

Ground Control Report

WISCONSIN WROC – 3DEP | PRICE COUNTY LIDAR 2018

1.1 GROUND CONTROL DESIGN AND METHODOLOGY

The ground control network and design used for the Price County lidar acquisition was made up of calibration points, GPS base stations, NGS base stations, and independent check points from the vertical accuracy ground control survey. This report will focus on the lidar calibration points that were collected at 14 locations in and around the Price County project area. The control points are used for QC checks and calibration of the raw point cloud and for additional vertical checks against the processed bare earth surface.

The ground control calibration survey was done in Wisconsin County Coordinate System-Price County, NAD83 (2011), US survey feet; NAVD88 (Geoid 12B), US survey feet. The field work was conducted by Ayres Associates surveyors. All field work was completed between July 11, 2018, and August 6, 2018.

CONTROL SUMMARY AND METHODOLOGY

Control Summary

Horizontal Datum:	NAD83 (2011)
Vertical Datum:	NAVD88 (2012), Wisconsin GEOID12B
Rectangular Coordinate System:	WISCRS – Price Zone
Used NGS Control?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
List any NGS control points used:	DN5273, DN7160, QN0597, AF9932
Summary of control checks and calibration (if applicable):	(See Field Notes for control checks on NGS monuments – No calibration was needed)
Survey Methods Used:	RTK-GPS using WISCORS Network through VRS connection were used for direct observations and to set control pairs for Robotic Total Station shots under canopy, etc
Equipment Used:	GPS Trimble R8-3 GNSS S/N 5239496998– (Ayres #72.22) Total station Trimble S 6 S/N 93410071 – (Ayres #74.11) Data Collector Trimble TSC 3 S/N RS17C22036 (Ayres #75.38)

Crew Chief Notes

Set PK, nails or spikes at control points used for total station measurements and for calibration points.

Recorded appropriate: NVA (Bare Earth & Urban) and VVA (Forested, Swamp/Wetland, Tall Weed/Crop). Took (4) pictures of each point – one from each cardinal direction.

Survey Methods (continued)

All work was performed in and referenced to NAD83 (2011), NAVD 88(2012), Geoid 12B, Wisconsin State Plane Coordinate System – Wisconsin Northern Zone in US Survey Feet. This data was then transformed to WISCRS County Coordinate System, Price Zone.

Established horizontal and vertical coordinate values on the points by a minimum of two – 90 epoch observations with separate initializations using RTK GPS and the WISCORS network. The resultant coordinates and elevations provided in the deliverables are an average of the two observations.

Check shots were taken on numerous NGS control points (see field notes) to verify that the values obtained are consistent with the datum/adjustment as described herein and meet the ± 3 centimeter vertical accuracy requirement at the 95% confidence level.

Points not able to be directly occupied by GPS means were measured using Total Station methods from control point pairs set utilizing GPS methods outlined above.

1.1.2 CONTROL LAYOUT

The locations were selected around the outer geometry of the project boundary and on major roads within the project area. This layout design is preferred when the calibration points will be used to check different areas across a large flight block. The control survey was conducted with a Trimble R-8 GPS receiver and a VRS connection with a TSC3 data collector.

1.1.3.1 STATISTICAL REPORT FOR CALIBRATION POINTS

NUMBER	EASTING	NORTHING	KNOWN Z	LASER Z	Dz
101	704861.866	492293.222	1484.972	1484.791	-0.181
103	838956.997	312210.811	1690.381	1690.551	+0.170
104	715061.641	309058.149	1305.228	1304.950	-0.278
105	773027.392	410632.910	1503.190	1503.237	+0.047
106	798744.577	361731.237	1536.375	1536.344	-0.031
107	738151.966	357566.489	1500.987	1501.025	+0.038
108	765131.274	482055.926	1454.830	1454.969	+0.139
111	727697.519	413925.433	1430.895	1430.662	-0.233
112	797324.724	323874.534	1576.186	1576.434	+0.248
114	699820.031	430381.580	1427.321	1427.144	-0.177
102V	842608.509	513266.352	1611.147	1611.041	-0.106
109V	823237.938	462105.012	1554.760	1554.693	-0.067
110V	840891.190	407391.482	1716.197	1716.165	-0.032
113A	862164.320	364234.924	1569.404	1569.470	+0.066
Average Dz		-0.028			
Minimum Dz		-0.278			
Maximum Dz		+0.248			
Root Mean Square		0.154			
Std Deviation		0.157			

1.1.4 FIELD NOTES

CALIBRATION POINTS				
<u>POINT #</u>	<u>CODE</u>	<u>TH</u>	<u>PIC</u>	<u>LOCATION</u>
101	CP	5.0'	✓	END OF FOG LINE @ SW QUAD OF CTH E & Rock Creek Rd

102 ✓	CP	2M	✓	SET PK NAIL @ C & E CY'S DR. & SPRINGSTEAD RD
103	CP	5.0'	✓	END OF FOG LINE SB HWY 102 @ SW QUAD "44" & 102
104	CP	2.0M	✓	SOUTH OF LITTLE RAPIDS RD / CTH N ~ 500' E @ 4 TH DASH MARK SOUTH OF BRIDGE
105	CP	2.0M	✓	TOP OF MH LID @ SPR 13 & ARBYLE RD W. SIDE OF ROAD

1.1.4 FIELD NOTES (CONTINUED)

CALIBRATION POINTS				
<u>POINT #</u>	<u>CODE</u>	<u>TH</u>	<u>PK</u>	<u>LOCATION</u>
106	CP	2.0M	✓	ON MH LID @ TOWN ST & PARK ST
107	CP	2.0M	✓	ON CONCRETE WEST OF GAS MH COVER @ N 2ND ROW OF COVERS
108	CP	2.0M	✓	BACK SIDEWALK CORNER @ SW QUAD 5TH 13 & PINE ST.
109 ✓	CP	2.0M	✓	E E RILEY LAKE RD & FR GATES LAKE RD

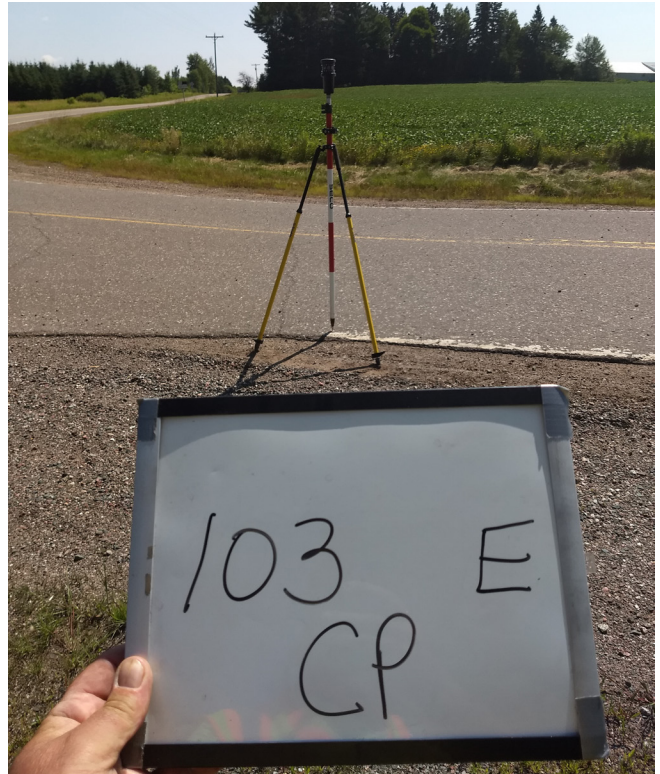
1.1.4 FIELD NOTES (CONTINUED)

48 POINT#	CODE	TH	PIC	LOCATION
110 ✓	CP	5.0'	✓	EE CHEQUAMAGON RR NEWLIN RD
111	CP	2.0M	✓	SW CORNER OF CONC. PCE # W9954
112	CP	2.0M	✓	SE CORNER OF MET N. SIDE STH 86 ACROSS FROM HOUSE # W5053
113 A	CP	2.0M	✓	NE QUAD @ STH 86 TOWN LINE RD ON END OF WB. FOG LINE
114	CP	5.0'	✓	DOUBLE YELLOW @ CTH W 1/2 PRICE LAKE RD ~ 42' W OF E PRICE LAKE RD.

1.15 FIELD PHOTOS



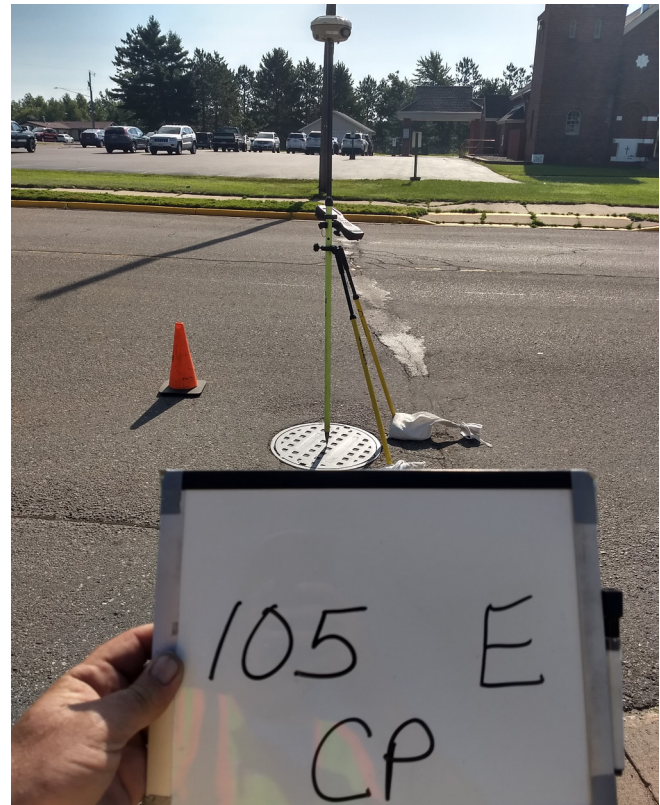
Point 101



Point 103



Point 104



Point 105

FIELD PHOTOS (CONTINUED)



Point 106



Point 107



Point 108

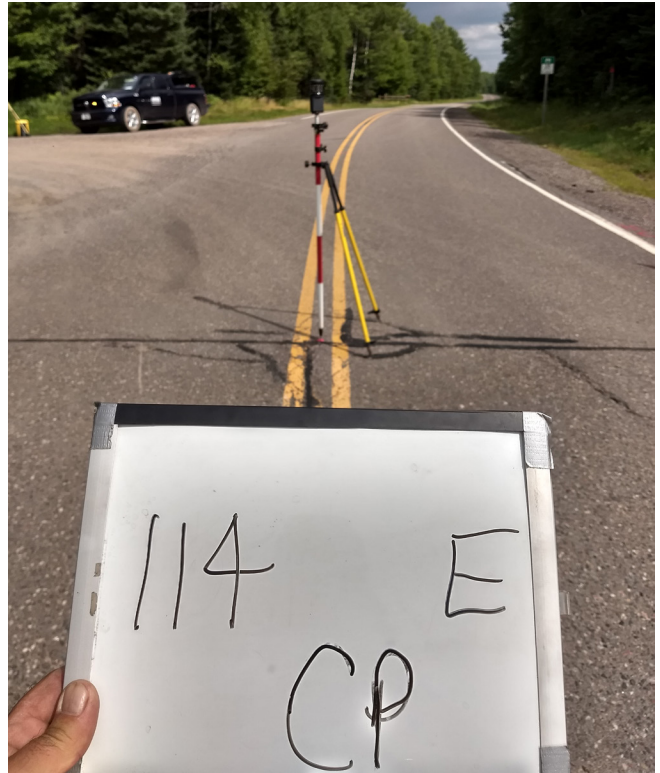


Point 111

FIELD PHOTOS (CONTINUED)



Point 112



Point 114



Point 102V



Point 109V

FIELD PHOTOS (CONTINUED)



Point 110V



Point 113A