

June 30, 2015

Field Survey Report of
LiDAR Ground Control & QC Points

Gratiot County, MI QL2 LiDAR
USGS Contract: G10PC00026
USGS Task Order: G15PD00343



1400 Independence Road
Rolla, Missouri 65401

Presented by



Subcontracted by



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Gratiot County, MI QL-2 Aerial LiDAR
Surveyor's Report for Ground Control Establishment

Project Description:

The Spicer Group was contracted to field survey LiDAR calibration control points and quality control points in support of Gratiot County, MI QL2 LiDAR. There are 20 calibration points in which the locations were provided by Quantum Spatial, 40 non-vegetated (NVA) points and 30 vegetated (VVA) points throughout the project for a total of 90 points. The land cover breakdown has the NVA points as 5 bare earth and 35 urban area. VVA points are broken down as 3 Forested, 3 swamp/wetland points, and 24 tall weeds/crops. Fifty percent of the NVA points can be used for horizontal accuracy verification.

The VVA and NVA points were placed throughout the county to try and provide maximum coverage while adhering to the LiDAR Base Specification Version 1.2 (November, 2014). Gratiot County has a tremendous amount of farmland and those fields were being prepared for seeding while field surveying activities were ongoing. VVA points were placed at points where they would not be disturbed by farm work. NVA points were placed throughout the county also.

Field Procedure:

Field work began on May 12th, 2015 and was completed on May 26th, 2015. A RTK GPS survey was performed using Leica GS14 GNSS receivers utilizing the Michigan Department of Transportation (MDOT) Continuously Operating Reference Stations (CORS) as base stations for the project. Each point was set on a flat surface at least five meters away from any significant elevation change. Points were occupied for 20 seconds, the unit was then rotated 180 degrees and occupied for 20 more seconds. Second, crews forced a loss of phase lock, and reacquired a fixed solution under a new set of ambiguities. The point was then occupied for 20 seconds, the GNSS receiver was again rotated 180 degrees and occupied for another 20 seconds. This procedure was completed twice on all control and QC points for this project with a minimum of 4 hours of separation between each set of observations. Any of the QC points that were unable to be collected with GPS were located conventionally with a Leica TS15 Robotic Total Station utilizing points previously established with GPS. A closed traverse was then run to tie in the conventional point, in order to analyze 3D traverse closures. Data sheets for each point were completed, which include point type, general location, occupation time, equipment used, and photographs. Final coordinates, point ties, and final RMSE values.

Office Procedure:

Upon completion of the field survey, all RTK observations were imported into Leica Geo Office (LGO) for processing and analysis. All redundant observations were reviewed in LGO for agreement and consistency. Observations averaging limits were set to 0.08' in XY & Z, and any points where multiple observations exceeded the 0.08' deviation from the mean, were observed for a third set of observations. All final observations for all points from a minimum of two sets agree to within 0.08' of the mean in 3D position.

Final 3D coordinate values are the result of a least squares adjustment performed on the RTK network. The six CORS stations used were held as 3D constraints in the final adjustment.

Reporting Procedure:

The North American Datum of 1983 (NAD83 (2011), Michigan South Zone projection was used for reporting the horizontal coordinates in international feet. The vertical elevations are North American Vertical Datum of 1988 (NAVD 88) utilizing the GEOID12A model and are reported in international feet.

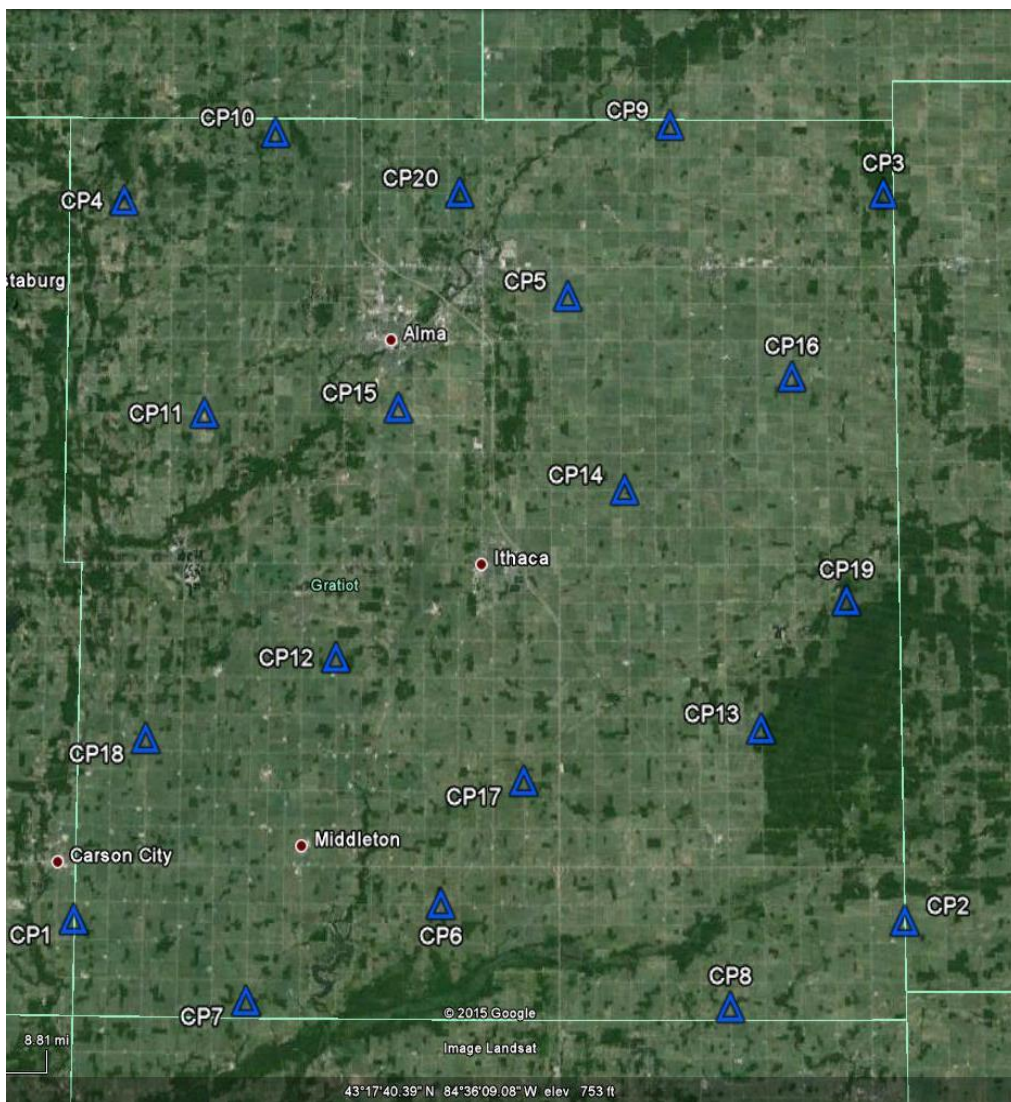
The average Horizontal RMSE for all points at the 95% confidence level is 0.04 international feet or 0.011 meter.

The average Elevation RMSE for all points at the 95% confidence level is 0.02 international feet or 0.006 meter.

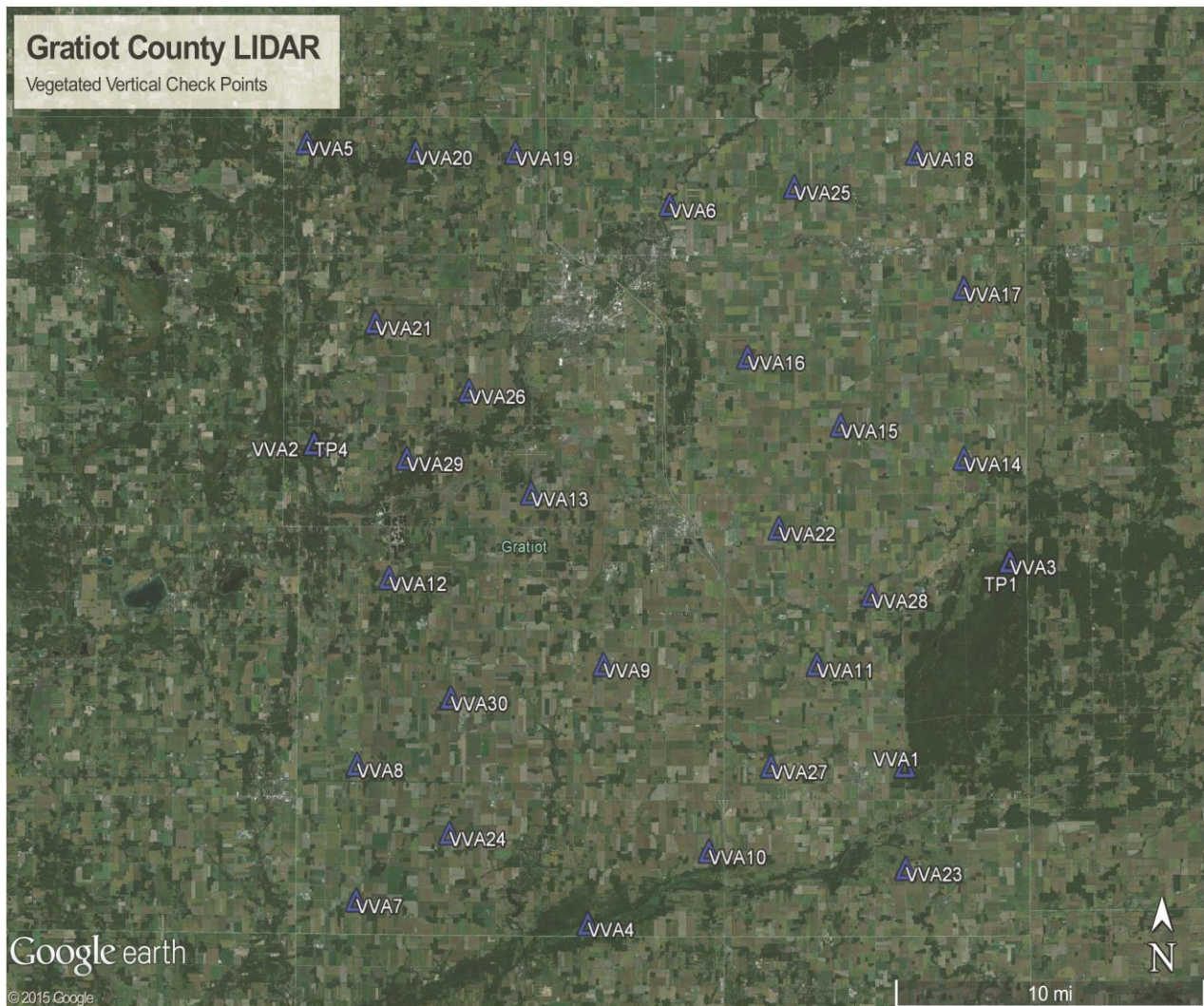
The average 3-Dimensional RMSE for all points at the 95% confidence level is 0.06 international feet or 0.017 meter.

Point Location Maps

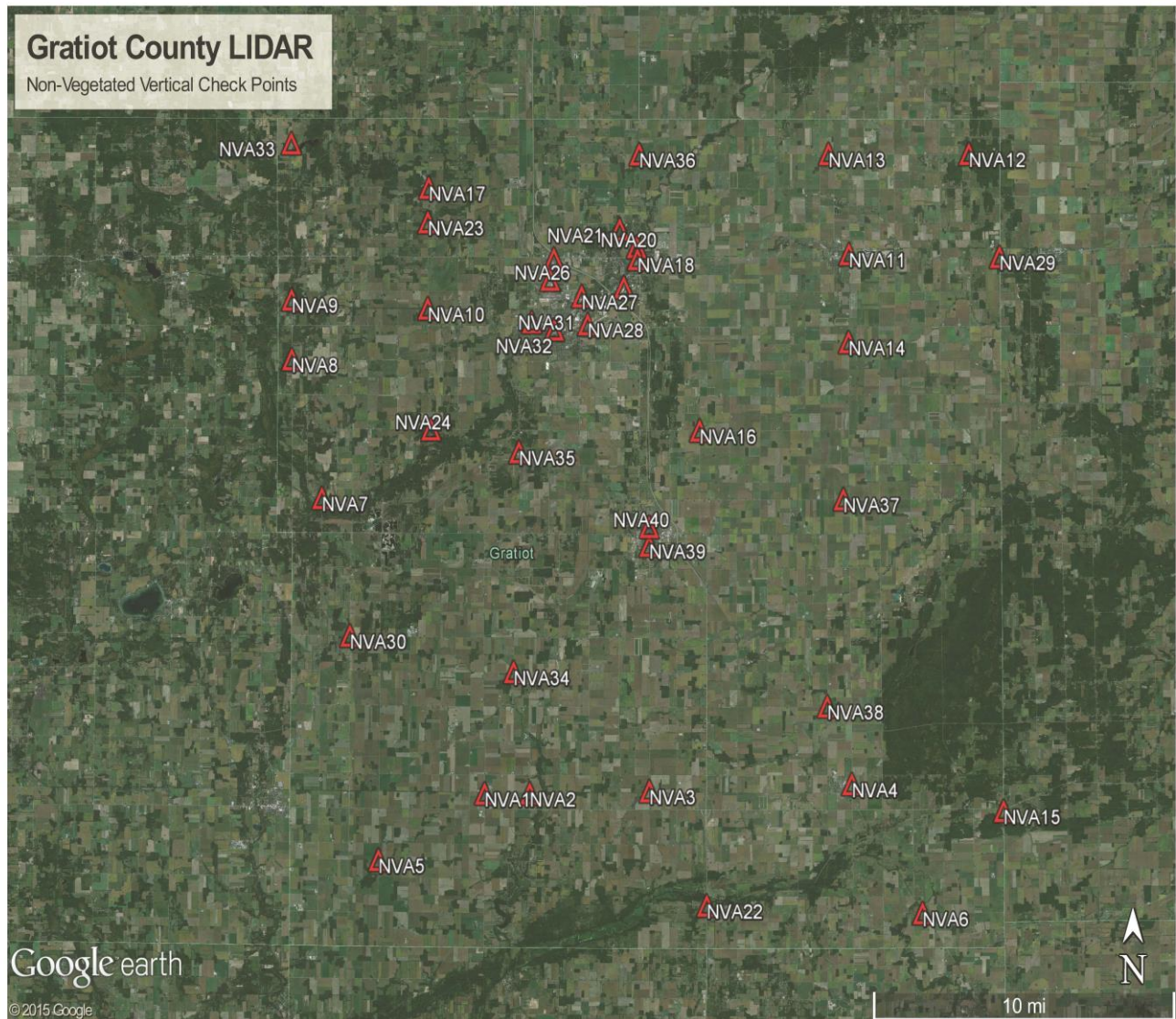
Calibration Points



VVA QC Points



NVA QC Points



NAME	NORTHING	EASTING	ELEVATION	FEATURE CODE	NORTHING RMSE_95%	EASTING RMSE_95%	ELEVATION RMSE_95%	Average Hz RMSE =	Intl Feet	Meters
CP1	603526.12	12997963.50	762.97	CP	0.010	0.004	0.006	Average Hz RMSE =	0.04	0.011
CP2	603199.46	13122952.38	660.08	CP	0.004	0.012	0.008			
CP3	705788.28	13120998.91	684.97	CP	0.018	0.022	0.016			
CP4	704863.58	13004552.38	813.24	CP	0.011	0.010	0.008	Average Z RMSE=	0.02	0.006
CP5	691068.47	13072514.93	730.97	CP	0.016	0.029	0.022			
CP6	605594.42	13053164.84	709.94	CP	0.009	0.007	0.011			
CP7	592250.72	13023939.45	736.03	CP	0.005	0.009	0.013	Average 3D RMSE=	0.06	0.017
CP8	591311.01	13096609.94	680.69	CP	0.007	0.004	0.011			
CP9	715680.39	13088285.08	700.04	CP	0.026	0.014	0.011			
CP10	714634.94	13027699.06	790.08	CP	0.008	0.013	0.011			
CP11	674439.77	13017085.08	780.95	CP	0.024	0.017	0.030			
CP12	639963.96	13037273.45	747.73	CP	0.007	0.003	0.015			
CP13	629903.10	13101549.56	679.86	CP	0.005	0.005	0.009			
CP14	663506.76	13081078.78	728.02	CP	0.022	0.018	0.021			
CP15	675164.23	13046645.04	757.43	CP	0.020	0.019	0.019			
CP16	679575.43	13106682.90	706.47	CP	0.016	0.025	0.022			
CP17	622665.80	13065663.81	719.36	CP	0.006	0.014	0.030			
CP18	628679.87	13008558.53	774.96	CP	0.008	0.012	0.033			
CP19	647870.82	13114664.56	666.79	CP	0.005	0.008	0.007			
CP20	705917.09	13055980.05	749.58	CP	0.022	0.021	0.021			
TP1	647847.24	13119626.58	669.42	TP	0.02	0.01	0.01			
TP2	647847.01	13119784.33	669.69	TP	0.02	0.01	0.01			
TP3	666365.15	13001220.47	780.94	TP	0.02	0.03	0.02			
TP4	666292.76	13001220.25	779.59	TP	0.02	0.03	0.02			
NVA1	613407.42	13032116.92	742.18	NVA	0.03	0.03	0.03			
NVA2	613401.88	13040008.95	733.85	NVA	0.03	0.03	0.03			
NVA3	613684.73	13060950.88	718.21	NVA	0.01	0.01	0.01			
NVA4	614656.73	13096395.30	666.15	NVA	0.02	0.02	0.02			
NVA5	603296.26	13013522.86	754.88	NVA	0.03	0.03	0.03			
NVA6	594864.54	13108726.33	670.86	NVA	0.03	0.03	0.03			
NVA7	658739.78	13003818.87	763.48	NVA	0.02	0.02	0.02			
NVA8	679979.98	12998604.32	800.64	NVA	0.03	0.03	0.03			
NVA9	689139.77	12998598.78	795.62	NVA	0.03	0.03	0.03			
NVA10	687713.83	13022375.81	773.96	NVA	0.02	0.02	0.02			
NVA11	695849.54	13096084.93	726.39	NVA	0.02	0.02	0.02			
NVA12	711164.21	13117112.95	694.55	NVA	0.02	0.02	0.02			
NVA13	711185.72	13092559.29	708.02	NVA	0.03	0.03	0.03			
NVA14	682355.36	13095983.75	720.51	NVA	0.02	0.02	0.02			
NVA15	610471.37	13122947.13	656.85	NVA	0.03	0.03	0.03			
NVA16	668886.55	13069862.69	744.68	NVA	0.01	0.01	0.01			
NVA17	706183.11	13022600.84	834.40	NVA	0.02	0.02	0.02			
NVA18	695179.13	13059076.78	734.16	NVA	0.02	0.02	0.02			
NVA19	695261.47	13044470.42	768.01	NVA	0.02	0.02	0.02			
NVA20	697024.52	13058936.21	723.13	NVA	0.02	0.02	0.02			
NVA21	699726.03	13055975.17	756.96	NVA	0.02	0.02	0.02			
NVA22	596144.32	13070944.22	661.57	NVA	0.02	0.02	0.02			
NVA23	700912.93	13022435.44	797.37	NVA	0.03	0.03	0.03			
NVA24	669198.65	13022894.22	752.33	NVA	0.02	0.02	0.02			
NVA25	690887.07	13056675.09	736.13	NVA	0.02	0.02	0.02			
NVA26	692065.60	13043792.00	769.52	NVA	0.02	0.02	0.02			
NVA27	689500.26	13049317.60	736.86	NVA	0.02	0.02	0.02			
NVA28	685196.28	13050345.02	745.92	NVA	0.02	0.02	0.02			
NVA29	695376.61	13122436.57	684.86	NVA	0.02	0.02	0.02			
NVA30	637661.20	13008648.52	773.08	NVA	0.03	0.03	0.03			
NVA31	684415.33	13044513.63	733.09	NVA	0.02	0.02	0.02			
NVA32	685546.14	13040552.67	759.62	NVA	0.02	0.02	0.02			
NVA33	713060.39	12998589.93	842.43	NVA	0.02	0.02	0.02			
NVA34	632021.50	13037230.91	741.36	NVA	0.02	0.02	0.02			
NVA35	665669.80	13038253.49	752.34	NVA	0.01	0.01	0.01			
NVA36	711209.36	13059427.70	735.07	NVA	0.02	0.02	0.02			

Michigan State Plane Coordinates
 NAD'83(2011), International Feet
 South Zone
 NAVD'88

Gratiot County LIDAR
LiDAR Calibration and Check Points

NVA37	658312.48	13095001.40	711.48	NVA	0.02	0.02	0.02			
NVA38	626585.02	13092129.58	682.25	NVA	0.02	0.02	0.02			
NVA39	651302.96	13061011.27	764.82	NVA	0.01	0.01	0.01			
NVA40	654165.96	13061023.89	773.40	NVA	0.01	0.01	0.01			
VVA1	616003.90	13101772.30	666.98	VVA	0.02	0.02	0.02			
VVA2	666356.40	13001288.31	777.47	VVA	0.04	0.02	0.02			
VVA3	647739.59	13119726.46	670.65	VVA	0.02	0.02	0.01			
VVA31	591897.77	13047567.93	654.28	VVA	0.03	0.02	0.02			
VVA5	712999.85	13000109.94	814.31	VVA	0.02	0.02	0.02			
VVA6	703221.95	13061879.81	702.57	VVA	0.02	0.02	0.02			
VVA7	595457.57	13008178.24	750.58	VVA	0.03	0.03	0.03			
VVA8	616496.81	13008392.64	760.83	VVA	0.02	0.02	0.02			
VVA9	631928.40	13050447.00	759.45	VVA	0.01	0.01	0.01			
VVA10	602867.44	13068282.17	670.87	VVA	0.02	0.02	0.02			
VVA11	631832.34	13086764.07	688.31	VVA	0.01	0.01	0.01			
VVA12	645465.88	13013958.39	773.47	VVA	0.02	0.02	0.02			
VVA13	658504.34	13038160.38	757.80	VVA	0.01	0.01	0.01			
VVA14	663718.23	13111929.42	690.25	VVA	0.02	0.02	0.02			
VVA15	668925.39	13090920.31	718.19	VVA	0.02	0.02	0.02			
VVA16	679545.21	13075091.31	735.79	VVA	0.01	0.01	0.01			
VVA17	690126.26	13112002.36	699.48	VVA	0.02	0.02	0.02			
VVA18	711110.28	13103975.29	708.07	VVA	0.02	0.02	0.02			
VVA19	711388.94	13035637.73	774.89	VVA	0.02	0.02	0.02			
VVA20	711504.11	13018662.79	809.84	VVA	0.02	0.02	0.02			
VVA21	685101.80	13011758.43	795.84	VVA	0.02	0.02	0.02			
VVA22	653001.38	13080320.76	724.88	VVA	0.01	0.01	0.01			
VVA23	600127.49	13101863.32	657.74	VVA	0.02	0.02	0.02			
VVA24	605832.43	13024100.93	744.64	VVA	0.02	0.02	0.02			
VVA25	705928.88	13083099.19	713.20	VVA	0.02	0.02	0.02			
VVA26	674424.15	13027643.06	761.09	VVA	0.02	0.02	0.02			
VVA27	616050.19	13078925.76	688.85	VVA	0.02	0.02	0.02			
VVA28	642557.75	13096104.61	700.15	VVA	0.02	0.02	0.02			
VVA29	664001.43	13016997.27	756.81	VVA	0.02	0.02	0.02			
VVA30	626844.04	13024394.14	750.44	VVA	0.02	0.02	0.02			

Point ID	CP 1
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Carson City

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
Michigan South Zone	
NAVD88	
GEOID12A	
International Feet	

Northing	Easting	Elevation
603526.1229	12997963.5024	762.968

Operator	Lance Koko
Receiver Model	Leica GS14
Receiver S/N	2810685
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	5/12/2015
RMSE Hz	0.000
RMSE Z	0.000
Method	RTK

PHOTOS:



Point ID	CP 2
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Ashley

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
Michigan South Zone
NAVD88
GEOID12A
International Feet

Northing	Easting	Elevation
603199.46	13122952.38	660.08

Operator	Lance Koko
Receiver Model	Leica GS14
Receiver S/N	2810685
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/12/2015
RMSE Hz	0.02
RMSE Z	0.01
Method	RTK

PHOTOS:



Point ID	CP 3
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Breckenridge

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
Michigan South Zone
NAVD88
GEOID12A
International Feet

Northing	Easting	Elevation
705788.28	13120998.91	684.97

Operator	Patrick Bentley
Receiver Model	Leica GS14
Receiver S/N	2805909
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/12/2015
RMSE Hz	0.04
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	CP 4
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Riverdale

Aerial Target	
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
	NAD83(2011)
	Michigan South Zone
	NAVD88
	GEOID12A
	International Feet

Northing	Easting	Elevation
704863.58	13004552.38	813.24

Operator	Patrick Bentley
Receiver Model	Leica GS14
Receiver S/N	2805909
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/12/2015
RMSE Hz	0.02
RMSE Z	0.01
Method	RTK

PHOTOS:



Point ID	CP 5
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	St. Louis

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
Michigan South Zone
NAVD88
GEOID12A
International Feet

Northing	Easting	Elevation
691068.47	13072514.93	730.97

Operator	Patrick Bentley
Receiver Model	Leica GS14
Receiver S/N	2805909
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/12/2015
RMSE Hz	0.04
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	CP 6
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Perrinton

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
Michigan South Zone
NAVD88
GEOID12A
International Feet

Northing	Easting	Elevation
605594.42	13053164.84	709.94

Operator	Lance Koko
Receiver Model	Leica GS14
Receiver S/N	2810685
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/12/2015
RMSE Hz	0.02
RMSE Z	0.01
Method	RTK

PHOTOS:



Point ID	CP 7
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Pompeii

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
Michigan South Zone	
NAVD88	
GEOID12A	
International Feet	

Northing	Easting	Elevation
592250.72	13023939.45	736.03

Operator	Lance Koko
Receiver Model	Leica GS14
Receiver S/N	2810685
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/12/2015
RMSE Hz	0.01
RMSE Z	0.01
Method	RTK

PHOTOS:



Point ID	CP 8
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Ashley

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
Michigan South Zone	
NAVD88	
GEOID12A	
International Feet	

Northing	Easting	Elevation
591311.01	13096609.94	680.69

Operator	Lance Koko
Receiver Model	Leica GS14
Receiver S/N	2810685
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/12/2015
RMSE Hz	0.01
RMSE Z	0.01
Method	RTK

PHOTOS:



Point ID	CP 9
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	St. Louis

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
Michigan South Zone
NAVD88
GEOID12A
International Feet

Northing	Easting	Elevation
715680.39	13088285.08	700.04

Operator	Patrick Bentley
Receiver Model	Leica GS14
Receiver S/N	2805909
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/12/2015
RMSE Hz	0.04
RMSE Z	0.01
Method	RTK

PHOTOS:



Point ID	CP 10
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Alma North

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	NAD83(2011)
	Michigan South Zone
	NAVD88
	GEOID12A
	International Feet

Northing	Easting	Elevation
714634.94	13027699.06	790.08

Operator	Patrick Bentley
Receiver Model	Leica GS14
Receiver S/N	2805909
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/12/2015
RMSE Hz	0.02
RMSE Z	0.01
Method	RTK

PHOTOS:



Point ID	CP 11
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Sumner

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
Michigan South Zone
NAVD88
GEOID12A
International Feet

Northing	Easting	Elevation
674439.77	13017085.08	780.95

Operator	Patrick Bentley
Receiver Model	Leica GS14
Receiver S/N	2805909
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/12/2015
RMSE Hz	0.04
RMSE Z	0.03
Method	RTK

PHOTOS:



Point ID	CP 12
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Alma South

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
Michigan South Zone
NAVD88
GEOID12A
International Feet

Northing	Easting	Elevation
639963.96	13037273.45	747.73

Operator	Lance Koko
Receiver Model	Leica GS14
Receiver S/N	2810685
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/12/2015
RMSE Hz	0.01
RMSE Z	0.01
Method	RTK

PHOTOS:



Point ID	CP 13
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Ashley

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
Michigan South Zone
NAVD88
GEOID12A
International Feet

Northing	Easting	Elevation
629903.10	13101549.56	679.86

Operator	Lance Koko
Receiver Model	Leica GS14
Receiver S/N	2810685
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/12/2015
RMSE Hz	0.01
RMSE Z	0.01
Method	RTK

PHOTOS:



Point ID	CP 14
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Ithaca

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
Michigan South Zone	
NAVD88	
GEOID12A	
International Feet	

Northing	Easting	Elevation
663506.76	13081078.78	728.02

Operator	Patrick Bentley
Receiver Model	Leica GS14
Receiver S/N	2805909
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/12/2015
RMSE Hz	0.04
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	CP 15
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Alma South

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
Michigan South Zone	
NAVD88	
GEOID12A	
International Feet	

Northing	Easting	Elevation
675164.23	13046645.04	757.43

Operator	Patrick Bentley
Receiver Model	Leica GS14
Receiver S/N	2805909
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/12/2015
RMSE Hz	0.04
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	CP 16
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Rathbone

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
Michigan South Zone	
NAVD88	
GEOID12A	
International Feet	

Northing	Easting	Elevation
679575.43	13106682.90	706.47

Operator	Patrick Bentley
Receiver Model	Leica GS14
Receiver S/N	2805909
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/12/2015
RMSE Hz	0.04
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	CP 17
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Pompeii

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
Michigan South Zone
NAVD88
GEOID12A
International Feet

Northing	Easting	Elevation
622665.80	13065663.81	719.36

Operator	Lance Koko
Receiver Model	Leica GS14
Receiver S/N	2810685
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/12/2015
RMSE Hz	0.02
RMSE Z	0.03
Method	RTK

PHOTOS:



Point ID	CP 18
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Carson City

Aerial Target	
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
	NAD83(2011)
	Michigan South Zone
	NAVD88
	GEOID12A
	International Feet

Northing	Easting	Elevation
628679.87	13008558.53	774.96

Operator	Lance Koko
Receiver Model	Leica GS14
Receiver S/N	2810685
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/12/2015
RMSE Hz	0.02
RMSE Z	0.03
Method	RTK

PHOTOS:



Point ID	CP 19
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Rathbone

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
Michigan South Zone
NAVD88
GEOID12A
International Feet

Northing	Easting	Elevation
647870.82	13114664.56	666.79

Operator	Lance Koko
Receiver Model	Leica GS14
Receiver S/N	2810685
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/12/2015
RMSE Hz	0.01
RMSE Z	0.01
Method	RTK

PHOTOS:



Point ID	CP 20
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	St. Louis

	Aerial Target
X	LiDAR Ground Control
	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
Michigan South Zone	
NAVD88	
GEOID12A	
International Feet	

Northing	Easting	Elevation
705917.09	13055980.05	749.58

Operator	Patrick Bentley
Receiver Model	Leica GS14
Receiver S/N	2805909
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/12/2015
RMSE Hz	0.04
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	NVA 1
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Perrinton

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
Michigan South Zone
NAVD88
GEOID12A
International Feet

Northing	Easting	Elevation
613407.42	13032116.92	742.18

Operator	Lance Koko
Receiver Model	Leica GS14
Receiver S/N	2810685
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/14/2015
RMSE Hz	0.06
RMSE Z	0.03
Method	RTK

PHOTOS:



Point ID	NVA 2
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Perrinton

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
Michigan South Zone
NAVD88
GEOID12A
International Feet

Northing	Easting	Elevation
613401.88	13040008.95	733.85

Operator	Lance Koko
Receiver Model	Leica GS14
Receiver S/N	2810685
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/14/2015
RMSE Hz	0.05
RMSE Z	0.03
Method	RTK

PHOTOS:



Point ID	NVA 3
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Pompeii

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
Michigan South Zone
NAVD88
GEOID12A
International Feet

Northing	Easting	Elevation
613684.73	13060950.88	718.21

Operator	Lance Koko
Receiver Model	Leica GS14
Receiver S/N	2810685
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/14/2015
RMSE Hz	0.03
RMSE Z	0.01
Method	RTK

PHOTOS:



Point ID	NVA 4
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Ashley

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
Michigan South Zone	
NAVD88	
GEOID12A	
International Feet	

Northing	Easting	Elevation
614656.73	13096395.30	666.15

Operator	Casey Bierlein
Receiver Model	Leica GS14
Receiver S/N	2804866
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/26/2015
RMSE Hz	0.04
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	NVA 5
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Carson City

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
Michigan South Zone	
NAVD88	
GEOID12A	
International Feet	

Northing	Easting	Elevation
603296.26	13013522.86	754.88

Operator	Casey Bierlein
Receiver Model	Leica GS14
Receiver S/N	2804866
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/26/2015
RMSE Hz	0.05
RMSE Z	0.03
Method	RTK

PHOTOS:



Point ID	NVA 6
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Ashley

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
Michigan South Zone	
NAVD88	
GEOID12A	
International Feet	

Northing	Easting	Elevation
594864.54	13108726.33	670.86

Operator	Casey Bierlein
Receiver Model	Leica GS14
Receiver S/N	2804866
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/26/2015
RMSE Hz	0.05
RMSE Z	0.03
Method	RTK

PHOTOS:



Point ID	NVA 7
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Sumner

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
Michigan South Zone	
NAVD88	
GEOID12A	
International Feet	

Northing	Easting	Elevation
658739.78	13003818.87	763.48

Operator	Casey Bierlein
Receiver Model	Leica GS14
Receiver S/N	2804866
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/20/2015
RMSE Hz	0.05
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	NVA 8
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Sumner

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
Michigan South Zone
NAVD88
GEOID12A
International Feet

Northing	Easting	Elevation
679979.98	12998604.32	800.64

Operator	Casey Bierlien
Receiver Model	Leica GS14
Receiver S/N	2804866
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/08/2015
RMSE Hz	0.05
RMSE Z	0.03
Method	RTK

PHOTOS:



Point ID	NVA 9
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Sumner

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	NAD83(2011)
	Michigan South Zone
	NAVD88
	GEOID12A
	International Feet

Northing	Easting	Elevation
689139.77	12998598.78	795.62

Operator	Casey Bierlein
Receiver Model	Leica GS14
Receiver S/N	2804866
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/20/2015
RMSE Hz	0.06
RMSE Z	0.03
Method	RTK

PHOTOS:



Point ID	NVA 10
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Alma North

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
Michigan South Zone	
NAVD88	
GEOID12A	
International Feet	

Northing	Easting	Elevation
687713.83	13022375.81	773.96

Operator	Casey Bierlein
Receiver Model	Leica GS14
Receiver S/N	2804866
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/26/2015
RMSE Hz	0.04
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	NVA 11
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Breckenridge

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
Michigan South Zone	
NAVD88	
GEOID12A	
International Feet	

Northing	Easting	Elevation
695849.54	13096084.93	726.39

Operator	Casey Bierlein
Receiver Model	Leica GS14
Receiver S/N	2804866
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/20/2015
RMSE Hz	0.05
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	NVA 12
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Breckenridge

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	NAD83(2011)
	Michigan South Zone
	NAVD88
	GEOID12A
	International Feet

Northing	Easting	Elevation
711164.21	13117112.95	694.55

Operator	Casey Bierlein
Receiver Model	Leica GS14
Receiver S/N	2804866
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/20/2015
RMSE Hz	0.04
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	NVA 13
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Breckenridge

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
Michigan South Zone
NAVD88
GEOID12A
International Feet

Northing	Easting	Elevation
711185.72	13092559.29	708.02

Operator	Casey Bierlein
Receiver Model	Leica GS14
Receiver S/N	2804866
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/20/2015
RMSE Hz	0.05
RMSE Z	0.03
Method	RTK

PHOTOS:



Point ID	NVA 14
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Breckenridge

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	NAD83(2011)
	Michigan South Zone
	NAVD88
	GEOID12A
	International Feet

Northing	Easting	Elevation
682355.36	13095983.75	720.51

Operator	Casey Bierlein
Receiver Model	Leica GS14
Receiver S/N	2804866
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/21/2015
RMSE Hz	0.04
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	NVA 15
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Chapin

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
Michigan South Zone
NAVD88
GEOID12A
International Feet

Northing	Easting	Elevation
610471.37	13122947.13	656.85

Operator	Casey Bierlein
Receiver Model	Leica GS14
Receiver S/N	2804866
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/26/2015
RMSE Hz	0.05
RMSE Z	0.03
Method	RTK

PHOTOS:



Point ID	NVA 16
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Ithaca

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	NAD83(2011)
	Michigan South Zone
	NAVD88
	GEOID12A
	International Feet

Northing	Easting	Elevation
668886.55	13069862.69	744.68

Operator	Casey Bierlein
Receiver Model	Leica GS14
Receiver S/N	2804866
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/21/2015
RMSE Hz	0.02
RMSE Z	0.01
Method	RTK

PHOTOS:



Point ID	NVA 17
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Alma North

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
Michigan South Zone	
NAVD88	
GEOID12A	
International Feet	

Northing	Easting	Elevation
706183.11	13022600.84	834.40

Operator	Casey Bierlein
Receiver Model	Leica GS14
Receiver S/N	2804866
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/20/2015
RMSE Hz	0.05
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	NVA 18
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	St. Louis

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	NAD83(2011)
	Michigan South Zone
	NAVD88
	GEOID12A
	International Feet

Northing	Easting	Elevation
695179.13	13059076.78	734.16

Operator	Casey Bierlein
Receiver Model	Leica GS14
Receiver S/N	2804866
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/20/2015
RMSE Hz	0.04
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	NVA 19
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Alma North

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	NAD83(2011)
	Michigan South Zone
	NAVD88
	GEOID12A
	International Feet

Northing	Easting	Elevation
695261.47	13044470.42	768.01

Operator	Casey Bierlein
Receiver Model	Leica GS14
Receiver S/N	2804866
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/21/2015
RMSE Hz	0.04
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	NVA 20
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Alma North

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	NAD83(2011)
	Michigan South Zone
	NAVD88
	GEOID12A
	International Feet

Northing	Easting	Elevation
697024.52	13058936.21	723.13

Operator	Casey Bierlein
Receiver Model	Leica GS14
Receiver S/N	2804866
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/20/2015
RMSE Hz	0.04
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	NVA 21
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	St. Louis

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
Michigan South Zone	
NAVD88	
GEOID12A	
International Feet	

Northing	Easting	Elevation
699726.03	13055975.17	756.96

Operator	Casey Bierlein
Receiver Model	Leica GS14
Receiver S/N	2804866
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/21/2015
RMSE Hz	0.05
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	NVA 22
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Pompeii

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
Michigan South Zone
NAVD88
GEOID12A
International Feet

Northing	Easting	Elevation
596144.32	13070944.22	661.57

Operator	Casey Bierlein 2804866
Receiver Model	Leica GS14
Receiver S/N	2804866
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/26/2015
RMSE Hz	0.04
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	NVA 23
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Alma North

Aerial Target	
LiDAR Ground Control	
X LiDAR QC Point	
New Control	
Photo ID	
Published Control	

Coordinate System	
NAD83(2011)	
Michigan South Zone	
NAVD88	
GEOID12A	
International Feet	

Northing	Easting	Elevation
700912.93	13022435.44	797.37

Operator	Casey Bierlein
Receiver Model	Leica GS14
Receiver S/N	2804866
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/20/2015
RMSE Hz	0.05
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	NVA 24
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Sumner

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
Michigan South Zone
NAVD88
GEOID12A
International Feet

Northing	Easting	Elevation
669198.65	13022894.22	752.33

Operator	Casey Bierlein
Receiver Model	Leica GS14
Receiver S/N	2804866
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	5/26/2015
RMSE Hz	0.04
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	NVA 25
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	St. Louis

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
Michigan South Zone
NAVD88
GEOID12A
International Feet

Northing	Easting	Elevation
690887.07	13056675.09	736.13

Operator	Casey Bierlein
Receiver Model	Leica GS14
Receiver S/N	2804866
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/21/2015
RMSE Hz	0.03
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	NVA 26
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Alma North

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
Michigan South Zone
NAVD88
GEOID12A
International Feet

Northing	Easting	Elevation
692065.60	13043792.00	769.52

Operator	Casey Bierlein
Receiver Model	Leica GS14
Receiver S/N	2804866
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/21/2015
RMSE Hz	0.04
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	NVA 27
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Alma North

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
Michigan South Zone
NAVD88
GEOID12A
International Feet

Northing	Easting	Elevation
689500.26	13049317.60	736.86

Operator	Casey Bierlein
Receiver Model	Leica GS14
Receiver S/N	2804866
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/21/2015
RMSE Hz	0.03
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	NVA 28
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	St. Louis

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
Michigan South Zone
NAVD88
GEOID12A
International Feet

Northing	Easting	Elevation
685196.28	13050345.02	745.92

Operator	Casey Bierlein
Receiver Model	Leica GS14
Receiver S/N	2804866
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/21/2015
RMSE Hz	0.03
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	NVA 29
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Breckenridge

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	NAD83(2011)
	Michigan South Zone
	NAVD88
	GEOID12A
	International Feet

Northing	Easting	Elevation
695376.61	13122436.57	684.86

Operator	Casey Bierlein
Receiver Model	Leica GS14
Receiver S/N	2804866
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/21/2015
RMSE Hz	0.03
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	NVA 30
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Sumner

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	NAD83(2011)
	Michigan South Zone
	NAVD88
	GEOID12A
	International Feet

Northing	Easting	Elevation
637661.20	13008648.52	773.08

Operator	Casey Bierlein
Receiver Model	Leica GS14
Receiver S/N	2804866
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/26/2015
RMSE Hz	0.05
RMSE Z	0.03
Method	RTK

PHOTOS:



Point ID	NVA 31
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Alma North

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
Michigan South Zone
NAVD88
GEOID12A
International Feet

Northing	Easting	Elevation
684415.33	13044513.63	733.09

Operator	Casey Bierlein
Receiver Model	Leica GS14
Receiver S/N	2804866
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/21/2015
RMSE Hz	0.03
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	NVA 32
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Alma North

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
Michigan South Zone	
NAVD88	
GEOID12A	
International Feet	

Northing	Easting	Elevation
685546.14	13040552.67	759.62

Operator	Casey Bierlein
Receiver Model	Leica GS14
Receiver S/N	2804866
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/21/2015
RMSE Hz	0.04
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	NVA 33
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Riverdale

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
Michigan South Zone
NAVD88
GEOID12A
International Feet

Northing	Easting	Elevation
713060.39	12998589.93	842.43

Operator	Casey Bierlein
Receiver Model	Leica GS14
Receiver S/N	2804866
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/20/2015
RMSE Hz	0.05
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	NVA 34
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Perrinton

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
Michigan South Zone	
NAVD88	
GEOID12A	
International Feet	

Northing	Easting	Elevation
632021.50	13037230.91	741.36

Operator	Casey Bierlein
Receiver Model	Leica GS14
Receiver S/N	2804866
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/26/2015
RMSE Hz	0.03
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	NVA 35
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Alma South

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
Michigan South Zone	
NAVD88	
GEOID12A	
International Feet	

Northing	Easting	Elevation
665669.80	13038253.49	752.34

Operator	Casey Bierlein
Receiver Model	Leica GS14
Receiver S/N	2804866
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/26/2015
RMSE Hz	0.03
RMSE Z	0.01
Method	RTK

PHOTOS:



Point ID	NVA 36
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	St. Louis

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
Michigan South Zone
NAVD88
GEOID12A
International Feet

Northing	Easting	Elevation
711209.36	13059427.70	735.07

Operator	Casey Bierlein
Receiver Model	Leica GS14
Receiver S/N	2804866
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/20/2015
RMSE Hz	0.05
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	NVA 37
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Rathbone

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
Michigan South Zone	
NAVD88	
GEOID12A	
International Feet	

Northing	Easting	Elevation
658312.48	13095001.40	711.48

Operator	Casey Bierlein
Receiver Model	Leica GS14
Receiver S/N	2804866
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/21/2015
RMSE Hz	0.03
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	NVA 38
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Ashley

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
Michigan South Zone
NAVD88
GEOID12A
International Feet

Northing	Easting	Elevation
626585.02	13092129.58	682.25

Operator	Casey Bierlein
Receiver Model	Leica GS14
Receiver S/N	2804866
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/26/2015
RMSE Hz	0.03
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	NVA 39
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Ithaca

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
Michigan South Zone	
NAVD88	
GEOID12A	
International Feet	

Northing	Easting	Elevation
651302.96	13061011.27	764.82

Operator	Casey Bierlein
Receiver Model	Leica GS14
Receiver S/N	2804866
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/26/2015
RMSE Hz	0.01
RMSE Z	0.01
Method	RTK

PHOTOS:



Point ID	NVA 40
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Ithaca

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	
NAD83(2011)	
Michigan South Zone	
NAVD88	
GEOID12A	
International Feet	

Northing	Easting	Elevation
654165.96	13061023.89	773.40

Operator	Casey Bierlein
Receiver Model	Leica GS14
Receiver S/N	2804866
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/26/2015
RMSE Hz	0.01
RMSE Z	0.01
Method	RTK

PHOTOS:



Point ID	VVA 1
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Ashley

Aerial Target	
LiDAR Ground Control	
X	LiDAR QC Point
New Control	
Photo ID	
Published Control	

Coordinate System	
NAD83(2011)	
Michigan South Zone	
NAVD88	
GEOID12A	
International Feet	

Northing	Easting	Elevation
616003.90	13101772.30	666.98

Operator	Patrick Bentley
Receiver Model	Leica GS14
Receiver S/N	2805909
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/13/2015
RMSE Hz	0.04
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	VVA 2
Project No.	26242
Project Name	Gratiot County, MI – QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Sumner

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
UTM – Zone 16N
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
666356.40	13001288.31	777.47

Operator	Pat Bentley
Instrument Model	Leica TS15
Date (MM-DD-YYYY)	5/13/2015
Occupy PT	TP 1
Back Sight PT	TP 2
RMSE Hz	0.06
RMSE Z	0.02

PHOTOS:



Point ID	VVA 3
Project No.	26242
Project Name	Gratiot County, MI – QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Rathbone

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
UTM – Zone 16N
NAVD88
GEOID12A
Meters

Northing	Easting	Elevation
647739.59	13119726.46	670.65

Operator	Pat Bentley
Instrument Model	Leica TS15
Date (MM-DD-YYYY)	5/13/2015
Occupy PT	TP 3
Back Sight PT	TP 4
RMSE Hz	0.04
RMSE Z	0.01

PHOTOS:



Point ID	VVA 31
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Perrinton

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
Michigan South Zone
NAVD88
GEOID12A
International Feet

Northing	Easting	Elevation
591897.77	13047567.933	654.28

Operator	Lance Koko
Receiver Model	Leica GS14
Receiver S/N	2810685
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	06/12/2015
RMSE Hz	0.03
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	VVA 5
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Riverdale

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
Michigan South Zone
NAVD88
GEOID12A
International Feet

Northing	Easting	Elevation
712999.85	13000109.94	814.31

Operator	Patrick Bentley
Receiver Model	Leica GS14
Receiver S/N	2805909
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/20/2015
RMSE Hz	0.05
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	VVA 6
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	St. Louis

Aerial Target	
LiDAR Ground Control	
X LiDAR QC Point	
New Control	
Photo ID	
Published Control	

Coordinate System	NAD83(2011)
	Michigan South Zone
	NAVD88
	GEOID12A
	International Feet

Northing	Easting	Elevation
703221.95	13061879.81	702.57

Operator	Patrick Bentley
Receiver Model	Leica GS14
Receiver S/N	2805909
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/20/2015
RMSE Hz	0.04
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	VVA 7
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Carson City

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
Michigan South Zone
NAVD88
GEOID12A
International Feet

Northing	Easting	Elevation
595457.57	13008178.24	750.58

Operator	Lance Koko
Receiver Model	Leica GS14
Receiver S/N	2810685
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/13/2015
RMSE Hz	0.06
RMSE Z	0.03
Method	RTK

PHOTOS:



Point ID	VVA 8
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Carson City

Aerial Target	
LiDAR Ground Control	
X LiDAR QC Point	
New Control	
Photo ID	
Published Control	

Coordinate System	NAD83(2011)
	Michigan South Zone
	NAVD88
	GEOID12A
	International Feet

Northing	Easting	Elevation
616496.81	13008392.64	760.83

Operator	Lance Koko
Receiver Model	Leica GS14
Receiver S/N	2810685
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/13/2015
RMSE Hz	0.05
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	VVA 9
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Perrinton

Aerial Target	
LiDAR Ground Control	
X LiDAR QC Point	
New Control	
Photo ID	
Published Control	

Coordinate System	NAD83(2011)
	Michigan South Zone
	NAVD88
	GEOID12A
	International Feet

Northing	Easting	Elevation
631928.40	13050447.00	759.45

Operator	Lance Koko
Receiver Model	Leica GS14
Receiver S/N	2810685
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/13/2015
RMSE Hz	0.03
RMSE Z	0.01
Method	RTK

PHOTOS:



Point ID	VVA 10
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Pompeii

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
Michigan South Zone
NAVD88
GEOID12A
International Feet

Northing	Easting	Elevation
602867.44	13068282.17	670.87

Operator	Lance Koko
Receiver Model	Leica GS14
Receiver S/N	2810685
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/13/2015
RMSE Hz	0.04
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	VVA 11
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Pompeii

Aerial Target	
LiDAR Ground Control	
X LiDAR QC Point	
New Control	
Photo ID	
Published Control	

Coordinate System	NAD83(2011)
	Michigan South Zone
	NAVD88
	GEOID12A
	International Feet

Northing	Easting	Elevation
631832.34	13086764.07	688.31

Operator	Lance Koko
Receiver Model	Leica GS14
Receiver S/N	2810685
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/13/2015
RMSE Hz	0.03
RMSE Z	0.01
Method	RTK

PHOTOS:



Point ID	VVA 12
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Sumner

Aerial Target	
LiDAR Ground Control	
X LiDAR QC Point	
New Control	
Photo ID	
Published Control	

Coordinate System	NAD83(2011)
	Michigan South Zone
	NAVD88
	GEOID12A
	International Feet

Northing	Easting	Elevation
645465.88	13013958.39	773.47

Operator	Lance Koko
Receiver Model	Leica GS14
Receiver S/N	2810685
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/13/2015
RMSE Hz	0.04
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	VVA 13
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Alma South

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	NAD83(2011)
	Michigan South Zone
	NAVD88
	GEOID12A
	International Feet

Northing	Easting	Elevation
658504.34	13038160.38	757.80

Operator	Lance Koko
Receiver Model	Leica GS14
Receiver S/N	2810685
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/13/2015
RMSE Hz	0.03
RMSE Z	0.01
Method	RTK

PHOTOS:



Point ID	VVA 14
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Rathbone

Aerial Target	
LiDAR Ground Control	
X LiDAR QC Point	
New Control	
Photo ID	
Published Control	

Coordinate System	NAD83(2011)
	Michigan South Zone
	NAVD88
	GEOID12A
	International Feet

Northing	Easting	Elevation
663718.23	13111929.42	690.25

Operator	Lance Koko
Receiver Model	Leica GS14
Receiver S/N	2810685
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/13/2015
RMSE Hz	0.04
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	VVA 15
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Rathbone

Aerial Target	
LiDAR Ground Control	
X LiDAR QC Point	
New Control	
Photo ID	
Published Control	

Coordinate System	NAD83(2011)
Michigan South Zone	
NAVD88	
GEOID12A	
International Feet	

Northing	Easting	Elevation
668925.39	13090920.31	718.19

Operator	Lance Koko
Receiver Model	Leica GS14
Receiver S/N	2810685
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/13/2015
RMSE Hz	0.03
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	VVA 16
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Ithaca

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System
NAD83(2011)
Michigan South Zone
NAVD88
GEOID12A
International Feet

Northing	Easting	Elevation
679545.21	13075091.31	735.79

Operator	Lance Koko
Receiver Model	Leica GS14
Receiver S/N	2810685
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/13/2015
RMSE Hz	0.03
RMSE Z	0.01
Method	RTK

PHOTOS:



Point ID	VVA 17
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Breckenridge

Aerial Target	
LiDAR Ground Control	
X LiDAR QC Point	
New Control	
Photo ID	
Published Control	

Coordinate System	NAD83(2011)
	Michigan South Zone
	NAVD88
	GEOID12A
	International Feet

Northing	Easting	Elevation
690126.26	13112002.36	699.48

Operator	Lance Koko
Receiver Model	Leica GS14
Receiver S/N	2810685
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/13/2015
RMSE Hz	0.05
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	VVA 18
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Breckenridge

Aerial Target	
LiDAR Ground Control	
X LiDAR QC Point	
New Control	
Photo ID	
Published Control	

Coordinate System	NAD83(2011)
	Michigan South Zone
	NAVD88
	GEOID12A
	International Feet

Northing	Easting	Elevation
711110.28	13103975.29	708.07

Operator	Lance Koko
Receiver Model	Leica GS14
Receiver S/N	2810685
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/13/2015
RMSE Hz	0.05
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	VVA 19
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Alma North

Aerial Target	
LiDAR Ground Control	
X LiDAR QC Point	
New Control	
Photo ID	
Published Control	

Coordinate System	NAD83(2011)
	Michigan South Zone
	NAVD88
	GEOID12A
	International Feet

Northing	Easting	Elevation
711388.94	13035637.73	774.89

Operator	Lance Koko
Receiver Model	Leica GS14
Receiver S/N	2810685
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/13/2015
RMSE Hz	0.05
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	VVA 20
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Alma North

Aerial Target	
LiDAR Ground Control	
X LiDAR QC Point	
New Control	
Photo ID	
Published Control	

Coordinate System	NAD83(2011)
	Michigan South Zone
	NAVD88
	GEOID12A
	International Feet

Northing	Easting	Elevation
711504.11	13018662.79	809.84

Operator	Lance Koko
Receiver Model	Leica GS14
Receiver S/N	2810685
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/13/2015
RMSE Hz	0.05
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	VVA 21
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Riverdale

Aerial Target	
LiDAR Ground Control	
X LiDAR QC Point	
New Control	
Photo ID	
Published Control	

Coordinate System	NAD83(2011)
	Michigan South Zone
	NAVD88
	GEOID12A
	International Feet

Northing	Easting	Elevation
685101.80	13011758.43	795.84

Operator	Lance Koko
Receiver Model	Leica GS14
Receiver S/N	2810685
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/13/2015
RMSE Hz	0.05
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	VVA 22
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Ithaca

Aerial Target	
LiDAR Ground Control	
X LiDAR QC Point	
New Control	
Photo ID	
Published Control	

Coordinate System	NAD83(2011)
Michigan South Zone	NAVD88
GEOID12A	
International Feet	

Northing	Easting	Elevation
653001.38	13080320.76	724.88

Operator	Lance Koko
Receiver Model	Leica GS14
Receiver S/N	2810685
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/13/2015
RMSE Hz	0.02
RMSE Z	0.01
Method	RTK

PHOTOS:



Point ID	VVA 23
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Ashley

Aerial Target	
LiDAR Ground Control	
X LiDAR QC Point	
New Control	
Photo ID	
Published Control	

Coordinate System	NAD83(2011)
	Michigan South Zone
	NAVD88
	GEOID12A
	International Feet

Northing	Easting	Elevation
600127.49	13101863.32	657.74

Operator	Lance Koko
Receiver Model	Leica GS14
Receiver S/N	2810685
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/13/2015
RMSE Hz	0.05
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	VVA 24
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Perrinton

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	NAD83(2011)
	Michigan South Zone
	NAVD88
	GEOID12A
	International Feet

Northing	Easting	Elevation
605832.43	13024100.93	744.64

Operator	Lance Koko
Receiver Model	Leica GS14
Receiver S/N	2810685
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/13/2015
RMSE Hz	0.05
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	VVA 25
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Breckenridge

Aerial Target	
LiDAR Ground Control	
X LiDAR QC Point	
New Control	
Photo ID	
Published Control	

Coordinate System	NAD83(2011)
	Michigan South Zone
	NAVD88
	GEOID12A
	International Feet

Northing	Easting	Elevation
705928.88	13083099.19	713.20

Operator	Lance Koko
Receiver Model	Leica GS14
Receiver S/N	2810685
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/13/2015
RMSE Hz	0.05
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	VVA 26
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Alma South

Aerial Target	
LiDAR Ground Control	
X LiDAR QC Point	
New Control	
Photo ID	
Published Control	

Coordinate System	NAD83(2011)
	Michigan South Zone
	NAVD88
	GEOID12A
	International Feet

Northing	Easting	Elevation
674424.15	13027643.06	761.09

Operator	Lance Koko
Receiver Model	Leica GS14
Receiver S/N	2810685
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/13/2015
RMSE Hz	0.04
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	VVA 27
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Pompeii

Aerial Target	
LiDAR Ground Control	
X LiDAR QC Point	
New Control	
Photo ID	
Published Control	

Coordinate System	NAD83(2011)
	Michigan South Zone
	NAVD88
	GEOID12A
	International Feet

Northing	Easting	Elevation
616050.19	13078925.76	688.85

Operator	Lance Koko
Receiver Model	Leica GS14
Receiver S/N	2810685
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/13/2015
RMSE Hz	0.03
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	VVA 28
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Rathbone

Aerial Target	
LiDAR Ground Control	
X LiDAR QC Point	
New Control	
Photo ID	
Published Control	

Coordinate System	NAD83(2011)
	Michigan South Zone
	NAVD88
	GEOID12A
	International Feet

Northing	Easting	Elevation
642557.75	13096104.61	700.15

Operator	Lance Koko
Receiver Model	Leica GS14
Receiver S/N	2810685
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/13/2015
RMSE Hz	0.03
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	VVA 29
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Sumner

Aerial Target	
LiDAR Ground Control	
X LiDAR QC Point	
New Control	
Photo ID	
Published Control	

Coordinate System	NAD83(2011)
Michigan South Zone	NAVD88
GEOID12A	
International Feet	

Northing	Easting	Elevation
664001.43	13016997.27	756.81

Operator	Lance Koko
Receiver Model	Leica GS14
Receiver S/N	2810685
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/13/2015
RMSE Hz	0.04
RMSE Z	0.02
Method	RTK

PHOTOS:



Point ID	VVA 30
Project No.	26242
Project Name	Gratiot County MI QL2 LiDAR
State	Michigan
County	Gratiot
Quad	Perrinton

	Aerial Target
	LiDAR Ground Control
X	LiDAR QC Point
	New Control
	Photo ID
	Published Control

Coordinate System	NAD83(2011)
	Michigan South Zone
	NAVD88
	GEOID12A
	International Feet

Northing	Easting	Elevation
626844.04	13024394.14	750.44

Operator	Lance Koko
Receiver Model	Leica GS14
Receiver S/N	2810685
Antenna Height	2.000 Meters

Date (MM-DD-YYYY)	05/13/2015
RMSE Hz	0.04
RMSE Z	0.02
Method	RTK

PHOTOS:

