WELL

MZ1129_SATELLITE: THE SITE LOCATION WAS REPORTED AS SUITABLE FOR

MZ1129+SATELLITE: SATELLITE OBSERVATIONS - March 28, 2004

MZ1129_ROD/PIPE-DEPTH: 4.6 meters

MZ1129

MZ1129 HISTORY - Date Condition Report By

MZ1129 HISTORY - 1978 MONUMENTED NGS
MZ1129 HISTORY - 19880617 GOOD NGS
MZ1129 HISTORY - 20000620 GOOD NGS
MZ1129 HISTORY - 20020509 GOOD MAGS
MZ1129 HISTORY - 20040328 GOOD GEOCAC

MZ1129

STATION DESCRIPTION

MZ1129

MZ1129'DESCRIBED BY NATIONAL GEODETIC SURVEY 1978

MZ1129'IN PALMER.

MZ1129'IN PALMER AT THE JUNCTION OF STATE HIGHWAY 20 AND STATE ROUTE 181,
MZ1129'SET DIRECTLY BEHIND A COMMEMORATIVE MONUMENT FOR GENERAL HENRY KNOX,
MZ1129'63.8 FEET EAST OF POWER POLE NUMBER 378-1, 55 FEET NORTHEAST OF THE
MZ1129'CENTER LINE OF HIGHWAY 20, 29.4 FEET WEST OF A METAL POLE WITH A
MZ1129'TRAFFIC LIGHT, 1 FOOT NORTHEAST OF THE MONUMENT.

MZ1129

STATION RECOVERY (1988)

MZ1129

MZ1129'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 1988

MZ1129'THE STATION IS LOCATED IN THE WEST EDGE OF PALMER, IN THE GRASS MEDIAN
MZ1129'AT THE JUNCTION OF U.S. HIGHWAY 20 AND STATE HIGHWAY 181, DIRECTLY
MZ1129'BEHIND AN 0.8 BY 1.2 METER GRANIT COMMEMORATIVE MONUMENT FOR GENERAL
MZ1129'HENRY KNOX.

MZ1129'OWNERSHIP--MASSACHUSETTS DEPARTMENT OF TRANSPORTATION.

MZ1129'THE STATION IS A STANDARD NGS DISK CRIMPED ON TOP OF A COPPER COATED
MZ1129'STEEL ROD DRIVEN TO A DEPTH OF 4.6 METERS RECESSED 10 CM BELOW GROUND
MZ1129'ENCASED IN A PVC PIPE FLUSH WITH THE GROUND. LOCATED 19.4 M
MZ1129'(63.6 FT) EAST FROM POWER POLE NUMBER 378-1, 16.1 M (52.8 FT) NORTH
MZ1129'FROM THE CENTER OF HIGHWAY 20, 8.9 M (29.2 FT) WEST FROM A METAL POLE
MZ1129'SUPPORTING A TRAFFIC LIGHT, AND 0.4 M (1.3 FT) NORTH FROM THE CENTER
MZ1129'OF THE GRANIT MONUMENT.

MZ1129'DESCRIBED BY C.L. SMITH, TYPED BY R.L. ZURFLUH.

MZ1129

STATION RECOVERY (2000)

MZ1129

MZ1129'RECOVERY NOTE BY NATIONAL GEODETIC SURVEY 2000 (CSM)

MZ1129'THE STATION IS LOCATED ON THE WEST SIDE OF PALMER AT THE JUNCTION
MZ1129'OF US HIGHWAY 20 (NORTH MAIN STREET) AND STATE HIGHWAY 181, ABOUT
MZ1129'IN THE CENTER OF THE GRASSY TRIANGLE FORMED BY THE JUNCTION OF
MZ1129'THE HIGHWAYS ABOUT 0.3 M (1.0 FT) NORTH OF THE CENTER OF THE NORTH
MZ1129'FACE OF A GRANITE MONUMENT COMMEMORATING GENERAL HENRY KNOX.

MZ1129'OWNERSHIP--CITY OF PALMER. TO REACH THE STATION FROM THE

MZ1129'JUNCTION OF INTERSTATE HIGHWAY 90 (MASSACHUSETTS TURNPIKE EXIT 8)

MZ1129'AND STATE HIGHWAY 32 LOCATED ON THE NORTH SIDE OF PALMER, FROM

MZ1129'THE EAST BOUND LANE OF INTERSTATE HIGHWAY 90 AND EXIT 8 GO EAST

MZ1129'ON THE EXIT RAMP FOR 0.64 KM (0.40 MI) TO THE TOLL BOOTH, CONTINUE

MZ1129'AHEAD ON THE EXIT RAMP FOR 0.08 KM TO THE T-JUNCTION OF STATE

MZ1129'HIGHWAY 32, TURN RIGHT, SOUTHEAST ON HIGHWAY 32 FOR 1.23 KM (0.75

MZ1129'MI) TO THE JUNCTION OF HIGHWAY 32 LEADING EAST AND HIGHWAY 20

MZ1129'STRAIGHT AHEAD, CONTINUE AHEAD, SOUTH ON HIGHWAY 20 FOR 0.24 KM

MZ1129'(0.15 MI) TO THE T-JUNCTION OF NORTH MAIN STREET, TURN RIGHT,

MZ1129'WESTERLY ON NORTH MAIN STREET (US HIGHWAY 20) FOR 1.29 KM (0.80 MI)

MZ1129'TO THE JUNCTION OF STATE HIGHWAY 181 AND THE STATION ABOUT IN THE

MZ1129'CENTER OF THE GRASSY TRIANGLE FORMED BY THE JUNCTION OF THE

MZ1129'HIGHWAYS AND DIRECTLY BEHIND THE CENTER OF A LONE GRANITE

MZ1129'COMMEMORATIVE MONUMENT FOR GENERAL HENRY KNOX. THE STATION IS

MZ1129'AN NGS VERTICAL CONTROL DISK CRIMPED TO THE TOP OF A COPPER CLAD

MZ1129'STEEL ROD ENCASED IN A 10 CM PVC PIPE SURROUNDED BY CONCRETE, THE

MZ1129'PVC PIPE IS FLUSH WITH THE GROUND, THE DISK IS RECESSED ABOUT 15 CM

MZ1129'BELLOW THE TOP OF THE PVC PIPE. LOCATED 12.47 M (40.91 FT) EAST OF A

MZ1129'STOP SIGN, 4.58 M (15.03 FT) WEST OF THE SOUTH METAL LEG OF A
MZ1129'SIGN-THREE RIVERS AND 0.37 M (1.21 FT) NORTH OF THE CENTER OF THE
MZ1129'NORTH FACE OF THE COMMEMORATIVE MONUMENT.

MZ1129'

MZ1129

MZ1129 STATION RECOVERY (2002)

MZ1129

MZ1129'RECOVERY NOTE BY MASSACHUSETTS GEODETIC SURVEY 2002 (DCA)

MZ1129'RECOVERED IN GOOD CONDITION.

MZ1129

MZ1129 STATION RECOVERY (2004)

MZ1129

MZ1129'RECOVERY NOTE BY GEOCACHING 2004 (RPM)

MZ1129'RECOVERED IN GOOD CONDITION.

*** retrieval complete.

Elapsed Time = 00:00:04

SECTION 5: GPS CONTROL POINTS

This section contains a graphical representation of the new quality control check points and existing ground control stations used for the USGS/NGTOC New England CMGP Sandy Lidar Project.

