



Vertical Accuracy Report

Wisconsin WROC - 3DEP 2020

Chippewa County Lidar

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Vertical Accuracy Report

Project Information

Prepared By: Ayres

Project Name: Wisconsin WROC – 3DEP Chippewa County Lidar 2020

Sensor Info: Riegl LMS-Q1560 SN754 & 1264

Required Nominal Pulse Spacing: 0.7

Consultant Name: Ayres primary and Quantum Spatial (now NV5 Geospatial) as lidar acquisition partner

Units: U.S. Survey Feet

Date of Acquisition: Start: 4/30/2020 | Finish: 5/7/2020

Report Information

This report documents the absolute vertical accuracy of the lidar data collected for the Chippewa County, WI, QL2 lidar project. Independent vertical checkpoints were collected by land surveyors using Trimble GNSS equipment connected to WISCRS base stations. The checkpoints were collected from February 25 to March 31, 2020.

The checkpoints were collected under various land cover types that are predominant in the County. Each land cover type falls into either the Non-vegetated Vertical Accuracy (NVA) or the Vegetated Vertical Accuracy (VVA) group. For this project, 62 NVA points and 51 VVA points were collected throughout the County.

The following report shows the final statistics for the NVA checkpoints compared against the raw swath point cloud and the bare earth DEM, and the VVA statistics compared against the DEM. Statistics are reported for LAS and DEM by NVA and VVA categories.

Vertical Accuracy Specifications per USGS QL2 level:

LAS:

NVA equates to 10 cm RMSEz, or 19.6 cm (0.64 ft) at the 95% confidence level.

DEM:

NVA equates to 10 cm RMSEz, or 19.6 cm (0.64 ft) at the 95% confidence level.

VVA equates to 29.4 cm (0.96 ft) at the 95th percentile.

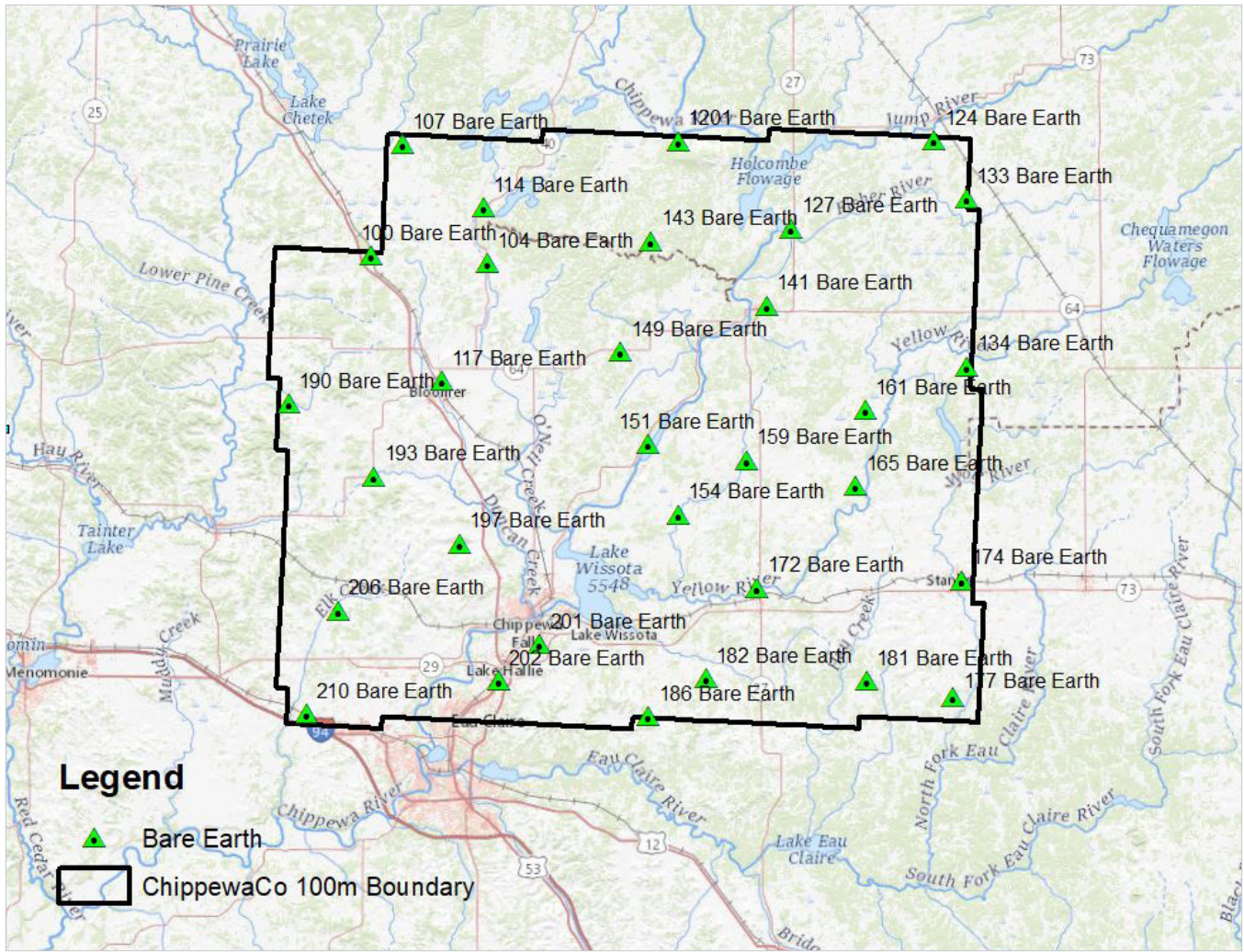
The NVA and VVA statistics for this project are within the above stated specifications.

Lidar Accuracy Assessment Summary

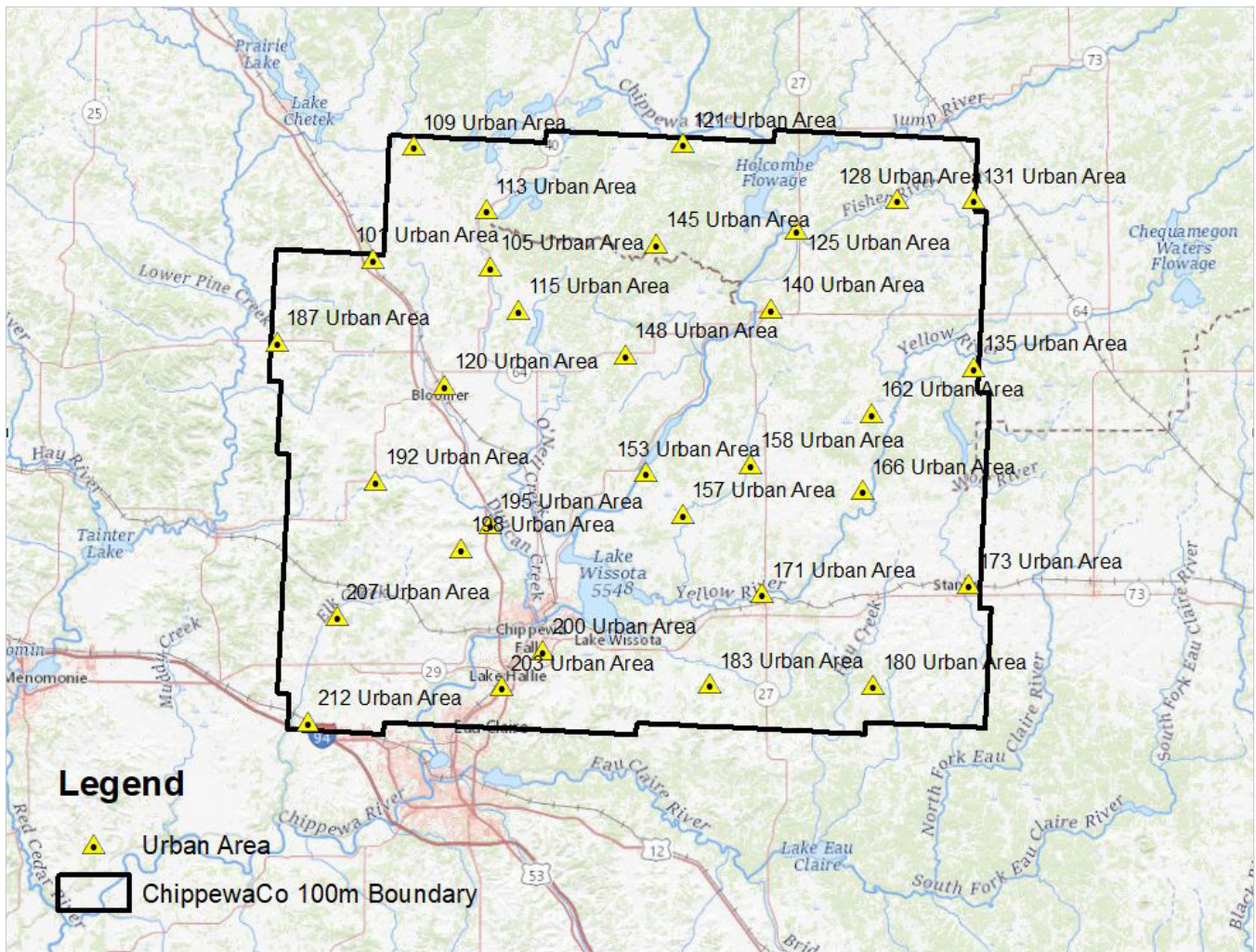
LAND COVER TYPE	# OF POINTS	NVA	VVA
LAS		95% confidence	
Bare Earth	31	0.387	N/A
Urban Area	31	0.180	N/A
Forest	25	N/A	N/A
Tall Weeds	26	N/A	N/A
Total	113	0.302	N/A
DEM		95% confidence	95th percentile
Bare Earth	31	0.376	N/A
Urban Area	31	0.211	N/A
Forest	25	N/A	0.721
Tall Weeds	26	N/A	0.776
Total	113	0.305	0.776

Units: U.S. Survey Feet

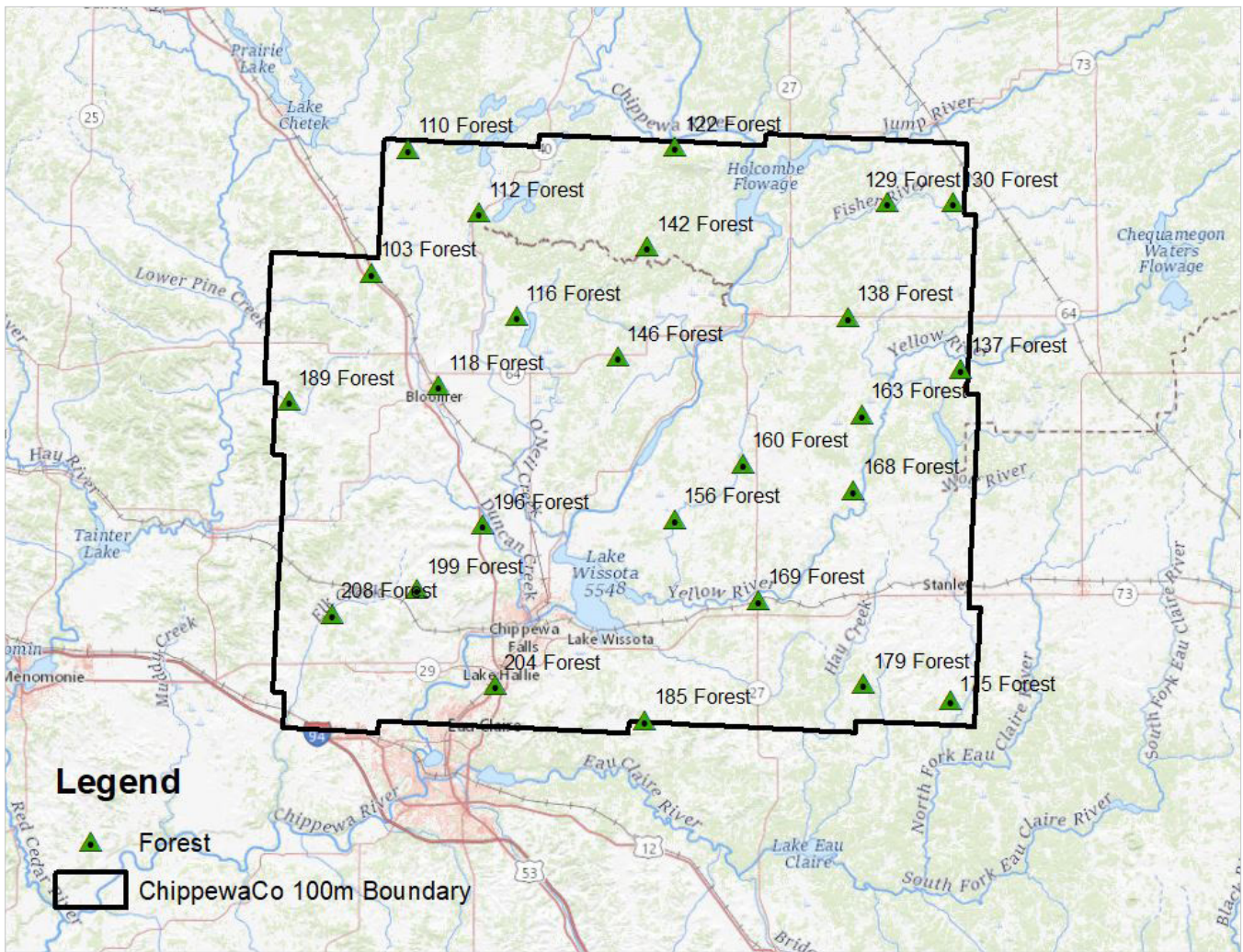
Map of NVA Checkpoint Locations - Bare Earth



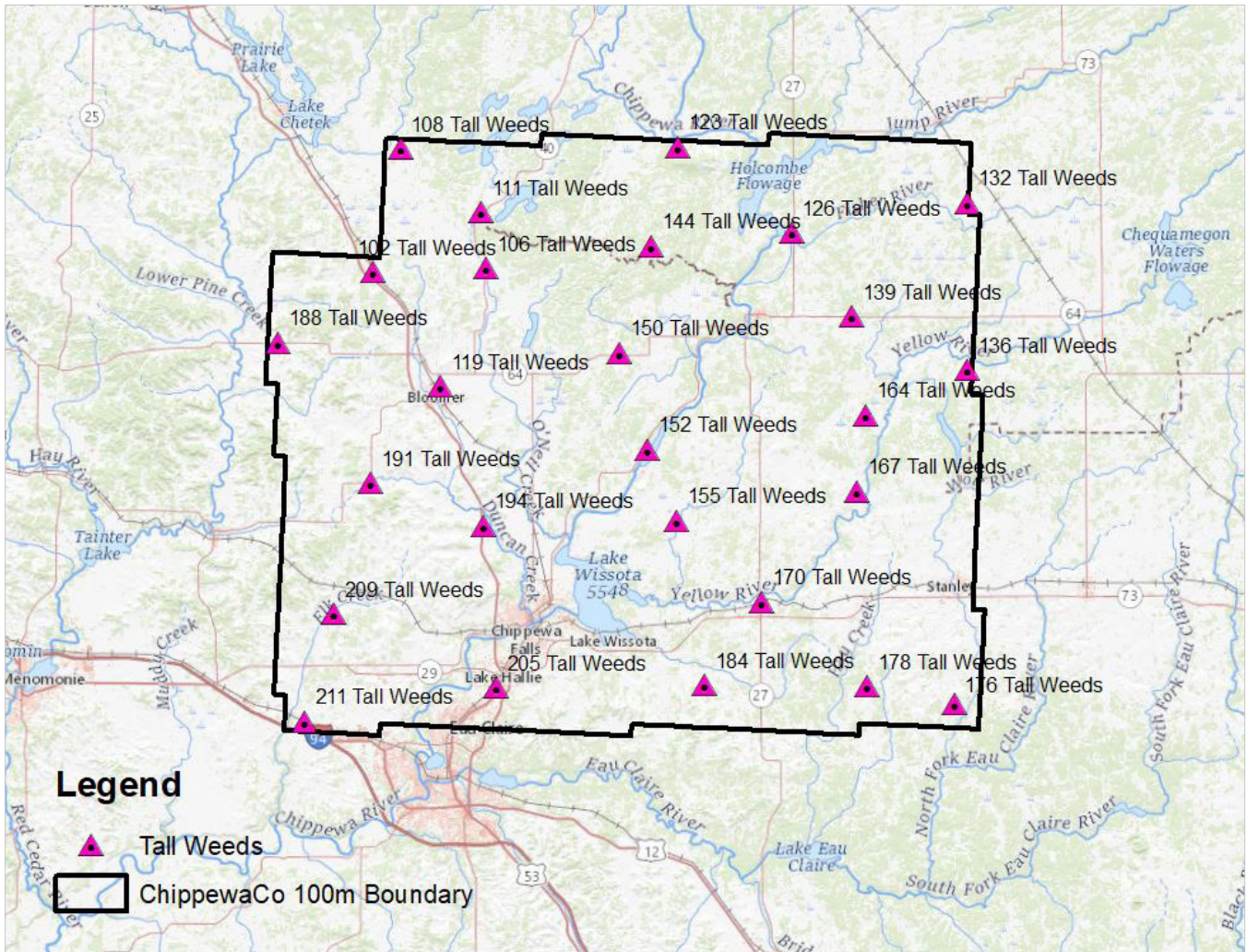
Map of NVA Checkpoint Locations - Urban Areas



Map of NVA Checkpoint Locations - Forested Areas



Map of NVA Checkpoint Locations - Tall Weeds



LAS

NONVEGETATED VERTICAL ACCURACY – OVERALL	
LAND COVER TYPE	BARE EARTH, URBAN AREA
Minimum DZ	-0.165
Maximum DZ	0.54
Mean DZ	0.108
Mean Magnitude DZ	0.349
Number Observations	62
Standard Deviation DZ	0.111
RMSE Z	0.154
95% Confidence Level Z	0.302
Units	U.S. Survey Feet

DEM

NONVEGETATED VERTICAL ACCURACY	
LAND COVER TYPE	BARE EARTH, URBAN AREA
Minimum DZ	-0.075
Maximum DZ	0.451
Mean DZ	0.122
Mean Magnitude DZ	0.358
Number Observations	62
Standard Deviation DZ	0.098
RMSE Z	0.156
95% Confidence Level Z	0.305
Units	U.S. Survey Feet

DEM (Continued)

VEGETATED VERTICAL ACCURACY	
LAND COVER TYPE	FOREST
Minimum DZ	0.145
Maximum DZ	0.939
Mean DZ	0.399
Mean Magnitude DZ	0.632
Number Observations	25
Standard Deviation DZ	0.185
RMSE Z	0.438
95th percentile	0.721
Units	U.S. Survey Feet

VEGETATED VERTICAL ACCURACY	
LAND COVER TYPE	TALL WEEDS
Minimum DZ	0.089
Maximum DZ	0.844
Mean DZ	0.375
Mean Magnitude DZ	0.612
Number Observations	26
Standard Deviation DZ	0.18
RMSE Z	0.415
95th percentile	0.776
Units	U.S. Survey Feet

Point: 100 Bare Earth

Survey X: 127759.76, Survey Y: 227597.75, Z1: 1107.71, Z DEM: 1107.97, Z LAS: 1107.98, ΔZ DEM: 0.26, ΔZ LAS: 0.28



North



South



East



West

Point: 101 Urban Area

Survey X: 127627.47, Survey Y: 227542.16, Z1: 1109.01, Z DEM: 1109.1, Z LAS: 1109.09, ΔZ DEM: 0.1, ΔZ LAS: 0.08



North



South



East



West

Point: 102 Tall Weeds

Survey X: 128707.32, Survey Y: 224439.89, Z1: 1096.28, Z DEM: 1096.6, Z LAS: 1096.75, ΔZ DEM: 0.32, ΔZ LAS: 0.47



North



South



East



West

Point: 103 Forested Area

Survey X: 128535.13, Survey Y: 224390, Z1: 1093.2, Z DEM: 1093.49, Z LAS: 1093.48, ΔZ DEM: 0.29, ΔZ LAS: 0.28



North



South



East



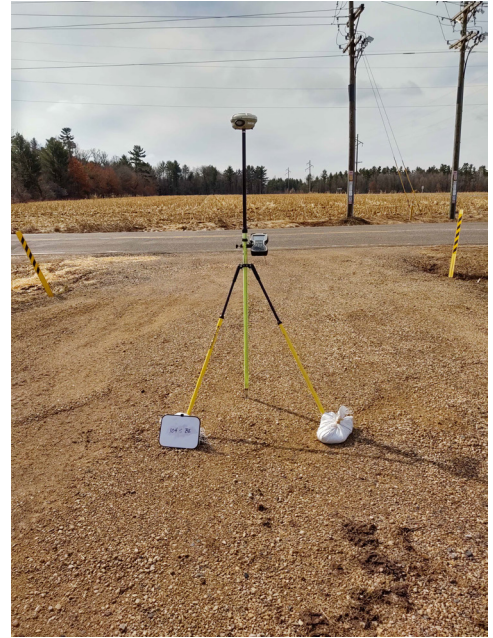
West

Point: 104 Bare Earth

Survey X: 159751.92, Survey Y: 225500.72, Z1: 1063.36, Z DEM: 1063.45, Z LAS: 1063.42, ΔZ DEM: 0.09, ΔZ LAS: 0.06



North



South



East



West

Point: 105 Urban Area

Survey X: 159724.83, Survey Y: 225465.88, Z1: 1064.3, Z DEM: 1064.31, Z LAS: 1064.28, ΔZ DEM: 0.01, ΔZ LAS: -0.02



North



South



East



West

Point: 106 Tall Weeds

Survey X: 159829.06, Survey Y: 225504.44, Z1: 1062.35, Z DEM: 1062.77, Z LAS: 1062.82, ΔZ DEM: 0.42, ΔZ LAS: 0.47



North



South



East



West

Point: 107 Bare Earth

Survey X: 136218.19, Survey Y: 258430.38, Z1: 1065.29, Z DEM: 1065.31, Z LAS: 1065.32, ΔZ DEM: 0.03, ΔZ LAS: 0.03



North



South



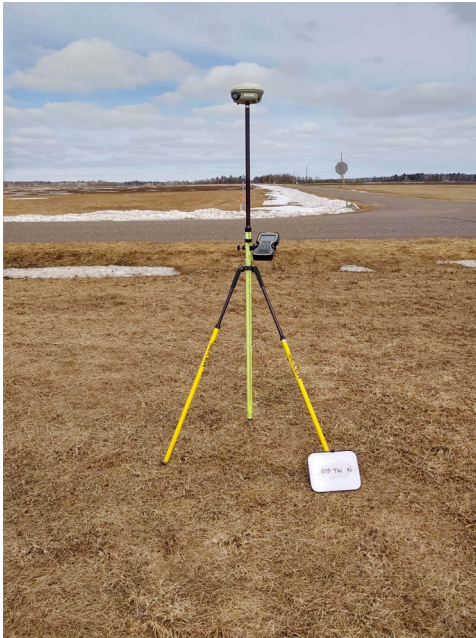
East



West

Point: 108 Tall Weeds

Survey X: 136168.86, Survey Y: 258429.64, Z1: 1064.97, Z DEM: 1065.06, Z LAS: 1065.11, ΔZ DEM: 0.09, ΔZ LAS: 0.14



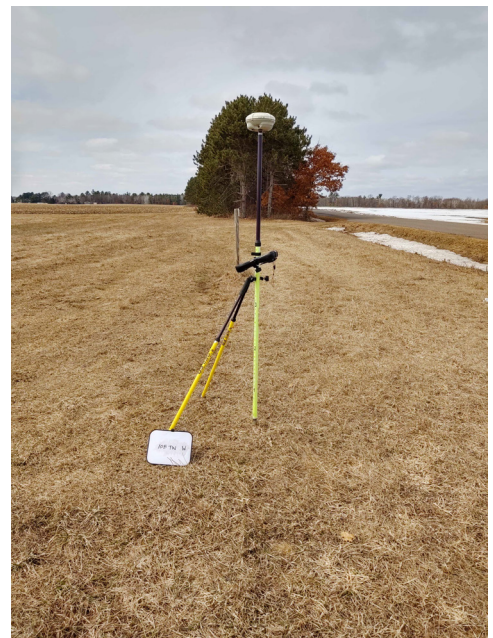
North



South



East



West

Point: 109 Urban Area

Survey X: 138731.13, Survey Y: 258408.35, Z1: 1072.34, Z DEM: 1072.37, Z LAS: 1072.32, ΔZ DEM: 0.03, ΔZ LAS: -0.01



North



South



East



West

Point: 110 Forested Area

Survey X: 138728.56, Survey Y: 258485.29, Z1: 1071.02, Z DEM: 1071.35, Z LAS: 1071.3, ΔZ DEM: 0.33, ΔZ LAS: 0.28



North



South



East



West

Point: 111 Tall Weeds

Survey X: 158447.41, Survey Y: 240856.44, Z1: 1080.57, Z DEM: 1080.74, Z LAS: 1080.75, ΔZ DEM: 0.17, ΔZ LAS: 0.18



North



South



East



West

Point: 112 Forested Area

Survey X: 158422.13, Survey Y: 240939.06, Z1: 1080.12, Z DEM: 1080.48, Z LAS: 1080.45, ΔZ DEM: 0.36, ΔZ LAS: 0.33



North



South



East



West

Point: 113 Urban Area

Survey X: 158515.11, Survey Y: 240943.58, Z1: 1081.2, Z DEM: 1081.23, Z LAS: 1081.18, ΔZ DEM: 0.03, ΔZ LAS: -0.02



North



South



East



West

Point: 114 Bare Earth

Survey X: 158694.51, Survey Y: 240965.98, Z1: 1081.64, Z DEM: 1081.61, Z LAS: 1081.62, ΔZ DEM: -0.02, ΔZ LAS: -0.02



North



South



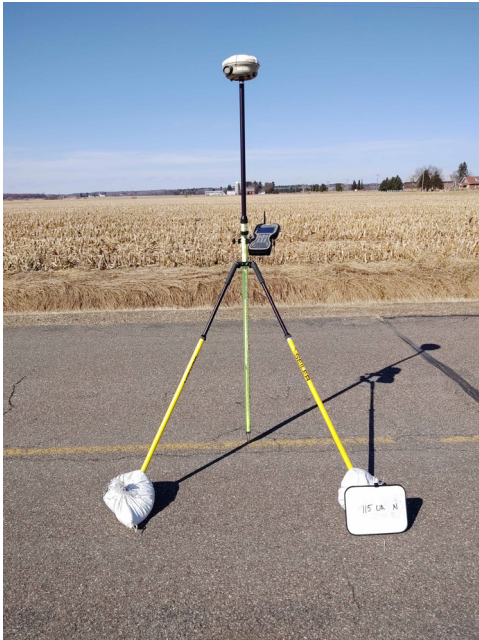
East



West

Point: 115 Urban Area

Survey X: 167350.88, Survey Y: 213599.79, Z1: 1048.9, Z DEM: 1048.93, Z LAS: 1048.89, ΔZ DEM: 0.03, ΔZ LAS: -0.01



North



South



East



West

Point: 116 Forested Area

Survey X: 168615.88, Survey Y: 212244.6, Z1: 1042.88, Z DEM: 1043.03, Z LAS: 1043.07, ΔZ DEM: 0.15, ΔZ LAS: 0.19



North



South



East



West

Point: 117 Bare Earth

Survey X: 147291.41, Survey Y: 193074.42, Z1: 1003.7, Z DEM: 1003.77, Z LAS: 1003.77, ΔZ DEM: 0.07, ΔZ LAS: 0.07



North



South



East



West

Point: 118 Forested Area

Survey X: 147222.35, Survey Y: 193110.24, Z1: 1004.03, Z DEM: 1004.29, Z LAS: 1004.27, ΔZ DEM: 0.26, ΔZ LAS: 0.24



North



South



East



West

Point: 119 Tall Weeds

Survey X: 147088.91, Survey Y: 193081.43, Z1: 1001.92, Z DEM: 1002.19, Z LAS: 1002.16, ΔZ DEM: 0.28, ΔZ LAS: 0.25



North



South



East



West

Point: 120 Urban Area

Survey X: 147181.82, Survey Y: 192945.35, Z1: 1003.74, Z DEM: 1003.73, Z LAS: 1003.83, ΔZ DEM: -0.01, ΔZ LAS: 0.08



North



South



East



West

Point: 121 Urban Area

Survey X: 212458.43, Survey Y: 259066.22, Z1: 1144.42, Z DEM: 1144.55, Z LAS: 1144.48, ΔZ DEM: 0.12, ΔZ LAS: 0.06



North



South



East



West

Point: 122 Forested Area

Survey X: 212420.32, Survey Y: 258983, Z1: 1147.22, Z DEM: 1147.73, Z LAS: 1147.83, ΔZ DEM: 0.51, ΔZ LAS: 0.61



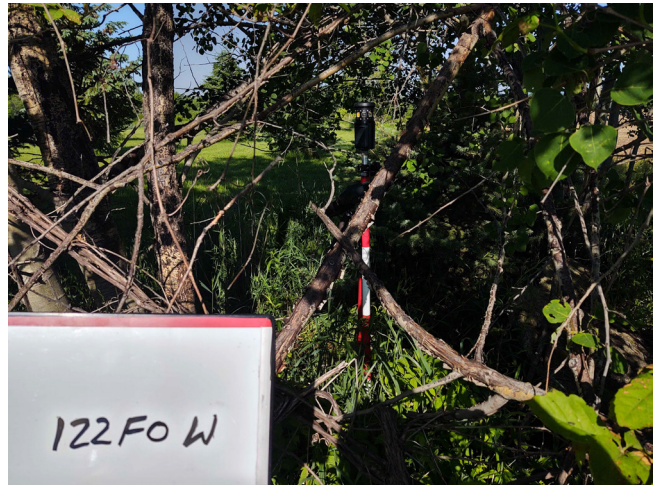
North



South



East



West

Point: 123 Tall Weeds

Survey X: 212419.68, Survey Y: 258849.33, Z1: 1151.25, Z DEM: 1151.4, Z LAS: 1151.6, ΔZ DEM: 0.15, ΔZ LAS: 0.35



North



South



East



West

Point: 124 Bare Earth

Survey X: 282996.41, Survey Y: 259352.64, Z1: 1138.49, Z DEM: 1138.68, Z LAS: 1138.6, ΔZ DEM: 0.18, ΔZ LAS: 0.11



North



South



East



West

Point: 125 Urban Area

Survey X: 243530, Survey Y: 235338.52, Z1: 1047.9, Z DEM: 1047.98, Z LAS: 1048.04, ΔZ DEM: 0.08, ΔZ LAS: 0.14



North



South



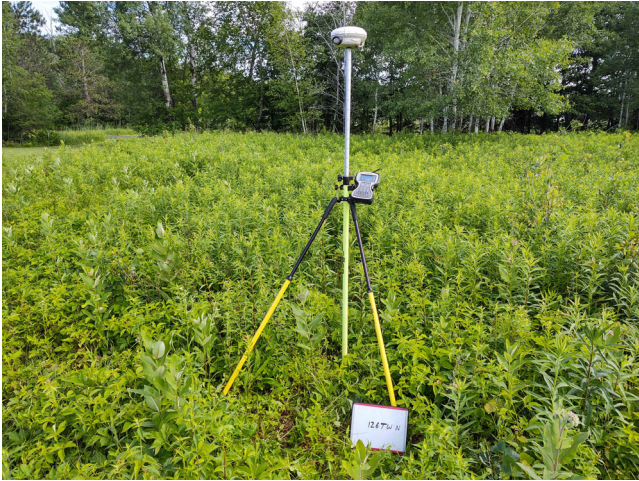
East



West

Point: 126 Tall Weeds

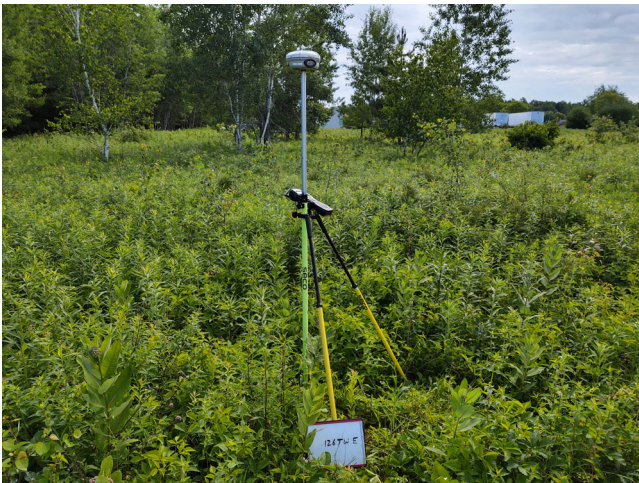
Survey X: 243643.47, Survey Y: 235324.1, Z1: 1047.69, Z DEM: 1048.05, Z LAS: 1048.11, ΔZ DEM: 0.36, ΔZ LAS: 0.42



North



South



East



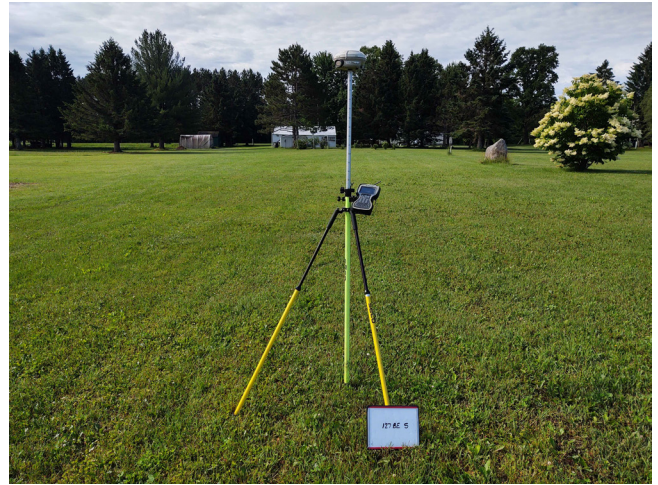
West

Point: 127 Bare Earth

Survey X: 243582.59, Survey Y: 235161.69, Z1: 1047.79, Z DEM: 1047.98, Z LAS: 1047.99, ΔZ DEM: 0.2, ΔZ LAS: 0.2



North



South



East



West

Point: 128 Urban Area

Survey X: 270863.85, Survey Y: 243657.69, Z1: 1111.29, Z DEM: 1111.28, Z LAS: 1111.29, ΔZ DEM: -0.01, ΔZ LAS: -0.01



North



South



East



West

Point: 129 Forested Area

Survey X: 270909.52, Survey Y: 243771.11, Z1: 1110.26, Z DEM: 1110.61, Z LAS: 1110.71, ΔZ DEM: 0.35, ΔZ LAS: 0.45



North



South



East



West

Point: 130 Forested Area

Survey X: 289022.87, Survey Y: 243673.52, Z1: 1133.18, Z DEM: 1133.38, Z LAS: 1133.32, ΔZ DEM: 0.2, ΔZ LAS: 0.14



North



South



East



West

Point: 131 Urban Area

Survey X: 291895.96, Survey Y: 243685.79, Z1: 1175.52, Z DEM: 1175.44, Z LAS: 1175.55, ΔZ DEM: -0.07, ΔZ LAS: 0.04



North



South



East



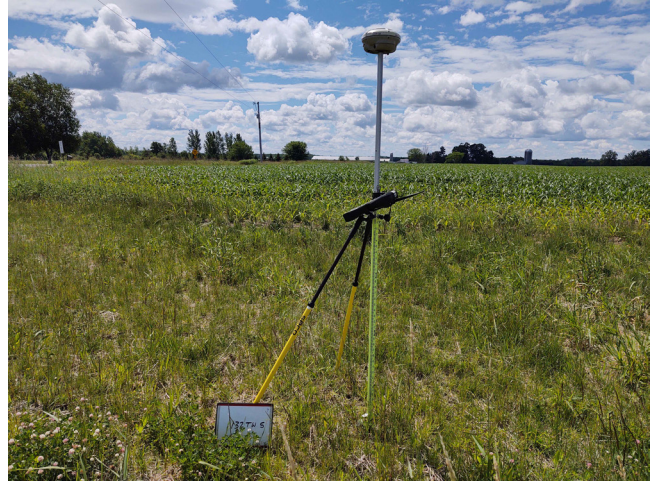
West

Point: 132 Tall Weeds

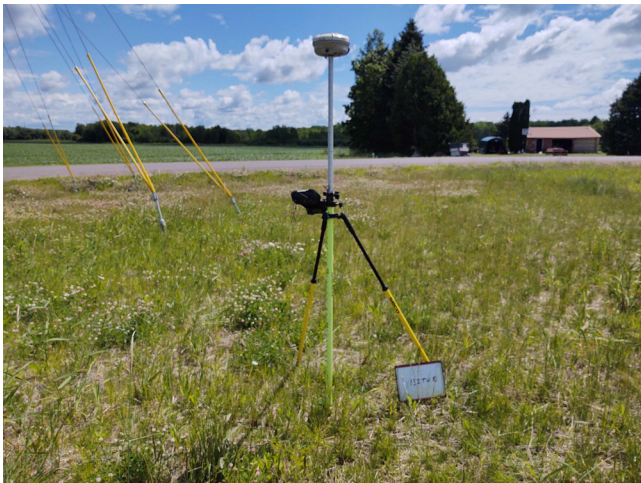
Survey X: 291870.85, Survey Y: 243604.12, Z1: 1175.3, Z DEM: 1175.64, Z LAS: 1175.71, ΔZ DEM: 0.34, ΔZ LAS: 0.4



North



South



East



West

Point: 133 Bare Earth

Survey X: 292028.84, Survey Y: 243406.64, Z1: 1175.87, Z DEM: 1176.13, Z LAS: 1176.12, ΔZ DEM: 0.25, ΔZ LAS: 0.25



North



South



East



West

Point: 134 Bare Earth

Survey X: 292136.41, Survey Y: 197111.91, Z1: 1142.4, Z DEM: 1142.6, Z LAS: 1142.56, ΔZ DEM: 0.2, ΔZ LAS: 0.16



North



South



East



West

Point: 135 Urban Area

Survey X: 292134.23, Survey Y: 197768.57, Z1: 1142.79, Z DEM: 1142.91, Z LAS: 1142.87, ΔZ DEM: 0.11, ΔZ LAS: 0.08



North



South



East



West

Point: 136 Tall Weeds

Survey X: 292066.59, Survey Y: 197711.04, Z1: 1139.23, Z DEM: 1140, Z LAS: 1140, ΔZ DEM: 0.78, ΔZ LAS: 0.77



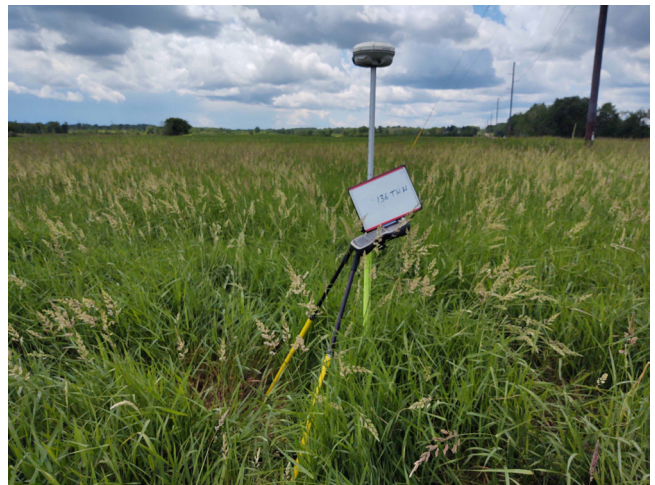
North



South



East



West

Point: 137 Forested Area

Survey X: 291383.97, Survey Y: 197824.71, Z1: 1134.36, Z DEM: 1135.08, Z LAS: 1134.78, ΔZ DEM: 0.72, ΔZ LAS: 0.42



North



South



East



West

Point: 138 Forested Area

Survey X: 260081.88, Survey Y: 212167.78, Z1: 1105, Z DEM: 1105.4, Z LAS: 1105.5, ΔZ DEM: 0.4, ΔZ LAS: 0.5



North



South



East



West

Point: 139 Tall Weeds

Survey X: 260239.85, Survey Y: 212330.9, Z1: 1110.74, Z DEM: 1111.05, Z LAS: 1111.1, ΔZ DEM: 0.32, ΔZ LAS: 0.36



North



South



East



West

Point: 140 Urban Area

Survey X: 236589.06, Survey Y: 213899.24, Z1: 1117.72, Z DEM: 1117.9, Z LAS: 1117.88, ΔZ DEM: 0.18, ΔZ LAS: 0.16



North



South



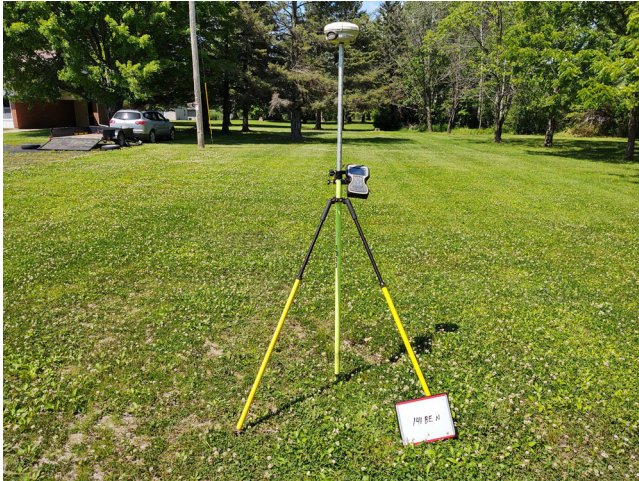
East



West

Point: 141 Bare Earth

Survey X: 236689.05, Survey Y: 213904.26, Z1: 1116.59, Z DEM: 1116.79, Z LAS: 1116.81, ΔZ DEM: 0.2, ΔZ LAS: 0.22



North



South



East



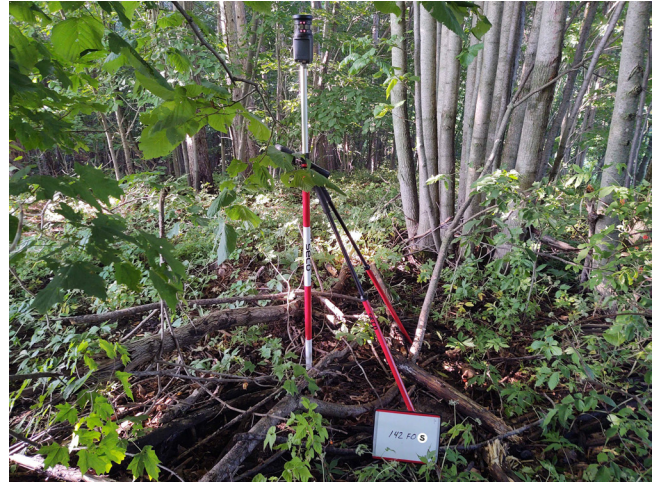
West

Point: 142 Forested Area

Survey X: 204801.37, Survey Y: 231559.45, Z1: 1358.04, Z DEM: 1358.73, Z LAS: 1358.66, ΔZ DEM: 0.69, ΔZ LAS: 0.62



North



South



East



West

Point: 143 Bare Earth

Survey X: 204874.18, Survey Y: 231581.53, Z1: 1362.25, Z DEM: 1362.58, Z LAS: 1362.56, ΔZ DEM: 0.33, ΔZ LAS: 0.31



North



South



East



West

Point: 144 Tall Weeds

Survey X: 205008.51, Survey Y: 231654.29, Z1: 1370.3, Z DEM: 1370.78, Z LAS: 1370.89, ΔZ DEM: 0.48, ΔZ LAS: 0.58



North



South



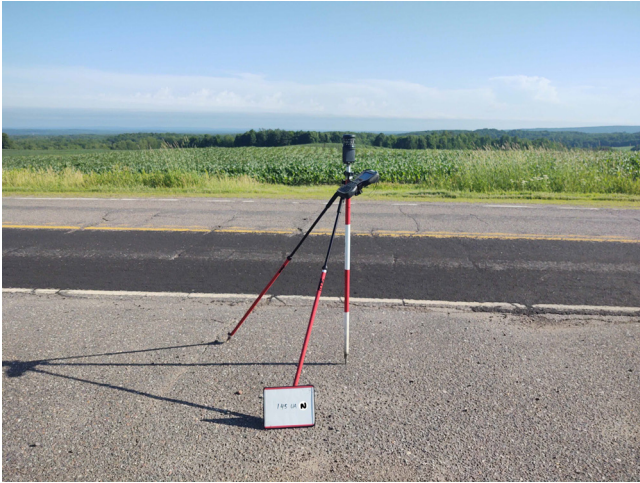
East



West

Point: 145 Urban Area

Survey X: 205148.56, Survey Y: 231613.92, Z1: 1373.47, Z DEM: 1373.67, Z LAS: 1373.65, ΔZ DEM: 0.21, ΔZ LAS: 0.18



North



South



East



West

Point: 146 Forested Area

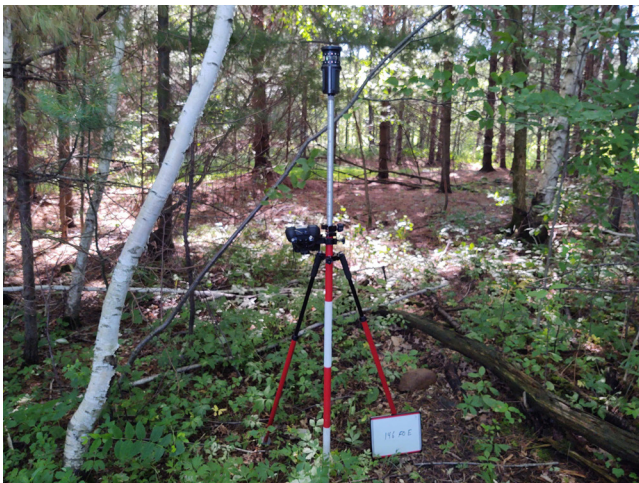
Survey X: 196633.16, Survey Y: 201208.24, Z1: 1074.56, Z DEM: 1074.82, Z LAS: 1075.14, ΔZ DEM: 0.26, ΔZ LAS: 0.59



North



South



East



West

Point: 148 Urban Area

Survey X: 196552.87, Survey Y: 201228.02, Z1: 1084.18, Z DEM: 1084.38, Z LAS: 1084.29, ΔZ DEM: 0.2, ΔZ LAS: 0.11



North



South



East



West

Point: 149 Bare Earth

Survey X: 196502.95, Survey Y: 201221.22, Z1: 1082.83, Z DEM: 1083.04, Z LAS: 1083.01, ΔZ DEM: 0.21, ΔZ LAS: 0.18



North



South



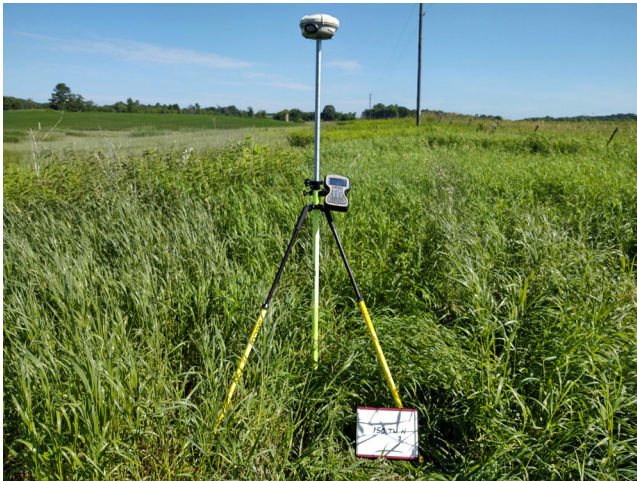
East



West

Point: 150 Tall Weeds

Survey X: 196499.22, Survey Y: 202438.57, Z1: 1092.24, Z DEM: 1092.59, Z LAS: 1092.59, ΔZ DEM: 0.34, ΔZ LAS: 0.34



North



South



East



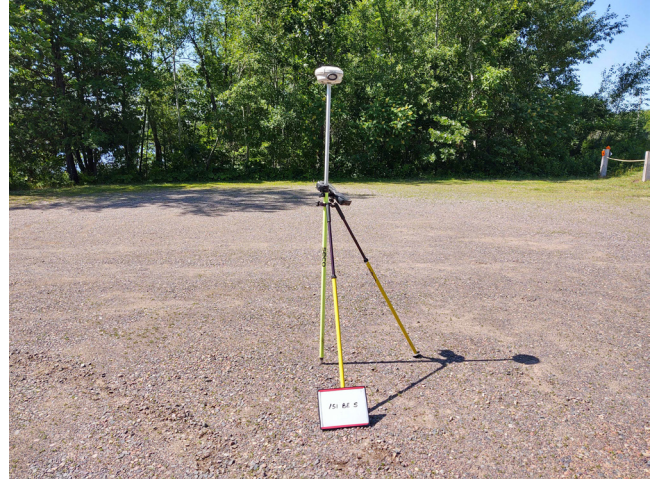
West

Point: 151 Bare Earth

Survey X: 204071.37, Survey Y: 175675.33, Z1: 957.44, Z DEM: 957.5, Z LAS: 957.49, ΔZ DEM: 0.07, ΔZ LAS: 0.06



North



South



East



West

Point: 152 Tall Weeds

Survey X: 204011.91, Survey Y: 175840.23, Z1: 961.09, Z DEM: 961.43, Z LAS: 961.51, ΔZ DEM: 0.34, ΔZ LAS: 0.42



North



South



East



West

Point: 153 Urban Area

Survey X: 202225.58, Survey Y: 168954.73, Z1: 956.07, Z DEM: 956.18, Z LAS: 956.19, ΔZ DEM: 0.11, ΔZ LAS: 0.12



North



South



East



West

Point: 154 Bare Earth

Survey X: 212273.63, Survey Y: 156229.76, Z1: 971.04, Z DEM: 971.01, Z LAS: 970.99, ΔZ DEM: -0.03, ΔZ LAS: -0.05



North



South



East



West

Point: 155 Tall Weeds

Survey X: 212220.49, Survey Y: 156274.84, Z1: 966.33, Z DEM: 966.5, Z LAS: 966.73, ΔZ DEM: 0.17, ΔZ LAS: 0.4



North



South



East



West

Point: 156 Forested Area

Survey X: 212365.82, Survey Y: 156321.16, Z1: 971.68, Z DEM: 972.05, Z LAS: 972.01, ΔZ DEM: 0.37, ΔZ LAS: 0.34



North



South



East



West

Point: 157 Urban Area

Survey X: 212266.01, Survey Y: 157758.41, Z1: 968.54, Z DEM: 968.54, Z LAS: 968.48, ΔZ DEM: 0, ΔZ LAS: -0.06



North



South



East



West

Point: 158 Urban Area

Survey X: 231070.35, Survey Y: 171249.51, Z1: 1027.87, Z DEM: 1027.95, Z LAS: 1027.96, ΔZ DEM: 0.08, ΔZ LAS: 0.08



North



South



East



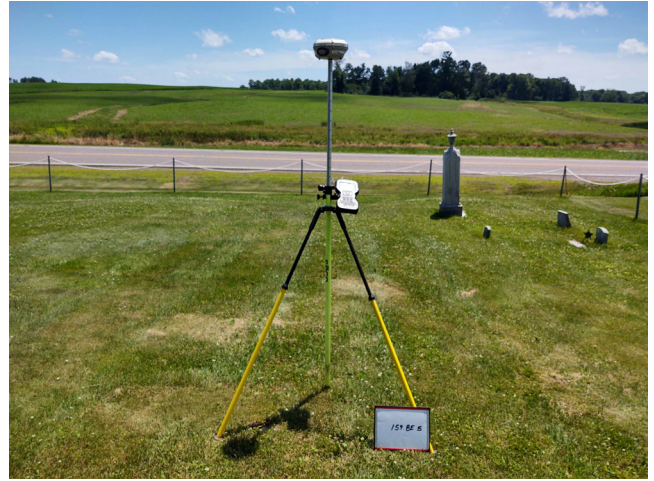
West

Point: 159 Bare Earth

Survey X: 231134.24, Survey Y: 171285.46, Z1: 1029.22, Z DEM: 1029.39, Z LAS: 1029.34, ΔZ DEM: 0.17, ΔZ LAS: 0.12



North



South



East



West

Point: 160 Forested Area

Survey X: 231093.34, Survey Y: 171668.13, Z1: 1012.97, Z DEM: 1013.37, Z LAS: 1013.36, ΔZ DEM: 0.4, ΔZ LAS: 0.39



North



South



East



West

Point: 161 Bare Earth

Survey X: 264007.22, Survey Y: 185139.58, Z1: 1112.95, Z DEM: 1113.13, Z LAS: 1113.19, ΔZ DEM: 0.18, ΔZ LAS: 0.24



North



South



East



West

Point: 162 Urban Area

Survey X: 264004.83, Survey Y: 185197.03, Z1: 1113.67, Z DEM: 1113.77, Z LAS: 1113.69, ΔZ DEM: 0.1, ΔZ LAS: 0.02



North



South



East



West

Point: 163 Forested Area

Survey X: 263976.61, Survey Y: 185274.39, Z1: 1108.94, Z DEM: 1109.34, Z LAS: 1109.46, ΔZ DEM: 0.4, ΔZ LAS: 0.51



North



South



East



West

Point: 164 Tall Weeds

Survey X: 264025.72, Survey Y: 185252.63, Z1: 1111.78, Z DEM: 1112.08, Z LAS: 1112.12, ΔZ DEM: 0.3, ΔZ LAS: 0.35



North



South



East



West

Point: 165 Bare Earth

Survey X: 261366.94, Survey Y: 164199.53, Z1: 1115.75, Z DEM: 1115.91, Z LAS: 1115.89, ΔZ DEM: 0.15, ΔZ LAS: 0.14



North



South



East



West

Point: 166 Urban Area

Survey X: 261501.99, Survey Y: 164220.4, Z1: 1115.41, Z DEM: 1115.48, Z LAS: 1115.45, ΔZ DEM: 0.07, ΔZ LAS: 0.04



North



South



East



West

Point: 167 Tall Weeds

Survey X: 261597.03, Survey Y: 164240.48, Z1: 1113.74, Z DEM: 1113.94, Z LAS: 1113.85, ΔZ DEM: 0.2, ΔZ LAS: 0.11



North



South



East



West

Point: 168 Forested Area

Survey X: 261621.82, Survey Y: 164343.89, Z1: 1116.2, Z DEM: 1116.41, Z LAS: 1116.54, ΔZ DEM: 0.21, ΔZ LAS: 0.34



North



South



East



West

Point: 169 Forested Area

Survey X: 235440, Survey Y: 133941.91, Z1: 987.48, Z DEM: 988.42, Z LAS: 988.32, ΔZ DEM: 0.94, ΔZ LAS: 0.85



North



South



East



West

Point: 170 Tall Weeds

Survey X: 235378.5, Survey Y: 133906.08, Z1: 989.12, Z DEM: 989.75, Z LAS: 989.74, ΔZ DEM: 0.63, ΔZ LAS: 0.62



North



South



East



West

Point: 171 Urban Area

Survey X: 234108.84, Survey Y: 135945.01, Z1: 966.39, Z DEM: 966.46, Z LAS: 966.49, ΔZ DEM: 0.07, ΔZ LAS: 0.09



North



South



East



West

Point: 172 Bare Earth

Survey X: 234139.14, Survey Y: 136010.48, Z1: 966.63, Z DEM: 966.86, Z LAS: 966.85, ΔZ DEM: 0.23, ΔZ LAS: 0.22



North



South



East



West

Point: 173 Urban Area

Survey X: 290644.2, Survey Y: 138316.67, Z1: 1083.39, Z DEM: 1083.52, Z LAS: 1083.49, ΔZ DEM: 0.13, ΔZ LAS: 0.1



North



South



East



West

Point: 174 Bare Earth

Survey X: 290611.71, Survey Y: 138192.53, Z1: 1083.92, Z DEM: 1084.02, Z LAS: 1084.13, ΔZ DEM: 0.11, ΔZ LAS: 0.21



North



South



East



West

Point: 175 Forested Area

Survey X: 288334.38, Survey Y: 106140.4, Z1: 1087.74, Z DEM: 1088.14, Z LAS: 1088.44, ΔZ DEM: 0.4, ΔZ LAS: 0.71



North



South



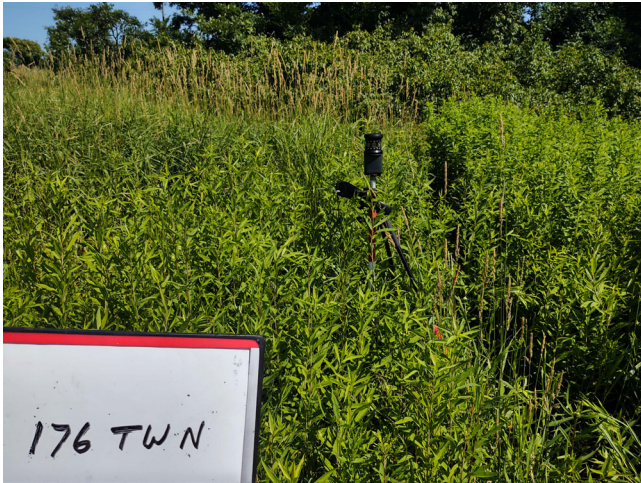
East



West

Point: 176 Tall Weeds

Survey X: 288337.55, Survey Y: 106065.33, Z1: 1085.18, Z DEM: 1085.66, Z LAS: 1085.71, ΔZ DEM: 0.48, ΔZ LAS: 0.53



North



South



East



West

Point: 177 Bare Earth

Survey X: 288205.3, Survey Y: 106061.17, Z1: 1098.59, Z DEM: 1098.72, Z LAS: 1098.52, ΔZ DEM: 0.13, ΔZ LAS: -0.07



North



South



East



West

Point: 178 Tall Weeds

Survey X: 264474.62, Survey Y: 110764.2, Z1: 1069.32, Z DEM: 1069.69, Z LAS: 1069.65, ΔZ DEM: 0.37, ΔZ LAS: 0.33



North



South



East



West

Point: 179 Forested Area

Survey X: 264554.58, Survey Y: 110812.58, Z1: 1069.02, Z DEM: 1069.4, Z LAS: 1069.43, ΔZ DEM: 0.38, ΔZ LAS: 0.42



North



South



East



West

Point: 180 Urban Area

Survey X: 264422.92, Survey Y: 110748.58, Z1: 1071.73, Z DEM: 1071.97, Z LAS: 1071.85, ΔZ DEM: 0.24, ΔZ LAS: 0.12



North



South



East



West

Point: 181 Bare Earth

Survey X: 264401.72, Survey Y: 110451.76, Z1: 1068.2, Z DEM: 1068.42, Z LAS: 1068.36, ΔZ DEM: 0.21, ΔZ LAS: 0.16



North



South



East



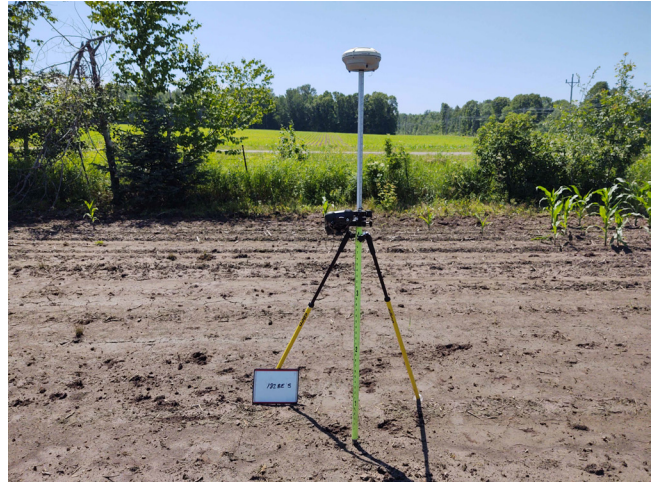
West

Point: 182 Bare Earth

Survey X: 219991.2, Survey Y: 111156.65, Z1: 959.97, Z DEM: 960.23, Z LAS: 960.22, ΔZ DEM: 0.25, ΔZ LAS: 0.25



North



South



East



West

Point: 183 Urban Area

Survey X: 219818.74, Survey Y: 111128.41, Z1: 962.27, Z DEM: 962.32, Z LAS: 962.3, ΔZ DEM: 0.05, ΔZ LAS: 0.03



North



South



East



West

Point: 184 Tall Weeds

Survey X: 219759.58, Survey Y: 111182.86, Z1: 958.23, Z DEM: 958.74, Z LAS: 958.89, ΔZ DEM: 0.51, ΔZ LAS: 0.66



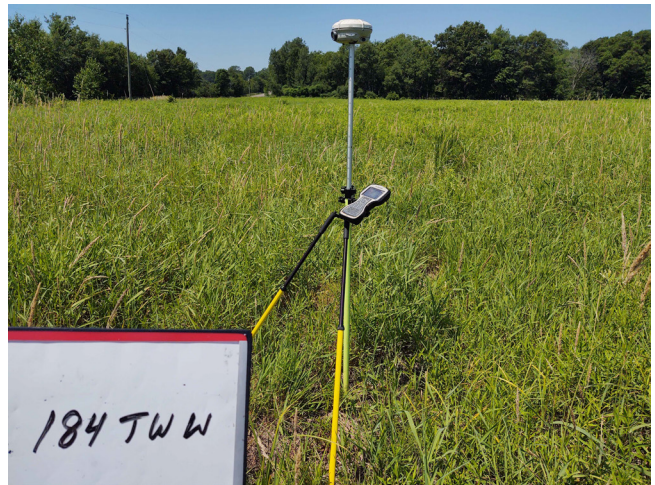
North



South



East



West

Point: 185 Forested Area

Survey X: 204064.21, Survey Y: 100765.36, Z1: 1043.07, Z DEM: 1043.28, Z LAS: 1042.97, ΔZ DEM: 0.21, ΔZ LAS: -0.1



North



South



East



West

Point: 186 Bare Earth

Survey X: 204141.8, Survey Y: 100667.62, Z1: 1041.08, Z DEM: 1041.1, Z LAS: 1041.07, ΔZ DEM: 0.02, ΔZ LAS: -0.01



North



South



East



West

Point: 187 Urban Area

Survey X: 101322.58, Survey Y: 204787.91, Z1: 1026.48, Z DEM: 1026.58, Z LAS: 1026.51, ΔZ DEM: 0.09, ΔZ LAS: 0.03



North



South



East



West

Point: 188 Tall Weeds

Survey X: 102527.5, Survey Y: 205064.05, Z1: 1015.96, Z DEM: 1016.22, Z LAS: 1016.34, ΔZ DEM: 0.27, ΔZ LAS: 0.38



North



South



East



West

Point: 189 Forested Area

Survey X: 105861.79, Survey Y: 188867.45, Z1: 997.83, Z DEM: 998.16, Z LAS: 998.19, ΔZ DEM: 0.33, ΔZ LAS: 0.36



North



South



East



West

Point: 190 Bare Earth

Survey X: 104783.25, Survey Y: 186825.64, Z1: 1048.17, Z DEM: 1048.36, Z LAS: 1048.38, ΔZ DEM: 0.2, ΔZ LAS: 0.21



North



South



East



West

Point: 191 Tall Weeds

Survey X: 127985.41, Survey Y: 166626.3, Z1: 999.08, Z DEM: 999.92, Z LAS: 999.91, ΔZ DEM: 0.84, ΔZ LAS: 0.83



North



South



East



West

Point: 192 Urban Area

Survey X: 128427.27, Survey Y: 166703.58, Z1: 1009.21, Z DEM: 1009.34, Z LAS: 1009.28, ΔZ DEM: 0.13, ΔZ LAS: 0.07



North



South



East



West

Point: 193 Bare Earth

Survey X: 128464, Survey Y: 166715.41, Z1: 1005.86, Z DEM: 1006.31, Z LAS: 1006.39, ΔZ DEM: 0.45, ΔZ LAS: 0.54



North



South



East



West

Point: 194 Tall Weeds

Survey X: 158954.94, Survey Y: 154837.57, Z1: 963.55, Z DEM: 963.8, Z LAS: 963.81, ΔZ DEM: 0.25, ΔZ LAS: 0.26



North



South



East



West

Point: 195 Urban Area

Survey X: 159545.19, Survey Y: 154642.19, Z1: 957.69, Z DEM: 957.77, Z LAS: 957.78, ΔZ DEM: 0.08, ΔZ LAS: 0.1



North



South



East



West

Point: 196 Forested Area

Survey X: 159371.44, Survey Y: 154739.44, Z1: 959.5, Z DEM: 959.93, Z LAS: 959.94, ΔZ DEM: 0.42, ΔZ LAS: 0.44



North



South



East



West

Point: 197 Bare Earth

Survey X: 151970.12, Survey Y: 148334.03, Z1: 972.02, Z DEM: 972.13, Z LAS: 972.1, ΔZ DEM: 0.11, ΔZ LAS: 0.08



North



South



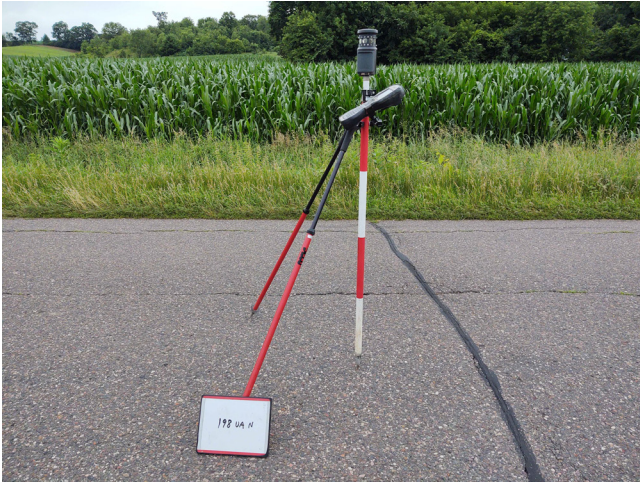
East



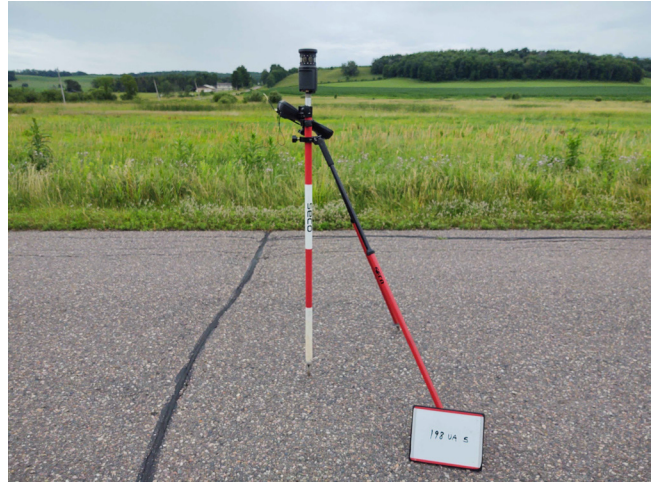
West

Point: 198 Urban Area

Survey X: 151800.64, Survey Y: 148303.81, Z1: 970.03, Z DEM: 969.99, Z LAS: 969.87, ΔZ DEM: -0.04, ΔZ LAS: -0.17



North



South



East



West

Point: 199 Forested Area

Survey X: 141289.2, Survey Y: 136969.13, Z1: 1070.78, Z DEM: 1071.37, Z LAS: 1071.35, ΔZ DEM: 0.59, ΔZ LAS: 0.57



North



South



East



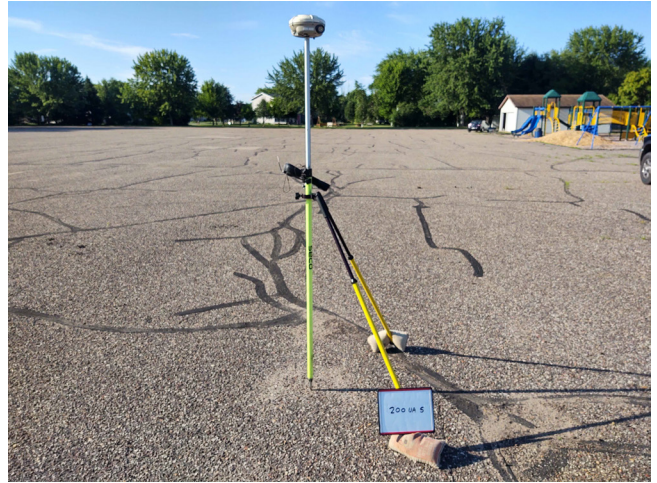
West

Point: 200 Urban Area

Survey X: 174168.33, Survey Y: 120426.28, Z1: 922.61, Z DEM: 922.61, Z LAS: 922.67, ΔZ DEM: 0, ΔZ LAS: 0.06



North



South



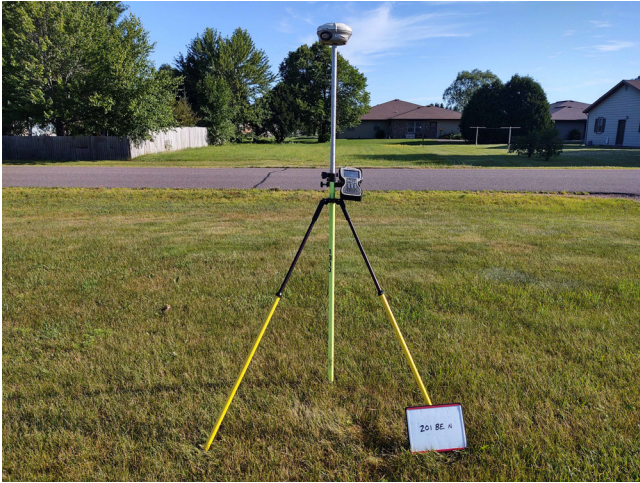
East



West

Point: 201 Bare Earth

Survey X: 174134.29, Survey Y: 120526.82, Z1: 922.61, Z DEM: 922.79, Z LAS: 922.74, ΔZ DEM: 0.19, ΔZ LAS: 0.13



North



South



East



West

Point: 202 Bare Earth

Survey X: 162810.44, Survey Y: 110395.04, Z1: 905.33, Z DEM: 905.49, Z LAS: 905.52, ΔZ DEM: 0.16, ΔZ LAS: 0.19



North



South



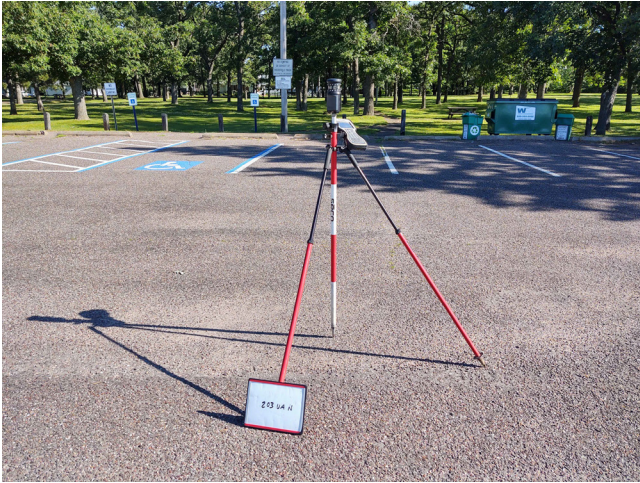
East



West

Point: 203 Urban Area

Survey X: 162767.19, Survey Y: 110460.75, Z1: 906.09, Z DEM: 906.23, Z LAS: 906.26, ΔZ DEM: 0.13, ΔZ LAS: 0.16



North



South



East



West

Point: 204 Forested Area

Survey X: 162688.64, Survey Y: 110379.97, Z1: 904.98, Z DEM: 905.23, Z LAS: 905.22, ΔZ DEM: 0.25, ΔZ LAS: 0.24



North



South



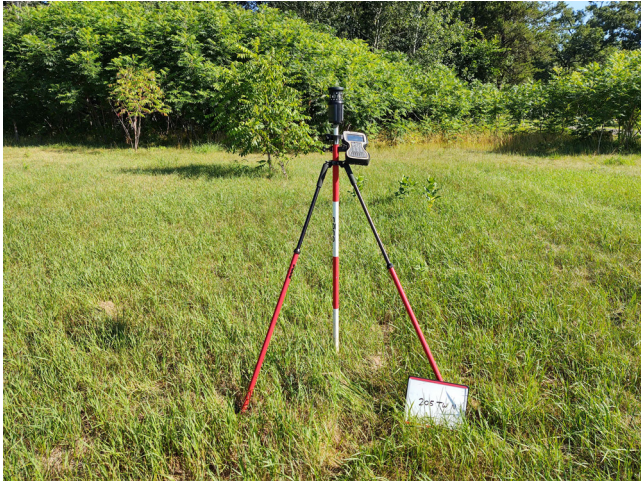
East



West

Point: 205 Tall Weeds

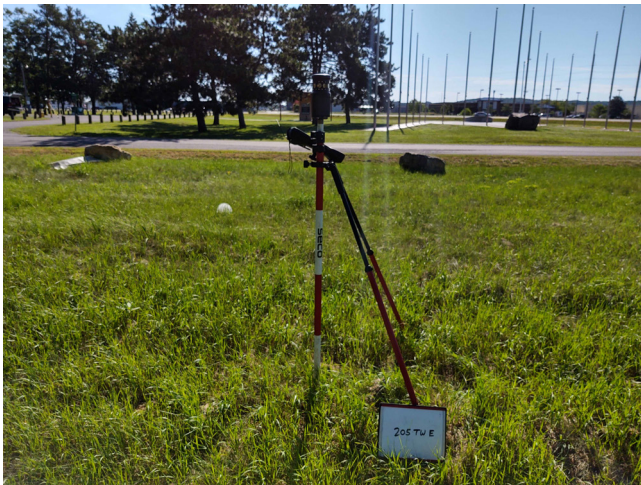
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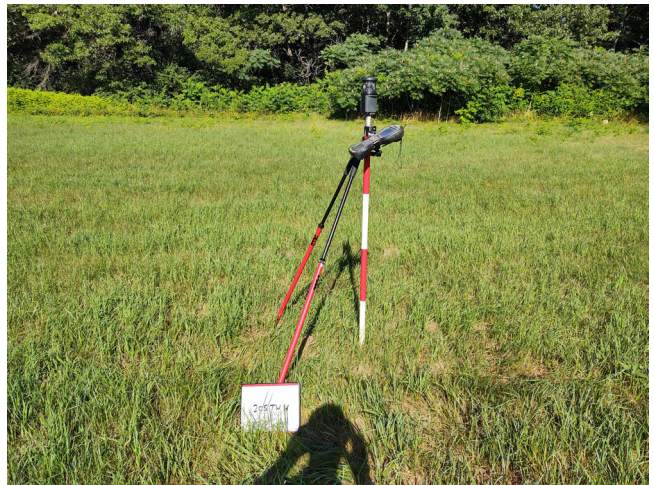
North



South



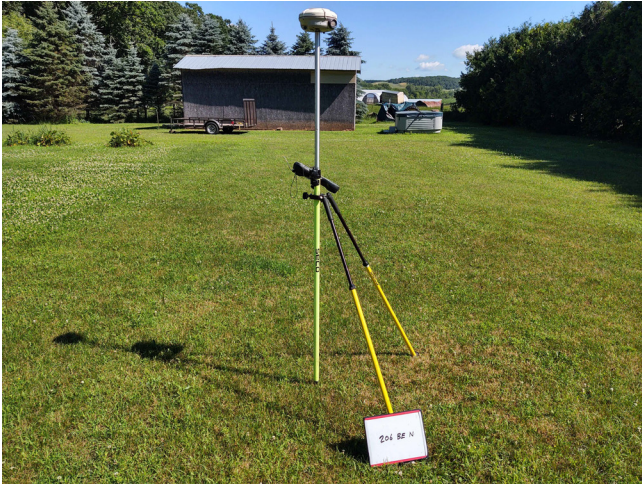
East



West

Point: 206 Bare Earth

Survey X: 118452.71, Survey Y: 129788.43, Z1: 948.38, Z DEM: 948.54, Z LAS: 948.63, ΔZ DEM: 0.16, ΔZ LAS: 0.25



North



South



East



West

Point: 207 Urban Area

Survey X: 117817.9, Survey Y: 129750.18, Z1: 944.24, Z DEM: 944.27, Z LAS: 944.3, ΔZ DEM: 0.03, ΔZ LAS: 0.06



North



South



East



West

Point: 208 Forested Area

Survey X: 117769.74, Survey Y: 130132.12, Z1: 934.75, Z DEM: 935.32, Z LAS: 935.42, ΔZ DEM: 0.57, ΔZ LAS: 0.67



North



South



East



West

Point: 209 Tall Weeds

Survey X: 117723.34, Survey Y: 130678.67, Z1: 925.32, Z DEM: 925.83, Z LAS: 925.65, ΔZ DEM: 0.51, ΔZ LAS: 0.33



North



South



East



West

Point: 210 Bare Earth

Survey X: 109740.27, Survey Y: 101268.08, Z1: 892.53, Z DEM: 892.76, Z LAS: 892.75, ΔZ DEM: 0.23, ΔZ LAS: 0.23



North



South



East



West

Point: 211 Tall Weeds

Survey X: 109673.11, Survey Y: 101165.65, Z1: 893.27, Z DEM: 893.72, Z LAS: 893.57, ΔZ DEM: 0.44, ΔZ LAS: 0.3



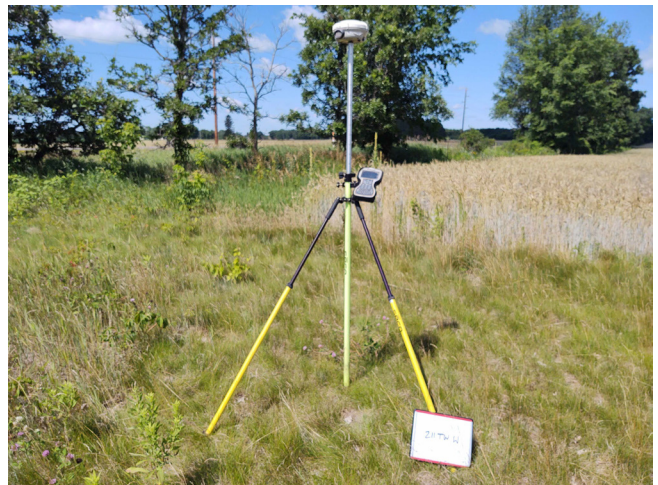
North



South



East



West

Point: 212 Urban Area

Survey X: 109880.13, Survey Y: 100729.21, Z1: 888.88, Z DEM: 889.04, Z LAS: 888.98, ΔZ DEM: 0.16, ΔZ LAS: 0.1



North



South



East



West

Point: 1201 Bare Earth

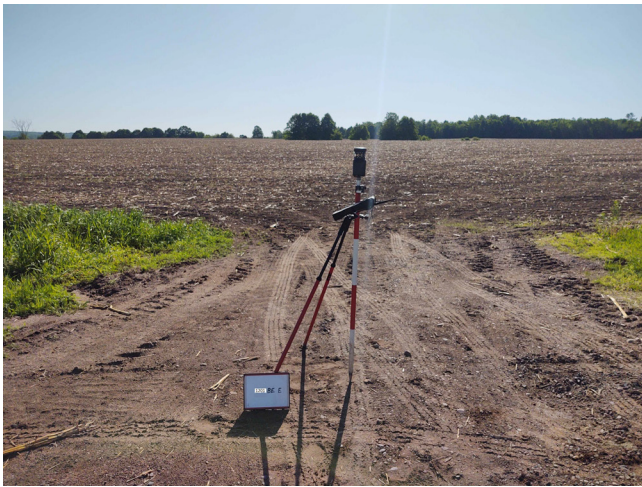
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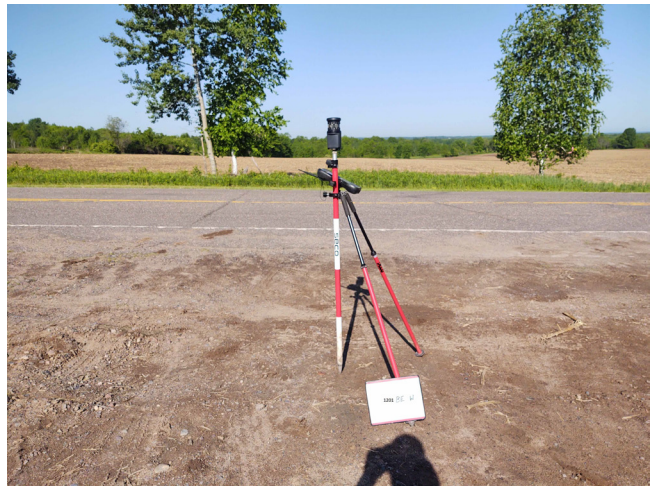
North



South



East



West